Changes in Children's Self-Concept of Ability, Achievement Values, and General Self-Esteem at Early Adolescence

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Changes in children's self-concept of ability, achievement values and general self-esteem at early adolescence

There has been increasing interest in how children's self-perceptions change at early adolescence. During these years, children experience the social and biological changes associated with puberty. In addition, most children make an important school transition, moving from elementary school to middle school or junior high school. Various theorists (e.g., Blyth, Simmons, & Carlton-Ford, 1983; Eccles, Midgley, & Adler, 1984; Hill & Lynch, 1983; Simmons, Blyth, Van Cleave, & Bush, 1979) have proposed that these changes can have a significant impact on students' self-perceptions and self-esteem.

Concerning the transition to junior high school, students' classroom environments change greatly once they leave elementary school (see Eccles et al., 1984). For instance, there are more formal, controlling, and less trusting relations between students and teachers (see Brophy & Evertson, 1978; Midgley, Feldlaufer & Eccles, 1987; Willover, Eidell, & Hoy, 1973)); a greater emphasis on evaluation and social comparison among students (Feldlaufer, Midgley, & Eccles, 1988; Harter, Whitesell, & Kowalski, 1987), stricter grading standards (Blyth, Simmons, & Bush, 1978; Kavrell & Petersen, 1984; Schulenberg, Asp, & Petersen, 1984), and a disruption of children's social networks (Berndt, 1987). Eccles et al. (1984) reviewed evidence showing that many students' self-perceptions become more negative following the transition to junior high. These students become more anxious about school (Fyans, 1979; Harter et al., 1987), have lower academic intrinsic motivation (Gottfried, 1981; Harter, 1981; Harter et al., 1987), have lower ability self-concepts and attach lower value to certain school subjects (Eccles et al., 1983). Some studies suggest that these changes are particularly likely to occur for mathematics (Barsh, 198., Eccles et al. 1984). Along with these changes in specific self-perceptions, Simmons, Rosenberg, & Rosenberg (1973) have shown that following the transition to junior high school, children's general self-esteem tends to be lower and less stable, and their self-consciousness higher. Eccles et al. (1984) and Simmons and her colleagues (e.g., Simmons et al., 1973; others) postulated that these changes in student attitudes and beliefs are due in part to the school environment changes just discussed.

Pubertal changes may also be responsible for some of these changes (both biological and social). Several investigators have suggested that gender-role appropriate activities may become more important to children at this time, as they try to conform more to gender-role stereotypes for their behavior (Eccles, 1987; Eccles & Bryant, 1978; Hill & Lynch, 1983; Katz, 19XX; and Lynch, 19xx), leading to gender-role intensification. In terms of children's achievement beliefs, gender role intensification may lead early adolescents to become less involved and interested in school subjects that they see as less appropriate for their own gender. In support of this hypothesis, girls' beliefs and attitudes about mathematics in particular become more negative following the transition to junior high while their attitudes toward English remain quite positive (Eccles et al., 1983).

Gender-role intensification may also lead to a temporary loss of self-esteem as children re-evaluate their competence using new heterosocial standards. This re-evaluation process may be especially debilitating if it coincides with other major transitions that disrupt existing social networks. In support of this prediction, Simmons et al. (1979) found that declines in self-esteem among students making the junior high school transition were particularly likely among early maturing girls who had also begun dating.

Though several studies suggest that at least some students self percpetions and achievement values become more negative at early adolescence, there has been some debate about the magnitude of these negative changes, their duration and their generality across the population and across various domains. This has been particularly true concerning changes in students' general self-esteem. Recent longitudinal studies of children's self-esteem during the adolescent years show that if change occurs, it is as likely to be positive as it is to be negative (Dusek & Flaherty, 1981; O'Malley & Bachman, 1983); even across the transition to junior high school (Nottleman, 1987). Though Simmons et al.'s cross-sectional work indicates that early adolescence is a period of disturbance in students' self-esteem, their longitudinal work (e.g., Blyth et al., 1983; Simmons et.al., 1979) shows that for most children, self-esteem scores increase across adolescence. In their studies, white girls who make the transition to junior high school are the only group who show declines in self- esteem. Generally, these studies tend to show that early adolescence is not a time of dramatic disturbance in children's self-esteem, and that most observed changes tend to be slightly positive.

In the present study, we extend this work by examining change across the junior high school transition in children's general self-esteem, as well as changes in their self-concepts of ability and valuing of mathematics, English, social activities, and physical skills activities. These variables were chosen because they represent central constructs in achievement motivation theory: self-esteem, perceptions of ability, and the values attached to different tasks all have been posited to influence students' achievement behavior (see Eccles et al., 1983). The different activity areas (academic, social, physical skills) were chosen because they represent activity domains that are common to childhood (Harter, 1982). Further, studies have shown that children differ in their self-beliefs in these different areas (see Eccles et al., 1984; Harter, 1982), and work in the self- concept area has shown that these different dimensions can be meaningfully distinguished (Marsh & Hocevar, 1984; Shavelson & Bolus, 1982).

Finally, studies reviewed by Eccles et al. (1984) suggest that the discrepancies noted in the previous paragraph may reflect different levels of specificity, different domains across studies and different times of measurement. By examining both general self-esteem and self-perceptions for specific activities at two time points each year, we can provide a more complete picture of how children's beliefs change at this time, and so clarify some of the conflicting findings in previous work. We predict that changes in self-esteem and changes in self-perceptions about specific activities may follow different patterns. Self-esteem should be disrupted immediately following the transition to junior high, as students adjust to the school change, and develop new social networks and roles. As children adjust to the transition, self-esteem should increase so that the initial decline disappears by the second term of the seventh grade. To the extent that changes in teaching practices account for changes in students subject matter specific behavioral ? values as predicted by Eccles et al. (1984). Children's self-concepts of ability and valuing of different academic activities should show moderate changes following the transition to junior high school, but become increasingly negative across the seventh grade year as the children have more experience with the different kinds of teaching practices characteristic of seventh grade instruction.

In addition to the extent that these teaching practices are more characteristic of math than of English instruction, as suggested by Brush (198) and by Eccles and Midgley (1989) the negative changes should be especially marked for self concept of ability and task value in mathematics. Changes in students' beliefs about social activities should be more similar to the self-esteem changes: Due to the disruption of children's social networks that comes with the move to junior high (Berndt, 1987), children's perceptions of their social ability should decline immediately after the transition, and then recover. However, children's valuing of social activities should not decrease after the transition, and perhaps will increase during seventh grade due to the salience of peer aceptance to early adolescents (CITE).

