Sex Stereotyping Versus Perceived Value as the Mediator of Sex Differentiated Math Participation

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This paper was presented at the meeting of the Society for Research in Child Development, Boston 1981. The research reported in this paper was supported by grants from the National Institute of Education (NIE-G-78-0022) and the National Institute of Mental Health (5RO1-MH31724-01).

A sizeable portion of both the empirical and theoretical literature related to the processes of socialization suggests that a variety of needs and values influence the form of an individual's achievement behavior (Hoffman, 1972; Mortimer & Simmons, 1978; Parsons & Goff, 1978, 1980; Spenner & Featherman, 1978; Stein & Bailey, 1973; Veroff, 1977). The importance of the centrality of values and needs to one's self-definition has been a reoccurring theme. Personal needs and values, it has been argued, operate in ways which both reduce the probability of engaging in roles that are perceived as inconsistent with these central values (Spenner & Featherman, 1978) and increase the probability of engaging in roles perceived as consistent with one's definition of self (Parsons & Goff, 1980).

One need, in particular, has received a great deal of attention: the need to behave according to a set of social prescriptions for sex-appropriate conduct, or sex role identity. Proponents of the cognitive-developmental model of sex role acquisition (e.g., Kohlberg, 1969; Parsons, Ruble, Hodges, & Small, 1976; Parsons, Note 1) suggest that sex roles influence achievement behavior through their impact on perceived task value. Specific tasks are identified as either consistent or inconsistent with one's sex role identity. The extent to which a task is consistent with one's sex role identity influences the value of that task. In partial support of this view, several studies have documented the influence of sex-labeling of tasks on children's performance and choice (e.g., Liebert, McCall, & Hanratty, 1971; Montemayor, 1974; Sherman, 1979). Studies of adolescent values suggest that males become more oriented to achievement in school with age while females become more concerned with the potential conflict between their academic goals and their social goals (Beech & Schoeppe, 1974; Douvan & Adelson, 1966; Sherman, 1979; Stein & Bailey, 1973). Taken together these studies suggest a growing sensitivity to the congruence between anticipated adult sex-related roles and the current task demands which may influence the value of various tasks for the individual and, in turn, influence achievement-related behaviors.

The influence of sex-typing on achievement behaviors has received considerable attention in the area of math achievement. The results of these studies are mixed but when math is stereotyped, it is seen as a male achievement domain by both male and female students. Males, however, typically consider math to be more of a male achievement domain than do females and females, when asked, do not characterize greater participation in mathematics courses or competence in mathematics as unfeminine (Dwyer, 1974; Ernest, 1976; Fennema & Sherman, 1977; Nash, 1979; Stein & Smithells, 1969; Armstrong & Kahl, Note 2; Boswell, Note 3; Fox, Brody, & Tobin, Note 4). For example, Fennema and Sherman (1977) reported that the high school girls in their studies stereotyped math as less of a male achievement domain than boys and did not show great concern about success in mathematics. Thus, it is not clear that females are stereotyping math as inappropriate for them, and it is even less clear that the sex-stereotyping of math is lowering its attainment value for females.

Turning to a more complex hypothesis, Nash (1979) has argued that the sex-typing of mathematics will have an effect on a girl's participation only to the extent that maintaining sex role congruence is a central concern to her. That is, Nash is predicting a sex-typing by sex role identity interactive influence on math participation.

Sex-typing of mathematics is fairly easy to measure. Sex role identity, on the other hand, is very difficult to conceptualize, much less to measure. Consequently, we chose to focus on two types of measures of sex role identity. One of the two, a measure of sex-related personality characteristics, was selected for two reasons: First, several theoreticians have suggested the importance of personality characteristics for achievement choices. For example, Hoffman (1972) has suggested that females' lesser goal oriented, instrumental qualities and greater affiliative needs and expressive orientation lead them to have weaker achievement strivings and to be less self-confident about certain academic tasks than males. Second, most of the previous studies in the field of sex role identity have used one of two personality measures as their criterion for sex role identity. We chose the PAQ as our measure. The results based on this measure will be discussed first.

To evaluate both sex-typed personality characteristics and the effects of the stereotyping of math as a male domain on mathematics attitudes and course enrollment plans, we correlated students' stereotyping of math as a male domain and their ratings of themselves on a simplified version of the PAQ (Spence, Helmreich, & Stapp,, 1975) with a battery of measures designed to assess student attitudes toward mathematics and their plans to continue taking math courses. Expressiveness, as measured by the PAQ, was not related to any of the student measures. Instrumentality, on the other hand, related consistently and positively to measures of expectancy and self-concept of math ability for both boys and girls.

