The Slippery Slope: Predicting Trajectories of Males' and Females' Mathematics Grades, Interest, and Self-Concept in Jr. High and High School

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There has been a renewed debate on the controversial issue of gender differences on math and science achievement. This debate currently focuses on why women are not seeking careers in information technology occupations. The most comprehensive reviews of the research in the area of gender differences have shown very few true differences between math and verbal abilities between men and women (Halpern, 2000). In fact, the research has shown only two gender differences in specific sub-areas of spatial and verbal abilities, three-dimensional mental rotation (favoring men), and speech production (favoring women). Other research has also shown a decline in the differences between the genders in the past few decades on standardized test, suggesting that the more exposure that women are getting to math and science classes, the better their scores. Even though this research puts into questions whether gender differences still exist in academic achievement, many researchers are still finding differences in performance as well as general interest in areas related to math and science. Thus, achievement alone cannot be the sole reason for women as they make their career choices.

Work by Eccles, Lord, Roeser, Barber, and Jozefowicz (1997) found that gender differences in enrollment in advanced mathematics courses in high school are mediated by gender differences in expectations for success in math and physics and perceived value of competence in math. Jacobs, Lanaz, Osgood, Eccles, and Wigfield (2002) found that self-concept of ability and task value in math decline for both genders between first and twelfth grades with no real difference between girls and boys trajectories over time. In fact, by the twelfth grade, girls valued math more than boys when controlling for self-concept of ability in math. This research might suggest that women should be just as represented in the technology or mathematical work force as men. This, however, is not the case. Even though women have made great strides in the law, medical, and social science professions, very few can be found in graduate programs or professions in mathematics, computer science, physics, engineering, or information technology jobs (Eccles, 2001). Many ideas have been put forth on why high achieving women may not be entering this professions including discrimination, gender-typed socialization, self-concept of ability in these areas, and the value and interest that women have in these professions (Eccles, 2001). The focus of this paper will be to examine how the value and interest in math relates to academic achievement over time. We predict that subjective task value, in particular, interest in math, will be associated with math school grades over time, even after controlling for maternal education and achievement-related variables.

Research Questions

Growth curve models for adolescents' school grades in mathematics courses, interest in mathematics, and self concept of mathematics ability were estimated to address the following questions: (a) What are the average trajectories for grades, interest, and self-concept, from 7th to 12th grade, by gender and by school track? (b) What maternal, teacher, and student variables are associated with math trajectories—e.g., which are associated with the intercept and slope of grades, interest, and self-concept of ability? And (c) do these predictors differ for young women and young men, for those in high versus low math tracked classes?

Method

Data and Sample

Data from the present study come from the Michigan Study of Adolescent Life Transitions (MSALT), a 18-year, nine-wave longitudinal project originally designed to examine the impact of school transitions and family environments on early adolescents' interest, motivation, and achievement-related self-concepts (Eccles et al., 1989). Additionally, the MSALT focuses the normative and non-normative transitions of adolescents from 6th grade to early adulthood (Barber, 1994; Eccles et al., 1989). Participants were initially recruited from twelve predominantly white middle- and lower-middle class school districts in four Southeastern Michigan counties through letters sent home in their 6th grade math classes (Eccles et al., 1989); three of these schools did not participate after seventh grade. Data from the first six waves (fall and spring of 6th and 7th grades, 10th grade, and 12th grade) as well as school record data from 6th through 12th grades were utilized. The sample included 1651 adolescents who participated in the first as well as at least one of the last two waves (10th and 12th grades). All members of the sample transitioned from elementary to junior high school between the 6th and 7th grades. Adolescents were predominately white (92%), and from working- to middle-class families.

Measures

Measures in the present study include maternal, teacher, and student level variables. Maternal measures include mothers' level of education, as well as mothers' expectations for math school grades measured in 7th grade. One teacher measure was included: teachers ranking of adolescents' effort in math class in 6th grade. Student level variables include in school grades, adolescents' interest in math, self-concept of math ability, score on a standardized math test from seventh grade, adolescent gender, and math class track.

