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Exploring Bias in Math Teachers' Perceptions of Students' Ability by Gender and Race/Ethnicity

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Abstract

This study explores whether gender stereotypes about math ability shape high school teachers' assessments of the students with whom they interact daily, resulting in the presence of conditional bias. It builds on theories of intersectionality by exploring teachers' perceptions of students in different gender and racial/ethnic subgroups, and advances the literature on the salience of gender across contexts by considering variation across levels of math course-taking in the academic hierarchy. Utilizing nationally representative data from the Education Longitudinal Study of 2002 (ELS), analyses reveal that disparities in teachers' perceptions of ability that favored white males over minority students of both genders are explained away by student achievement in the form of test scores and grades. However, we find evidence of a consistent bias against white females which, although relatively small in magnitude, suggests that teachers hold the belief that math is easier for white males than it is for white females. We also find some evidence of variation across course level contexts with regard to bias. We conclude by discussing the implications of our findings for research on the construction of gender inequality.

INTRODUCTION

Despite the progress of many social movements, reforms, and policy initiatives over the last several decades aimed at issues of equity, stereotypes regarding gender differences continue to prevail. One of the most dominant refers to the presumed male superiority in math ability. Researchers in the fields of sociology, psychology, and education have all found evidence of the persistence of stereotypes that, compared to males, females possess inferior ability in the field of math, a key gatekeeper to elite occupations in science and technology related sectors (Correll 2001; Fox, Sonnert, and Nikiforova 2011; Spencer, Steele, and Quinn 1999). Such stereotypes reflect strongly held cultural beliefs that men and women are innately and fundamentally different in skills and interests, and they likely persist because the idea that men and women are different in this regard is considered natural and not discriminatory (Charles and Bradley 2002; England 2010). The consequences of the internalization of such stereotypes by young females are well-documented, including inhibiting their performances on math tests and dampening their related sense of self-worth and feelings of competency (Aronson et al. 1999; Correll 2001; Eccles 1994; Steele and Aronson 1995).

This study builds on prior work to examine how gender stereotypes may permeate contemporary high school classrooms. Situated within a theoretical framework that views gender as a social structure, it contributes to the emerging literature on bias at the interactional level, where gender differences are continually constructed and reconstructed (Deutsch 2007; Risman 2004). Specifically, we examine whether stereotypes of females' inferior math ability might shape teachers' assessments of the students with whom they interact daily, resulting in the presence of conditional bias, or disparate perceptions of ability

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that remain after accounting for observable measures of academic performance (Ferguson 2003).

Our study addresses the lack of national-level research on teacher bias by utilizing data from the Education Longitudinal Study of 2002 (ELS), a survey of a nationally representative cohort of high school students. Further, it advances the literature on gender stereotypes by drawing on theories of intersectionality that articulate how gender and race/ethnicity are concurrent and intertwined domains of inequality (Andersen 2005; Browne and Misra 2003; Risman 2004). Specifically, we note that racial/ethnic minority students as well as female students are likely to encounter negative status expectations in math classrooms as stereotypes of men’s superior math skills do not in general refer to all males, but rather to the presumed advantage inherent to white males in particular. We therefore view white males as the relevant group of comparison and explore how evidence of bias in teachers’ perceptions of students’ ability may be greater for some groups (e.g., Black females) than for others.

Additionally, this study furthers our knowledge of bias by drawing on interactional theories of gender that argue for an exploration of the conditions or environments in which gender might be less relevant or salient (Deutsch 2007; Ridgeway and Correll 2004). Rather than assume constancy in the biased assessments teachers form, we consider how the stratified system of math course-taking in high school might create different contexts with implications for the activation of stereotypes. We utilize course-taking information available from the high school transcript component of ELS to examine the presence of teacher bias in low, average, and advanced level math courses. In sum, this study will contribute new knowledge about the existence of gender bias in contemporary settings, so that by better understanding its occurrence, we can work more effectively to combat it.

BACKGROUND

Gendered Interactions and Bias in Math Classrooms

The framework of this study is rooted in theories of gender as a social structure that is constructed and maintained across different levels or dimensions. Specifically, recent work by Risman (2004) articulates how gender operates at three different levels: the level of individuals (who internalize gender socialization processes), the interactional level, where men and women confront different cultural expectations, and the more macro level of social institutions. She calls for more research that sheds light on how cultural expectations shape interactions, positing that inequality in contemporary times is driven largely through the construction and reconstruction of gender that occur in exchanges between individuals in daily life. Others have also argued for the importance of considering how gender differences are created and maintained in interactions (Deutsch 2007; Ridgeway and Correll 2004), particularly with regard to how status expectations favoring males lead to cognitive bias. According to Correll, Benard, and Paik, “The performance of low-status actors, even when objectively equal to that of their high-status counterparts, are less likely to be judged as demonstrating task ability or competence” (2007, 1302). Because cultural norms and stereotypes dictate a lower social status for women, they are often subject to harsher judgments or expectations than men in interactions where gender is believed to be relevant.

Previous literature on gender socialization has explored how young females internalize stereotypes about math with subsequent consequences for their own behavior, while studies of stereotype threat have documented how the priming of gender stereotypes in controlled environments or laboratory settings negatively impacts females’ academic performance (Aronson et al. 1999; Correll 2001; Eccles 1994; Spencer, Steele, and Quinn 1999; Steele and Aronson 1995). In contrast, there is comparatively less research considering how math stereotypes lead to the occurrence of gender bias in interactions between individuals in real-life situations. This study focuses on this important dimension of inequality by examining whether math teachers, as key gatekeepers who interact daily with young people regarding their math performance, form biased assessments of their male and female students. We build on a small body of research that suggests that cultural expectations of females' inferior math ability shape teachers' evaluations of the students in their classrooms.

For example, in their study of 38 first-grade teachers, Fennema et al. (1990) concluded that teachers tended to overrate male students' math capability and correspondingly underrate female students' math capability. Using a sample of 6th-grade students in Michigan, Jussim and Eccles (1992) found a small but consistent pattern of conditional bias such that teachers rated their male students higher in math talent despite the fact that there were no gender disparities on standardized test scores or grades. A more recent California study also found that the discrepancy between elementary school teachers' ratings of students' math ability and their scores on achievement tests was greater for girls than for boys (McKown and Weinstein 2002).

While informative, these studies are limited in scope to a few classrooms or schools at the elementary level, raising the question of whether results are representative of a larger trend, particularly among more recent cohorts. Prior research on this topic has also left virtually untouched the question of bias at the high school level, which is a key stage in educational trajectories where students make decisions about future fields of study and careers. Our study will address these shortages by examining evidence of teacher bias in the assessments of a recent national cohort of high school students. It will also make a key contribution to previous literature by considering how theories of intersectionality and the variability of gender salience across different contexts relate to the formation of bias.