To test more directly for the combined effects of "masculine" instrumentality and "feminine" expressiveness, we classified students as masculine, feminine, androgynous, or undifferentiated, using the median split method outlined by Spence et al. (1975). This variable, a measure of the degree of stereotyping of math as a male domain (neutral, moderately masculine, or highly masculine) and sex of student were entered as predictor variables into a series of multivariate contingency table analyses. Self-concept of math ability, concept of task difficulty, concept of the value of math, estimate of the utility of math for future goals, and current expectancies were the dependent measures in these analyses. Neither a student's personality classification nor her/his degree of stereotyping of math as a masculine domain had any significant influence on these dependent measures. These findings, in conjunction with the correlational findings reported above, suggest that it is <u>only</u> the responses to the instrumental items on the PAQ that are related to self-concept of ability. In addition, contrary to Nash's (1979) suggestion, these results indicate that one's attitudes toward mathematics are not a joint function of one's sex-typing of math and one's sex role identity as measured by the PAQ.

These findings do not, however, invalidate the significance of a student's sex role identity as an influence in course selection. What they do suggest is that the link between sex-typed personality structures as defined by the PAQ median split classificatory system and achievement-related behaviors is weak at best. Instrumentality as a separate dimension, however, is related. A careful inspection of the items in the instrumentality scale suggests that the individual differences in one's general orientation to achievement underlie this relationship. as might be expected by a careful inspection of the items. Five of the six instrumentality items tap either confidence in one's abilities, persistence in the face of difficulty, or independent orientation to work. All of these characteristics have been linked to general achievement motivation in previous work and ought to relate to confidence in one's ability to master a difficult subject like mathematics.

These data also do not support the popular notion that sex-typing of subject matter as masculine acts as a deterrent to female achievement. In fact, if anything the sex-typing of math as masculine increased its value for both boys (r=.50, p<.001) and girls (r=.58, p<.001). Yet, the hypothesized impact of the sex-typing of math continues to be a favored explanation of sex-differentiated math course-taking (e.g., Nash, 1979). If it is not the sex-typing of high school math courses that is responsible for this hypothesized link, how else might sex roles be influencing student decisions regarding math enrollment? While females may not be stereotyping mathematics as exclusively masculine, they may be stereotyping math-related careers as either masculine or unfeminine. In support of this suggestion, Boswell (Note 3) found that career mathematicians are perceived as being both decidedly unfeminine and unmasculine. It is not surprising then that females might not aspire to math-related occupations and consequently would perceive advanced math courses as having low utility value especially given the consistent view that advanced mathematics courses are difficult (e.g., Brush, 1980; Heller, Futterman, Kaczala, Karabenick, & Parsons, Note 5). A number of articles have either reported or summarized distinct differences in the career interests of males and females, with females preferring occupations which require little math (Astin, 1969; Astin, Harway, & McNamara, 1976; Fox & Denham, 1974; Hawley, 1971, 1972; Lipman-Blumen & Tickameyer, 1975; Parsons & Goff, 1980; Parsons, Note 1; Goff, Note 6). Further, in a recent reanalysis of the Project Talent data, Wise (Note 7) found a large proportion of the sex differences in math course enrollment was accounted for by career interests in the ninth grade. To the extent, then that one's future career goals influence the value one attaches to any given subject area, these studies suggest that it is the utility value of math rather than its sex-typing that is mediating sex differences in enrollment patterns.

Results from our second measure of sex role identity provide additional support for the suggestion that it is not the stereotyping of math per se that affects its value but rather the range of a student's activity interest that is critical in determining attitudes toward mathematics (Kaczala, Note 8). As a second measure of sex role identity we asked students to rate how important it is for boys and girls to engage in a variety of sex-typed activities. (See appendix for sample list of items.) Kaczala (Note 8) scored a child a) androgynous if s/he felt it was important for same sex peers to engage in both male- and female-typed activities, b) feminine if s/he felt it was only important for same sex peers to engage in female-typed tasks, c) masculine if s/he felt it was only important for the same sex peer to engage in male-typed tasks, and d) undifferentiated if s/he felt it was not important whether a same sex peer engaged in either type task. (See appendix for table of means from Kaczala, Note 8). Girls whose ideal female was androgynous rated math as both more valuable and more important and rated their abilities as higher than did girls whose ideal female was either sex-typed or undifferentiated. Similarly, boys whose ideal male was androgynous rated math as both more valuable and important than did boys whose ideal male was either sex-typed or undifferentiated. Apparently, for both boys and girls positive attitudes toward math are associated with an androgynous ideal for members of one's own gender.