Maternal measures. Maternal education was reported by mothers at 6th grade, and by adolescents at 10th grade. At 6th grade, mothers were asked, "What is the highest level of education you have received?" They could select from nine categories: 1=*grade school*, 2=*some high school*, 3=*high school graduate*, 4=*some college or technical school*, 5=*associates degree,* 6=*college graduate*, 7=*some graduate work*, 8=*master's degree*, 9=*Ph.D. or professional degree (e.g., M.D., L.L.B.)*. At 10th grade, adolescents were asked, "What is the highest level of education your parents received?" This response was coded 1=*grade school*, 2=*some high school*, 3=*high school graduate*, 4=*some college or technical school,* 5=*college graduate*, 6=*some graduate school*. If mothers' reports at 6th grade were missing, adolescents' reports at 10th grade were utilized. Maternal education reports by mother and by adolescent are highly correlated (*r* = .72, p < .001). Because the majority of mothers were either high school graduates or had some college or technical school, and in order to make the mothers' and adolescents' reports more comparable, the maternal education variable was recoded into 3 meaningful groups: 1=*less than high school*, 2=*high school graduate*, and 3=*some college or more*. The mean was 1.7 (*SD* = 0.8).

Mothers' expectations their adolescents' success in math were measured at 7th grade were assessed with the open-ended question, "What grade in math do you expect your child to get this term?" Answers to the above four questions were coded along a 13-point scale, where 13=*A+*, 12=*A*, 11=*A-*, 10=*B+*, 9=*B*, 8=*B-*, 7=*C+*, 6=*C*, 5=*C-*, 4=*D+*, 3=*D*, 2=*D-*, and 1=*F* *(NOTE: NEED TO DETERMINE WHY THIS IS ON 13 pt scale and GRADES ARE ON 16 PT SCALE)*. The mean was 9.2 (*SD* = 2.3). This measure was developed by Eccles and colleagues for the MSALT, to test the influence of parents on their children's achievement-related outcomes. Barber and Eccles (1991) found that maternal expectations for mathematics performance are related to adolescents' subsequent performance in math, controlling for earlier mathematics ability.

Teacher measure. When the students were in 7th grade, teachers ranked students' abilities in math. Teachers reported on students' effort in math class in 6th grade, on a Likert scale where 1=*low effort* and 7=*high effort*. The mean of this item was 5.2 (*SD* = 1.4).

Adolescent level measures. School grades in math were collected from school record data every semester in 6th, 7th, 9th, 10th, 11th, and 12th grades. A mean of both semesters was used for each grade level. Math school grades were coded on a 16-point scale, where 16=*A+*, 15=*A*, 14=*A-*, 13=*B+*,… 1=*F*. Adolescents' interest in math was assessed at the all six waves (fall and spring of 6th and 7th grades, 10th grade, and 12th grade) with the following question, "How much do you like doing math?" Adolescents could respond on a 7-point Likert scale, anchored at 1=*a little* and

7=*a lot*. Self-concept of math ability was measured at all 6 waves. Students were asked, "How good at math are you?" and could respond on a Likert-type scale, where 1=*not at all good* and 7=*very good*. This scale was anchored at the two end points; no other numbers in the scale corresponded to words. Means (*SD)* for math grades, interest, and self-concept at each grade level are reported in Table 1. A standardized math test, the Michigan Educational Assessment Program [MEAP] was administered to all 7th graders, and scores were collected from record data. Scores ranged from xx to xx; the mean was 23.3 (*SD* = 4.5). Gender was dummy coded so that 1=*Female*.

