Understanding Motivation: Achievement Beliefs, Gender-roles, and Changing Educational Environments

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My goal today is to use a variation of the classic APTITUDE BY TREATMENT approach to understand two specific types of individual differences in academic motivation: gender differences in interest in math and developmental declines in motivation associated with the transition to junior high school. I use both of these examples to illustrate the point that we can better understand motivation if we look at the interaction between the characteristics the individual brings to the classroom and the characteristics of the educational environment itself. This point is illustrated in Figure 1.

INSERT FIGURE 1

As you can see, I am defining motivation in terms of the measurable, observable behaviors that we assume are the consequences of motivation. I am assuming that these consequences are a function of: (1) individual characteristics linked to motivation, such as motivational orientation, confidence, and long and short terms goals, and (2) characteristics of the classroom such as instructional style, classroom climate, and curriculum. I am also assuming that both of these proximal influences are affected by a variety of other constructs, four of which I'll be focusing on today: Gender-role identity, developmental age, teacher beliefs, and institutional characteristics.

Before beginning my discussion of these interrelations a few words about motivation in general are in order. First, we need to think about how motivation is defined. Motivation has been defined in many ways, which basically reflect the four general categories illustrated in Figure 2.

INSERT FIGURE 2: MOTIVATIONAL CONSTRUCTS

In my remarks today, I'll be focusing primarily on those motivational constructs linked to the middle two questions: Can I succeed? and Do I want to succeed?

The importance of first of these (Can I Succeed?) has been documented repeatedly in motivational research. Lack of confidence undermines achievement and achievement choices in a variety of ways ranging from the adoption of counterproductive face-saving strategies designed to protect one's self-esteem (Covington & Beery, 1976), to increased anxiety in evaluative performance settings, and even to non-participation (see Eccles, 1983; Eccles, 1985; Wigfield & Eccles, 1988 for discussions).

The importance of the second question (Do I want to Succeed?) became clear to me in a discussion I had with my daughter when she was in the third grade. In response to my question "how could you let yourself get such low marks?", she relied first with the comment "but mom, everybody gets these grades." When that didn't appease me, she added "but, I'd have to work harder to get better grades." To which, I replied: "That's right, so why don't you work arder?" Without blinking an eye, she retorted "but mom, what do you want me to do, waste my childhood doing school work?"

Empirical evidence has substantiated the importance of this construct as well, especially as a key influence on academic choice-related decisions like course enrollment and participation in out-of-school related activities (see Eccles, 1983 and Eccles et al, 1984)

A second critical issue revolves around the need for specificity. Evidence in my research and that of others suggests that we must be quite specific when we try to understand motivation. We need specificity in terms of the subject areas being talked about. It is becoming increasingly clear that there is a great deal of within individual variation on measures of motivational constructs as one goes across domains or subject areas and that the predictive power of particular motivational constructs increases as one makes both the domain of the motivational construct and the achievement outcome being predicted more specific.

We also need specificity in terms of the particular motivation-to-behavior link being studied. Varied motivational constructs impact differently on various outcome measures. Let me illustrate this need for specificity with the following analysis. We have tested the impact of

the two constructs we have been discussing (i.e. confidence an subjective task value) on both performance and enrollment decisions i both math and English in two separate studies with similar results These results are illustrated in Figures 3, 4, 5 and 6.

Figures 3 and 4 illustrate our path analytic findings in one schoo district. Figure 3 illustrated the direct and indirect influence of variou factors on students' math grades and intentions to take more math Figure 4 illustrates the relative influence of subjective task value an confidence on these same students' decisions regarding enrollment i mathematics in their twelfth grade year. Figures 5 and 6 illustrat similar path analyses for a second, larger, more representative schoo district. Figure 5 illustrates the data for mathematics; Figure 6 illustrates the data for English.

INSERT PATH ANALYSES: Figures 3-6

The results are quite consistent across analyses. Confidence seems to have its most powerful impact on performance measures such as course grades and standardized test scores. Subjective task value seems to have its most powerful impact on intentions to enroll and on actual enrollment decisions.

Anxiety, in contrast, has equivalent negative impact on both participation measures and performance measures (see Figure 3). In addition, it seems quite likely that anxiety is related to both self-concept and subjective task value. Students with low self-confidence should manifest more anxiety than students with high self-confidence. Likewise, over time students with high anxiety should come to dislike the subject domains that make them feel anxious.

Taken an a set, these results suggest that we must be specific about the particular achievement-related outcome we are trying to analyze from a motivational perspective. Choice appears to be influenced by a different motivational system than performance.

Third, we need to be specific in terms of the impact of classroom characteristics on motivational processes. A given classroom characteristic should have different consequences on various motivational constructs especially in interaction with pre-existing individual student characteristics. For example, providing students with some choice over their activities in the classroom and reducing teacher control may increase subjective task value without influencing ability

concepts. In contrast, ability grouping may lower the confidence of high ability students while, at the same time, increasing the challenge value of the material being presented.

PERSON X CLASSROOM INTERACTIONS:

CASE 1: GIRLS AND MATH

Let me now describe how both individual differences in students and classroom characteristics can influence motivation. Suppose you had a group of students who had relatively low confidence in their math ability and who found competitive classroom environments especially uncomfortable. We would not expect such students to like a math classroom in which the teacher used competitive motivational strategies or in which the teacher used a lot of public drill and the other students generated a competitive climate. These students would probably be reluctant to participate in the public activities and over the course of the year might come to dislike the subject matter. Consequently, even though these students' might do as well on tests and might get grades equivalent to those of the other students in the class, they might reduce their estimates of the value of math and be less likely to enroll in math courses when they become optional. Very different motivational consequences would be predicted for a different type of classroom; one that relied more heavily on individualized or cooperative learning approaches. Similarly, different motivational consequences would result for a different type of student in the target type of classroom. Confident, highly competitive students might find a competitive classroom especially motivating.