We next had the children estimate the frequency with which they themselves engaged in these same activities (see appendix for sample scale and for table of relevant means taken from Kaczala, Note 8). Using a median split procedure similar to that outlined above, Kaczala (Note 8) classified the children as androgynous, masculine, feminine or undifferentiated based on the frequency with which they engaged in masculine and feminine activities. Once again androgynous girls had more positive attitudes toward the value of math than feminine girls. In addition, androgynous and masculine girls were the least likely to stereotype math as a masculine domain. Similarly, androgynous and masculine boys had the most positive views of their math ability while feminine boys had the most negative views of both their math ability and the difficulty of math. In addition, masculine boys were the most likely to stereotype boys as having more math ability than girls while androgynous boys were the least likely to hold such a stereotype.

In summary, for both boys and girls, a positive attitude toward math and toward their own math abilities is associated either with preferring as androgynous activity pattern for one's own grades or with having an androgynous activity pattern oneself. Being classified as feminine by either of these criteria is associated with a more negative view of math. For boys only, being classified as masculine based on one's own activity patterns is associated both with holding stereotypic beliefs regarding which gender has more math aptitude, and with the beliefs that math is easy and that one is good in math.

These results suggest that having an androgynous, rather than sex-typed, orientation toward the activities of childhood facilitates girls' attitudes toward the value of mathematics as a subject area. It could be argued that it is precisely these androgynous girls who will consider technic,al, more scientific and less traditionally feminine careers among the various career options open to them. They will come to the career decision points in their lives with a past history of engaging in both masculine and feminine typed activities, will hold an androgynous activity ideal for their own gender, and will see mathematics as both interesting and important. This cluster of attitudes should facilitate non-traditional career choices.

A third line of investigation provides additional evidence for the suggestion that it is the perceived value of math that mediates sex differences in math participation rather than the sex stereotyping of math per se. Several theoreticians have argued that one's values and life goals can influence the value one attaches to various activities such that activities consistent with these beliefs are seen as more valuable than activities which are inconsistent with or unrelated to one's personal value structure. In support of this argument, several recent studies have documented a relation between mathematics and science involvement and personal values. For example, Dunteman, Wisenbaker, and Taylor (Note 9) have found that being thingoriented rather than person-oriented predicted becoming a math or science major. Similarly, Fox and Denham (1974) found that mathematically talented children are relatively low on social values and high on theoretical, political, and economic values. In both of these studies females were less likely to hold the math- and science-related values than were males. To the extent, then, that one's core personal values influence the utility value one attaches to a variety of tasks, math should have lower utility value for females. In turn, the utility value of math should predict course enrollment plans.

To test these hypotheses directly we compared the utility value ratings of our male and female subjects. The females did indeed rate math as less useful. More central to the issue of sex differences in math participation, however, is the question of whether or not this difference in perceived value mediates sex differences in math enrollment patterns. To answer this question we entered our subjects' responses into a path analysis. The results of this analysis are depicted in Figure 1.

Insert Figure 1 about here

Students' plans to continue taking math are predicted most directly by their estimate of the value of mathematics courses, and their math anxiety. Further, when one compares boys and girls on the zero-order correlations

Insert Table 1 About Here

between their estimates of the value of mathematics and objective indicators of their mathematical ability, an interesting difference emerges (see Table 1). Boys' estimates of the value of math are significantly related to their past math performance (r=.33, $p\leq.01$) and to both their teachers' and parents' estimates of their math ability (r=.33, $p\leq.01$; r=.28, $p\leq.01$). In contrast, girls estimates of the value of math are not significantly related to any of these measures (r=.06, r=.03, and r=.06, respectively) but are significantly related to both plans to continue enrolling in math courses and to their math grades one year later.

In addition, girls' estimates of the value of math are related to their stereotypes of math as masculine, (r=.58, p<.01), to their career plans (r=.42, p<.01), and their parents' beliefs regarding both the importance of math courses (r=.24, p<.01) and the difficulty of mathematics (r=-.27, p<.01). Interestingly, in our data set, stereotyping math as a male subject area increased its value for the girls. Otherwise, the pattern of relations is as one would expect: girls who are planning careers in science, and whose parents think math is both not too difficult and very important rate math as more valuable than girls who are planning careers in non-scientific and non-technical fields and whose parents think math is both very difficult and not very important.