Math track reflects our best judgment of the level of the sequence of courses the students took across their four years of high school. We inspected individual course enrollment patterns, which were quite diverse across individuals within schools (Updegraff et al., 1996). Most of the students followed the sequences recommended in their high school handbooks—that is, sequences linked to either their math ability level or their post high school occupation trajectories. Students were classified into one of four tracks based on their 9th grade math course and information in their high school handbook: honors, college, regular, and basic. Typical course patters for each track are as follows: honors students typically took Geometry in 9th grade, Algebra/Trigonometry in 10th grade, Pre-Calculus in 11th grade, and Calculus in 12th. The college group commonly chose Algebra, Geometry, Algebra 2/Trigonometry, and Pre-Calculus (or no math) in 9th through 12th grades, respectively. The regular group was enrolled in Pre-Algebra in 9th grade, Algebra 1 in 10th, Geometry in 11th, and no math in 12th. Finally, those classified into the basic track were commonly enrolled in General Math in 9th grade, General Math/Pre-Algebra/Algebra in 10th, and no math in 11th or 12th grades. In analyses for this paper, "honors" and "college" were combined into a high track category, and "regular" and "basic" were combined into a low track category.

Analysis Plan

A latent growth curve (LGC) modeling technique was used to estimate adolescent math school grades, math interest level, and self-concept of math ability from 7th grade through 12th grade. This technique involves estimating the two components of a curve, the intercept and slope, as latent constructs (Duncan, Duncan, Stryker, Li, & Alpert, 1999). All are analyses were performed using the Amos (Analysis of Moment Structures) program (Arbuckle & Wothke, 1999). Amos allows models to be estimated even when there is some missing data (Kline, 1998), and uses the preferred maximum likelihood (ML) method for estimating parameters (Bollen, 1989) by calculating a log function of the model parameters from the raw data (Arbuckle, 1996; Bollen, 1989; McArdle & Hamagami, 1996). All predictors were mean centered before entered into the growth models, indicating that the sample means were subtracted to give all variables a mean of zero. Thus, the variance component for growth curve means had a consistent interpretation across models (Jacobs & Osgood, 2002).

In our analyses, 7th grade school math grades served as the intercept for school grade trajectories, 7th grade math interest served as the intercept for math interest trajectories, and 7th grade self-concept of math ability served as the intercept for self-concept of math ability trajectories. First, we examined means of each math related outcome, across all time points, to assess the general direction of growth curves. Next we estimated LGC models for each math related outcome (school grades, interest, and self-concept of ability), controlling for all maternal, teacher, and adolescent level predictors. We examined models separately by 9th grade math track (those in the honors and college tracks were compared to those in the regular and basic tracks) and by gender, such that there were four groups for each model.

Results

Of interest across all LGC models, the intercept and slope (starting point and change over time) were significant for every outcome, for every track by gender subgroup. This means both intercept and slope were significantly different than zero. In order to predict the intercept and slope, there has to be some variance in each component. Thus, prediction of these model components for every group was justified, although not every predictor variable was associated with the intercept and/or slope for every group and model. Details of the overall models as well as which predictors were associated with intercept and slope are detailed below.

Math School Grade Trajectories

Table 1 includes means of each variable in the model; for each gender by track group, the means decline for every math related outcome. We conducted *t*-tests to determine gender and track differences in both math school grades from 7th to 11th grades. Results of these tests are reported in footnotes in Table 1 (all *t*-tests significant at $p < .05$). Adolescent girls in the honors/college group had the highest grades, either higher than all other groups (for 6th, 7th, and 12th grades) or were not significantly different than adolescent boys' grades in the honors/college group (9th, 10th grades).

We estimated LGCs for each outcome, controlling for maternal, teacher, and adolescent measures. Figure 1 illustrates mean math school grades from 7th to 11th grades, by track (honors/college vs. regular/basic) and gender, taking into account all control variables[1]. Overall, young women have slightly higher grades than young men (within each tracking group). For both young men and women in the honors/college track group, math grades start out fairly high (around a B or B-), and then decline throughout high school, ending up at about a B- or C+. For students in the regular/basic math track, lower (about a B- or C+) and then decline, ending up at about a C.

Predicting grade intercept. Table 2a illustrates which predictors were associated with intercept (7th grade) and slope (change from 7th to 11th grade) of math school grades for all gender by math track groups. Only significant predictors (based on the critical ratio, interpreted like a *t*-

score where 1.96 and above is significant at the $p < .05$ level) are listed for each group. Consistent predictors of intercept for all groups include 6th grade math grades and 7th grade maternal expectations. MEAP score in 7th grade was a predictor of males' and females' grade intercept for those in the honors/college group. Teachers' rating was also a predictor of honors/college girls' intercept, and self-concept of math ability was a significant—and negative—predictor of regular/basic boys' math grades, meaning those with lower self-concept tended to have higher grades.