All of the changes as well as the absolute levels of the constructs of each wave should also be influenced by the early adolescents' actual competence levels. Students with higher academic ability should have higher general self-esteem, because academic activities are quite central to students' (particularly boys) overall self-evaluations at this age (Walker & Greene, 1986). Students with lower academic ability should de-value the importance of academic subjects, and increase the perceived value they attach to activities in other domains across time, whereas students rated high in academic ability should continue to value academic subjects the most across time.

We also predicted that students with lower academic ability should have relatively higher ability perceptions in other areas that they value highly. For exmaple, boys rated low in mathematics ability should have higher self-concepts of ability and higher valuing of sports activities than boys rated high in mathematical ability. Similarly, girls rated low in mathematics ability should have relatively more positive self-perceptions concerning social activities than girls rated higher in mathematical ability. Low math able students could use these "compensation" strategies of valuing those things they are good at and de-valuing the things they are less good at to help them maintain their self-esteem; having congruence between one's ability perceptions and valuing of different activities should enhance general self-esteem.

As discussed earlier, early adolescence is a time of gender role intensification. Consequently it is important to examine gender differences in both the absolute levels of student's self-esteem and self-perceptions at each wave and the patterns of change across the four waves. Consistent with past work, we predict that boys will have more positive self-perceptions in the math and sports domains and in their general self-esteem, and girls in the English and social domains (Eccles et al., 1983; Harter, 1982, Maccoby & Jacklin, 19XX). In addition, to the extent that gender role intensification is occurring during this period of development, gender differences in children's beliefs should increase over the four waves of our study.

The effects due to gender-role intensification should be excerbated by certain types of change in the classroom environment common to the junior high school transition. Further, for children's academic self-perceptions, the classroom environments children experience following the transition to junior high may contribute to these increasing gender differences, since those classrooms (particularly mathematics classrooms) are less "girl-friendly" after the transition (Eccles, MacIver, & Lange, 1987).

Method

Study Overview

The data presented in this paper were collected as part of a larger investigation (the Transitions in Early Adolescence Project) concerned with the impact of change in the classroom and family environments on early adolescents' beliefs, motives, values, and behaviors in several activity domains. The study has a two-year, four wave design. Students completed questionnaires twice each year (fall, spring) over the two years of the study. Hence, we could assess both within and across year changes in student self-perceptions.

Sample

Twelve school districts located in low- to middle-income communities were recruited for this project. The districts are located within 50 miles of a large midwestern city. Almost 90% of the students in these districts are Caucasian. All teachers in those districts who taught mathematics to fifth or sixth graders scheduled to make a transtion the next year to middle or junior high school were recruited year 1; 95% of the teachers, representing 143 classrooms, agreed to participate. Students were followed year 2 into 171 mathematics classrooms. All eligible teachers year 2 agreed to participate. Of the eligible students, 79% agreed to participate. A student attrition rate of 14% between years 1 and 2 occurred primarily because of students moving away from participating districts. A total of 2501 students filled out questionnaires at all four waves.

A subset of the student sample from the Transitions project is used in the analyses reported here. The sample consists of approximately 1800 students who made a transtion from a sixth grade elementary school classroom to a seventh grade junior high school classroom, and who completed questionnaires at all four waves of the study.

Student Questionnaire

Student questionnaires measuring a large number of theoretical constructs across multiple activity domains were administered by field staff to students during the period they normally received mathematics instruction for two consecutive days in the fall and spring of each school year. The questionnaire contains items assessing a broad range of students' values, beliefs, and attitudes concerning mathematics, English, physical skills, and social activities, as well as many other constructs (see Eccles 1986, for a detailed description of the student questionnaire and its development). Many of these items have been used in previous studies by Eccles and her colleagues, (e.g., Eccles et al., 1983; Eccles, Wigfield, Jayaratne, Kaczala, & Meece, 1987), and so their psychometric properties are well-known (reported in Parsons, 1980).

The dependent variables included in the present paper include: 1) students' self-esteem, assessed by Harter's (1982) 5-item Self-Esteem scale; 2) children's self-concept of ability ratings for mathematics, English, athletics, and social interactions, assessed by two items in each domain; 3) children's liking of activities in each of the four domains, assessed by one item in each domain; and 4) children's rating of the importance they attach to competence in each of these four domains. assessed by one item in each domain. All of these variables were measured at each of the four waves of the study. Internal consistency reliabilities for the variables that were measured by more than one item (self-esteem and self-concept of ability) are presented in Table 1. Copies of the specific items measuring each construct are available from the authors.

Math Ability Ratings

Need note on why one is OK -- four previous studies of high inter-- many items comparing these scales and limited space

Children's math ability level was measured using the sixth grade teachers' rating of each child's natural math talent and relative performance in math. Three groups were formed from these ratings: high, average, and low ability groups. To keep the two extreme groups as meaningful as possible, we tried to achieve a 20-60-20% split. The distribution of the sample would not allow this, and so a 12-66-22% split for low, average, and high ability children was used. Females are slightly over-represented in the average and high ability groups CHECK #'s (645 girls and 530 boys in the average group; 210 girls and 177 boys in the high ability group). Males are slightly overrepresented in the low ability group (111 boys, 102 girls).

Scoring

Each item on the self-esteem scale was answered on the 1 to 4 scale developed by Harter (1982), and the scores were coded so that higher scores indicated higher self-esteem. The scores for each item were summed to form a total score for self-esteem, which could range from 5 to 20. All other constructs were assessed using 1 to 7 scales, with higher scores indicating higher self-concepts of ability, importance, and liking, respectively. For the self-concept of ability construct, the two items measuring self-concept of ability in each domain were averaged, so that scores on self-concept of ability, liking, and importance would range from 1 to 7.

Analysis

Each set of dependent variables (self-esteem, self-concept of ability, liking, and importance) was analyzed in separate repeated measures multivariate analyses of variance (MANOVA). The .01 level of significance was adopted because of the large sample size and large number of possible effects. All MANOVAS except the MANOVA on self-esteem scores included two between subjects factors, teacher-rated math ability and student gender, and two within subjects factors, time of measurement and activity domain. The MANOVA assessing self-esteem had only one within subject factor, time of measurement. For the time of measurement factor, significant effects were interpreted by examining whether change over time was linear or nonlinear. Quadratic and cubic nonlinear effects were examined. Quadratic trends indicate one shift in direction of change over time, and cubic trends indicate two shifts in direction of change over time (Kirk, 1968). Significant activity domain main effects or interactions of domain with one of the other factors were followed up with three way MANOVAs that assessed gender, ability level, and time of measurement effects separately in each domain. These analyses provided univariate follow-up tests for the various significant multivariate findings. The analysis of each dependent variable is discussed in turn. Significant effects from the four-way MANOVAs on self-concept of ability, liking, and importance are presented in Table 3, and the significant effects from the three-way MANOVAs within each domain are presented in Table 4. Given the complexity of the results, we will include some discussion in the results section.