Exploring the Intersection of Gender and Race/Ethnicity

Much prior research on gender inequality focuses on stratification between males and females while holding race/ethnicity constant (Browne and Misra 2003). Research on bias in teacher assessments is no exception in this regard; previous studies tend to focus on gender stereotypes, as described earlier, or on racial/ethnic stereotypes and bias in the classroom. But doing so assumes homogeneity within each gender group, and therefore ignores the possibility of distinctive experiences and obstacles for males and females from different racial/ethnic backgrounds (Andersen 2005). Thus, feminist theorists have strongly articulated the need for research on inequality in education as well as other domains to recognize the intersection of gender and race/ethnicity as simultaneously lived and intersecting status characteristics (Andersen and Collins 1995; Browne and Misra 2003; Risman 2004).

Theories of intersectionality are highly relevant when considering bias in math classrooms, as stereotypes of men's innately higher math ability refer specifically to white males. Thus both gender and race/ethnicity are likely to be salient identities in math classrooms with implications for teachers' evaluations. While females encounter gender stereotypes declaring the subject of math as inherently less feminine, Black and Hispanic individuals must often contend with negative stereotypes about their intellectual abilities more generally (Aronson et al. 1999; McKown and Weinstein 2002; Steele 1997). For example, McKown and Weinstein's (2002) study of elementary school teachers found some evidence of Blacks being underestimated compared to whites, as teacher ratings of Black students were lower than their achievement test scores would predict. In his extensive review of the literature, Ferguson (2003) surmised that there is little evidence that teachers engage in conditional bias, i.e., hold different perceptions of minority compared to majority students once test scores or other observed measures of performance are taken into account. He noted, however, that research on this topic is quite incomplete.

A primary contribution of this article is its examination of the intersection of gender and race/ethnicity as it pertains to teachers' bias in perceptions of their students' math ability. We consider white males as the relevant comparison group for measuring the presence of bias. In a math classroom, teachers may expect that minority youth have low relative chances for success and mastery of this demanding and academically rigorous subject (Ladson-Billings 2009; Ong 2005; Seymour and Hewitt 1997). The '"multiple jeopardy'" hypothesis espoused by some theories of intersectionality would subsequently anticipate that minority females would be the subject of the strongest teacher bias, as interactions between teachers and students in the classroom would be shaped by status expectations pertaining to both gender and race/ethnicity (Tang 1997). Yet others argue that gender and race/ethnicity may not always intersect in this manner, and instead suggest that research should first examine evidence of how the experiences of members of different groups diverge rather than assume that a particular pattern applies across all domains (Browne and Misra 2003). Our perspective is more consistent with this latter approach, as we work to provide empirical evidence of inequality in the form of biased teacher assessments that can inform future theory building.

Exploring Bias Across Contexts

Although the continued prevalence of gender stereotypes about math is well-established, it does not necessarily follow that stereotypes are constantly invoked or applied in all math classrooms. Recent work by Deutsch (2007) has called attention to the need for research that explores when social interactions are less gendered, or when gender might in fact be irrelevant. From this perspective, since gender is a social construct that is created and recreated through interactions, it may also be resisted or subverted. Finding locations where gender appears to be '"undone'" can increase our understanding of inequality and thus how to ameliorate it (Deutsch 2007; Eisenhart and Finkel 1998; Risman 2009).

When considering whether biased assessments occur in the interaction between teachers and their students, we therefore consider the varying contexts of high school classrooms. Math course-taking in high school is a highly stratified system created through a long structure of testing and pre-requisites extending back to middle and elementary school (Stevenson, Schiller, and Schneider 1994). Students taking the most advanced classes enjoy an elite position within this hierarchy, while others occupy parts of the distribution with less status. Among contemporary cohorts, there are virtually no gender differences in high school math course-taking, while minority youth, particularly males, remain less likely than majority peers to be in advanced level courses (Berends, Lucas, and Peñaloza 2008; Hyde et al. 2008). We currently know nothing about the salience of stereotypes in classroom interactions in the different course levels that students occupy, but this is an issue worthy of being explored. For example, teacher bias may be strongest in the highest level courses, where performance expectations are the highest and beliefs about who is most likely to be '"gifted'" become relevant (Oakes 1985; Staiger 2004). Alternatively, in average level courses there may be more ambiguity regarding students' skills; in such instances stereotypes could become more salient in shaping teacher expectations (Correll, Benard, and Paik 2007). If we can pinpoint those instances in which bias does not exist or appears less pronounced, we can better understand the complexity and potential fluidity of the construction of gender differences.

Some Additional Considerations for Measuring Bias

As prefaced earlier, in this study we focus on the presence of conditional bias. From this perspective, evidence of teacher bias is found "in the *difference* between the teacher's perception or expectation and whatever benchmark they use to evaluate students, such as test score" (Ferguson 2003, 466). Therefore teachers are not necessarily biased if their perceptions or expectations are based on socially legitimated, observable predictors of performance, such as grades and test scores. Relying on conditional rather than unconditional measures of bias is particularly relevant when considering race/ethnicity.[1] Given that, for example, Black students on average have much lower math test scores than white students (Berends, Lucas, and Peñaloza 2008), teachers' evaluations of ability that are consistent with this gap do not necessarily indicate bias on their part.

We note that a focus on conditional bias in this manner likely underestimates the prevalence of harmful stereotypes in the interactions between teachers and students. First, grades and test scores are themselves imperfect measures of ability. Education research highlights how questions and assignments may be biased in their design, while psychological research indicates that stereotype threat may decrease females' and minority students' test performance (Grodsky, Warren, and Felts 2008; Steele 1997). Furthermore, bias is not limited to any particular year or stage of education, but is part of an ongoing and cumulative process. If students are exposed to bias in elementary and middle school, their grades and test scores may consequently suffer (Alexander, Entwisle, and Thompson 1987). Therefore, conditional bias occurring as late as high school likely represents only a fraction of the bias to which students have been exposed, particularly in the case of minority students whose comparatively low high school achievement is the culmination of many years of educational disadvantages (Phillips, Crouse, and Ralph 1998).Yet if such bias is indeed present, it speaks to the power of status expectations to continually reconstruct inequality in the classroom.

Finally, we note that the conditional bias we measure here may very well be implicit. Unlike explicit bias, which refers to those attitudes of which people are actively and consciously aware, implicit bias refers to unintentional behavior or an orientation that people may not consciously endorse, or at the very least not want to reveal to themselves or others (van den Bergh et al. 2010). Recent research suggests that among contemporary cohorts, implicit stereotypes about gender differences in math ability are far more common than explicit ones (Nosek, Banaji, and Greenwald 2002; Schmader, Johns, and Barquissau 2004). Shedding light on the existence of implicit bias in contemporary high school classrooms is an important step towards disrupting the construction of inequality.

