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ABSTRACT

When students make the transition from elementary school to junior high school, they experience abrupt organizational changes in their school environment. The hypothesis that social comparison processes mediate the relation between ability grouping practices in mathematics and students' achievement expectancies was tested in a longitudinal sample of 862 students making the transition from grade 6 to grade 7. Compared to between-classroom ability grouping, heterogeneous grouping raised the achievement expectancies of high achievers and lowered the achievement expectancies of low achievers. When controls for the direction of students' social comparison choices and for their mathematics grades were introduced, the independent effect of ability grouping on achievement expectancies was consistently and substantially reduced. It is argued that ability grouping practices constrain the choices available to students and teachers for social comparison of abilities and thereby influence the frame of reference students use for self-assessment and teachers use for assigning grades. Eight tables and four figures are appended. (YP)

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Effects of Between-Classroom Ability Grouping in Mathematics At the Transition to Junior High School

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Abstract

The hypothesis that social comparison processes mediate the relation between ability grouping practices in mathematics and students' achievement expectancies is tested in a longitudinal sample of students making the transition from elementary school to junior high school (N = 862). Compared to between-classroom ability grouping, heterogeneous grouping raises the achievement expectancies of high achievers and lowers the achievement expectancies of low achievers. When controls for the direction of students' social comparison choices and for their mathematics grades are introduced, the independent effect of ability grouping on achievement expectancies is consistently and substantially reduced. It is argued that ability grouping practices constrain the choices available to students and teachers for social comparison of abilities and thereby influence the frame of reference students use for self-assessment and teachers use for assigning grades.

Effects of Between-Classroom Ability Grouping in Mathematics
At the Transition to Junior High School

When students make the transition from elementary school to junior high school, they normatively experience abrupt organizational changes in their school environment. For instance, many students first experience between-classroom ability grouping assignments when they enter junior high school. The transition from heterogeneous elementary classrooms to ability-grouped junior high school classrooms is particularly common in mathematics (McPartland, Coldiron, & Braddock, 1987). By examining patterns of change in students' mathematics-related beliefs and performance at the transition to junior high school, and by linking these patterns of change to the new ability grouping conditions that students encounter, this research illustrates important effects of these changes in school organization on early adolescent development. A primary hypothesis in the model to be tested is that ability grouping practices constrain the choices available to students and teachers for social comparison of abilities and thereby influence the frame of reference students use for self-assessment and teachers use for assigning grades. Although several theorists have hypothesized that social comparison processes are a critical mediator of the relation between ability grouping and students' achievement expectancies (e.g., Bachman & O'Malley, 1986; Marsh & Parker, 1984; O'Connor, Atkinson, & Horner, 1966; Richer, 1976), as yet only one investigation (Reuman, in press) has directly assessed and demonstrated the mediating role of social comparison processes. Whereas that research focussed on upper-elementary students in one school district, the present investigation follows students in several school districts across the transition to junior high school.

Experiences of success and failure in day-to-day schoolwork are assumed to be determined, in some substantial part, by comparing one's own performance outcomes to those of other students in the same classroom (Levine, 1983). If social comparison in the classroom does occur, then how favorable a student's self-evaluation will be ought to depend on the nature of the reference group made available to students by the classroom organization. In a heterogeneous class highly-able students are likely to outperform their classmates consistently and by substantial margins and therefore hold high expectancies for success; however, when they move into a homogeneous classroom with others who are also highly able, such students will neither outperform their classmates so consistently nor by such substantial margins and therefore should decrease their expectancies for success. Similarly, low ability students are likely to hold low expectancies for success in a heterogeneous classroom but they are likely to raise their expectancies for success toward an intermediate level when they move into a homogeneous classroom where everyone is performing at a more nearly equal level.

Ability grouping practices also constrain the nature of the student reference group available to teachers. In one school district (Reuman, in press), students in low ability groups received lower grades in mathematics than did students in low ability classrooms, despite equivalent achievement test scores in mathematics at the outset of the school year. Similarly, students in high ability groups received higher grades in mathematics than did students in high ability classrooms. In heterogeneous classrooms, performance differences among students may be especially salient and lead teachers to assign more extreme grades to students who differ in ability.

The basic strategy underlying this investigation is to show first that patterns of change in students' achievement expectancies at the transition to junior high school are predictable from patterns of change they experience in ability grouping. If effects of ability grouping are mediated by the social comparison behavior of students and grading practices of teachers, then adjustments for these hypothesized mediators should substantially reduce the variation in expectancies that is uniquely attributable to ability grouping change as a predictor. In addition to adjustments for the social comparison behavior of students and grading practices of teachers, effects of individual differences in math achievement will be partialled out, using a state-wide mathematics proficiency test administered at the beginning of seventh grade to students in all school districts in this sample.

There is a great deal of evidence to suggest that by junior high school, boys perceive themselves as more able in mathematics than do girls (Eccles (Parsons), Adler, Futterman, Goff, Kaczala, Meece, & Midgley, 1983; Meece, Eccles-Parsons, Kaczala, Goff, & Futterman, 1982). Sex differences in achievement expectancies occur despite the fact that throughout the elementary school years boys and girls typically perform equally well in their math classes and on standardized math achievement tests (Meece et al., 1982). Because gender has been repeatedly identified as an independent predictor of achievement expectancies, adjustments for gender will be included when analysing effects of ability grouping.

Method

Sample

The sample examined here participated in a longitudinal investigation, called the Transitions in Early Adolescence project. This project is concerned with the impact of change in the classroom and family environments of early adolescents on their achievement-related beliefs, motives, values, and behaviors. Students in the Transitions project completed questionnaires at school in the fall (between early October and late November) and spring (between late March and late April) of two successive school years (1983/84 and 1984/85). The occasions when students completed questionnaires will be called Waves 1 through 4.