Thus it appears that social factors, independent of real math aptitude, are more likely to influence girls' perceptions of the value of math than they are to influence boys' perceptions. These data suggest that sex roles may be shaping girls' career goals and activity preferences which, in turn, shape their perceptions of the value of math as well as their actual performance in mathematics courses and their enrollment plans.

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Table 1

Zero-order Correlation Matrix of All Variables Used in the Path Analysis[a]

	Past math performance	Parent perception of importance of math for child	Mother's perception of task difficulty for child	Parents' perception of child's math ability	Teacher's perception of child's math ability	Child's self-concept of math ability	Child's perception of task difficulty	Child's rating of the value of math	Child's math anxiety	Math grade	Child's intention to take more math
Past math performance[b]	1.00	-.06	$-.33^{xx}$	$.51^{xx}$	$.56^{xx}$	$.31^{xxd}$	$-.21^{x}$	$.06^{d}$	$-.19^{x}$	$.28^{xxd}$	$.19^{x}$
Parents' perception of importance of math for child[b]	.05	1.00	-.10	.14	-.04	.09	.00	$.24^{xx}$	-.07	.07	.03
Mother's perception of task difficulty for child[b]	$-.50^{xx}$	-.06	1.00	$-.40^{xx}$	$-.47^{xx}$	$-.59^{xx}$	$.52^{xx}$	$-.27^{xx}$	$.26^{xxd}$	$-.22^{xxd}$	-.10
Parents' perception of child's math ability[b]	$.42^{xx}$	$.23^{x}$	$-.35^{xx}$	1.00	$.52^{xx}$	$.31^{xx}$	$-.21^{x}$	$-.06^{d}$	$-.21^{x}$	$.36^{xx}$	.13
Teacher's perception of child's math ability[b]	$.49^{xx}$	.16	$-.51^{xx}$	$.39^{xx}$	1.00	$.47^{xx}$	$-.34^{xx}$	$-.03^{d}$	$-.20^{x}$	$.37^{xx}$	.01
Child's self-concept of math ability[b]	$.51^{xxd}$	.14	$-.60^{xx}$	$.35^{xx}$	$.62^{xx}$	1.00	$-.67^{xx}$	$.49^{xx}$	$-.46^{xx}$	$.29^{xxd}$	$.20^{x}$
Child's perception of task difficulty[b]	$-.34^{xx}$	-.00	$.46^{xx}$	-.16	$-.40^{xx}$	$-.59^{xx}$	1.00	-.05	$.40^{xx}$	$-.10^{d}$	-.05
Child's rating of the value of math[b]	$.33^{xxd}$	.09	$-.33^{xx}$	$.28^{xxd}$	$.33^{xxd}$	$.59^{xx}$	-.12	1.00	$-.27^{xx}$	.07	$.32^{xx}$
Child's math anxiety[c]	$-.19^{x}$	-.10	$.49^{xxd}$	-.20	-.11	$-.56^{xx}$	$.46^{xx}$	$-.36^{xx}$	1.00	$-.27^{xx}$	$-.30^{xx}$
Math grade[c]	$.52^{xxd}$	.10	$-.42^{xxd}$	$.38^{xx}$	$.47^{xx}$	$.50^{xxd}$	$-.34^{xxd}$	$-.18^{x}$	$-.39^{xx}$	1.00	.12
Child's intention to take more math[c]	.14	.12	-.15	.08	-.09	$.21^{x}$	-.03	$.39^{xx}$	$-.39^{xx}$	.06	1.00

[a] Correlations for females are presented in the upper right triangle
Correlations for males are presented in the lower left triangle