In sum, this study contributes new knowledge to research on gender inequality by utilizing a nationally representative dataset to examine whether teachers' evaluations of the high school students in their classrooms reflect gendered stereotypes about math ability. We add to the literature on intersectionality by exploring teachers' biased perceptions of students in different gender and racial/ethnic subgroups, and advance the literature on the salience of gender across different contexts by considering variation across levels of math course-taking in the academic hierarchy.

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[1]While gender disparities in math were once quite pronounced, differences in course-taking and test scores have disappeared or greatly diminished in most instances (Hyde et al. 2008; Xie and Shauman 2003). In contrast, Black and Hispanic students trail their white peers in math course-taking, grades, and test scores, often by a difference of a standard deviation or more (Oakes 1985; Phillips, Crouse, and Ralph 1998).

DATA AND METHODS

Our study uses data from the Educational Longitudinal Study of 2002 (ELS: 2002), which was designed by the National Center of Education Statistics (NCES) to follow a nationally representative cohort of approximately 15,000 students beginning in their sophomore year of high school, and continuing through the transition into postsecondary education and eventually the labor force. ELS used a multi-stage sampling design where schools were selected first, and subsequently 10th-grade students were randomly selected from within each school. Follow-up student surveys were administered in 2004 and 2006. ELS also included parent and teacher surveys in the base year and collected students' high school transcripts. Our analysis includes Black, Hispanic and white (non-Hispanic) students whose 10th-grade math teachers completed a survey. The sample is also restricted to those students included in the ELS First Follow-Up Transcript study, as this provided the information for both students' course-taking and grades.

Dependent Variable

Students' math teachers were asked to offer their personal assessment of the ELS students that were in their classrooms, indicating whether they felt that the course was too easy for the student, the appropriate level, or too difficult.[2] This categorical indicator serves as our dependent variable. In general, teachers felt that students were in the class that was at the appropriate level (82 percent), while a much smaller percentage felt that the class was too easy (7 percent) or too difficult (11 percent). Although not frequent, it is these perceived misalignments that we seek to explore. We acknowledge that this is a relatively crude measure of bias, a rather blunt instrument trying to capture something as complex and elusive as bias. Yet to the extent that we find any evidence that, on a national scale, female and/or minority students are less likely than their white male peers to be judged as being in a class that is too easy, or alternatively more likely to be judged as being in a class that is too difficult, this is a new and important contribution to prior research. Further, this measure is well-suited to capture two slightly different dimensions of teachers' potential bias, the first of which may overestimate white males' ability (such that teachers are more likely to think that the class is too easy for them but not for others), while the second relates more to the underestimation of other groups (i.e., the class is not too difficult for white males but is more likely too difficult for females and/or minority students). Our analyses make it possible to test whether one or both dimensions are present.

Considering Course-Taking

Math is a hierarchically ordered subject where students must pass through a series of pre-requisites to reach advanced level courses (Riegle-Crumb 2006; Stevenson, Schiller, and Schneider 1994). Using Classification of Secondary School Course (CSSC) codes from high school transcripts, we were able to identify the specific math course taken by students in their 10th grade year and subsequently divide students into three groups: students currently taking Geometry (the modal or average category including 47.4 percent of our sample), students taking a course below Geometry (the low group including about 30 percent of our sample), and students taking a course above Geometry (the advanced group including about 22 percent of the sample).[3] We performed separate analyses for students in each of these three groups. In doing so, we can take into account the varying course levels that provide the comparative context in which students are assessed, and explore, for example, whether

[2]ELS does not provide teacher identification numbers, but instead links teacher responses directly to the student identifier in the same manner that parent responses are also linked to students. Therefore the relationship between the student and teacher data is treated as dyadic.

teacher bias towards females and/or minority students is more prevalent in the social context of advanced math classrooms.

Grades and Test Scores

To condition on students' academic performance in math, we include measures of students' math GPA in 10th grade, as well as their score on a standardized math test administered by ELS in the spring of the same year. The latter are IRT (Item Response Theory) scores for students based on the estimation of the number of items the student would have answered correctly had she/he taken the complete mathematics test (Ingels et al. 2007). Although teachers are not privy to students' scores on such tests, research notes a high correlation of such scores with other tests such as the ACT, pre-SAT, and SAT, and state accountability exams (Dougherty, Mellor, and Smith 2006). Therefore, it seems likely that teachers are generally aware of students' performance on standardized exams. Grades are taken from students' high school transcripts, with math courses identified by the CSSC codes described earlier. We note that our GPA indicator is the cumulative grade that the student received that year as assigned by the teacher who is also rating the student on our measure of potential bias, as described. Our examination of conditional bias is therefore likely to be a quite conservative one as grades themselves may contain an element of bias.[4]

Other Independent Variables

Based on questions from the student surveys, we include measures for self-reported race/ethnicity and gender.[5] We create separate indicators for each subgroup (white females, Black females, Black males, Hispanic females, and Hispanic males) with the reference category as white male.[6] Consistent with demographic trends, white students make up the majority of high school students in 2002, with approximately 16 percent of students self-reporting as Black and an additional 16 percent self-reporting as Hispanic.

We also include an array of measures to capture the students' family and school background, described briefly here but fully documented in the Appendix. Parent education is measured by a series of dummy variables capturing the highest level of education attained by either of the student's parents. Family income is also included as an ordinal measure. As differing contexts of the schools that students attend are relevant to consider (Wilkinson and Pearson 2009), we include measures for school sector (private and Catholic vs. public), urbanicity (indicators for urban and rural with suburban as the contrast category), and region (indicators for South, West, and Midwest with Northeast as the reference group). We consider percent minority in the school with a series of dummy variables dividing the percentage into thirds (0-33 percent, 34-66 percent, and above 66 percent). Schools with the lowest percent minority (0-33 percent) serve as the reference category.

Lastly, we include characteristics of the teachers themselves, including their gender, as well as years teaching and whether or not the teacher was a math major. Students were on average taught by teachers with almost fifteen years of experience. While a little more than half of students (55 percent) were taught math by a female instructor, the gender distribution

[3]To account for the fact that a small percentage of students do not progress through the math course sequence in the typical order of Algebra I, Geometry, Algebra II, and so on, we include two additional control variables in all of our analyses. The first is the course level in which the student was enrolled the year before (according to their high school transcript), and the second is a measure of whether their school appears to order courses differently, typically with Geometry occurring after Algebra II. For students to which this latter condition applied, we considered them to be in advanced math if they were in Geometry as a sophomore having already completed both Algebra I and Algebra II.

[4]In analyses not shown, we used students' 9th-grade GPA and found substantively identical results.

[5]When answering the survey, students were asked to choose between the response categories "male" and "female." Subsequently we use these terms to refer to the respondents.