Results and Discussion

Self-esteem. As predicted, significant effects from the MANOVA on self esteem scores are presented in Table 2. There was a significant cubic trend. This trend is presented in Figure 1. As predicted, there is a substantial decline in self-esteem scores following the transition to junior high school. And as predicted, there is also change within each year; with the result that students report the lowest self-esteem in the fall of the seventh grade year after the transition to junior high school. In both years, students report lower self-esteem in the fall than in the spring.

As predicted, there is also a significant sex effect: Boys report significantly higher self-esteem than do girls at all four waves (see Table 3 for the means). Again, as predicted, the effect for mathematics ability level also is significant. At all four waves, children with high-rated math ability have the highest self-esteem, followed by the average group, and then the lower group (see Table 3).

Self-Concept of Ability. As indicated by the significant activity domain by time of measurement interaction (see Table 4), the pattern of change differs across the domains. Changes in self-concept of ability in each domain are shown in Figure 2. For mathematics and English self-concept of ability, there is a small linear decline across the four waves, with the linear trend for the English self-concept of ability beliefs reaching significance (see Table 5). As predicted, social self-concept of ability shows the most marked decrease following the transition to junior high. Additionally, children's social self-concepts of ability are higher in the spring than the fall both years of the study (and highest in the spring of the sixth grade year), as shown by the significant cubic trend. Children's self-concept of ability for physical skills activities declines from Waves 1 through 3, and the linear trend is significant. These beliefs rebound slightly at Wave 4.

As predicted, the two-way interaction of ability group by activity domain is significant. The means for the three ability groups collapsed across waves are presented in Table 6. Students rated as low in mathematics ability had relatively higher self-concepts of ability for non-academic activities than for academic activities. In contrast and as predicted, high-math-rated children have relatively higher self-concepts of ability for academic activities (particularly math) than for other activities. The average group falls between these other two groups, and their scores are more similar across the domains. The univariate follow-up tests show that the only significant differences among the ability groups are for mathematics and English self-concepts of ability. The high-rated math ability children's mathematics and English self-concepts of ability are higher than those of the average and low-rated children.

The significant three way interaction of activity domain by math ability group by time of measurement shows that these differences change over time, though the only significant trends were the linear and cubic trends in mathematics self-concepts of ability (see Tables 3 and 4). These trends indicate that the direction of change in math self-concept depends on the students' math ability level. Contrary to what might be expected, the mathematics ability perceptions of high-rated students decline across the transition to junior high school, whereas those of low-rated ability students increase somewhat (see Table 6). Average students' self-concepts of ability in mathematics also show a decline, at Wave 4.

Boys' and girls' self-concepts of ability differ across activity domains, as indicated by the significant two-way interaction of sex by activity domain (see Table 3) and by the univariate simple effects tests within domain. The means are presented in Table x. (Collapse across waves.) At all four waves, boys have significantly higher self-concepts of ability than girls in the math and physical skills domains, and girls have significantly higher self-concepts of ability than boys in English. Boys' and girls' social self-concepts of ability do not differ. The three-way sex by domain by time of measurement interaction also is significant. Simple effects indicate that the only significant sex difference trend over time is a significant cubic sex by wave trend in children's social self-concepts of ability. This sex difference in the trend occurs because, con[illegible] to our prediction, boys' self-concepts of ability in the social domain are affected negatively more by the transition to junior high school than are girls'.

Liking of each domain. Overall changes in children's liking of activities in each domain are shown in Figure 3. The MANOVA effects for liking are shown in Table 3 and the univariate simple effects are shown in Table 4.

There is a quite large domain main effect for liking. In general, children report liking non-academic activities more than academic activities, and report liking English the least (see Figure 3). In addition, the two way activity domain by time of measurement interaction is significant. In looking at the changes in liking over time, children's liking of mathematics and sports activities declines steadily over the four waves, as the highly significant linear trends for each show (see Table 4). For the social domain, all three trends are significant, with the cubic trend the strongest (see Table 4). This trend results from the following pattern: Children report liking social activities slightly more in the spring of each year than in the fall, particularly in seventh grade, though the differences are small. Children's liking of English also is more positive in the spring than the fall of each year, and the cubic trend is significant for English beliefs as well.

As predicted, the two-way interaction of activity domain by ability level is significant, and the univariate follow-up tests show that the significant differences between the ability groups are in the mathematics and social activity domains (see Table 4). The means are presented in Table 8. (collapse across waves) High ability children report liking math more than the average ability children, who in turn like mathematics more than do the low ability children. Not surprisingly, all the groups report liking social activities more than they like mathematics. But contrary to our predictions, and contrary to what one might expect given the "nerdy" stereotype of mathematically-able children, the high and average-rated math ability children report liking social activities more than do the low-rated math ability children. Nonetheless, and consistent with our predictions, the differences between liking of mathematics and liking of social activities are much more pronounced in the low ability group than in the high and average groups.

The significant three-way interaction of ability level, domain, and time of measurement shows that the differences across ability groups in children's liking of activities changes over time. The univariate follow-up tests show that these differences are significant in the mathematics and sports domains (see Table 4). For mathematics, the observed ability by wave interaction reflects differences in the linear trend. High and average rated children show a steady decline in liking of mathematics, whereas low ability children show an increases in their liking of math until wave 4 (see Table 8). The ability by wave intereaciton for sports is a difference in the quadratic trend. High and average-rated children's liking of sports decline steadily over time. In contrast, for low ability children liking of sports increases at Wave 2, and then decreases sharply between Waves 3 and 4, as the significant quadratic interaction trend shows.

As predicted, the two-way interaction of sex by activity domain is significant (see Table 3). The means are presented in Table 9 collapse across waves. Boys and girls differ significantly in their liking of sports activities, social activities, and English: boys report liking sports more than do girls, whereas girls report liking social interactions and English more than do boys. These effects did not interact with ability level or time of measurement.