Twelve school districts with varying educational practices were recruited for the Transitions project. The school districts are located in the Detroit metropolitan area and serve lower-middle and middle income communities. No participating school districts are rural or inner-city districts. Ten of the twelve districts are characterized by a student body that is at least 85 percent Caucasian; the remaining two districts are 60 percent and 5 percent Caucasian, respectively.

Case selection

Only a subset of the student sample from the Transitions project was selected for the analyses described here. The analysis sample is restricted to students who were sixth graders in elementary schools during the 1983/84 school year and seventh graders in junior high schools during the following school year. Only students who experienced particular patterns of change in between-classroom ability grouping have been included. Some students experienced no ability grouping throughout sixth and seventh grade (called "No Grouping"). Other students experienced continuous assignment to between-classroom ability grouping at either an above-average or average-ability level (called "High Class 6G and 7G" and "Average Class 6G and 7G", respectively).[1] Still other students experienced no ability grouping throughout the sixth grade followed by continuous between-classroom ability grouping (at one ability level) throughout the seventh grade (called "High Class 7G Only", "Average Class 7G Only", and "Low Class 7G Only" in this report). Only students with no missing data on all relevant questionnaire items and performance measures have been included. The total number of students included by these criteria is 862.

Measures

Ability grouping practices have been assessed through teacher reports. The math grades students received each year and math proficiency scores students received on a statewide, standardized test (part of the Michigan Educational Assessment Program) have been collected from students' school files. The student questionnaire includes items intended to measure three distinct components of students' achievement expectancies in mathematics: their self-concept of math ability, expectancies for success in math activities, and perception of mathematics as an easy subject. Several items conceived as indicators of each component had been selected from previous research (Parsons, 1980). Confirmatory factor analyses have been performed to establish that items intended to measure the same component are unidimensional, and items intended to measure distinct components show discriminant validity (Reuman, 1986). The student questionnaire also includes items in which students nominated classmates with whom they would compare themselves, reasons why those classmates were selected, and how the nominee compared to the nominator with respect to math ability. Other items focus on the rated frequency and importance of students' within-classroom social comparison behavior. All student questionnaire measures and their internal consistency reliabilities are described in the Appendix.

Results

Ability Grouping Assignments and Math Proficiency

Some investigators have argued that ability grouping assignments are often not systematically related to objective academic performance (e.g., Rosenbaum, 1976). That is not characteristic of ability grouping assignments in this sample. Overall, there is a strong association between ability grouping change conditions and scores on the Mathematics Battery of the Michigan Educational Assessment Program (MEAP) test, administered when students were in the second month of seventh grade, F (5, 856) = 30.99, $p < .0001$, MS_e = 17.05, $R^2 = .153$. Table 1 displays descriptive statistics for the MEAP test as a function of ability grouping change at the transition to junior high school. Tukey comparisons were used to test differences among means and maintain an experiment-wise Type I error rate of .05. These comparisons indicate that, in general, students who are in high-ability math classrooms (both years or just in the seventh grade) show significantly higher mean scores on the Math Battery than do students who are in average-ability math classrooms (both years or just in the seventh grade) and students who experience no grouping, who in turn show significantly higher mean scores than students who enter low-ability math classrooms in the seventh grade.[2]

Table 1 about here

Simple Effects of Ability Grouping Change on Achievement Expectancies

Descriptive statistics for each expectancy component as a function of change in ability grouping at the transition to junior high school are shown in Tables 2 through 4. For ease of inspection, Figures 1 through 3 show the means of these expectancy components as a function of ability grouping change patterns.

Tables 2 through 4 and
Figures 1 through 3 about here

The simple relation between ability-grouping change and each component of students' achievement expectancies in mathematics (i.e., self-concept of ability, expectancies for success, and perceptions of math as an easy subject) was analysed with repeated-measures MANOVAs, with grouping change as a between-subjects factor and year, semester, and year-by-semester contrasts as within-subject factors. With self-concept and expectancies for success as dependent variables, there are highly significant effects of school year.[3] Overall, self-concept of ability declines from sixth to seventh grade, approximate F (1, 856) = 5.50, p = .019, as do expectancies for success, approximate F (1, 856) = 7.56; p = .006. Perceptions of math as an easy subject does not show a year effect, approximate F (1, 856) = 2.52; p = .11. There are also highly significant effects of grouping change on self-concept, F (5, 856) = 13.88, $p < .0001$, on expectancies for success, F (5, 856) = 15.97, $p < .0001$, and on perceptions of math as an easy subject, F (5, 856) = 12.07, $p < .0001$. High ability students show higher means than do regular ability students, who in turn show higher means than low ability students. Finally, the year contrast depends on the nature of ability-grouping change experienced by a student: In the case of self-concept, approximate F (5, 856) = 9.30, $p < .0001$; in the case of expectancies for success, approximate F (5, 856) = 7.17, $p < .0001$; and in the case of perceptions of math as an easy subject, approximate F (5, 856) = 21.75, $p < .0001$. The nature of this year-by-grouping-change interaction is exactly what would be expected based on the social comparison model presumed to underlie students' achievement expectancies. For example, among those students who did not experience ability grouping in the sixth grade, entering a high ability math class in the seventh grade is associated with a sharp drop in self-concept of math ability, whereas entering a low ability math class in the seventh grade is associated with a sharp increase in self-concept, and entering an average ability math class is associated with no change in self-concept (see Table 2 and Figure 1).