[6]The small number of students who identified as both white and Black were categorized as Black for our analyses.

of high school math teachers appears to be close to parity. Almost 60 percent of students were taught math by a teacher who had majored in the subject in college. Finally, we note that because the overwhelming majority (over 90 percent) of math teachers in the sample were white, we do not include teachers' race/ethnicity in the analyses.[7]

RESULTS

Before examining whether teachers view the academic ability of their female and/or minority students less favorably than white male students once differences in academic performance are taken into account, we first turn to a discussion of the extent of such differences. First, we note that, consistent with the wealth of literature on racial/ethnic disparities in education, minority students in our sample are overrepresented in low math courses and subsequently underrepresented in advanced math courses (see Table 1). For example, while about 30 percent of white males are in low math courses, approximately 45 percent of minority males are in the same group. In contrast, white females have a slightly higher representation than white males in the average and advanced categories, a pattern that is also consistent with recent research (Hyde et al. 2008). Additionally, we note the clear stratification in academic performance across levels of course-taking, with test score differences of approximately one standard deviation between adjacent groups.

To further explore inequality within each math course-taking level, in Table 2 we display calculated effect sizes (standardized differences in means between groups) to measure the extent of differences between white males and all other groups for math test scores and GPA. Beginning with white females, we note that the relatively small white male advantage in math test scores is virtually mirrored by the corresponding white female advantage in math grades (as indicated by a negative sign) across all three levels of course-taking; however, the scope of both disparities does increase slightly as course level increases. All other subgroups clearly trail behind the average math performance of white males on test scores and grades. Differences in GPA appear smaller in scope than those for test scores, yet the magnitude of differences also increases in accordance with the level of the course. For example, among students in low level math courses, Black males' test score average is slightly more than half of a standard deviation below that of white males, while the test score gap between the two groups increases to almost 1.5 standard deviations for the students in the advanced course level. Therefore, in contrast to a comparison between white males and white females, we see strong evidence of differences in math academic performance between white males and minority students that are likely to influence teachers' relative ratings of ability.

Because our dependent variable is categorical, we employ multinomial logistic regression for our multivariate analyses. Teacher ratings of the course being "too easy" or "not difficult enough" for the student are each separately predicted against the reference category of perceiving the course is the "appropriate level." The results of these multinomial logistic analyses are presented as odds ratios, in which values greater than one indicate a higher likelihood of the outcome compared to the reference category, and values less than one indicate a lower likelihood. Results predicting a teacher rating of the course being too easy are presented on the left side of the tables, while results predicting a teacher rating of the course being too difficult are presented on the right. For each math course level we begin

[7]In exploratory analyses we included teacher race/ethnicity as an independent variable, as well as interactions between teacher and student race/ethnicity. Because our outcomes of interest are relatively rare within each math level, it is important not to over-specify the model. Therefore, we limited inclusion of variables to those that are significant predictors and improve overall model fit (Peduzzi et al. 1996). Indicators of teacher race/ethnicity met neither of these criteria, nor did their inclusion change the main results of our analyses. Additionally, the small number of minority students in classrooms with minority teachers within each math level led to unstable estimates for interactions between student and teacher background.

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with a baseline model that includes only gender and racial/ethnic subgroup indicators as independent variables. In model 2, we move towards identifying the existence of conditional bias by adding indicators of test scores and GPA to the model, and noting the extent to which disparities in teacher ratings according to students' gender and race/ethnicity remain. Finally, in model 3 we add the aforementioned indicators for parents, teachers, and schools.

To examine the possibility that grades and test scores contributed differently to teacher perceptions for certain subgroups, in exploratory analyses we included interaction terms between academic performance and students' gender and race/ethnicity. Additionally, as some prior literature has suggested the need to consider the interplay between teacher and student characteristics (Alexander, Entwisle, and Thompson 1987), we also constructed interactions of teachers' background (e.g., gender, years teaching) and students' gender and race/ethnicity. None of the interactions were statistically significant, nor did they improve model fit or alter the results of other key indicators; therefore they are not included in the models presented here.

To account for the clustering of students within schools, we utilized sample weights and estimated robust standard errors using Stata software. Exploratory models using hierarchical linear modeling (HLM) software provided comparable results. In addition to the multinomial logistic regression results, we also calculated marginal effects across models, as some have argued that this offers a more accurate comparison of differences across nested models and/or comparing different groups or samples (Mood 2010). All results were consistent with the models presented here. Missing values were imputed via single imputation.

Low Level Math Course

Table 3 presents the odds ratios for students in the low math group. Beginning with the baseline model including only indicators of gender and racial/ethnic subgroup, we see that relative to white males, both white females and Black males are less likely to be viewed as being in a class considered too easy (as indicated by an odds ratio less than one), compared to the contrast category of being in a class that is the appropriate level. In model 2 we add indicators for math test score and GPA, both of which positively and significantly increase the odds of receiving a rating of the course being too easy. With the addition of these measures of math performance, the odds ratio for Black males increases towards one and is no longer statistically significant. However, the disparity between white females and white males remains with the inclusion of academic performance indicators. This is also the case in model 3, where we add our full array of background variables capturing student, family, and school characteristics. Of these background characteristics, we note that students with teachers who have been teaching longer are less likely to be perceived as being in too easy a class.

The second half of Table 3 displays results predicting the math teacher's perception that the student is in a course that is too difficult (rather than the appropriate level). Model 1 shows that, compared to white males, Black students of both genders and Hispanic females are all more likely to be perceived as being in a class that is too difficult for them. For example, the odds of a teacher rating a low level math course as too difficult for a Black female student are about two times the odds for a white male student. However, once math grades and test scores are introduced in model 2, the odds ratios for all three groups are reduced in size and none are statistically significant. Therefore, we note that the only evidence of conditional bias we find among students in the low math course level is that white females are significantly less likely than white males to receive a teacher evaluation of the course being too easy for them.

Average Level Math Course

Table 4 shows results for students in the average level math course, which corresponds to taking geometry in 10th grade and includes almost half of the students in our sample. Looking across the three models predicting the odds of receiving a teacher rating of the course being too easy for the student, we once again find that white females are significantly less likely than white males to receive such a rating. This disparity remains once measures of academic performance are taken into account in model 2, and additional controls are added in model 3.

By contrast we find no differences in ratings for the too easy category between white males and all other subgroups in the baseline model, but disparities emerge in model 2 with the inclusion of test scores and grades, such that Black males and females are *more likely* than white males to be viewed as being in too easy a course once we condition on performance. However, in model 3 the corresponding odds ratios for Black students of both genders move back towards one and are no longer statistically significant. Exploratory analyses revealed that it is the inclusion of the measures for percent minority in the school that leads to the decrease and loss of significance of these results. As seen in Table 4, students in schools with greater than 66 percent minority are more likely than those in schools in the lowest third of percent minority to be considered to be in too easy of a course. These results suggest that teachers in high minority schools may feel that their students in average level math classes are capable of learning more difficult material, a fact that, once taken into account, results in statistically indistinguishable ratings between Black students and white male students. While speculative, this explanation is consistent with some recent studies that find that the content of math courses is less rigorous in poor and/or high minority schools (Dougherty, Mellor, and Jian 2006; Riegle-Crumb and Grodsky 2010).