Importance of Each Domain. The significant main effect of domain and the significant wave by domain interaction will be discussed together (see Table 3). The means associated with these effects are illustrated in Figure 4. Overall, children rate math and social activities as most important to them, and physical skills activities as least important at each wave. These differences, however, vary in magnitude across waves due to the face that the pattern of change varies across the domains, as shown by the significant two-way activity domain by time of measurement interaction (see Figure 4 and Tables 3 and 4). At Wave 1, the domains cluster clearly in two groups (social and math; and English and physical). By Wave 4, the two academic domains have converged due to a decrease in math and an increase in English and social has become relatively more important than math despite the linear decrease in both of these domains. Contrary to our hypotheses, the importance of social activities does not increase across the seventh grade year and does note change disproportionately over the school transition; in fact. it decreases slightly and steadily across the four waves. as the significant simple linear effects trend indicates (see Table 4). Similarly, the perceived importance of math decreases steadily over time, as the highly significant linear trend indicates. Children's rating of the importance of English changes within year as well as across year, with children rating its importance higher in the spring than in the fall of each year, as the significant cubic trend shows. In addition, like the previous three domains, its importance declines as the children move from elementary to junior high school. The importance children attach to physical activities shows a significant linear decrease over time (across waves 1-3) that levels off between waves 3 and 4 (as indicated by the significant quadratic simple effects trend).

Contrary to the notion that low math rated children may compensate for their low ability perceptions in mathematics by devaluing mathematics, the very significant main effect of domain (see Table 3) coupled with an inspection of the mean in Table 10 indicate that children at all ability levels rate mathematics and social activities as most important and physical skills least important (see Table 10 collapse across waves). Despite these similar overall patterns, the ability level by activity domain interaction is significant (see Table 3). The univariate follow-up tests show that high ability children rate mathematics and English as more important than do average ability children, and the average-rated children rate each subject more important than do low-ability children. Interestingly, high and average ability children also rate social activities as more important than do low ability children. All the ability groups rate sports activities as the least important of this set of activities.

As expected, the ratings of importance vary by sex, as shown by the significant sex by domain interaction. The means are presented in Table 11 (collapse across domains). Girls rate English and social interactions as more important than do the boys, and boys rate sports as more important than do girls, with the univariate follow-up tests showing these differences are significant. Boys and girls rate math as equally important.

The three-way interaction of sex by activity domain by time of measurement indicates that these patterns change over time (see Table 3). However, the only significant simple interaction effect is the cubic trend by sex interaction (see Table 4) in beliefs about the importance of English. This trend shows that for both boys and girls, the importance of English declines following the transition to junior high school, but then increases across the seventh grade year.

General Discussion

In this section, we will discuss the changes over time we observed in children's self-esteem and self-perceptions, and then discuss findings for boys and girls, and the different ability groups. We also will discuss the implications of our findings for theories of gender intensification, and compensation models of self-esteem.

Time of Measurement Effects

Consistent with the results reported by Simmons et al. (1973), we find clear evidence of a disruption in self-esteem that coincides with the transition to junior high. This negative shift occurs in both boys' and girls' self- esteem scores, and in the groups differing in math ability level. This decline in self-esteem probably reflects students' reaction to their new school environments. In sixth grade students are the oldest group, and so are likely to have the most status. They know their school routines well, and the school environment is familiar to them. Not surprisingly, then, we found that students' self-esteem is highest during the spring of the sixth grade year. In seventh grade, students are now the youngest group in the school, and are adjusting to their new school environments. This adjustment period may be reflected by the drop in self-esteem they report in the fall of the seventh grade year. With time, children's self- esteem increases so that it is nearly as positive by the spring of the seventh grade year as it had been in the spring of the sixth grade year. These findings are similar to those reported by Bachman and O'Malley (1983) and Nottelman (1987) suggesting that children's general self-esteem increases during this time period. There seems to be a disruption in self-esteem at early adolescence that is associated with the transition to junior high, but that disruption does not persist.

Children's self-concepts of ability and valuing of mathematics, English, social, and physical skills activities tend to become more negative following the transition to junior high. Self-perceptions concerning social activities (and to some extent English) rebound over the seventh grade year, whereas beliefs about mathematics and physical skills activities continue to decline. We believe these negative shifts in students' beliefs about mathematics can be tied to the changes in the classroom environment that occur following the transition to junior high school. These changes include the increasing use of homogeneous ability grouping, the decreases in opportunities for student input, decision-making, interaction, and cooperation, and the increases in whole class task organization, teacher mistrust of students, and teachers' authoritarian attitudes (Feldlaufer, Midgley, & Eccles, 1987; Midgley & Feldlaufer, 1987; Midgley, Feldlaufer, & Eccles, 1988), and the stricter evaluative standards students encounter (Blyth et al., 1978; Kavrell & Petersen, 1984; Schulenberg et al., 1984).

We currently are exploring the specific impact of mathematics classroom environment changes on students' achievement beliefs and values about mathematics. Results show that changes in teacher efficacy (Midgley, Feldlaufer, & Eccles, 1988) and changes in the quality of student/teacher relationships (Feldlaufer, Midgley, & Eccles, 1988) across the transition have a causal effect on changes in students' achievement beliefs and values about mathematics. We would like to emphasize that these changes in classroom environments may be particularly likely to occur in mathematics classrooms and therefore most strongly influence children's mathematics beliefs. Though children's self-concepts of ability for English decline following the transition, their valuing of English increases slightly during seventh grade (though English is not valued highly overall). Perhaps the classroom practices in English do not change in the same negative ways that we have found in mathematics classrooms. Future studies should include observations in both mathematics and English classrooms to test this hypothesis.

The finding that children's beliefs about physical skills activities also continue to decline steadily across the four times of measurement was surprising. We had predicted that beliefs about physical skills activities would become more positive in seventh grade, particularly for boys. Perhaps the greater competition and selectivity that occurs in junior high gym classes and physical activities (due to larger schools, and greater selectivity for team sports) deflates the beliefs of many students. These classroom environment changes may be similar to those we have observed in mathematics classrooms.

By and large, children's beliefs about social activities remain relatively positive following the transition to junior high, and children's self-concepts of ability and liking of social activities show some increases during the seventh grade year, suggesting that social activities become increasingly important to children during this time period.

Gender Differences

Boys' self-esteem scores were higher than girls' scores at all four waves, a finding reported by many others (e.g., Blyth et al., 1983; Nottleman, 1987; Simmons et al., 1979). We are unsure whether this finding reflects "true" sex differences in self-esteem or response bias, since boys tend to be more self-congratulatory than girls in their responses to self-report measures (ref).

Boys' and girls' self-concepts of ability generally differed in predicted ways: Boys had higher self-concepts of ability for mathematics and sports, and girls for English. Contrary to prediction, girls and boys had similar perceptions of ability for social activities. Further, these patterns changed little over time, which is contrary to our prediction. We hypothesized that due to girls' and boys' increasing interest in sex-role appropriate activities their beliefs would diverge more following the transition to junior high school, but this did not occur.