[b] Based on Year One data

[c] Based on Year Two data

[d] There is a significant sex difference in the zero-order correlations

[x] $p < .05$

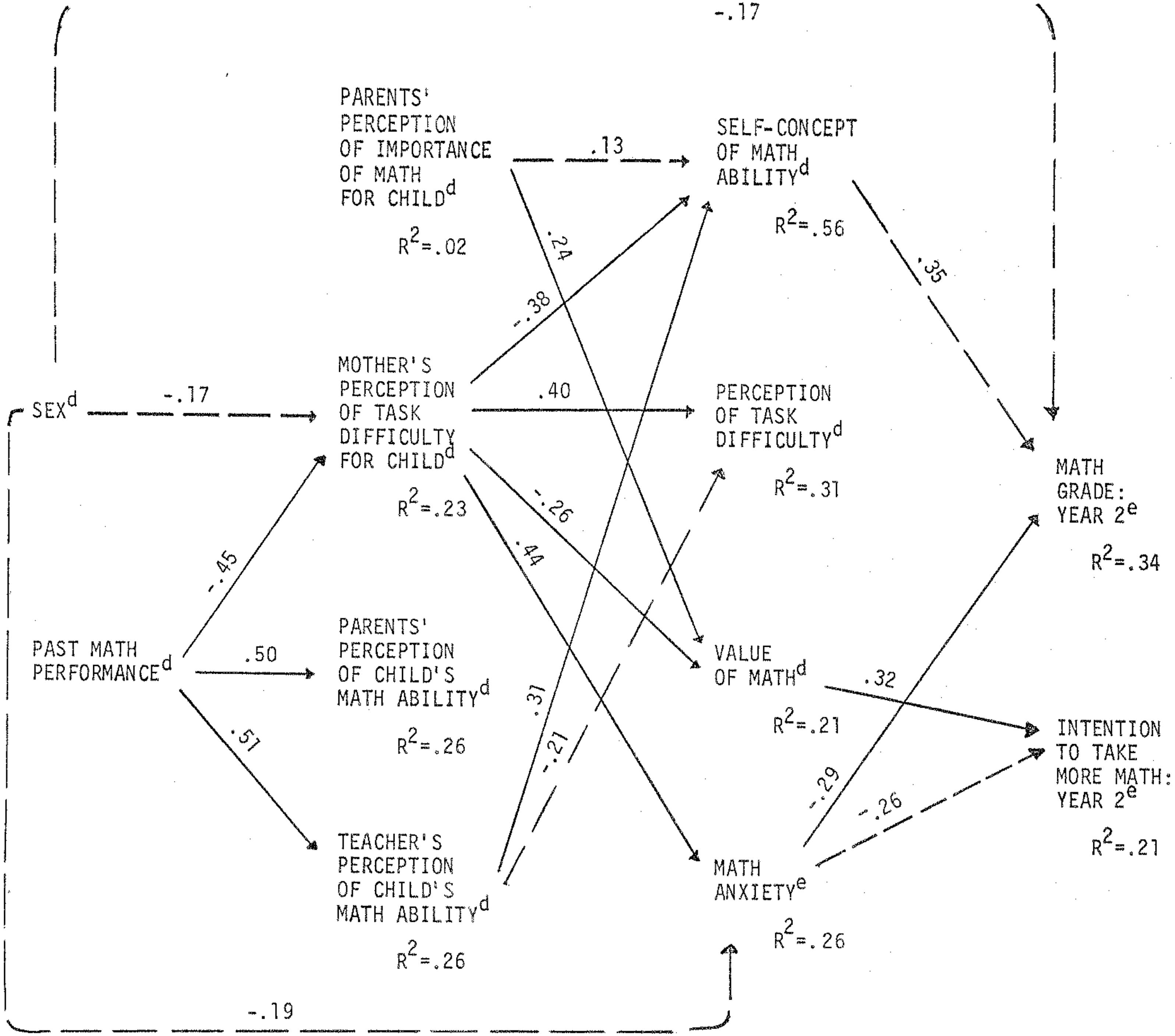
[xx] $p < .01$

Figure Caption

Figure 1. Reduced path analytic diagram: longitudinal determinants of grade in mathematics course and enrollment plans. (Column-wise multiple regression equation procedures were used to estimate the path coefficients. At each step, each endogenous variable was regressed on the set of all predictor variables to the left of the column to which it belongs. Shared explanatory variance is divided among the relevant predictor variables. The standardized path coefficients, which are standardized regression coefficients, reflect the relative predictive power of the predictor variables in comparison to one another. Specification of the path model, i.e., assignment of variables to particular columns, was based on the theoretical model laid out by Parsons et al. (in press). All possible paths across columns were estimated by regression procedures. No paths were specified within columns. A t-test was used to test for the significance of each path coefficient. Only paths significant at $\underline{p}<.02$ are presented in the figure. Dashed lines are significant at $\underline{p}<.02$; solid lines at $\underline{p}<.001$; N=164. R^2=the percent of variance of each endogenous measure accounted for by the model, a R^2 is listed under each variable).