The right side of Table 4 reports the odds of students being perceived as being in a course that is too difficult by their math teacher. In model 1 we see that Black and Hispanic students of both genders have a higher probability than white males of being viewed by their teachers as being in too difficult a course. For example, the odds that a Black male is viewed as being in too difficult a class are almost three times the odds for a white male. Once we condition on grades and test scores in model 2, the odds ratios are close to one and no longer statistically significant. We also note that once grades and test scores are included in the model, the odds ratio comparing white females to white males increases in size and becomes statistically significant. Specifically, the odds of receiving a teacher rating of the class being too difficult are 1.3 times greater for white females than for white males. Subsequent exploratory analyses indicated that it is the inclusion of math GPA that leads to this result, suggesting that teachers may be downplaying the grades that girls earn. The odds ratio for white females remains significant with the inclusion of family, teacher, and school characteristics in model 3. Therefore, when examining patterns within average level courses, we find evidence suggesting conditional teacher bias towards white females at both ends of the spectrum, such that the class is judged to be relatively easier for white males and also relatively more difficult for white females.

Advanced Level Math Course

Finally, Table 5 displays the results for students in the highest level math courses in 10th grade. On the left side of the table, we see that there are no statistically significant racial/ ethnic and gender differences in the baseline model. However, once we condition on grades and test scores in model 2, white females are significantly less likely than white males to be viewed by their teachers as being in too easy a class. Specifically, with the same GPA and test scores, white females in advanced high school math courses are approximately 40 percent less likely than white males to receive a teacher assessment of the class being too easy for them; alternatively, white males are 60 percent more likely than white females to be rated as being in too easy a class. This disparity remains in the final full model.

Moving to the right side of the table, we see that Hispanic males are significantly more likely than white males to be viewed as being in a class that is too difficult. Yet this disparity in teacher assessment disappears once we condition on the observable differences between groups on test scores and grades in model 2. Also in this model, the odds ratio comparing Black females to white males is now much smaller and statistically significant, indicating that once differences in performance are taken into account, Black females in advanced high school math are *less likely* than white males to be viewed as being in a course too difficult for them. This result remains in the final model. Of school characteristics, private schools show a significant difference from public schools, with these students more likely to be perceived as being in both too easy or too difficult a course.

DISCUSSION AND CONCLUSION

Building on gender theories that articulate how inequality is constructed through interactions and daily exchanges between individuals, this study focused on whether high school math teachers form biased perceptions of the female students in their classrooms. We extend the small body of extant research on this topic beyond a focus on a few elementary classrooms or schools, to consider evidence of bias for a nationally representative sample of high school students. Our analyses support the idea that stereotypes shape teachers' personal evaluations of their male and female students, but also indicate that we must consider the complexity of bias and move past assumptions of broad gender patterns.

Specifically, we find evidence that informs theories of intersectionality and literature on variation in the saliency of gendered status expectations across contexts. First, our work supports the idea that the social categories of gender and race/ethnicity intersect to generate unique experiences for different groups in the domain of education. Yet in contrast to theories that minority females consistently suffer a double penalty as a result of their lower status on the axes of both race/ethnicity and gender (Tang 1997), we find that it is white females who most consistently are the recipient of conditional bias in high school math classrooms. Compared to their white male peers in the same level class, and controlling for differences in both grades and test scores, high school math teachers are less likely to judge white females as being in a class that is too easy for them. This speaks to the presence of a perhaps subtle yet omnipresent stereotype in high school classrooms: Math, comparatively speaking, is just easier for white males than it is for white females.

In contrast, we find that at all levels of course-taking, differences in teacher perceptions of ability that favored white males over minority students of both genders are explained away by student achievement in the form of test scores and grades. In other words, once we take into account that, on average, Black and Hispanic male and female students have lower grades and test scores than white males, teachers do not rate the math ability of minority students less favorably than students belonging to the traditionally advantaged category of white males. We caution that our results in no way imply that negative stereotypes pertaining to students' racial/ethnic background are absent in contemporary schools. Researchers of stereotype threat (Aronson et al. 1999; Steele 1997) would likely be correct to argue that the test scores on which we condition are partly influenced by previous exposure to racial/ethnic (as well as gender) stereotypes. Our study examines just one form of potential bias and finds that, net of strong achievement differences and all that such differences encompass, teachers do not perceive male and female minority students as having lower math ability than their white male peers.

In fact, we note some results that suggest somewhat the opposite pattern, and speak to the importance of considering variation in the saliency of stereotypes across different contexts. Among students in the advanced level, we find that teachers are *less likely* to view the course as too difficult for their Black female students in comparison to white males. Such a finding runs counter to both gender and racial stereotypes. We note that Black females (as well as other minority students in the sample) are less likely to be in high level math courses. Specifically, only about 12 percent of Black females are in the advanced math level. Perhaps teachers view the few Black females in their advanced courses as having achieved much to make it this far, suggesting greater perseverance and a very high degree of academic potential. Clearly this is but one possible explanation of the patterns observed here and is speculative at best. We look towards others in the field to further examine how race and gender identities intersect in the classroom in ways that both benefit and diminish students' experiences, and suggest that qualitative work may be particularly helpful in this regard (Morris 2007).

Finally, we also find evidence of variation across context with regard to bias towards white females. While teachers' perceptions of math being easier for white males than white females appear across all course levels, it is only in the average classroom context that white females are also more likely to be judged as being in too difficult a class. This suggests that bias towards white females is strongest in this mid-level context. One potential explanation is that teachers rely more on status expectations when making judgments of students in classes where notions of math ability are more ambiguous. In contrast to students who occupy the top and bottom of the course-taking hierarchy, those that occupy the populous middle ground have a less distinct academic status. In the presence of uncertainty, stereotypes offer actors clear direction on how to categorize and sort people (Correll, Bernard, and Paik 2007). Therefore, teachers may rely more on notions of females' inferior ability in interactions within this middle ground.

So why would this work to the detriment of white females, but not necessarily their minority female peers? And why do we in general find such a consistent pattern suggesting bias in the classroom interactions between teachers and their white female students in particular? As mentioned before, one distinct possibility is that the low relative achievement of minority female and male students captures years of previous exposure to bias and stereotypes, leaving nothing discernible in the kind of conditional bias we measure. Another possibility is that gender bias held by teachers (and individuals in society in general) is so socially ingrained that it is hard to grasp and, therefore, hard to resist, while at the same time teachers may be keenly aware of race/ethnicity in the classroom, and any opinion or action on their part that would suggest discrimination. More recently teacher education programs have prioritized training in cultural sensitivity and diversity, and professional development programs for in-service teachers have likewise followed (Tatto 1996). Therefore, contemporary teachers may be more self-reflective when assessing the performance of minority students. If this is the case, then white females remain as the most likely recipient of low status expectations in the interactions between teachers and students in the math classroom.