As you may have quessed, I didn't pick this example randomly. It is quite relevant to our understanding of sex differences in interest in math and physical science. Let me now turn to this issue.

As you know, girls are less likely to enroll in advanced level math and physical science courses. Why? A variety of explanations ranging from innate differences in their cognitive processes and styles, to differential treatment, to gender-role socialization have been offered. Discussing them all is beyond the scope this talk. In keeping with my goals, I'll discuss the joint effects of student and classroom characteristics.

First, I'll focus on gender differences in confidence in one's ability and subjective task value, the two motivational constructs of primary interest to me. I'll do this quite briefly because I assume many of you

are already familiar with this body of research. It is reviewed extensively in Eccles, 1984. Then I'll discuss classroom effects.

Self-concept of ability

In general, girls report lower confidence than boys in their academic abilities but this effect is especially marked in math and the physical sciences and for math appears to get more pronounced as the students advance through high school to the critical decision-making points regarding course enrollment. These patterns are well illustrated by the results of our recent studies, as shown in Figure 7 depicting fifth through twelfth grade students' reports of their math and English ability. As you can see, girls report lower estimates of their math ability than boys beginning at grade 10. But even more importantly, from my perspective, girls report lower estimates of their math ability than of their English ability beginning at grade 8. Both of these differences (sex and subject matter differences) exist despite the fact that there are no significant differences in this population between boys' and girls' performance in math and between girls' performance in math and English.

INSERT FIGURE 7:SEX BY SUBJECT MATTER BY GRADE LEVEL EFFECTS FOR ENGLISH AND MATH.

Subjective task value

In general, girls also rate math and the physical sciences as less interesting, important, and useful than boys and this difference also gets more pronounced as boys and girls advance through secondary school at least for math. Our results for the construct subjective task value are illustrated in Figure 8. They are consistent with the general findings for math and physical science. In addition, and again even more importantly, the difference between math and English for girls gets increasingly larger as the girls move through secondary school.

INSERT FIGURE 8: SUBJECTIVE TASK VALUE.

Given the importance of these two constructs, one would predict that the girls in this sample would be less likely to continue taking math in high school than the boys; this is exactly what happened in our longitudinal follow-up. What could accounting for the increasingly less positive view females have of mathematics as they move through

secondary school. To answer this question, I'll focus on classroom effects on motivation.

Girls and math: Girl friendly classrooms

How might classrooms be contributing to these differences? Are there general classroom climate variables that either have different impacts, on the average, on boys and girls? (That is, that affect the motivation of boys and girls differently?) Or that seem especially detrimental, or facilitative, of girls' motivation to study math?

My thinking about these questions has been greatly influenced by the work of Pat Casserly (1980) and Jane Kahle (1984). They have studied math and science teachers who have an especially good track record in encouraging girls to continue their studies of math and science. Several distinquishing characteristics emerge with great regularlity in this type of work. These are summarized on Figure 9 and listed below:

1. Effective teachers are more likely to use cooperative or individualized learning strategies than to rely solely on public drill and seat work.

2. Effective teachers are less likely to use competitive motivational strategies than non-effective teachers.

3. They use more hands-on learning opportunities.

4. They use practical problems with the possibility for creative solution e.g. build a bridge, and allow students to work in teams in solving these problems.

5. They engage in a great deal of active career and educational guidance in the classroom, stressing the importance and the usefulness of math and science for students in other courses and for their future employment opportunities.

6. They insist on full class participation; no one is allowed to "drop out" and no-one is allowed to dominate class discussion or laboratory equipment.

INSERT FIGURE 9: EFFECTIVE CLASSROOMS

These variables are quite reasonable if you think about how gende roles are likely to have induced differences between females and male especially during the adolescent years. A summary of the processe and outcomes associated with gender-role socialization is provided i Figure 10. Given these dynamics, it is likely that girls will b particularly concerned about competing with boys, especially in subje matter areas sex-typed as male-dominated. Consequently, an classroom characteristics that increase one's saliency and induc competition between students are likely to undermine girls' motivatior especially their interest. In addition, given the common stereotypes c the occupations that rely on math and physical science, any attempt o the part of the teacher to provide girls with a broader, less male sex typed view of math and science-related careers is likely to increase th value they attach to math and science courses. Finally, given girl interest in cooperative, social activities, classroom practices that provid girls the opportunity to work on math and science as part of cooperative, problem-solving group is also likely to increase the valu they attach to these subject areas.

INSERT FIGURE 10: GENDER-ROLE INFLUENCES

We have now completed a study looking at similar types of variable It is a longitudinal study of the transition to junior high school involvin over 3500 students and their math teachers drawn from 12 schoc districts in southeastern Michigan. We measured both student an classroom characteristics for this population four times over the cours of two years: In the fall and spring of their sixth grade year and agai in the fall and spring of their seventh grade year following thei transition into traditional junior high schools. Several of my colleague have worked on this project: Elaine Carlsmith, Harriet Feldlaufer, Constance Flanagan, Rena Goldsmith, Janis Jacobs, Dave Klingel, Dougla MacIver, Carol Midgely, Christy Miller, David Reuman, Allan Wigfield and Doris Yee. The work I'll be presenting in the remainder of my tal reflects their efforts as well as mine. I'll be presenting a series o findings from this study. The first set focuses on the issue of girl friendly classroom environments and uses only sixth grade data.