Predicting grade slope. Significant predictors of slope also varied by gender and tracking groups. Once again, mothers' expectations were important; they were negatively associated trajectories for three of the four groups, and were not a significant predictor of boys' trajectories in the regular/basic group. This negative association means that if mothers had higher expectations, the slope of school grades fell *less* quickly; because the overall slope of school grades declines for every group, a predictor variable with a negative coefficient pulls the slope in the positive (higher grades) direction. For honors/college girls, higher 6th grade math self-concept was also associated with a less negative slope in math grades. Other predictors of trajectories were associated with a steeper slope: for honors/college girls, higher mothers' education as well as higher interest in math in 6th grade were associated positively with a declining slope (e.g., higher values on these variables were associated with a more negative slope), and higher mothers' education was also associated with a steeper slope for the honors/college boys.

Math Interest Trajectories

We conducted *t*-tests to determine gender and track differences in math interest from 7th to 12th grades. Results of these tests are reported in footnotes in Table 1 (all *t*-tests significant at $p < .05$). Overall, adolescents in the honors/college group generally had higher grades than those in the

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[1] Note that we could not estimate the model including 12th grade math grades, because by definition of the tracking

regular/basic group, regardless of gender (see Table 1 for more details).

Figure 2 illustrates means of math interest from 7^{th} to 12^{th} grades, by track (honors/college vs. regular/basic) and gender, taking into account all control variables. For all four math track by gender groups, math interest starts out between about 4.5 and 5 on a 7 point scale. For all gender and track groups, math interest declines, so by 12th grade is much lower (between 3 and 4). Boys in the regular/basic group start out lower than the other three groups; by 12^{th} grade, the boys in the honors/college group have not fallen quite as far as the other groups.

Predicting interest intercept. Table 2b illustrates which predictors were associated with intercept (7^{th} grade) and slope (change from 7^{th} to 12^{th} grade) of math interest for all gender by math track groups. Again, only significant predictors are listed for each group. One measure predicted intercept across all four groups: 6^{th} grade math interest. MEAP score in 7^{th} grade was a negative predictor of females' interest intercept for those in either tracking group; higher MEAP score was associated with lower interest in 7^{th} grade. For girls in the regular/basic group, higher self-concept of math ability at 6^{th} grade and higher maternal expectations in 7^{th} grade were associated with higher interest at 7^{th} grade. Maternal expectations were also positively associated with the interest intercept for boys in the regular/basic group.

Predicting interest slope. Significant predictors of slope also varied by gender and tracking groups. Interest level at 6^{th} grade was important for the slope for three of the four groups (all except for females in the regular/basic group). Because the estimate was negative, this means that the higher math interest was at 6^{th} grade, the less quickly the slope declined over time for these three groups. Higher maternal expectations at 7^{th} grade were associated with a more steeply declining slope for girls in the honors/college group; higher mothers' education level was associated with a less steeply declining slope for boys in the regular/basic group.

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groups, those in the regular group did not take math courses in 12^{th} grade, and those in the basic group did not take math

Self-Concept of Math Ability Trajectories

We conducted *t*-tests to determine gender and track differences in self-concept of math ability from 7th to 12th grades. Results of these tests are reported in footnotes in Table 1 (all *t*-tests significant at $p < .05$). For every grade (except 6th grade), boys in the honors/college group had the highest self-concept of math ability, and everyone in the regular/basic group had the lowest self-concept (details are listed in Table 1).

Figure 3 illustrates means of self-concept of math ability from 7th to 12th grades, by track (honors/college vs. regular/basic) and gender, taking into account all control variables. For all four math track by gender groups, self-concept of math ability starts out between 5 and 6 on a 7 point scale. For all groups, self-concept of math ability declines, so by 12th grade is lower (between 4 and 5). Interestingly, the slope declines at about the same rate for every group, but males in the honors/college group start out higher than all the other groups and remain at a higher level throughout high school.