[a]Based on year one data.

[b]Based on year two data.


-.17
PARENTS' PERCEPTION OF IMPORTANCE OF MATH FOR CHILD^d
R^2=.02
.13
SELF-CONCEPT OF MATH ABILITY^d
R^2=.56
.24
-.38
.35
SEX^d
-.17
MOTHER'S PERCEPTION OF TASK DIFFICULTY FOR CHILD^d
R^2=.23
.40
PERCEPTION OF TASK DIFFICULTY^d
R^2=.31
-.26
.44
MATH GRADE: YEAR 2^e
R^2=.34
-.45
PAST MATH PERFORMANCE^d
.50
PARENTS' PERCEPTION OF CHILD'S MATH ABILITY^d
R^2=.26
.51
.31
-.21
VALUE OF MATH^d
R^2=.21
.32
INTENTION TO TAKE MORE MATH: YEAR 2^e
R^2=.21
-.29
-.26
TEACHER'S PERCEPTION OF CHILD'S MATH ABILITY^d
R^2=.26
MATH ANXIETY^e
R^2=.26
-.19

APPENDIX

Modified PAQ Given to 5th-8th Graders

Now we would like to know what kind of person you think you are. Listed below are words that can be used to describe a person. For each set of words or phrases, circle the number that best describes you.

For example:

not at all nice				very nice
1	2	3	4	5

If you feel you are very nice you would circle 5. If you feel you are not at all nice, circle 1. If you are nice most of the time, circle 4. Do not circle more than one number on a line.

Scale Component								
Masculine	1. Not able to work alone	1	2	3	4	5	Always work by myself
Masculine	2. Not at all active	1	2	3	4	5	Very active
Feminine	3. Very rough	1	2	3	4	5	Very gentle
Feminine	4. Not at all helpful to others	1	2	3	4	5	Very helpful to others
Feminine	5. Not at all kind	1	2	3	4	5	Very kind
Feminine	6. Not at all aware of feelings of others	1	2	3	4	5	Very aware of feelings of others
Masculine (reversed)	7. Can make up my mind very easily	1	2	3	4	5	Have very hard time making up my mind
Masculine	8. Give up easily	1	2	3	4	5	Never give up easily
Masculine	9. Not at all sure of myself	1	2	3	4	5	Very sure of myself
Masculine	10. Feel I'm not as good as other people	1	2	3	4	5	Feel I'm better than other people
Feminine	11. Not at all understanding of others	1	2	3	4	5	Very understanding of others
Feminine	12. Very unfriendly toward people	1	2	3	4	5	Very friendly toward people

Modified PAQ Given to 9th-12th Graders

Now we would like to know what kind of person you think you are. Listed below are words that can be used to describe a person. For each set of words or phrases, circle the number that best describes you.

For example:

not at all nice 1 2 3 4 5 very nice

If you feel you are very nice you would circle 5. If you feel you are not at all nice, circle 1. If you are nice most of the time, circle 4. Do not circle more than one number on a line.

cale Component					
asculine	1.	Not at all independent	1 2 3 4 5	Very independent	2:48
	2.	Not at all emotional	1 2 3 4 5	Very emotional	2:49
asculine	3.	Not at all active	1 2 3 4 5	Very active	2:50
eminine	4.	Very rough	1 2 3 4 5	Very gentle	2:51
eminine	5.	Not at all helpful to others	1 2 3 4 5	Very helpful to others	2:52
	6.	Not at all competitive	1 2 3 4 5	Very competitive	2:53
eminine	7.	Not at all kind	1 2 3 4 5	Very kind	2:54
eminine	8.	Not at all aware of feelings of others	1 2 3 4 5	Very aware of feelings of others	2:55
asculine (reversed)	9.	Can make decisions easily	1 2 3 4 5	Have difficulty making decisions	2:56
asculine	10.	Give up easily	1 2 3 4 5	Never give up easily	2:57
asculine	11.	Not at all sure of myself	1 2 3 4 5	Very sure of myself	2:58
asculine	12.	Feel very inferior	1 2 3 4 5	Feel very superior	2:59
eminine	13.	Not at all understanding of others	1 2 3 4 5	Very understanding of others	2:60
eminine	14.	Very cold toward people	1 2 3 4 5	Very warm toward people	2:61

Self Rating Activity Scale

As a person you do a lot of different things. Some things you do more often than others. For each activity listed below, circle the number which best indicates how often you do this activity. Circle 1 if you rarely or never do the activity. Circle a 2 if you do the activity only very occasionally. Circle a 3 or 4 if you do the activity often to fairly often. Circle a 5 if you do the activity quite regularly. Circle a 6 if you do it very often.