INSERT FIGURE 11: CLASSROOM TYPOLOGIES

Building on the strategy used by Casserly, Kahle and by us in previous study, we sought to identify classrooms in which girls ha particularly favorable attitudes toward math and then to identify thos characteristics of the classroom environment that distinquished thes

classrooms from other classrooms. Using the variables listed on Figure 11, we calculated standardized classroom means for boys and girls separately for both waves of sixth grade data and then performed a complete linkage cluster analysis of the classroom data. Figure 11 summarizes the mean sex differences for the four cluster solution. As you can see, in Type 1 classrooms boys were significantly more postive than girls on several of the variables including: plans to take more math, self-concept of one's math ability, expectations for success, both utility and intrinsic value of math, and various measures of anxiety. In type 2 classrooms, boys and girls were bascially the same except that girls were less anxious than the boys on several indicators of anxiety. In type 3 and 4 classrooms, the girls had more positive attitudes in general than the boys.

How did these classrooms differ from one another? We had the students, teachers, and observers provide us with information about their classroom. Based on the previous studies and on gender-role theory, we were especially interested in assessing whether these classrooms differed in the predicted direction on indicators of the competitiveness of the classroom, on the students' perceptions of teacher fairness, and teacher valuing of math. We predicted that girls would have relatively more favorable attitudes and affect in classrooms with low levels of competition and social comparison among the students, and in classrooms in which the teacher was perceived as being fair and valuing math.

To test these predictions, we created scales based on the students' ratings of their classrooms using factor analysis. Five factors emerged; 4 of which tapped these dimensions. We then used profile analysis to compare the four classroom types on these 4 factors measured at both time points. The results are illustrated in the next two figures. Figure 12 illustrates the mean classroom-level differences on students' ratings of their teachers' fairness and valuing of math (coded in each case in the negative direction). Figure 13 illustrates the students' rating of the amount of competition and social comparison among students in their math class. As predicted classtypes 3 and 4 (the two girl-advantaged classrooms) were lower than the other classroom types on perceived competition among the students and social comparison among the students. They were also highest on perceived teacher valuing of math and perceived teacher fairness (scored in the reverse). More details on this study are available in Eccles, MacIver, and Lange, 1986.

INSERT FIGURES 12 AND 13: CLASSROOM DIFFERENCES

We see here a good example of the interaction of a particular student characteristic (gender) and classroom environments in their influence on motivation: Girls' and boys' motivation seems to be optimized by different room characteristics. Similar effects have been reported by Fennema and Petersen in their study of math skill acquisition. They assessed cognitive skills in math at the beginning of the school year and again at the end of the school year. Gain scores were created. They had observations of classroom climate and related these to the gain scores of boys and girls separately. Like our findings, girls' gain scores were negatively effected by the extent of competitive and competitive motivational strategies and positively effected by the extent of cooperative learning opportunities. Boys' gain scores, in contrast, were positively affected by competition and negatively affected by cooperatively learning strategies (Fennema & Petersen, 1985).

Student and Classroom Environment Interactions, Case 2: Junior High School Transition Effects.

Let me now turn to my second set of case studies illustrating the importance of the person by situation perspective in understanding motivation. In this set of studies, I focus on the relationships between developmental changes in motivation, interest, and self-perception and structural changes students often confront when they move into a traditional junior high school.

Several investigators suggest that there are general developmental declines in such motivational constructs as: interest in school (Epstein & McPartland, 1976); intrinsic motivation (Harter, 1980); and self-concepts (Eccles et al., 1984 and Simmons). We have outlined these general declines in Eccles, Midgley, and Adler, 1984 and Eccles and Midgley, 1988. The major changes are listed on Figure 14. Some on these changes vary across subject areas. For example, Figure 15 illustrates the changes in fifth through twelfth grade students' ratings of their own ability, of the value they attach to the subject area, and of their perceptions of the difficulty of the subject area for both math and English. As you can see, the general decline in these motivational attitudes is only characteristic of math.

INSERT FIGURES 14 AND 15

Some of these changes are especially marked at the junior high school transition. For example, our data (see Figure 15) indicates a marked discontinuity in the rate of change in attitudes toward math between grades six and seven. Similar discontinuities are evident in the work of Harter (1980) and Simmons and her colleagues (e.g. Simmons and Blyth, 1987). Figure 16 illustrates the decline in intrinsic motivation reported by Harter (1980). As you can see, there is a sharp drop in students' preference for challenge and their preference for independent mastery as they move from the sixth to the seventh grade.

INSERT FIGURES 16 AND 17

Figure 17, taken from Simmons and Blyth, 1987, illustrates the junior high transition effect on girls even more dramatically. Simmons and Blyth (1987) compared children moving from sixth to seventh grade in a K-8 system to children making the same transition in a K-6, 7-9, 10-12 school system. Girls moving into a traditional junior high school show a more marked decline in their self-esteem than girls who remain in the same school building. Several other studies, including Harter, 1982 and Connell, 1984, report declines that seem to be associated with the junior high school transition. The findings regarding this transition are summarized on Figure 14 and in Eccles and Midgley, 1988. The bulk of studies indicate that something unique may be going on during early adolescence and that it interacts with the nature of school transitions in affecting the motivation of early adolescents.

Several investigators have suggested just such a link between these motivational declines and the junior high school transition. These investigators suggest that the school transition is causally related to changes in early adolescents' motives, beliefs, values, and behaviors (Blyth, Simmons, & Carlton-Ford, 1983; Eccles, Midgley, & Adler, 1984; Eccles & Midgley, 1988; Simmons & Blyth, 1987). Several important questions have been raised. Does the transition have a negative impact on early adolescent development? What are the mediators between the transition and changes in beliefs and behaviors? Are some early adolescents more vulnerable to transition effects than others? What are the long term consequences of the transition effects? Is a school transition at this stage of life inevitably detrimental for some groups of children? On the one hand, cumulative stress theory (see Simmons &

Blyth, 1987) suggests that the timing of the transition to junior high school should result in more disruption to the individual already undergoing the stress associated with pubertal development than would a similar transition a few years later "after the individual has developed a more mature sense of who he or she is" (Blyth et al., 1983, p. 106).