Predicting self-concept intercept. Table 2c illustrates which predictors were associated with intercept (7th grade) and slope (change from 7th to 12th grade) of self-concept of math ability for all gender by math track groups. Again, only significant predictors are listed for each group. Maternal expectations at 7th grade was a significant and positive predictor of intercept for all four groups. Self-concept of math ability at 6th grade was significant and positive for all groups except regular/basic boys; math interest at 6th grade was significant and positive for all groups except for regular/basic girls. Teachers' ratings at 7th grade were a significant but negative predictor of self-concept intercept for boys in the honors/college group.

Predicting self-concept slope. There were few significant predictors of girls' self-concept slopes, and no significant predictors of boys' slopes. For girls in the honors/college track, 6th grade

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courses in 11th or 12th grades.

self-concept of math ability was negatively associated with the slope, so a higher self-concept at 6th was associated with a slower decline in the slope. A higher MEAP score was also negatively associated with the declining slope. For girls in the regular/basic track, only one predictor was significant; those with higher math interest at 6th grade had more steeply declining self-concept slopes.

Discussion

- ***in general, models better at predicting girls' trajectories compared to boys***
- ***school grades: females fall the slowest, so end up with highest grades; interest: h/c girls and boys start out the same, but then girls decline much faster; sc of ma: h/c boys start out much higher, everyone falls at same rate (slope is about the same for all) so h/c boys still end up on top… can discuss differences in starting level and differences in slopes***
- ***maternal expectations for grades not surprisingly most important for school grades, but also important for other outcomes***

Similar to the findings of Jacobs et al. (2002), our results suggest that for both boys and girls, math grades fall over the course of junior high and high school. As can be seen in Figures 1 through 3, young women achieve at comparable or higher levels in math as males, but their interest and self-concept, especially for the high achieving females, is the same or lower than males.

This research would suggest that in order to encourage more women into math, science, and information technology fields, interventions need to be designed that focus not on the academic achievement of women but in how to make math- and science-related occupations more interesting for young, high achieving women. This type of intervention should start early in the academic careers for these adolescents and young women; our results suggest the lack of interest in math begin earlier than the junior high school years and never improve.

Table 1: Means (*SD*) for all variables for entire sample, and by subgroup

	Full Sample	H/C Males	H/C Females	R/B Males	R/B Females
Grades	(N^{h} = 1651)	(*n* = 455)	(*n* = 476)	(*n* = 310)	(*n* = 410)
6th grade math grades[a]	11.7 (2.5)	12.3 (1.9)	13.1 (1.7)	9.6 (2.5)	10.5 (2.4)
7th grade math grades[a]	10.7 (3.0)	11.9 (2.3)	12.4 (2.1)	8.0 (2.7)	9.2 (2.7)
9th grade math grades[b]	9.7 (3.0)	10.2 (3.0)	10.5 (2.9)	8.3 (2.9)	9.3 (3.0)
10th grade math grades[b]	9.5 (3.2)	10.4 (3.0)	10.8 (2.7)	7.4 (2.8)	8.2 (3.1)
11th grade math grades[c]	9.4 (3.2)	10.0 (3.2)	10.3 (3.0)	8.0 (3.0)	8.5 (3.0)
12th grade math grades[d]	9.4 (3.3)	9.8 (3.4)	10.6 (2.9)	7.0 (2.8)	9.2 (3.3)
Interest					
6th grade math interest[c]	4.9 (1.9)	5.3 (1.7)	5.2 (1.7)	4.4 (2.0)	4.6 (2.1)
7th grade math interest (1) [c]	4.9 (1.8)	5.2 (1.7)	5.5 (1.2)	4.4 (1.9)	4.6 (1.9)
7th grade math interest (2) [c]	4.5 (1.9)	4.9 (1.8)	4.7 (1.7)	4.0 (1.9)	4.1 (2.0)
10th grade math interest[g]	3.8 (1.9)	4.2 (1.9)	3.9 (2.0)	3.3 (1.8)	3.5 (2.0)
12th grade math interest[e]	3.7 (2.0)	4.1 (1.9)	3.7 (2.0)	3.3 (1.8)	3.1 (1.9)
Self-concept of ability					
6th grade math SCA[e]	5.3 (1.4)	5.3 (1.1)	5.5 (1.2)	4.6 (1.5)	4.8 (1.4)
7th grade math SCA (1) [e]	5.3 (1.3)	5.9 (1.1)	5.5 (1.1)	4.9 (1.4)	4.7 (1.4)
7th grade math SCA (2) [e]	5.2 (1.4)	5.9 (1.0)	5.5 (1.0)	4.7 (1.4)	4.5 (1.5)
10th grade math SCA[e]	4.9 (1.5)	5.4 (1.3)	5.1 (1.3)	4.4 (1.5)	4.4 (1.6)
12th grade math SCA[e]	4.6 (1.5)	5.1 (1.4)	4.7 (1.4)	4.1 (1.3)	4.0 (1.6)
Predictor variables					
Adolescent level					
6th grade math self concept of ability[e]	5.3 (1.4)	5.8 (1.1)	5.5 (1.2)	4.6 (1.5)	4.8 (1.4)
6th grade math interest[c]	4.9 (1.9)	5.3 (1.7)	5.2 (1.7)	4.4 (2.0)	4.6 (2.1)
7th grade math MEAP[c]	23.3 (4.5)	25.2 (3.1)	25.2 (2.8)	20.2 (5.1)	20.9 (4.5)
Teacher level					
7th grade teacher rating of student	5.2 (1.4)	5.5 (1.3)	5.8 (1.1)	4.2 (1.4)	5.0 (1.3)