Scale Component			never					very often	
Fem.	1.	Spend time making yourself look attractive	1	2	3	4	5	6	2:10
Masc.	2.	Fix things around the house	1	2	3	4	5	6	2:11
Fem.	3.	Learn new dances	1	2	3	4	5	6	2:12
Fem.	4.	Take care of a baby	1	2	3	4	5	6	2:13
Masc.	5.	Shovel snow off the sidewalk	1	2	3	4	5	6	2:14
Masc.	6.	Play active sports	1	2	3	4	5	6	2:15
Fem.	7.	Help wash the dishes	1	2	3	4	5	6	2:16
Masc.	8.	Fish and hunt	1	2	3	4	5	6	2:17

Idealized Boy Activity Scale

As a person, you engage in a lot of different activities. What you do and what you don't do may change how well you are liked by friends, parents, and teachers, how much fun you have, how well prepared you are for the future and how good you feel about yourself. Listed below are things that people may do. Some they do more often than others. Some of the things boys are more likely to do while other of the things, girls are more likely to do. Rate each activity according to how important you think it is for boys to know how to do and do each of these things.

1. How important is it for a boy to spend time making himself look attractive?

not very important — very important

1 2 3 4 5 6 7 **2:26**

2. How important is it for a boy to fix things around the house?

not very important — very important

1 2 3 4 5 6 7 **2:27**

3. How important is it for a boy to enjoy learning new dances?

not very important — very important

1 2 3 4 5 6 7 **2:28**

4. How important is it for a boy to know how to take care of a baby?

not very important — very important

1 2 3 4 5 6 7 2:29

5. How important is it for a boy to offer to help shovel snow off the sidewalk?

not very important — very important

1 2 3 4 5 6 7 2:30

6. How important is it for a boy to enjoy playing active sports?

not very important — very important

1 2 3 4 5 6 7 2:31

7. How important is it for a boy to offer to help wash the dishes?

not very important — very important

1 2 3 4 5 6 7 2:32

8. How important is it for a boy to enjoy fishing and hunting?

not very important — very important

1 2 3 4 5 6 7 2:33

Idealized Girl Activity Scale

As a person, you engage in a lot of different activities. What you do and what you don't do may change how well you are liked by friends, parents, and teachers, how much fun you have, how well prepared you are for the future and how good you feel about yourself. Listed below are things that people may do. Some they do more often than others. Some of the things boys are more likely to do while other of the things, girls are more likely to do. Rate each activity according to how important <u>you think</u> it is for girls to know how to do and do each of these things.

1. How important is it for a girl to spend time making herself look attractive?

   not very important — 1 2 3 4 5 6 7 — very important   2:18

2. How important is it for a girl to fix things around the house?

   not very important — 1 2 3 4 5 6 7 — very important   2:19

3. How important is it for a girl to enjoy learning new dances?

   not very important — 1 2 3 4 5 6 7 — very important   2:20

4. How important is it for a girl to know how to take care of a baby?

   not very important — 1 2 3 4 5 6 7 — very important   2:21

5. How important is it for a girl to offer to help shovel snow off the sidewalk?

   not very important — 1 2 3 4 5 6 7 — very important   2:22

6. How important is it for a girl to enjoy playing active sports?

   not very important — 1 2 3 4 5 6 7 — very important   2:23

7. How important is it for a girl to offer to help wash the dishes?

   not very important — 1 2 3 4 5 6 7 — very important   2:24

8. How important is it for a girl to enjoy fishing and hunting?

   not very important — 1 2 3 4 5 6 7 — very important   2:25

Table 5

Mean Values for Scales of Attitudes Toward Math for Males and Females for all Significant Differences Across Sex Roles as Measured by the PAQ and Activity Rating Scales