On the other hand, both Simmons and Blyth (1987) and Eccles et al. (1984) have argued that the nature of the transition, as well as the timing, is important. My colleagues and I, in particular, have argued that it is the fit between the developmental needs of the adolescent and the educational environmnent that is important. Image two trajectories: one a developmental trajectory of student growth. The other a trajectory of environmental change across the school years. We believe there will be positive motivational consequences when these two trajectories are in sync with one another; in other words, when the environment is both responsive to the changing needs of the individual and offers the kinds of stimulation that will propel continued positive growth. In contrast, negative motivational consequences will result if the two trajectories are out of sync. In other words, transition to a facilitative and developmentally appropriate environment, even at a vulnerable age should have a positive impact on children's perceptions of themselves and their educational environment.

Unfortunately, we believe that developmentally inappropriate changes in a cluster of classroom orgainzational, instructional, and climate variables, including task structure, task complexity, grouping practices, evaluation techniques, motivatinal strategies, locus of responsibility for learning, and quality of teacher-student and student-student relationships may contribute to the negative change in students' motivation and achievement-related beliefs assumed to coincide with the transition into junior high school.

In particular, we believe that the prototypical environmental changes experienced by many early adolescents as they move from elementary school to junior high school include increases in the following: the size of student body, the extent of both departmentalization and ability grouping, use of competitive motivational strategies, rigor in grading along with increased focus on normative grading standards, teacher control, and whole class instruction. They also typically experience decreases in teacher trust of students, opportunities for student autonomy, teachers' sense of efficacy, and continuous close, personalized contact between teachers

and students and between students and their friends. These changes are summarized on Figures 18 and 19.

INSERT FIGURES18 AND 19: GENERAL AND SPECIFIC CHANGES IN EDUCATIONAL ENVIRONMENT

In turn, we believe that these changes are particularly harmful at early adolescence given what we know about adolescent development. Figure 20 summarizes the major developmental changes associated with adolescent development. These changes include increases in the desire for autonomy, coupled with an increased peer orientation, increased self-focus and self-consciousness, increased salience of identity issues, increased concern over heterosexual relationships, and increased cognitive capacity. In order to meet these developmental tasks, adolescents need a reasonably safe environment as well as an intellectually challenging environment.

INSERT FIGURE 20: DEVELOPMENTAL CHANGES

In light of these needs, the environmental changes often associated with the transition to junior high school seem especially harmful in that they emphasize competition, social comparison, and ability self-assessment at a time of heightened self-focus; they decrease decision-making and choice at at time when the desire for control is growing, they emphasize lower level cognitive strategies at a time when the ability to use higher level strategies is increasing; and they disrupt social networks at a time when adolescents are especially concerned with peer relationships and may be in special need of close adult friendships. The nature of the environmental changes coupled with the normal course of individual development results, it seems to us, in a developmental mismatch so that the "fit" between the early adolescent and the classroom environment is particularly poor, increasing the risk of negative motivational outcomes for the children.

We have spent the last 3 years testing these hypotheses. The work I'll now report reflects the efforts of the colleagues I listed earlier as well as my own. As I described earlier, we have gathered 4 waves of data on approximately 3500 students who moved from sixth grade to seventh grade and made transition to junior high school. Average participation rate was about 90% and between year attrition was about

14%, due mostly to family moves. The sample was drawn from 12 school districts. A total of 107 sixth grade teachers, and 64 junior high school teachers participated. (Average participation rate of teachers was about 95%). Data were collected in the fall and spring of each year. Student data was gathered by questionnaire in math class; teacher data was collected either during class or by follow-up questionnaire.

I will focus first on the differences we are finding in the behaviors and beliefs of teachers across this transition and will then discuss their impact on the students in our sample. Based on the nature of the decline in student attitudes, cultural stereotypes regarding early adolescence, organizational theory, and existing studies, we predicted the following types of changes in teacher beliefs and behaviors:

1. Increase in control concerns and control practices
2. Decrease in trust and autonomy
3. Decrease in teacher efficacy beliefs
4. Increase in practices that focus children's attention on ability assessment, such as ability grouping, social comparison, whole class instruction, performance rather than effort based grading systems.

In other words, since the transtion to junior high school involves a move from a small, informal, relatively homogeneous school to a more buracartic organization, it would involve the disruption of peer networks, and an increase in the distance between teachers and students. These changes, in turn, should increase the frequency of teacher control, and decrease the students' sense of control and familiarity with their teachers. In addition, since the junior high school is often seen as a time to get serious about instruction and about performance evaluation, the transition to junior high school should increase the frequency of certain practices, such as ability grouping and grading on the curve, that accentuate the importance of ability as a sorting characteristic.

INSERT FIGURE 21: TEACHER BELIEFS

What did we find? The results for the teacher control, teacher trust, and teacher efficacy variables are illustrated in Figure 21 which depicts

the results from an analysis by Midgely, Feldlaufer, and Eccles (1987). As predicted, seventh grade teachers report more need to control their students than sixth grade teachers on such items as 'it is often necessary to remind students that their status in school differs from that of teachers' and 'students often misbehave in order to make teachers look bad'. Similarly, as predicted, seveth grade teachers rate students as less trustworthy that sixth grade teachers on items such as ' Most students will waste free time if not given something to do' and 'students can be trusted to work together without supervision'. Finally, again as predicted, seventh grade teachers feel less efficacious than sixth grade teachers, despite the fact that seventh grade teachers are more likely to teaching their speciality.