effort[a]					
Maternal level					
Maternal expectations[b]	9.2 (2.3)	9.8 (2.4)	10.2 (1.7)	6.8 (2.9)	7.9 (2.3)
Maternal Education[f]	1.7 (0.8)	1.8 (0.8)	1.7 (0.8)	1.7 (0.8)	1.5 (0.7)

[a]all 4 groups differ from each other, according to Tukey's post-hoc test of one-way ANOVAs
[b]H/C Males and Females do not differ from each other, but all other groups are different
[c]H/C Males and Females do not differ from each other, and R/B Males and Females do not differ, but all other groups are significantly different
[d]H/C Males do not differ from R/G Females; all other groups are different
[e]R/B Males and Females do not differ from each other, but all other groups are different
[f]Only 1 group differs: H/C Males and R/B Females
[g]H/C Males and Females do not differ; R/B Males and Females do not differ; and H/C Females and R/B Females do not differ; all other groups are different
[h]Reported *N*s are maximum available; *n*s are smaller for some subgroups

Table 2a: *Predictors of Intercept and Slope—Math School Grades*

	Estimate	SE	Critical Ratio	Squared Multiple Correlation
Math School Grades Intercept				
Females, H/C	11.148	0.115	97.068	0.780
Females, R/B	10.597	0.163	64.911	0.880
Males, H/C	11.256	0.110	102.322	0.776
Males, R/B	9.910	0.214	46.210	0.716
Intercept Predictors				
Females, H/C				
6th grade math grades	0.237	0.063	3.739	
7th grade math MEAP	0.092	0.044	2.094	
7th grade mother's exp.	0.627	0.057	10.961	
7th grade teacher rating	0.258	0.090	2.876	
Females, R/B				
6th grade math grades	0.210	0.074	2.855	
7th grade mother's exp.	0.642	0.064	10.061	
Males, H/C				
6th grade math grades	0.181	0.063	2.870	
7th grade math MEAP	0.134	0.044	3.044	
7th grade mother's exp.	0.635	0.043	14.799	
Males, R/B				
6th grade math grades	0.358	0.075	4.755	
6th grade math self concept	-0.388	0.138	-2.820	
7th grade mother's exp.	0.451	0.064	7.069	
Math School Grades Slope				
Females, H/C	-0.418	0.051	-8.227	0.193
Females, R/B	-0.454	0.064	-7.130	0.684
Males, H/C	-0.571	0.046	-12.388	0.163
Males, R/B	-0.300	0.090	-3.346	0.106
Slope Predictors				
Females, H/C				
Mother's education	0.122	0.048	2.561	
6th grade math self concept	-0.074	0.038	-1.939	
6th grade math interest	0.071	0.024	2.940	
7th grade mother's exp.	-0.083	0.030	-2.809	
Females, R/B				
7th grade mother's exp.	-0.176	0.030	-5.946	
Males, H/C				
Mother's education	0.132	0.050	2.635	
7th grade mother's exp.	-0.105	0.022	-4.876	
Males, R/B [none]				