Mediators of Ability Grouping Effects

As predicted, when adjustments are introduced for the nature of students' within-classroom social comparison choices, students' rated frequency and importance of social comparison, grades in math, performance on the statewide math proficiency test, and gender, the net effect of ability grouping change is substantially reduced. For self-concept of math ability, the net effect of ability grouping change is still significant, $F(5, 844) = 3.16$, $MS_e = 18.04$, $p = .008$ (see Table 5); however, the variation in overall self-concept that is uniquely attributable to grouping change has been reduced to .009 (from .075, when grouping change was used as a single between-subjects factor). For expectancies for success, the net effect of grouping change is significant, $F(5, 844) = 2.45$, $MS_e = 9.36$, $p = .03$ (see Table 6), but once again the variation in overall expectancies that is uniquely attributable to grouping change has been substantially reduced (to .008 from .085, when grouping change was used as a single between-subjects factor). Similarly, for perceptions of math as an easy subject, the net effect of ability grouping change is still significant, $F(5, 844) = 6.28$, $MS_e = 19.62$, $p < .0001$ (see Table 7), but the variation in perceptions of math ease that is uniquely attributable to grouping change has been reduced (to .023 from .066, when grouping change was used as a single predictor). Because the independent effect of ability grouping change on achievement expectancies is consistently and substantially reduced when adjustments are introduced for students' social comparison behavior and for their mathematics grades (among other variables), these variables that have been added as predictors may be mediators of the relation between ability grouping and expectancies.

Tables 5, 6, and 7 about here

Apart from showing that the net effect of ability grouping change is substantially reduced when adjustments for other predictors are made, these results show the importance of the added predictors themselves. Math grades and Math Battery scores from the MEAP test consistently covary positively with students' achievement expectancies. Boys consistently show higher achievement expectancies than girls do. Interestingly, the nature of students' social comparison choices in the sixth grade is a consistent predictor of achievement expectancies, but seventh-grade comparison choices are not. It is conceivable that the social comparison process in the sixth grade consists primarily of <u>within-classroom</u> comparisons (which was the focus of the present measures), but that in the seventh grade <u>across-classroom</u> comparisons are salient as well, insofar as more students experience a departmentalized curriculum in junior high school and interact with diverse groups of classmates. In any case, students who choose a classmate who is worse at math tend to show the highest achievement expectancies, and students who choose a classmate who is better at math tend to show the lowest achievement expectancies in math. Finally, students' rated frequency and importance of social comparison is not a consistent predictor of achievement expectancies; to the extent that teachers, counselors, or parents are concerned with students' achievement expectancies, they should focus on which students are chosen for comparison, rather than how often comparisons are made.

<u>The Relation Between Change in Ability Grouping and Math Grades</u>

The relation between year-end grades in math and change in ability grouping at the transition to junior high school can be seen in Table 1 and Figure 4. Overall, math grades decline significantly from sixth- to seventh grade, approximate $\underline{F}$ (1, 856) = 80.96, $\underline{p}$ <

.0001. Ability grouping conditions are a strong predictor of math grades as well, F (5, 856) = 25.81, MS_e = 12.02, $p < .0001$. It is evident in Figure 4 that students ever in high-ability classrooms earn higher grades than students ever in average-ability classrooms or in classrooms with no grouping at all, who in turn earn higher grades than students in low ability classrooms. Finally, the nature of the year change in math grades depends on the nature of the change in ability grouping experienced by a student, approximate F (5, 856) = 10.47, $p < .0001$. Whereas students who make the transition from a heterogeneous classroom in the sixth grade to a low-ability math classroom in the seventh grade show an increase in their math grades, all other groups of students show a decline in math grades from sixth grade to seventh grade.

Figure 4 about here

These trends in students' math grades help explain some, but not all, of the trends in students' achievement expectancies. For instance, the school-year decline in math grades for high achieving students could be responsible for the school-year decline in high-achieving students' achievement expectancies, and the school-year increase in math grades for low-achieving students could be responsible for the school-year increase in low-achieving students' expectancies. On the other hand, even though students who are in high-ability math classrooms in both sixth- and seventh grade receive the same grades as students who enter high-ability math classrooms beginning in the seventh grade, the latter students show higher means on all three components of achievement expectancies. Their higher expectancies are predictable consequences of the social comparison processes suggested here.

<u>The Relation Between Change in Ability Grouping and Social Comparison Choices</u>

A primary argument underlying this analysis has been that heterogeneous classrooms will make performance differences within the classroom salient to many students who engage in social comparison with their classmates. Overall, the relation between sixth-grade students' social comparison choices and ability grouping conditions is significant, chi-square (15) = 57.72, $p < .001$. Table 8 displays the frequencies of sixth-graders' social comparison choices as a function of their ability grouping. Most of the cells that contribute substantially to the chi-square statistic are related to students who were in a heterogeneous class in the sixth grade (when they nominated a classmate for comparison) and who entered a high-, average-, or low-ability math class in the seventh grade. High achievers in heterogeneous classrooms (i.e., those who eventually enter a high-ability math classroom) are disproportionately likely not to choose someone better at math, whereas average and low achievers in heterogeneous classrooms (i.e., those who eventually enter average- and low-ability classrooms) are disproportionately likely to choose someone who is better at math. The consequence of average- and low-achievers' choosing for comparison someone better at math than themselves is lowered achievement expectancies, as we have seen.

Table 8 about here

Discussion

The quasi-experimental design used here shows an unambiguous effect of between-classroom ability grouping on students' achievement expectancies. When students make the transition from a heterogeneous sixth-grade classroom to a homogeneous, high-ability seventh-grade math classroom, we observe an abrupt drop in their achievement expectancies. When students make the transition from a heterogeneous sixth-grade classroom to a homogeneous, low-ability seventh-grade math classroom, we observe an abrupt increase in their achievement expectancies. In order to understand patterns of student change at the transition to junior high school, we must understand patterns of change in their classrooms environments and the effects of that changing environment. The pattern of change observed here is consistent with predictions from a social comparison framework.

The pattern of the effect observed here has important implications for students' persistence in mathematics through secondary school. To the extent that the incidence of between-classroom grouping in mathematics increases after elementary school (McPartland et al., 1987), one might forecast a general grade-related decline in the mathematics achievement expectancies of high achieving students and a grade-related increase for low achievers. Grade-related changes in ability grouping practices represent a powerful organizational mechanism that could dampen the achievement expectancies of precisely those students who are most skilled in mathematics, and ultimately lead them not to enroll in optional, advanced mathematics courses.