Similar patterns emerged on students' and observers' view of the warmth of the relationship between students an teachers. Seventh grade teachers were seen as less fair and less friendly by both groups (Feldlaufer, Midgley, & Eccles, 1987).

The results for changes in ability-focusing experiences is illustrated in Figure 22. Rosenholtz and Simpson (1984) have suggested that whole class instruction makes ability comparisons easier and more salient; conversely, cooperative and/or individualized instruction should decrease competition and social comparison amongst the students. We have compared teacher, student, and observer reports of instructional management. All three sources report an increase in whole class instruction, a decrease in individualized and cooperative structure, and an increase in social comparison interest among students. The teachers' reports are illustrated in Figure 22.

INSERT FIGURE 22: CLASSROOM ENVIRONMENT DIFFERENCES

Implications for Student Motivation

We are just beginning to look at the impact of these grade-level shifts in teacher beliefs and behaviors on children's self-perceptions. I am going to focus on two of these changes: Changes in autonomy and control and changes in teachers' feelings of efficacy.

Autonomy and decision making

Midgley and Feldlaufer (1986) compared the students' view of their autonomy as they moved from sixth to seventh grade, using a set of item developed by Lee and his colleagues (Lee, Statuto, & Kedar-Voivodas, 1983). These items ask students about five possible areas in which they might be allowed to help make classroom policy. They are asked two questions about each area: Are they allowed to participate in the decision-making and should they be allowed to participate. The teachers at each grade level were asked a comparable set of questions about the amount of decision-making opportunity they provided to the students and the amount of decision-making they thought was appropriate. Results are displayed in Figures 23-26.

INSERT FIGURES 23-26: STUDENT AND TEACHER DECISION-MAKING

Several things emerged clearly in the data As one would expect, there is an increase in children's desire for more decision making opportunities as they move into junior high school (see Figure 23). Also as predicted and contrary to what a developmentally guided curriculum might recommend, the children perceived fewer opportunities in the seventh grade than they had perceived the previous year in their sixth grade classroom (see Figure 24). These two trends produce a greater mismatch between the students' desires and their perceived opportunities in the seventh than in the sixth grade (see Figure 25). Furthermore, their perceptions appear to be accurate since the junior high school teachers themselves reported providing fewer decision-making opportunities than the sixth grade teachers (see Figure 26) as well reporting greater concern over student control on the attitude measures discussed earlier.

How might such a widening mismatch between the students' desire for automony and their perceptions of their opportunity for automony affect motivation? Person-Environment Fit theories suggest that a mismatch between one's needs and the environmental affordances will lead to decline in moitvation and engagement. MacIver, Klingel, and Reuman (1986) tested this prediction with the sixth grade students by relating perceived congruence versus perceived incongruence to student motivation and behavior. Congruent children differed from incongruent children in several ways (assessed using CHANGES IN congruence to predict changes in the child variables). They rated math as more useful and interesting; they liked the teacher and school in general better; they had higher expectations for theirown performance in math; and they engaged in less misbehavior according to own and their

teachers' reports. Therefore, it seems likely that this decline in the opportunity for decision-making and this increase in the misfit between students' desire for autonomy and their perceptions of the opportunities for autonomy in their seventh grade math classrooms could contribute to the decline we find in their motivation to study math. We will test this hypothesis in the near future.

Teacher Efficacy

Midgley, Feldlaufer, and I have assessed the impact of moving from a high efficacious teacher to a low efficacious teacher in conjunction with the transition to junior high school. First, it should be noted that the most common pattern of change is from a high efficacy sixth grade teacher to a low efficacy seventh grade teacher; 559 out of 1329 students experienced this pattern. Another 474 experienced a low/low pattern; 117 experienced a low/high pattern; and 179 experienced a high/high pattern. Thus, fully 78% of our sample of children moved into low teacher efficacious classrooms in the seventh grade.

INSERT FIGURES 27 AND 28: TEACHER EFFICACY EFFECTS

In general, the children who moved from a high to a low efficacious teacher or from a low to a low efficacious teacher came to see math as more difficult, developed lower expectations for their own performance, and came to believe that math is a less modifiable characteristic than children moving into a high teacher efficacious classroom in the seventh grade. This pattern is well illustrated in Figures 27 and 28 depicting the students' ratings of the modifiability of math ability and of their expectations for their own performance.

SUMMARY AND CONCLUSIONS

In summary, I have made the following three points in this talk:

1. There are student attitudes and beliefs that affect motivational outcomes.

2. Understanding motivation depends on our understanding of the interaction between students' characteristics and the characteristics of the educational environments they inhabit and/or confront.

3. Some "motivational problems" result from the mismatch between the individuals' characteristics and needs, and the characteristics of particular educational environments they inhabit. I provided examples of this process in two arenas: sex differences in the motivation to study math and science and the developmental declines in motivation associated with the transition to junior high school. In addition, I presented preliminary evidence of the negative impact of the mismatch on individuals' motivation.

I would like to close with one additional point: These "motivational problems" are amenable to educational intervention. There are concrete examples of the success of educational interventions for both of these motivational arenas. The success of these interventions stems, in part, I believe, from their impact on the degree of perceived mismatch between the needs of the individual students and the educational environments they find themselves in.