The findings of this study suggest the need for future research. Specifically, we could learn much from qualitative research that explicitly studies how teacher bias plays out in the high school classroom. As students grow older they become more socially aware and may be better able to pick up subtle social cues and perceive teacher expectations more accurately (McKown and Weinstein 2002); this suggests that comparative studies of bias at different levels of education would be informative. Additionally, while a long history of sociological and educational research reminds us that schools are a primary site of social reproduction (Bowles and Gintis 1976), we echo the call of more recent feminist researchers who articulate the need for more research on the interactions between teachers and students that construct, as well as deconstruct, gender difference (Deutsch 2007; Risman 2009).

Finally, we note that while the evidence of conditional bias towards white females that we detect is relatively small in magnitude, we should not diminish its potential importance. The occurrence of bias in high school classrooms indicates that cultural expectations likely function to shape interactions and recreate inequality throughout the math pipeline that leads to high-status occupations in related fields of science and technology. Indeed, Valian notes that "the long-term consequences of small differences in the evaluation and treatment of men and women also hold up the glass ceiling" (1999, 3). While it is easy to dismiss any one instance or interaction as inconsequential, it is the accumulation of thousands of such experiences over the lifetime of the individual that likely work to create, maintain, and reproduce inequality in a manner that is almost invisible and therefore insidious (Prokos and Padavic 2005; Ridgeway and Correll 2004).

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APPENDIX

VARIABLE DESCRIPTIONS

Dependent Variable

Our dependent variable is based on a question asked of the students' math teachers: "Is this class too difficult, the appropriate level, or not challenging enough for this student?" The source variable is BYTM10 from the Math Teacher survey in the Base Year ELS data.

Gender and Racial/Ethnic Group

These are a series of dichotomous variables each indicating the self-identified race/ethnicity and gender of the student. They include non-Hispanic white female, Black male, Black female, Hispanic male, and Hispanic female. Students who identified as both Black and white were categorized as Black. The reference category for these variables is non-Hispanic white males. Students who identified as Asian/Pacific Islander, Native American, or other race/ethnicity were excluded from the analysis. The source variables for these constructs are F1RACE_R and F1SEX, both from the ELS First Follow-Up data. The gender source variable for this construct asks the student to choose between the response categories of "male" and "female."

Math Level in 10th Grade

Using the CSSC codes (Classification of Secondary School Courses taxonomy) from the First Follow-Up Transcript Study, students' 10^{th}-grade math course was categorized as being below average, average, or above average for their grade. Students enrolled in Geometry in 10th grade were placed in the "average" level math course, while those enrolled in a less advanced course were categorized as being in a "low" level math course (including Basic/Remedial Math, General/Applied Math, Pre-Algebra, or Algebra I). Finally, students in a course that was more advanced than Geometry in the 10th grade were placed in the "advanced" level math course (including Algebra II, Advanced Math, Pre-Calculus, or Calculus). As some schools order math courses differently (with Geometry taken after Algebra I and Algebra II), we took into consideration the student's course sequence from 9th to 10th grade. Students who took Algebra II in 9th grade and Geometry in 10th grade were categorized as being in an "advanced" level course. **10th-Grade Math Test Score:** The student's Math IRT estimated number right administered by ELS when the student was in 10th grade. Source variable is BYTXMIRR from ELS Base Year data.

10th-Grade Math GPA

This indicates the student's math GPA in their 10th-grade year. The measure uses the standardized course grade from the Transcript study, and converts it to a conventional 4-point scale. **9th-Grade Math Course:** This variable indicates the level of math course taken when the student was in the 9th grade. Using CSSC codes from the First Follow-Up Transcript data, 9 categories of math courses were created. The coding is as follows: 0 (no math in 9th grade), 1 (Basic/Remedial Math), 2 (General/Applied Math), 3 (Pre-Algebra), 4 (Algebra I), 5 (Geometry), 6 (Algebra II), 7 (Advanced Math), 8 (Pre-Calculus, including Trigonometry), 9 (Calculus). The modal course in our sample was 4 (Algebra I).

Alternative Math Sequence

Using the CSSC codes identifying math courses from the First Follow-Up Transcript data, we identified the most common order of math courses taken during high School. This dummy variable indicates whether the student's sequence of math courses differed from this modal sequence: Algebra I, Geometry, Algebra II. 8.2 percent of the total sample of students followed an alternate math sequence: Algebra I, Algebra II, Geometry.

Income

The source variable for this measure is BYINCOME in the ELS Base Year data. It is coded as follows: 1 (none), 2 ($1,000 or less), 3 ($1,001-$5,000), 4 ($5,001-$10,000), 5 ($10,001-$15,000), 6 ($15,001-$20,000), 7 ($20,001-$25,000), 8 ($25,001-$35,000), 9 ($35,001-$50,000), 10 ($50,001-$75,000), 11 ($75,001-$100,000), 12 ($100,001-$200,000), 13 ($200,001 or more). We recoded this variable by combining categories 1-4, and then replaced each value with the midpoint of the interval. We recoded the top interval using a modified Pareto formula (see Hout 2004). Each midpoint value was then divided by 10,000. The mean income value for our sample (in $10,000 units) is 6.642.

Parent Education

This variable is the highest level of education reached by either of the student's parents, coded as a series of dummy variables. The categories are: less than HS, high school diploma or GED, some college, 2-year degree, 4-year degree, and advanced degree. When included in regression models, parents with a high school diploma or GED are used as the reference category. The source variable is F1PARED in the ELS First Follow-Up data. 5.1 percent of the analytic sample had the highest parent education level of less than high school, 20 percent of students had parents with a high school diploma or GED, 23.93 percent had parents reporting having some college, 11.78 percent had parents with a 2-year degree, 21.77 percent had parents with a 4-year degree, and 15.97 percent had parents with an advanced degree.

Math Teacher—Total Years Teaching

The total years teaching variable indicates the total number of years the student's 10^{th}-grade math teacher has been teaching K-12. The variable ranges from 0-40, with a mean of 14.85. The source variable is BYTM26C from the Math Teacher survey in the Base Year ELS data.

Math Teacher—Math Major

This is a dichotomous variable indicating whether the student's 10th-grade math teacher was a math major. The source variable is BYTM31A from the Math Teacher survey in the Base Year ELS data. 59 percent of students in our sample had a teacher whose college major was math. **Math Teacher—Female:** This is a dichotomous variable indicating whether the student's 10th-grade math teacher was female. The source variable is BYTM22 from the Math Teacher survey in the Base Year ELS data. 55.4 percent of students had a female math teacher.