Gender differences in liking of English, social activities, and physical skills followed our predictions. However, girls and boys reported liking math equally well and girls liked math as much as they liked English. This finding is counter to the notion that girls would like male stereotyped activities less than boys do, and may suggest that girls are beginning to view math as just as appropriate for them as English, even during early adolescence. However, we should note that neither boys nor girls reported liking math or English very well in comparison to the two non-academic activities. Boys and girls rated mathematics as equally important, and as more important than either sports or English. Though it is encouraging that boys and girls in this study value math similarly, the fact that girls continue to hold slightly less positive views of their ability in math may mean that they will be less likely to take advanced math courses in high school as those courses become more difficult, even though they believe the courses are important. The differences in the importance girls attach to math and English decrease across the waves due to declines in the importance they attach to math and increases in the importance they attach to English. As a result, by the end of the seventh grade, girls rate both math and English as quite important to them, while boys still rate math as more important than English (though boys' ratings of the importance of math also decline over the four waves. If these trends continue into high school as our previous studies suggest (Eccles et al., 1984, 1988), the girls should be less likely to take optional advanced level math courses than the boys, especially if the girls believe they are better in English than in math.

In general, then, we found little evidence for gender intensification influences on boys' and girls' beliefs, as the differences we did observe between boys and girls did not increase greatly over the four waves of the study. Further, boys' and girls' beliefs about mathematics and (to some extent) social activities) were similar than we had anticipated they would be. These findings can be interpreted in two ways: that gender intensification did not have any effects following the transition to junior high school, or that its effects occurred earlier, since the differences we observed were in place when students were in sixth grade. Since previous studies have shown that the effects of gender intensification occur during early adolescence. we would argue that it did not have strong effects on the beliefs we measured in this study.

Ability Level Differences

Children rated high in math ability by their teachers had the highest self-esteem scores, followed by the average ability children, and then the low ability children. This finding suggests that students' school performance has a strong impact on their general self-esteem during this time period, as others have found (Walker & Greene, 1986). For students doing poorly in school, doing well in other activities may not be enough to maintain their self-esteem during this time period.

Children rated highest in math ability by their teachers had the most positive self-concepts of ability in math, whereas those of children rated lowest in math ability students were the most negative. Although this finding is not surprising, it is interesting to note that these differences lessened somewhat following the transition to junior high school. With time the high-rated students' self-concepts of math ability decline, whereas the low-rated students' self-concepts of math ability increase. Reuman, Mac Iver, Eccles, & Wigfield (1987) found that these shifts are particularly strong for students who go from heterogeneously ability grouped classrooms in sixth grade to homogeneously grouped classrooms in seventh grade. Schwarzer and his colleagues (Schwarzer & Lange, 1983; Schwarzer & Schwarzer, 1982) have obtained similar results. These studies suggest that changes in children's social comparison reference groups produce these changes in ability self-assessment. In heterogeneous classrooms, high ability children outperform most of the other children in the class. However, when they are grouped with other high ability children, they may not be as outstanding. Relative to other children in a heterogeneous group of children, low ability children would do poorly. But placed in a low ability class, their relative ability perceptions increase. It would be interesting to assess these students' self-concepts of ability in math in eighth or ninth grade to see if the declines in high-ability students' and increases in low ability students' math self-concepts of ability persist, or if the differences between the two groups start to widen again. We would predict that the gap would begin to widen again, as the more general implications of tracking in math beginto become clearer to students.

In comparing children's self-concepts of ability in the different domains, the high ability children report the highest self-concepts of ability in the academic areas (mathematics for boys, mathematics and English for girls), whereas the children rated low in mathematics ability did so for the non-academic areas (sports for boys, social for girls). Children rated average in mathematics ability report the highest self-concepts of ability in a combination of academic and non-academic activities. These patterns support our predictions that students rated lower in math ability would have higher self-concepts of ability in other areas, especially the non-academic activities. This also suggests that students may compensate for their low self-concepts of ability in one area by having higher self-concepts of ability in other areas. However, the high-rated and low-rated children's self-concepts of ability for the non-academic activities did not differ, and so summing across all activities the high-rated children had higher self-concepts of ability. This general difference could be a major reason why the high math-able children had higher self-esteem scores.

The findings concerning liking of math for the different ability groups were quite similar to the self-concept of ability findings. High ability children reported liking math more than did the low ability children, but these groups' scores converged somewhat following the transition to junior high. These findings also can be related to the changes in ability grouping practices that occurred for many children at seventh grade (see Reuman et al., 1987). High ability children may like math less because they are not performing as well relative to others, whereas the low-rated children might like it more because their relative performance is better.

Consistent with a compensation model of self-esteem maintenance, the differences in liking of non-academic and academic activities were stronger for low ability children than for the high ability children. However, low-rated children's liking of sports activities declined rather sharply during the seventh grade year. We predicted that these children's (particularly boys) liking of sports would increase during that time, as one way to compensate for more negative beliefs about academic activities. This did not occur, perhaps because as mentioned earlier sports activities become much more competitive in junior high school.

In contrast to our findings for self-concept of ability and liking, children high, middle, and low in mathematics ability ranked the importance of activies in different domains very similarly, with all groups rating mathematics and social activities as most important. The similarities in the importance ratings across ability groups suggest that the low mathematics ability children are not engaging in the compensation strategy of adjusting their valuing of activities to correspond to their ability perceptions. Though the children rated low in mathematics ability by their teachers have relatively low self-concepts of ability in math and don't especially like math, they still rank math as quite important to them, with only social activities ranked as important. We think these findings also help explain why the low mathematics ability children have low general self-esteem scores: They are doing poorly in a school activity that they regard as relatively important. In order to increase their general self-esteem, it would appear that these students would have to lower the importance they attach to mathematics in order that their self-concepts of ability and values become more congruent, or perhaps stop taking mathematics when that option becomes available to them. Alternatively, they could move into a mathematics classroom that is organized in a way to make them feel more able. Unfortunately, most junior high mathematics classrooms do not seem to be structured in ways that would facilitate these children's perceptions of competence.

Perhaps more troubling, the children rated low in mathematics ability were becoming increasingly negative in their beliefs about most of the activities we assessed. For instance, though these children's self-concepts of ability and liking of sports activities were high initially, they showed a steady decline over the four waves of the study. These children also rated social activities as less important than did the high-rated mathematics ability group. In general, then, the low-rated group became more disaffected by the end of their seventh grade year, not just in academic areas but non-academic areas as well. If these trends continue, these children's self-esteem scores may continue to decline even further.