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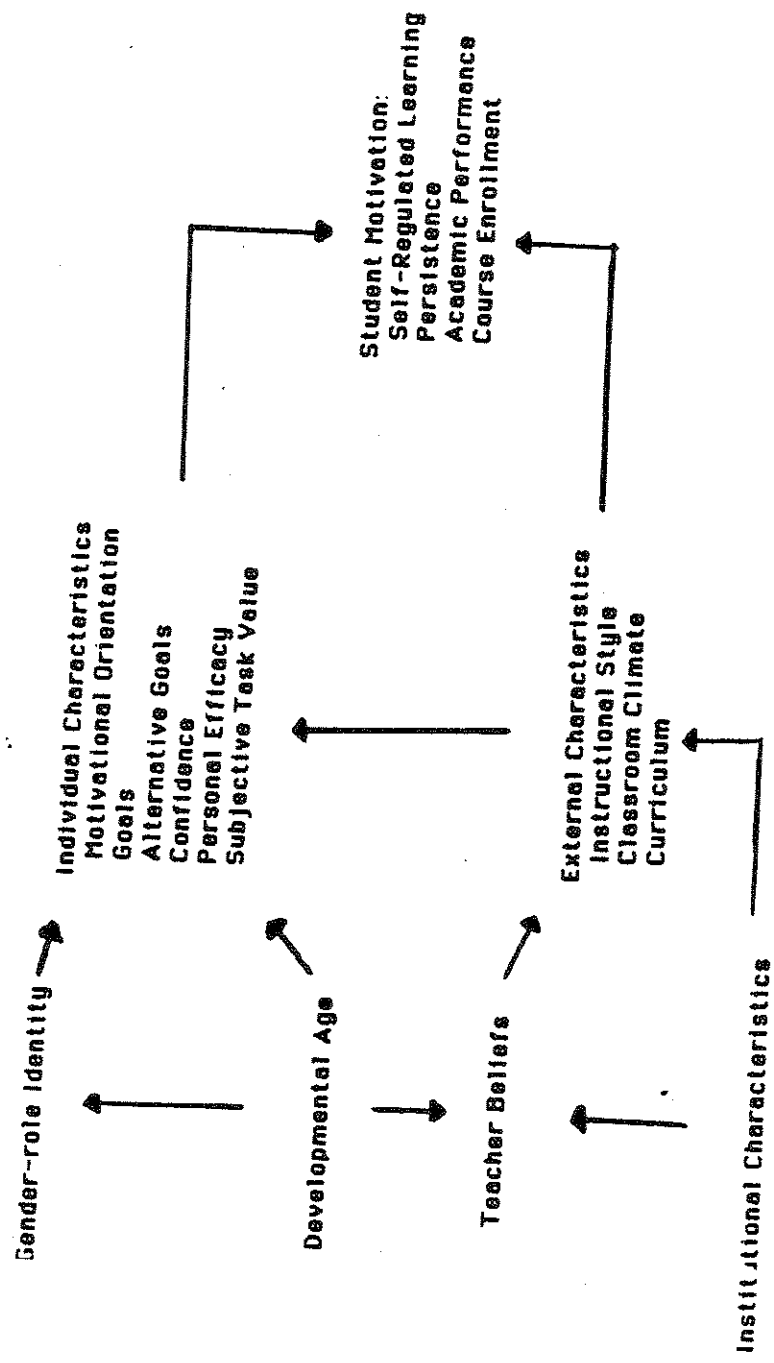


Figure 1

MOTIVE/AFFECTIVE STATE	CAN I SUCCEED?	DO I WANT TO SUCCEED AND WHY?	WHAT DO I NEED TO DO?
Effectance Motive	Self-Concept of Ability	Effectance Motive	Task Focus/Mastery Orientation versus Self/Ego Focus
Need Achievement	Expectations for Future Success	Incentive Value	Attention
Fear of Failure	Perceived Control	Attainment Value	Cognitive Strategies
Hope for Success	Learned Helplessness	Utility Value	Anxiety
Test Anxiety	Attributional Patterns	Intrinsic/Interest Value	Task Goals
Competence Motivation	Self-Worth	Cost of Success	Autonomous Learning Behaviors
Motivational Goals	Personal Efficacy	Cost of Failure	Learning Strategies
	Effectance Motivation	Conflicting Goals	Help-Seeking Strategies
		Loss of Valued Alternatives	Self-Monitoring/Self-Regulated Learning
		Anticipated Effort	Adaptive Learning
		Perceived Task Difficulty	Motivated Learning
		Extrinsic Rewards/ Costs	Resource Management Strategies
			Metacognitive Strategies