Adjustments for the math grades students receive consistently and substantially reduce the net effects of ability grouping change on students' achievement expectancies. This finding is consistent with the interpretation of grading practices as a mediator of ability grouping effects. The finding that students entering high-ability math classrooms receive lower grades and students entering low-ability math classrooms receive higher grades is consistent with the prediction that teachers would be influenced by the reference group established by the classroom organization and assign more extreme grades to high- and low achievers in heterogeneous classrooms (than to equally high- and low-achieving students in homogeneous classrooms); however, the finding that students in high-ability sixth-grade classrooms receive grades that are comparable to those received by high-achievers in heterogeneous sixth-grade classrooms suggests that classroom heterogeneity does not have a simple influence on grading practices. More research is needed to understand the relation between grading and grouping practices.

Similarly, adjustments for students' social comparison behavior consistently and substantially reduce the net effects of ability grouping change on students' achievement expectancies. This finding is consistent with the interpretation of students' social comparison behavior as a mediator of ability grouping effects. The fact that within-classroom comparisons are important in the sixth grade but not in the seventh grade may be due to changes in the nature of the reference groups encountered by students as they make the transition from self-contained elementary classrooms to a departmentalized curriculum in junior high school. Future research ought to expand to include consideration of students' across-classroom comparisons. These may be especially important in understanding effects of grouping practices in secondary schools. Finally, the rated importance and frequency of social comparison does not appear to mediate effects of grouping practices on achievement expectancies and suggests that teachers, parents, and counselors should be more concerned with which classmates are chosen for comparison than how often comparisons are made.

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Footnotes

[1]Some students experienced assignment to a classroom that is below-average in math ability in both the sixth and seventh grades. In this sample, only two students who fit this pattern had no missing data on all analysis variables. Because of the small sample size, these students were not included in the analyses reported here.

[2]There are two exceptions to this general pattern. Based on the Tukey comparisons, a) students who enter an average-ability class in the seventh grade show a significantly lower mean Math Battery score than do students who never experience grouping, and b) students who are in average-ability math classrooms in both school-years show a mean Math Battery score that is not significantly lower than students who are in a high-ability classroom (both years or just in the seventh grade).

[3]Approximate F-statistics reported here are based on Wilks' lambda and are computed from repeated-measures MANOVAs.

Table 1

Math Proficiency Scores and Year-End Grades in Math as a Function of Change in Ability Grouping at the Transition to Junior High School

Ability Grouping in			Math	Year-End Math Grades in Grade	
Grade 6	Grade 7	n	Proficiency	6	7
None	None	507			
	Mean		23.05	11.18	10.26
	SD		4.43	2.63	3.28
None	High	104			
	Mean		25.15	13.67	11.60
	SD		2.52	1.81	2.59
None	Average	119			
	Mean		21.68	11.60	9.84
	SD		4.87	2.39	2.88
None	Low	22			
	Mean		15.32	7.00	8.14
	SD		4.98	1.45	2.55
High	High	71			
	Mean		26.06	13.46	11.82
	SD		2.53	1.44	2.51
Average	Average	39			
	Mean		23.79	12.10	10.31
	SD		2.59	1.86	2.61

Note. Math proficiency scores are based on the Mathematics Battery of the Michigan Educational Assessment Program test, with a range from 0 to 28. Math grades are coded 16=A+, 15=A, 14=A-, etc.

Table 2

Mean Self-Concept of Math Ability as a Function of Change in Ability Grouping at the Transition to Junior High School

Ability Grouping in			Grade 6		Grade 7	
Grade 6	Grade 7	n	Fall	Spring	Fall	Spring
None	None	507				
	Mean		15.38	15.25	15.01	14.55
	SD		3.64	3.57	3.80	4.16
None	High	104				
	Mean		17.55	17.90	16.10	15.65
	SD		2.53	2.38	3.28	3.65
None	Average	119				
	Mean		14.57	14.82	15.18	14.39
	SD		3.25	3.53	3.59	3.82
None	Low	22				
	Mean		11.09	10.54	13.27	12.32
	SD		3.39	3.45	4.05	4.22
High	High	71				
	Mean		16.46	16.15	15.34	14.94
	SD		2.69	2.70	2.92	3.21
Average	Average	39				
	Mean		15.02	15.18	14.64	14.13
	SD		2.80	2.55	3.86	3.62

Note. Self-concept of math ability is represented by a composite of three items, with a range from 3 to 21, where a high score indicates higher self-concept.

Table 3

Mean Expectancies for Success in Math as a Function of Change in Ability Grouping at the Transition to Junior High School

Ability Grouping in Grade 6	Grade 7	n	Grade 6 Fall	Grade 6 Spring	Grade 7 Fall	Grade 7 Spring
None	None	507				
	Mean		11.05	11.00	10.80	10.38
	SD		2.39	2.53	2.50	2.92
None	High	104				
	Mean		12.65	12.68	11.76	11.38
	SD		1.40	1.40	2.17	2.34
None	Average	119				
	Mean		10.92	10.87	10.75	10.16
	SD		2.11	2.30	2.45	2.52
None	Low	22				
	Mean		8.27	7.45	9.95	9.09
	SD		2.95	2.81	2.40	2.84
High	High	71				
	Mean		11.98	11.60	11.21	10.77
	SD		1.54	1.68	1.94	2.32
Average	Average	39				
	Mean		10.95	11.05	10.82	9.74
	SD		1.70	1.60	2.35	2.78

Note. Fxpectancies for success in math is represented by a composite of two items, with a range from 2 to 14, where a high score indicates higher expectancies.