Table 2b: *Predictors of Intercept and Slope—Math Interest*

	Estimate	SE	Critical Ratio	Squared Multiple Correlation
Math Interest Intercept				
Females, H/C	4.820	0.086	56.315	0.468
Females, R/B	4.860	0.109	44.481	0.409
Males, H/C	4.759	0.080	59.522	0.363
Males, R/B	4.451	0.145	30.693	0.477
Intercept Predictors				
Females, H/C				
6th grade math interest	0.497	0.039	12.907	
7th grade math MEAP	-0.082	0.032	-2.588	
Females, R/B				
6th grade math interest	0.316	0.054	5.846	
6th grade math self concept	0.192	0.085	2.267	
7th grade math MEAP	-0.061	0.026	-2.366	
7th grade mother's exp.	0.192	0.063	3.023	
Males, H/C				
6th grade math interest	0.474	0.046	10.313	
Males, R/B				
6th grade math interest	0.552	0.060	9.268	
7th grade mother's exp.	0.163	0.056	2.915	
Math Interest Slope				
Females, H/C	-0.160	0.014	-11.347	0.124
Females, R/B	-0.161	0.017	-9.484	0.030
Males, H/C	-0.097	0.013	-7.693	0.059
Males, R/B	-0.106	0.022	-4.755	0.256
Slope Predictors				
Females, H/C				
6th grade math interest	-0.014	0.006	-2.224	
7th grade mother's exp.	0.028	0.009	3.171	
Females, R/B [none]				
Males, H/C				
6th grade math interest	-0.017	0.007	-2.315	
Males, R/B				
Mother's education	-0.039	0.019	-2.087	
6th grade math interest	-0.040	0.009	-4.492	

$^{+}$ $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 2c: *Predictors of Intercept and Slope—Math Self Concept*

	Estimate	SE	Critical Ratio	Squared Multiple Correlation
Math Self Concept Intercept				
Females, H/C	5.229	0.056	95.348	0.481
Females, R/B	5.174	0.079	65.580	0.584
Males, H/C	5.629	0.047	120.395	0.538
Males, R/B	5.339	0.106	50.240	0.483
Intercept Predictors				
Females, H/C				
6th grade math self concept	0.302	0.040	7.461	
6th grade math interest	0.076	0.026	2.971	
7th grade mother's exp.	0.165	0.033	5.020	
Females, R/B				
6th grade math self concept	0.425	0.060	7.049	
7th grade mother's exp.	0.201	0.041	4.874	
Males, H/C				
6th grade math self concept	0.346	0.046	7.565	
6th grade math interest	0.078	0.027	2.904	
7th grade mother's exp.	0.114	0.024	4.708	
7th grade teacher rating	-0.089	0.039	-2.279	
Males, R/B				
6th grade math interest	0.193	0.045	4.269	
7th grade mother's exp.	0.151	0.039	3.843	
Math Self Concept Slope				
Females, H/C	-0.079	0.011	-7.206	0.059
Females, R/B	-0.088	0.013	-6.596	0.127
Males, H/C	-0.082	0.009	-9.009	0.026
Males, R/B	-0.095	0.017	-5.695	0.060
Slope Predictors				
Females, H/C				
7th grade math MEAP	-0.011	0.004	-2.809	
6th grade math self-concept	-0.021	0.008	-2.636	
Females, R/B				
6th grade math interest	0.016	0.007	2.471	
Males, H/C [none]				
Males, R/B [none]				

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