	Females			Males		
	PAQ	Self rating on activity scale	Idealized girl rating on activity scale	PAQ	Self rating on activity scale	Idealized boy rating on activity scale
Current difficulty in math	M 3.58**				M 3.44**	
	A 3.74				U 3.67	
	F 4.10				A 3.76	
	U 4.09				F 4.30	
Effort required to do well in math	M 4.70*				M 4.72	
	U 4.89				U 4.74	
	A 5.01				F 5.05	
	F 5.17				A 5.09	
Cost of doing well in math	A 2.89**			F 2.72*	U 2.81*	
	M 3.04			M 2.82	M 2.88	
	F 3.28			A 2.88	A 2.96	
	U 3.31			U 3.16	F 3.64	
Perception of task difficulty	M 4.22				M 4.12*	
	A 4.47				M 4.27	
	U 4.48				A 4.45	
	F 4.66				F 4.59	

Table 5 (continued)

Mean Values for Scales of Attitudes Toward Math for Males and Females for all Significant Differences Across Sex Roles as Measured by the PAQ and Activity Rating Scales

	Females			Males		
	PAQ	Self rating on activity scale	Idealized girl rating on activity scale	PAQ	Self rating on activity scale	Idealized boy rating on activity scale
Current expectancies in math	U 4.72***		M 4.81*	U 4.91***	F 4.72**	U 5.01*
	F 4.78		F 4.95	F 5.10	U 5.09	F 5.24
	M 5.08		U 5.06	M 5.34	A 5.23	M 5.27
	A 5.50		A 5.15	A 5.50	M 5.41	A 5.42
Perception of math ability	U 4.57***		M 4.55**	U 4.82**	F 4.33**	
	F 4.63		F 4.67	F 4.73	U 4.95	
	M 4.80		U 4.83	A 5.14	A 4.98	
	A 5.13		A 4.94	M 5.19	M 5.17	
Estimated performance in math	U 4.89***			U 4.85***		
	F 5.12			F 5.06		
	M 5.26			M 5.34		
	A 5.57			A 5.48		
Self concept of math ability	U 4.70***		M 4.80*	U 4.85***	F 4.62*	
	F 4.80		F 4.84	F 5.01	U 5.08	
	M 5.03		U 5.00	M 5.29	A 5.17	
	A 5.37		A 5.11	A 5.38	M 5.28	

Table 5 (continued)

Mean Values for Scales of Attitudes Toward Math for Males and Females for all Significant Differences Across Sex Roles as Measured by the PAQ and Activity Rating Scales

	Females			Males		
	PAQ	Self rating on activity scale	Idealized girl rating on activity scale	PAQ	Self rating on activity scale	Idealized boy rating on activity scale
Interest in math	U 4.44***	F 4.59*	M 4.46**	U 4.26**	F 3.76***	U 4.15***
	F 4.54	U 4.64	F 4.53	F 4.63	U 4.36	M 4.65
	M 4.81	M 4.76	U 4.71	M 4.67	M 4.75	F 4.70
	A 5.15	A 4.97	A 4.96	A 4.85	A 4.75	A 4.88
Importance of math	U 5.56***		M 5.54***	U 5.51**		U 5.52***
	M 5.64		U 5.60	F 5.66		M 5.70
	F 5.76		F 5.69	M 5.82		F 5.80
	A 6.18		A 6.12	A 5.96		A 6.02
Value of math	U 4.84***	F 4.95***	F 4.91***	U 4.84***		U 4.87***
	F 4.97	U 5.07	M 4.94	F 5.16		M 5.09
	M 5.13	M 5.24	U 4.97	M 5.19		F 5.21
	A 5.48	A 5.36	A 5.34	A 5.36		A 5.39
Abilty required to	U 3.48*	F 3.51*	U 3.21 ***			F 3.41 *
do well in math	M 3.49	M 3.69	M 3.49			U 3.54
	F 3.64	U 3.70	F 3.74			M 3.67

Table 5 (continued)

Mean Values for Scales of Attitudes Toward Math for Males and Females for all Significant Differences Across Sex Roles as Measured by the PAQ and Activity Rating Scales

	Females			Males		
	PAQ	Self rating on activity scale	Idealized girl rating on activity scale	PAQ	Self rating on activity scale	Idealized boy rating on activity scale
Stereotyping math as male domain		M .11**				
		A .65				
		U 1.07				
		F 1.09				
Stereotyping of math ability					A 4.06*	U 4.10**
					F 4.17	F 4.13
					U 4.28	A 4.17
					M 4.34	M 4.48
N	U 137	U 88	U 103	U 132	U 134	U 126
	F 162	F 260	F 72	F 54	F 18	F 70
	M 73	M 32	M 138	M 189	M 231	M 160
	A 161	A 161	A 222	A 140	A 137	A 159

* p .05

** p .01

*** p .001