Table 4

Mean Perception of Math as an Easy Subject as a Function of Change in Ability Grouping at the Transition to Junior High School

Ability Grouping in			Grade 6		Grade 7	
Grade 6	Grade 7	n	Fall	Spring	Fall	Spring
None	None	507				
	Mean		14.09	14.29	14.09	13.91
	SD		3.60	3.49	3.37	3.76
None	High	104				
	Mean		15.74	16.52	13.99	13.75
	SD		3.24	3.11	3.63	3.72
None	Average	119				
	Mean		12.86	13.23	13.72	13.30
	SD		3.64	3.64	3.28	3.50
None	Low	22				
	Mean		9.59	8.59	11.64	12.23
	SD		2.56	3.32	2.15	3.01
High	High	71				
	Mean		14.68	14.86	13.00	12.86
	SD		2.57	2.52	2.99	3.25
Average	Average	39				
	Mean		13.95	14.41	13.97	13.46
	SD		2.83	2.84	2.75	3.48

Note. Perception of math as an easy subject is represented by a composite of three items, with a range from 3 to 21, where a high score indicates higher perception of task ease.

Table 5

MANOVA Statistics for the Relation Between Ability Grouping Change, Other Predictors, and Repeated Measures of Students' Self-Concept of Math Ability

Between-Subjects Effects	Overall	Within-Subject Effects: Year	Semester	Year x Sem
		8.17**	4.66*	.54
Grouping Change	3.16**	7.62***	.60	1.04
Gender	39.68***	.26	.46	.62
Wave 2 Comparison Direction	9.91***	3.91**	1.55	2.40
Wave 4 Comparison Direction	1.96	.43	1.41	.80
Wave 2 Comparison Frequency and Importance	2.70	.29	.85	2.90
Wave 4 Comparison Frequency and Importance	1.04	5.32*	.31	1.25
6th-Grade Math Grades	85.82***	41.57***	.46	23.27***
7th-Grade Math Grades	77.56***	181.23***	18.14***	29.58***
7th-Grade MEAP Scores	9.89**	2.13	1.99	.09

Note. MEAP scores are raw scores from the Mathematics Battery of the Michigan Educational Assessment Program test. Values in the column labelled "Overall" are *F*-statistics based on a MS_e = 18.04. Values in the "Within-Subject Effects" columns are approximate *F*-statistics, based on Wilks' lambda. One-, two-, and three asterisks indicate the statistic is significant at or below .05, .01, and .001, respectively.

Table 6

MANOVA Statistics for the Relation Between Ability Grouping Change, Other Predictors, and Repeated Measures of Students' Expectancies for Success in Math

		Within-Subject Effects		
Between-Subjects Effects	Overall	Year	Semester	Year x Sem
		2.80	9.76**	.00
Grouping Change	2.45*	3.42**	1.18	.96
Gender	12.08***	3.01	2.74	4.44*
Wave 2 Comparison Direction	6.71***	3.43*	.40	.87
Wave 4 Comparison Direction	1.84	1.47	1.49	1.50
Wave 2 Comparison Frequency and Importance	3.47	3.20	.00	.01
Wave 4 Comparison Frequency and Importance	.01	7.79**	2.01	.00
6th-Grade Math Grades	44.14***	44.10***	.00	20.14***
7th-Grade Math Grades	68.00***	169.05***	28.46***	31.38***
7th-Grade MEAP Scores	4.50*	4.96*	4.82*	.27

Note. MEAP scores are raw scores from the Mathematics Battery of the Michigan Educational Assessment Program test. Values in the column labelled "Overall" are F-statistics based on a MS_e = 9.36. Values in the "Within-Subject Effects" columns are approximate F-statistics, based on Wilks' lambda. One-, two-, and three asterisks indicate the statistic is significant at or below .05, .01, and .001, respectively.

Table 7

MANOVA Statistics for the Relation Between Ability Grouping Change, Other Predictors, and Repeated Measures of Students' Perceptions of Math as an Easy Subject

		Within-Subject Effects		
Between-Subjects Effects	Overall	Year	Semester	Year x Sem
		.95	3.73	.00
Grouping Change	6.28***	11.87***	.21	.60
Gender	33.42***	.11	1.10	.07
Wave 2 Comparison Direction	7.28***	4.65**	1.57	2.53
Wave 4 Comparison Direction	3.10*	1.36	.18	2.56
Wave 2 Comparison Frequency and Importance	.09	.18	1.61	.28
Wave 4 Comparison Frequency and Importance	9.19**	.00	.09	1.72
6th-Grade Math Grades	40.16***	27.31***	4.52*	9.90**
7th-Grade Math Grades	33.66***	61.61***	12.10***	13.79***
7th-Grade MEAP Scores	11.97***	3.81*	3.14	.03

Note. MEAP scores are raw scores from the Mathematics Battery of the Michigan Educational Assessment Program test. Values in the column labelled "Overall" are *F*-statistics based on a MS_e = 19.62. Values in the "Within-Subject Effects" columns are approximate *F*-statistics, based on Wilks' lambda. One-, two-, and three asterisks indicate the statistic is significant at or below .05, .01, and .001, respectively.

Table 8

Frequencies of Social Comparison Choices Made According to the Nature of the Comparison Other and Patterns of Ability Grouping Change at the Transition to Junior High School

Ability Grouping in		Comparison Other				
Grade 6	Grade 7	Worse at Math	Same at Math	Better at Math	Nobody	
None	None	34	231	167	75	507
None	High	10	63	16	15	104
None	Average	6	49	45	19	119
None	Low	0	3	14	5	22
High	High	3	42	16	10	71
Average	Average	2	16	5	16	39
		55	404	263	140	862

Figure 1

Self-Concept of Math Ability
As a Function of Change in Ability Grouping
At the Transition to Junior High School