School Sector

The school sector variables are a series of dichotomous variables indicating whether the school in which the student was enrolled was private or Catholic. The reference group is public schools. The source variable is BYSCTRL from the linked CCD/PSS (Common Core of Data/Private School Survey) data. 91.72 percent of students in our sample were in public schools, 3.54 percent in private, and 4.73 percent in Catholic.

School Urbanicity

The school urbanicity variables are a series of dichotomous variables indicating whether the school in which the student was enrolled was located in a suburban or rural area. The reference group is schools in urban areas. The source variable is BYURBAN from the linked CCD/PSS data. 26.24 percent of students were in urban schools, 21.9 percent in rural, and 51.86 percent in suburban.

School Region

This is a series of dichotomous variables indicating in what region the student's school is. The variables created are Midwest, South, and West, and schools in the Northeast act as the reference group. The source variable is BYREGION from the linked CCD/PSS data. 35.83 percent of students were in schools in the South, 19.23 percent in the West, 26.31 percent in the Midwest, and 18.63 percent in the Northeast.

Percent Minority

The percent minority in each student's school is represented with a series of dummy variables indicating that the school has 0-33 percent minority, 34 percent-66 percent minority, or above 66 percent minority. Schools in the lowest category (0 to 33 percent) are used as the reference category in regression analysis. These categories are created from the source variable CP02PMIN from the linked CCD/PSS data. 63.8 percent of students in the sample were in schools with 0-33 percent minority, 23.2 percent in schools with 34-66 percent minority, and 13 percent in schools with more than 66 percent minority.

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Table 1

Means and Proportions by Level of Coursetaking for High School Sophomores

	Low (Algebra 1 or below)	Average (Geometry)	Advanced (Algebra 2 or above)
Total N	**2,943**	**5,193**	**2,350**
Dependent Variable			
Teacher Report of Difficulty of Math Class			
Too Easy	0.07	0.07	0.07
Appropriate Level	0.82	0.82	0.85
Too Difficult	0.12	0.12	0.07
Student Characteristics			
Students' Race/Ethnicity and Gender (row %)			
White Male	0.29	0.46	0.24
White Female	0.23	0.50	0.27
Black Male	0.45	0.42	0.13
Black Female	0.38	0.51	0.12
Hispanic Male	0.44	0.41	0.14
Hispanic Female	0.35	0.49	0.16
Student Academics			
10th grade Math Test Score	29.82 (9.44)	38.37 (10.06)	48.18 (9.69)
10th grade math GPA	1.56 (0.95)	1.97 (1.00)	2.62 (0.92)

Source: ELS: 2002

Note: Standard deviations in parentheses.

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Table 2

Standardized Differences in Math Test and GPA by Level of Math Course

	Low Level Math Course				
White Male vs	White Female	Black Male	Black Female	Hispanic Male	Hispanic Female
Math Test Score	0.136	0.627	0.866	0.580[a]	0.705
Math GPA	−0.135	0.549	0.287[a]	0.303[a]	0.113
	Average Level Math Course				
White Male vs	White Female	Black Male	Black Female	Hispanic Male	Hispanic Female
Math Test Score	0.239	1.024	1.151	0.810	1.092
Math GPA	−0.182	0.806	0.450	0.587	0.263
	Advanced Level Math Course				
White Male vs	White Female	Black Male	Black Female	Hispanic Male	Hispanic Female
Math Test Score	0.365	1.389	1.736	0.867	0.888
Math GPA	−0.247	0.888	0.756	0.605	0.257

Source: ELS: 2002

Note:

[a]All differences are significant at the $p < .05$ level except for those indicated here; Standardized Differences (relative to white males) calculated as the difference between the means divided by the pooled standard deviation.

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Table 3

Odds Ratios from Multinomial Logistic Regression Predicting Math Teachers' Perceptions of Students in *Low* Level Math Course

	Too Easy (vs. Appropriate Level)			Too Difficult (vs. Appropriate Level)		
	Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Race/Ethnicity and Gender (ref: White Males)						
White Female	0.598* (0.126)	0.557** (0.118)	0.591* (0.128)	1.240 (0.227)	1.355 (0.262)	1.381 (0.267)
Black Male	0.454* (0.154)	0.819 (0.274)	0.569 (0.222)	1.749* (0.389)	1.132 (0.255)	1.175 (0.271)
Black Female	0.802 (0.247)	1.367 (0.407)	0.915 (0.291)	1.960** (0.459)	1.347 (0.308)	1.402 (0.329)
Hispanic Male	0.738 (0.237)	1.055 (0.355)	0.660 (0.251)	1.501 (0.374)	1.048 (0.270)	1.000 (0.289)
Hispanic Female	0.590 (0.242)	0.786 (0.306)	0.52 (0.201)	1.749* (0.430)	1.282 (0.322)	1.247 (0.360)
Academic Achievement						
Math Test Score		1.042*** (0.009)	1.050*** (0.010)		0.961*** (0.009)	0.958*** (0.009)
Math GPA		1.825*** (0.189)	1.907*** (0.198)		0.431*** (0.039)	0.424*** (0.039)
Family Background						
Income			0.979 (0.026)			1.007 (0.013)
Parent education level (ref: HS diploma)						
Less than HS			1.439 (0.478)			0.797 (0.227)
Some college			1.161 (0.276)			1.166 (0.213)
2-year degree			1.945* (0.555)			0.977 (0.253)
4-year degree			1.176 (0.362)			1.086 (0.215)
Advanced degree			0.331* (0.150)			1.167 (0.316)

	Too Easy (vs. Appropriate Level)			Too Difficult (vs. Appropriate Level)		
	Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Teacher Characteristics						
Years Teaching			0.974 ** (0.009)			1.007 (0.008)
Female Teacher			0.849 (0.189)			1.015 (0.162)
Math Major			0.909 (0.169)			1.338 (0.210)
School Characteristics						
School Sector (ref: Public)						
Private			0.539 (0.302)			2.082 (0.971)
Catholic			0.468 (0.206)			2.156 * (0.692)
Region (ref: Northeast)						
South			0.951 (0.324)			0.994 (0.216)
West			0.799 (0.290)			1.388 (0.364)
Midwest			1.005 (0.334)			0.680 (0.189)
Urbanicity (ref: Suburban)						
Urban			1.366 (0.369)			0.727 (0.134)
Rural			0.731 (0.184)			0.814 (0.171)
Percent Minority (ref: 0-33%)						
34-66%			1.199 (0.358)			0.967 (0.208)
>66%			1.601 (0.547)			0.989 (0.244)
Constant	0.110 *** (0.015)	0.009 *** (0.003)	0.012 *** (0.006)	0.107 *** (0.016)	0.936 (0.272)	0.635 (0.232)
N=2,943						

Source: ELS: 2002

Notes: Standard errors are displayed in parentheses; Models 2 and 3 also control for 9th grade math course & non-normative math sequence.