Figure 3

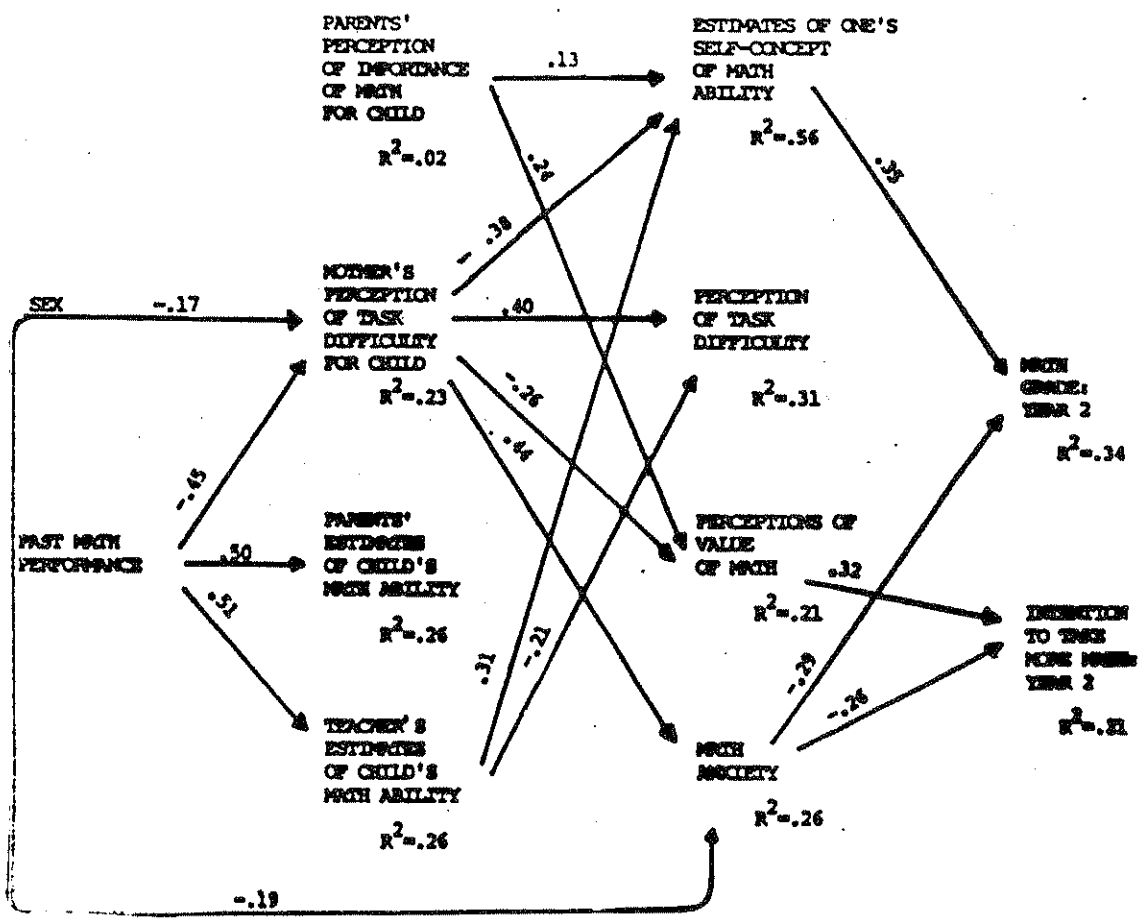


Figure 4

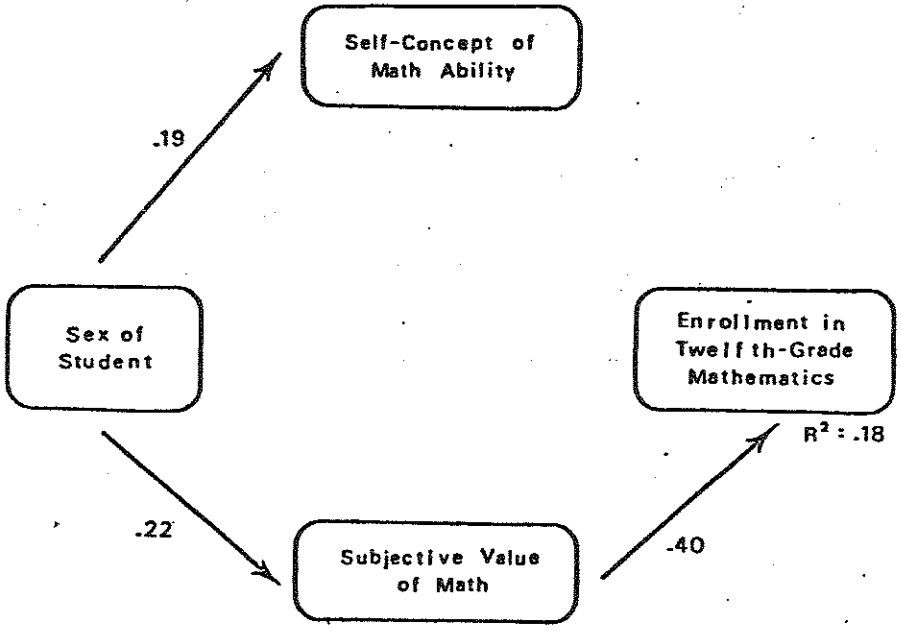
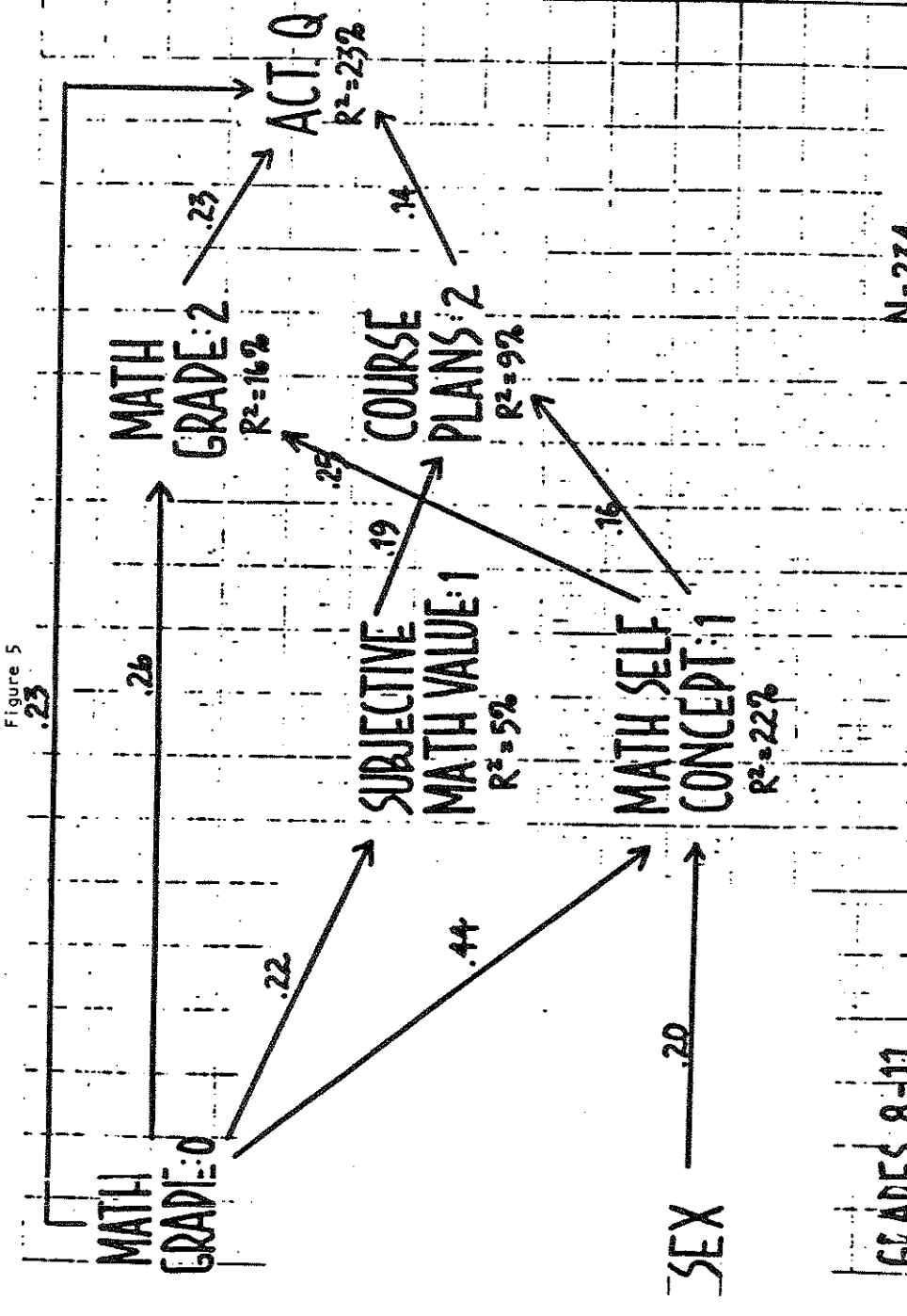