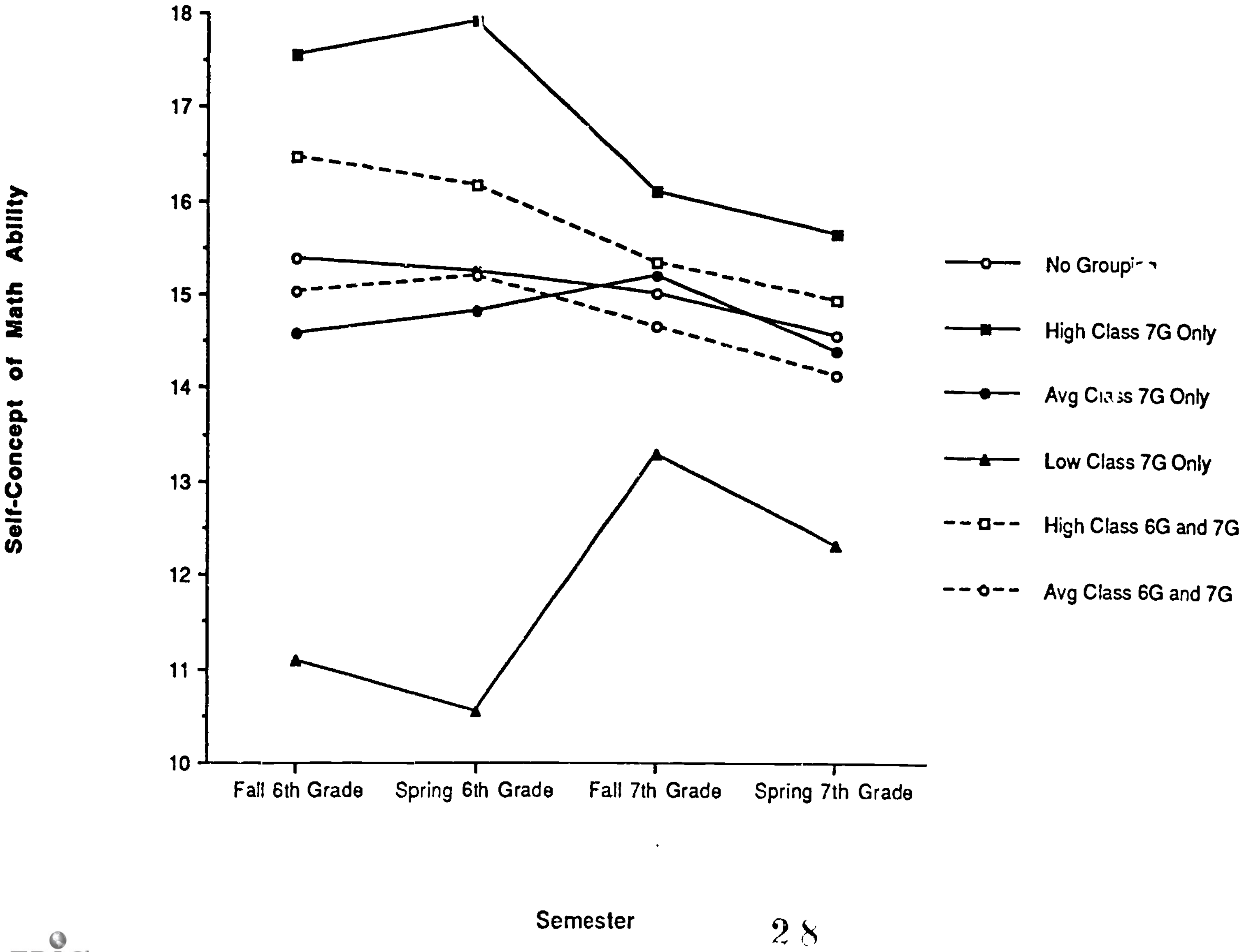


Figure 2

**Expectancies for Success in Math
As a Function of Change in Ability Grouping
At the Transition to Junior High School**

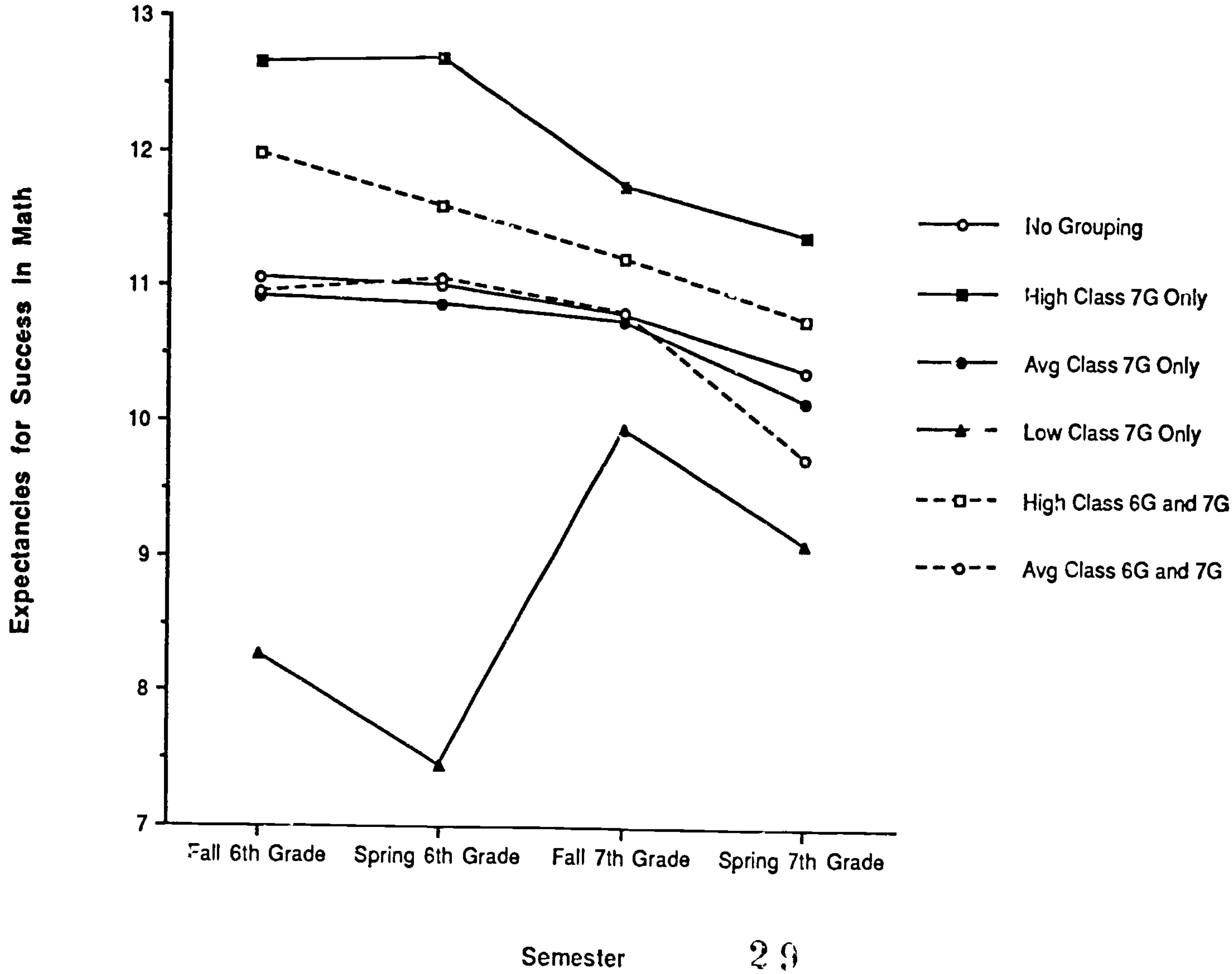