To conclude, we have found that the transition to junior high school is associated with changes in children's general self-esteem and beliefs about specific activities. Though these differences are not always large, they are systematic, and followed many of our predictions. We are most concerned about the negative shift in many of the beliefs we measured, particularly for the low ability students. We are beginning to understand how the mathematics classroom environments students encounter following the transition to junior high school relate to the negative shift in their beliefs and values about mathematics. Researchers now should examine how classroom environments in other subject areas change, to begin to determine the factors influencing children's beliefs and values in those areas. Children's beliefs about English do not continue to decline in the way the beliefs about mathematics do; perhaps the classroom environments in English remain more positive following the junior high transition. However, the negative changes in children's beliefs about sports activities suggest that children experiences with those activities are less positive following the junior high transition. Such changes may be particularly problemmatic for children doing relatively poorly in academic subjects, who may try to excel in sports activities as a way to maintain their general self-esteem.

Table 2

Effects of Gender, Math Ability Level, and Time of Measurement on Self-Esteem

	Self-Esteem
Between-subjects effects	
Gender	25.66*
Math Ability Level	31.69*
Gender by Math Ability Level	1.92
Within-subjects effects	
Time of Measurement	11.60*[c]
Time of Measurement by Gender	2.80
Time of Measurement by Ability Level	.87
Time of Measurement by Gender by Ability Level	.69

Note. Cells display F-tests based on repeated measures MANOVAs. An asterisk indicates the effect is significant at .0001.

[c]Significant cubic trend based on univariate tests

Table 3

Effects of Gender, Math Ability Level, Time of Measurement, and Domain on Attitudes and Values

	Self-Concept of Ability	Liking	Importance
Between-subjects effects			
Gender	18.52*	.06	2.14
Ability Level	52.63*	14.23*	14.05*
Gender by Ability Level	2.30	.58	.98
Within-subjects effects			
Domain	4.85*	381.60*	794.24*
Domain by Gender	91.28*	61.54*	61.50*
Domain by Ability Level	54.95*	6.59*	16.31*
Domain By Gender by Ability Level	.88	.18	.58
Time of Measurement	22.11*	39.90*	32.13*
Time of Measurement by Gender	1.55	1.44	2.69
Time of Measurement by Ability Level	2.26	1.85	2.18
Time of Measurement by Gender by Ability Level	.49	.80	1.05
Domain by Time of Measurement	5.13*	12.15*	5.75*
Domain by Time of Measurement by Gender	2.60*	2.73*	2.07
Domain by Time of Measurement by Ability Level	3.38*	1.69	2.87*
Domain by Time of Measurement by Gender by Ability Level	1.14	1.68	1.06

Note. Cells display F-tests based on repeated measure MANOVAs. An asterisk indicates the effect is significant at or below .01.

Table 4

Effects of Gender, Math Ability Level, and Time of Measurement on Attitudes toward Mathematics, English, Social, and Physical Activities

	Self-Concept of Ability	Liking	Importance
Between-subjects effects			
Gender	69.84*	53.60*	49.58*
Mathematics	17.84*	.20	2.88
English	21.68*	57.74*	31.52*
Physical	145.29*	69.35*	86.12*
Social	2.26	49.08*	35.31*
Math Ability Level	67.62*	16.76*	11.26*
Mathematics	232.82*	45.53*	36.56*
English	62.82*	2.58	3.16
Physical	1.44	1.03	1.01
Social	2.10	14.06*	35.31*
Gender by Math Ability Level	1.32	.74	.27
Mathematics	1.39	.32	.20
English	3.06	1.98	.22
Physical	1.14	.02	.41
Social	.90	.70	.50
Within-subjects effects			
Time of Measurement	9.90*	13.03*	19.55*
Math - linear trend		32.07*	150.55*
Math - quadratic trend		21.94*	7.41*
English - linear trend	25.26*		
English - cubic trend		15.91*	22.66*
Physical - linear trend	63.39*	55.77*	29.19*
Physical - quadradic trend		11.39*	7.38*
Physical - cubic trend			7.59*
Social - linear trend	10.21*	7.38*	34.96*
Social - quadradic trend		12.32*	
Social - cubic trend	25.49*	13.82*	
Time of Measurement by Gender	2.32*	2.12	2.40*
English - cubic trend			7.80*
Social - cubic trend	13.99*		
Time of Measurement by Ability Level	3.05*	2.80*	1.71
Math - linear trend	9.42*	9.22*	
Math - cubic trend	13.79*		
Physical - Quadradic trend		16.88*	
Time of Measurement by Gender by Ability Level	.98	1.08	1.42

Note. What do you want here?

Table 5

Mean Self-Esteem at Each Wave, by Gender and Math Ability Level

	Gender					
	Females			Males		
	N	Mean	SD	N	Mean	SD
Wave 1	904	14.04	3.33	775	14.65	3.08
Wave 2	904	13.92	3.26	775	15.04	2.98
Wave 3	904	13.55	3.21	775	14.43	2.88
Wave 4	904	13.76	3.21	775	14.72	3.01

	Math Ability Level								
	Low			Average			High		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Wave 1	200	13.24	3.28	1109	14.27	3.20	370	15.04	3.11
Wave 2	200	13.78	3.16	1109	14.38	3.16	370	14.98	3.18
Wave 3	200	13.05	2.60	1109	13.93	3.15	370	14.52	3.03
Wave 4	200	13.40	3.26	1109	14.13	3.12	370	14.87	3.09

Table 6

Mean Self-Concept of Ability at Each Wave, by Math Ability Level

	Math Ability Level								
	Low			Average			High		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Mathematics									
Wave 1	213	3.85	1.34	1175	4.88	1.15	387	5.61	.95
Wave 2	213	3.89	1.33	1175	4.82	1.08	387	5.72	.89
Wave 3	213	4.02	1.39	1175	4.83	1.15	387	5.37	1.05
Wave 4	213	4.01	1.41	1175	4.71	1.29	387	5.37	1.02
English									
Wave 1	213	4.46	1.34	1175	4.77	1.16	387	5.29	1.06
Wave 2	213	4.50	1.32	1175	4.78	1.20	387	5.30	1.18
Wave 3	213	4.39	1.45	1175	4.70	1.28	387	5.10	1.28
Wave 4	213	4.15	1.53	1175	4.66	1.33	387	5.17	1.27
Sports									
Wave 1	213	5.11	1.58	1175	5.00	1.42	387	4.91	1.45
Wave 2	213	5.03	1.45	1175	4.88	1.40	387	4.75	1.49
Wave 3	213	4.87	1.42	1175	4.77	1.42	387	4.66	1.55
Wave 4	213	4.81	1.57	1175	4.78	1.41	387	4.66	1.53
Social									
Wave 1	213	4.74	1.35	1175	4.87	1.28	387	5.00	1.19
Wave 2	213	4.82	1.38	1175	5.05	1.23	387	5.05	1.23
Wave 3	213	4.76	1.33	1175	4.79	1.16	387	4.81	1.19
Wave 4	213	4.73	1.40	1175	4.84	1.21	387	4.86	1.17