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*** $p<0.001$

** $p<0.01$

* $p<0.05$

Table 4

Odds Ratios from Multinomial Logistic Regression Predicting Math Teachers' Perceptions of Students in *Average* Level Math Course

	Too Easy (vs. Appropriate Level)			Too Difficult (vs. Appropriate Level)		
	Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Race/Ethnicity and Gender (ref: White Males)						
White Female	0.689* (0.107)	0.649** (0.104)	0.669* (0.109)	1.136 (0.152)	1.325* (0.192)	1.357* (0.200)
Black Male	0.826 (0.240)	2.159* (0.679)	1.442 (0.485)	2.713*** (0.510)	0.948 (0.199)	1.156 (0.260)
Black Female	1.127 (0.314)	2.454** (0.711)	1.468 (0.453)	2.715*** (0.527)	1.259 (0.264)	1.53 (0.357)
Hispanic Male	0.829 (0.245)	1.559 (0.534)	1.080 (0.392)	1.862** (0.419)	0.769 (0.202)	0.965 (0.287)
Hispanic Female	0.843 (0.227)	1.566 (0.432)	1.123 (0.332)	1.930*** (0.377)	1.105 (0.259)	1.361 (0.366)
Academic Achievement						
Math Test Score		1.050*** (0.010)	1.057*** (0.010)		0.955*** (0.007)	0.953*** (0.007)
Math GPA		2.323*** (0.253)	2.448*** (0.266)		0.298*** (0.024)	0.287*** (0.024)
Family Background						
Income			1.010 (0.011)			1.002 (0.011)
Parent education level (ref: high school diploma)						
Less than HS			1.407 (0.559)			1.174 (0.329)
Some college			0.882 (0.204)			0.869 (0.145)
2-year degree			0.600 (0.198)			1.116 (0.251)
4-year degree			0.816 (0.205)			1.011 (0.189)
Advanced degree			0.728 (0.192)			1.058 (0.218)

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	Too Easy (vs. Appropriate Level)			Too Difficult (vs. Appropriate Level)		
	Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Teacher Characteristics						
Years Teaching			0.978 * (0.009)			1.000 (0.006)
Female Teacher			0.840 (0.138)			0.810 (0.115)
Math Major			1.001 (0.173)			1.103 (0.148)
School Characteristics						
School Sector (ref: Public)						
Private			0.713 (0.196)			1.705 (0.490)
Catholic			0.706 (0.162)			1.366 (0.289)
Region (ref: Northeast)						
South			0.938 (0.222)			0.991 (0.190)
West			0.313 *** (0.096)			0.778 (0.195)
Midwest			0.554 * (0.130)			1.056 (0.212)
Urbanicity (ref: Suburban)						
Urban			0.941 (0.206)			0.859 (0.140)
Rural			0.63 (0.168)			1.155 (0.223)
Percent Minority (ref: 0-33%)						
34-66%			1.644 (0.418)			0.838 (0.160)
>66%			2.005 * (0.598)			0.803 (0.189)
Constant	0.098 *** (0.012)	0.002 *** (0.001)	0.003 *** (0.002)	0.101 *** (0.011)	3.693 *** (1.037)	3.326 ** (1.470)
N=5,193						

Source: ELS: 2002

Notes: Standard errors are displayed in parentheses; Models 2 and 3 also control for 9th grade math course & non-normative math sequence.

*** $p<0.001$

** $p<0.01$

* $p<0.05$

Table 5

Odds Ratios from Multinomial Logistic Regression Predicting Math Teachers' Perceptions of Students in *Advanced* Level Math Course

	Too Easy (vs. Appropriate Level)			Too Difficult (vs. Appropriate Level)		
	Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Race/Ethnicity and Gender (ref: White Males)						
White Female	0.748 (0.156)	0.619* (0.134)	0.627* (0.142)	0.726 (0.156)	0.966 (0.232)	0.973 (0.238)
Black Male	0.615 (0.263)	1.262 (0.607)	0.923 (0.493)	1.258 (0.550)	0.383 (0.206)	0.416 (0.237)
Black Female	0.234 (0.178)	0.380 (0.312)	0.330 (0.264)	0.945 (0.394)	0.290** (0.134)	0.331* (0.166)
Hispanic Male	0.526 (0.243)	0.720 (0.382)	0.574 (0.336)	2.125* (0.805)	0.955 (0.392)	1.261 (0.615)
Hispanic Female	0.583 (0.301)	0.540 (0.304)	0.538 (0.334)	1.863 (0.807)	1.256 (0.521)	1.637 (0.737)
Academic Achievement						
Math Test Score		0.993 (0.014)	1.008 (0.015)		0.978* (0.011)	0.979 (0.012)
Math GPA		2.867*** (0.596)	2.867*** (0.607)		0.301*** (0.031)	0.266*** (0.030)
Family Background						
Income			0.991 (0.014)			1.005 (0.012)
Parent education level (ref: high school diploma)						
Less than HS			2.271 (1.706)			1.260 (0.853)
Some college			1.532 (0.562)			1.253 (0.502)
2-year degree			0.828 (0.388)			1.680 (0.754)
4-year degree			1.006 (0.391)			1.878~ (0.668)
Advanced degree			0.749 (0.277)			1.567 (0.611)
Teacher Characteristics						

	Too Easy (vs. Appropriate Level)			Too Difficult (vs. Appropriate Level)		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Years Teaching			0.974 * (0.011)			0.991 (0.010)
Female Teacher			0.783 (0.164)			1.271 (0.288)
Math Major			0.676			1.127
School Characteristics			(0.142)			(0.249)
School Sector (ref: Public)						
Private			2.179 * (0.665)			2.129 ** (0.533)
Catholic			0.928 (0.297)			1.124 (0.428)
Region (ref: Northeast)						
South			2.307 * (0.830)			0.717 (0.225)
West			0.831 (0.346)			0.532 (0.227)
Midwest			1.437 (0.564)			0.807 (0.253)
Urbanicity (ref: Suburban)						
Urban			0.814 (0.199)			1.186 (0.294)
Rural			1.008 (0.285)			1.425 (0.374)
Percent Minority (ref: 0-33%)						
34-66%			1.472 (0.383)			0.587 (0.194)
>66%			1.029 (0.568)			1.129 (0.442)
Constant	0.109 *** (0.015)	0.009 *** (0.009)	0.008 *** (0.008)	0.085 *** (0.012)	3.112 * (1.631)	2.362 (1.620)
N=2,350						

Source: ELS: 2002

Notes: Standard errors are displayed in parentheses; Models 2 and 3 also control for 9th grade math course & non-normative math sequence.

*** p<0.001

** $p<0.01$

* $p<0.05$