Figure 3

Perceived Facility of Math
As a Function of Change in Ability Grouping
At the Transition to Junior High School

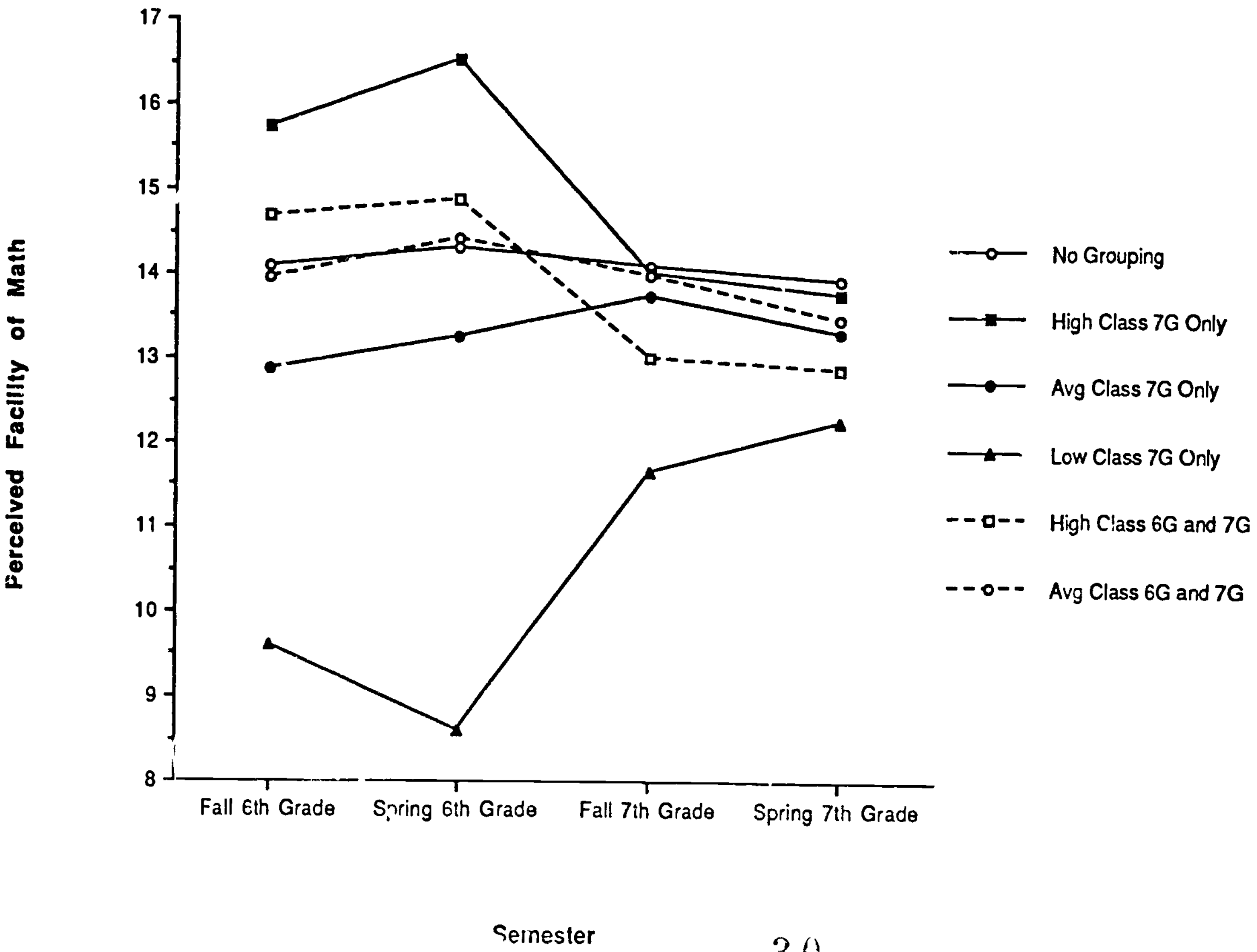
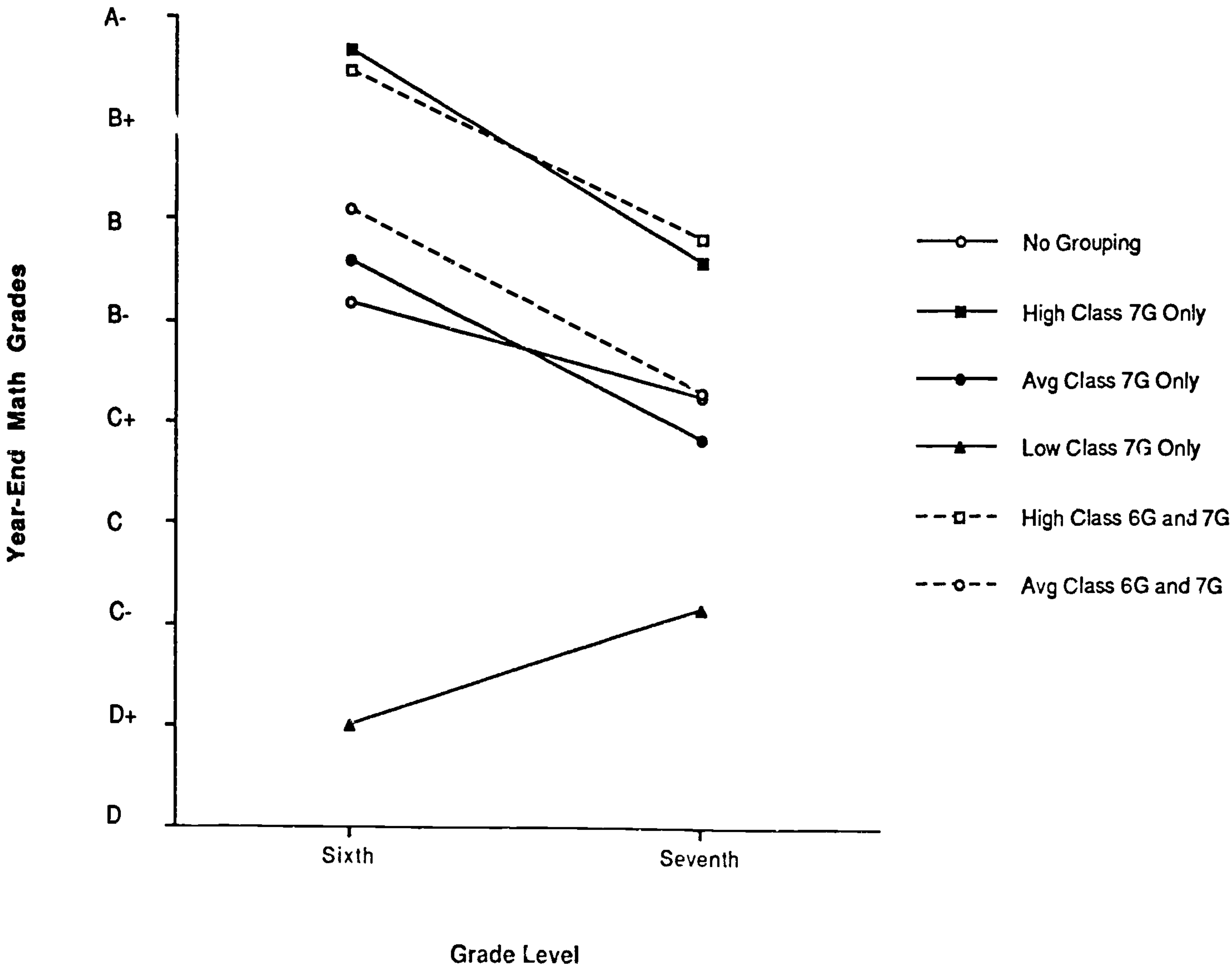