Table 7

Mean Self-Concept of Ability at Each Wave, by Gender

	Gender					
	Females			Males		
	N	Mean	SD	N	Mean	SD
Mathematics						
Wave 1	957	4.83	1.23	818	5.02	1.23
Wave 2	957	4.80	1.18	818	5.03	1.21
Wave 3	957	4.76	1.18	818	4.96	1.26
Wave 4	957	4.65	1.26	818	4.91	1.36
English						
Wave 1	957	4.96	1.13	818	4.72	1.24
Wave 2	957	4.98	1.18	818	4.71	1.28
Wave 3	957	4.88	1.26	818	4.59	1.37
Wave 4	957	4.87	1.28	818	4.52	1.45
Sports						
Wave 1	957	4.60	1.43	818	5.46	1.32
Wave 2	957	4.51	1.41	818	5.29	1.34
Wave 3	957	4.38	1.42	818	5.20	1.34
Wave 4	957	4.38	1.42	818	5.19	1.38
Social						
Wave 1	957	4.91	1.25	818	4.85	1.29
Wave 2	957	5.00	1.24	818	5.04	1.26
Wave 3	957	4.87	1.13	818	4.70	1.24
Wave 4	957	4.88	1.19	818	4.77	1.26

Table 8

Mean Liking Scores at Each Wave, by Math Ability Level

	Math Ability Level								
	Low			Average			High		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Mathematics									
Wave 1	223	3.95	2.10	1232	4.87	1.88	400	5.45	1.66
Wave 2	223	4.13	2.05	1232	4.90	1.87	400	5.41	1.71
Wave 3	223	4.13	1.98	1232	4.78	1.77	400	5.15	1.71
Wave 4	223	4.04	1.91	1232	4.36	1.86	400	4.86	1.84
English									
Wave 1	223	4.38	2.06	1232	4.10	2.06	400	4.18	2.01
Wave 2	223	4.50	1.93	1232	4.27	1.98	400	4.33	2.00
Wave 3	223	4.27	2.02	1232	4.12	1.98	400	3.99	1.88
Wave 4	223	4.30	1.99	1232	4.22	2.05	400	4.09	1.93
Sports									
Wave 1	223	5.86	1.81	1232	6.12	1.52	400	6.17	1.51
Wave 2	223	6.11	1.61	1232	6.02	1.63	400	5.97	1.69
Wave 3	223	5.98	1.59	1232	5.90	1.60	400	5.87	1.74
Wave 4	223	5.51	1.94	1232	5.83	1.67	400	5.80	1.70
Social									
Wave 1	223	6.07	1.36	1232	6.32	1.11	400	6.37	1.05
Wave 2	223	6.21	1.33	1232	6.46	1.01	400	6.50	.85
Wave 3	223	6.07	1.30	1232	6.30	1.09	400	6.34	1.04
Wave 4	223	5.89	1.44	1232	6.31	1.12	400	6.40	1.03

Table 9

Mean Liking Scores at Each Wave, by Gender

	Gender					
	Females			Males		
	N	Mean	SD	N	Mean	SD
Mathematics						
Wave 1	1013	4.82	1.92	842	4.95	1.89
Wave 2	1013	4.86	1.89	842	4.99	1.88
Wave 3	1013	4.81	1.79	842	4.74	1.82
Wave 4	1013	4.43	1.89	842	4.43	1.87
English						
Wave 1	1013	4.45	2.03	842	3.78	2.00
Wave 2	1013	4.60	1.95	842	3.95	1.96
Wave 3	1013	4.83	1.93	842	3.65	1.91
Wave 4	1013	4.57	1.99	842	3.75	1.96
Social						
Wave 1	1013	6.42	1.07	842	6.16	1.19
Wave 2	1013	6.55	.97	842	6.30	1.07
Wave 3	1013	6.46	.96	842	6.05	1.22
Wave 4	1013	6.47	.98	842	6.04	1.30
Sports						
Wave 1	1013	5.82	1.65	842	6.43	1.37
Wave 2	1013	5.73	1.76	842	6.36	1.42
Wave 3	1013	5.58	1.75	842	6.29	1.38
Wave 4	1013	5.47	1.78	842	6.15	1.54

Table 10

Mean Importance Ratings at Each Wave, by Math Ability Level

	Math Ability Level								
	Low			Average			High		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Mathematics									
Wave 1	225	5.68	1.53	1222	6.18	1.18	404	6.41	1.01
Wave 2	225	5.55	1.56	1222	5.95	1.28	404	6.27	1.09
Wave 3	225	5.55	1.56	1222	5.80	1.34	404	6.05	1.19
Wave 4	225	5.05	1.66	1222	5.51	1.51	404	5.87	1.35
English									
Wave 1	225	5.24	1.59	1222	5.20	1.67	404	5.31	1.58
Wave 2	225	5.13	1.66	1222	5.31	1.53	404	5.51	1.47
Wave 3	225	4.98	1.66	1222	5.04	1.65	404	5.15	1.59
Wave 4	225	4.94	1.61	1222	5.29	1.63	404	5.35	1.64
Social									
Wave 1	225	5.95	1.36	1222	6.24	1.15	404	6.29	1.11
Wave 2	225	5.92	1.48	1222	6.23	1.17	404	6.27	1.04
Wave 3	225	5.86	1.34	1222	6.00	1.24	404	6.17	1.07
Wave 4	225	5.68	1.63	1222	6.00	1.25	404	6.11	1.19
Sports									
Wave 1	225	5.06	1.91	1222	5.16	1.89	404	5.08	1.81
Wave 2	225	4.97	1.99	1222	4.94	1.93	404	5.03	1.99
Wave 3	225	4.66	2.03	1222	4.88	1.89	404	4.76	1.96
Wave 4	225	4.77	1.97	1222	4.91	1.88	404	4.86	1.83

Table 11

Mean Importance Ratings at Each Wave, by Gender

	Gender					
	Females			Males		
	N	Mean	SD	N	Mean	SD
Mathematics						
Wave 1	994	6.24	1.15	857	6.09	1.27
Wave 2	994	6.00	1.22	857	5.93	1.38
Wave 3	994	5.83	1.30	857	5.82	1.40
Wave 4	994	5.59	1.51	857	5.47	1.52
English						
Wave 1	994	5.42	1.60	857	5.02	1.67
Wave 2	994	5.47	1.46	857	5.18	1.61
Wave 3	994	5.29	1.58	857	4.80	1.66
Wave 4	994	5.45	1.55	857	5.02	1.69
Social						
Wave 1	994	6.37	1.09	857	6.04	1.24
Wave 2	994	6.30	1.14	857	6.08	1.23
Wave 3	994	6.20	1.13	857	5.81	1.29
Wave 4	994	6.12	1.27	857	5.83	1.31
Sports						
Wave 1	994	4.79	1.92	857	5.52	1.75
Wave 2	994	4.59	1.98	857	5.40	1.82
Wave 3	994	4.41	1.89	857	5.31	1.85
Wave 4	994	4.49	1.89	857	5.34	1.76

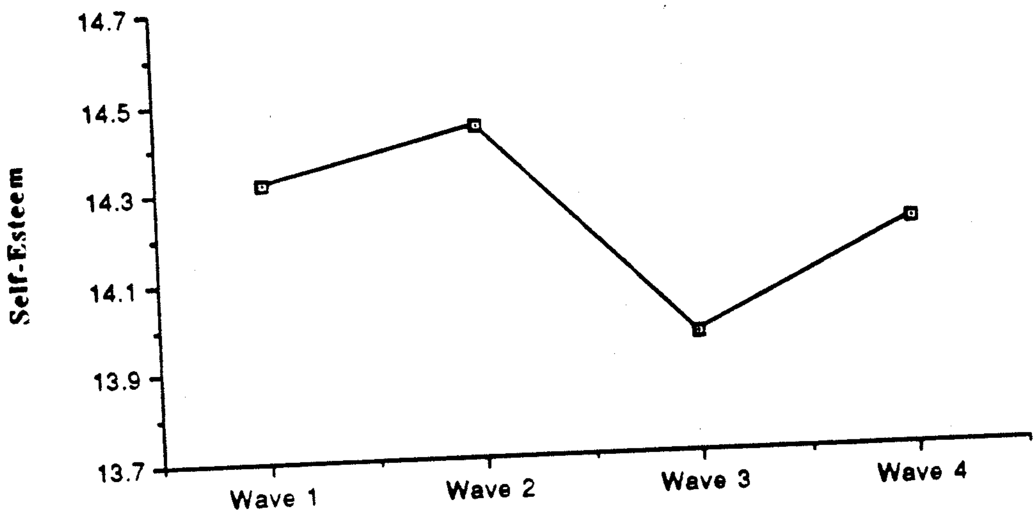

Fig. 1. Change in Self-Esteem

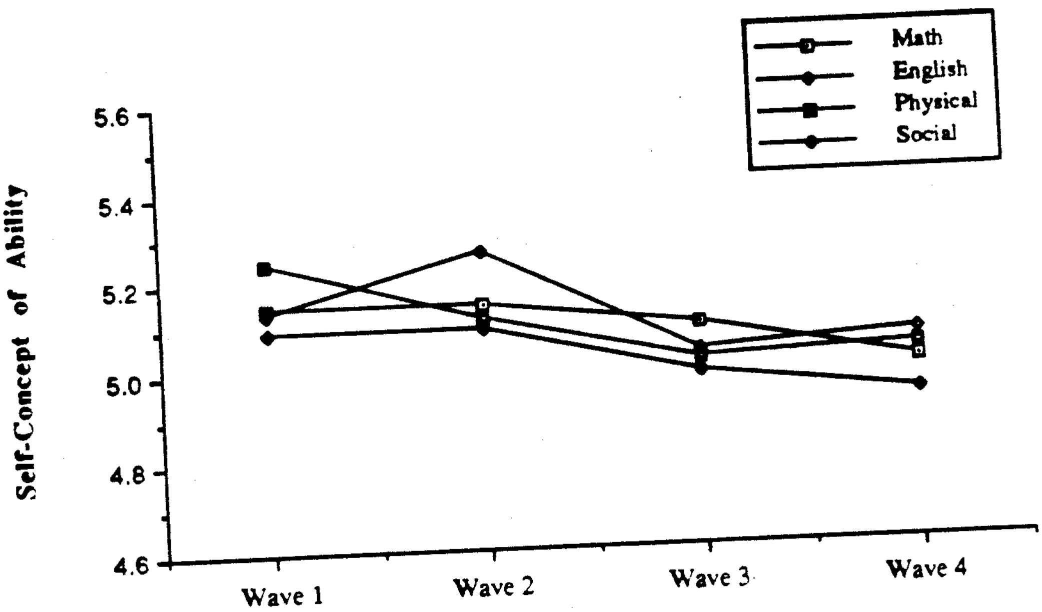

Fig. 2. Change in Self-Concept of Ability

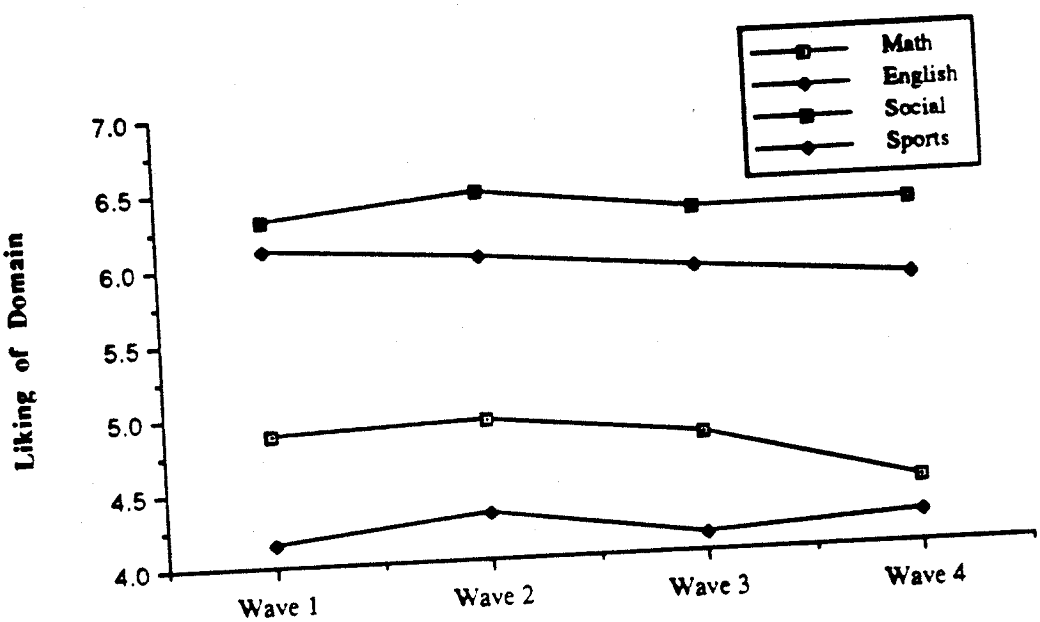

Fig. 3. Change in Liking