Figure 4

Year End Math Grades As a Function of Change in Ability Grouping At the Transition to Junior High School



Appendix

Student Questionnaire Measures Used to Assess Components of Achievements in Mathematics, Social Comparison Choices, and the Rated Frequency and Importance of Social Comparison Within the Classroom

Self-Concept of Math Ability.

(Cronbach's alphas are .81 and .79 for sixth-grade girls and boys, respectively.)

1. How good at math are you? [1 = not at all good; 7 = very good]
2. If you were to rank all the students in your math class from the worst to the best in math, where would you put yourself? [1 = the worst; 7 = the best]
3. Compared to most of your other school subjects, how good are you at math? [1 = much worse; 7 = much better]

Expectancies for Success in Math.

(Cronbach's alphas are .76 and .79 for sixth-grade girls and boys, respectively.)

1. How well do you think you will do in math this year? [1 = not at all well; 7 = very well]
2. How successful do you think you'd be in a career that required mathematical ability? [1 = not very successful; 7 = very successful]

Perception of Math as an Easy Subject (scores were reversed for analysis).

(Cronbach's alphas are .63 for both sixth-grade girls and boys.)

1. In general, how hard is math for you? [1 = very easy; 7 = very hard]
2. Compared to other students your age, how much time do you have to spend working on your math assignments? [1 = much less time; 7 = much more time]
3. Compared to most other school subjects you have taken or are taking, how hard is math for you? [1 = my easiest course; 7 = my hardest course]

Social Comparison Choice.

1. Make believe you just got a math test back from your teacher. If you could look at someone else's test in your classroom, whose test would you want to look at? [Students could either

nominate a classmate by name or write "Nobody" if they strongly felt there was nobody whose test they would want to see.]

2. (If a classmate was nominated, students then indicated) This person is... [1 = not as good at math as me; 2 = about the same at math as me; 3 = better at math than me]

Frequency and Importance of Social Comparison.

(Cronbach's alphas are .77 and .76 for sixth-grade girls and boys, respectively.)

1. I compare my math ability to other students in my math class. [1 = never; 7 = very often]
2. I like to know how my math ability compares to other students in my math class. [1 = not at all true; 7 = very true]
3. Doing better in math than other students in my classroom is important to me. [1 = strongly disagree, 7 = strongly agree]
4. I compare how hard I try in math to how hard other students try in my classroom. [1 = never; 7 = very often]
5. Trying harder in math than other students in my classroom is important to me. [1 = strongly disagree; 7 = strongly agree]