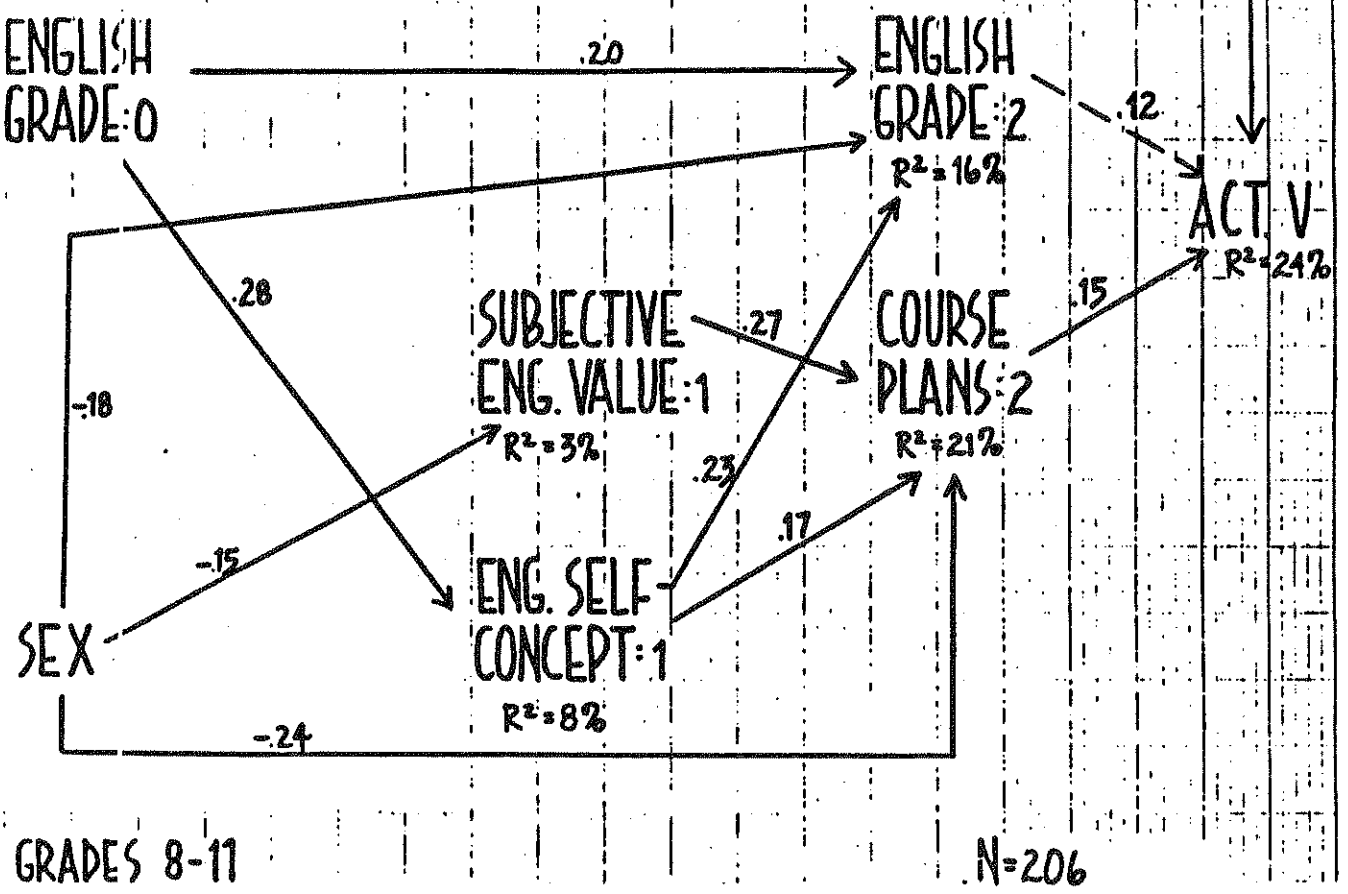


Figure 5





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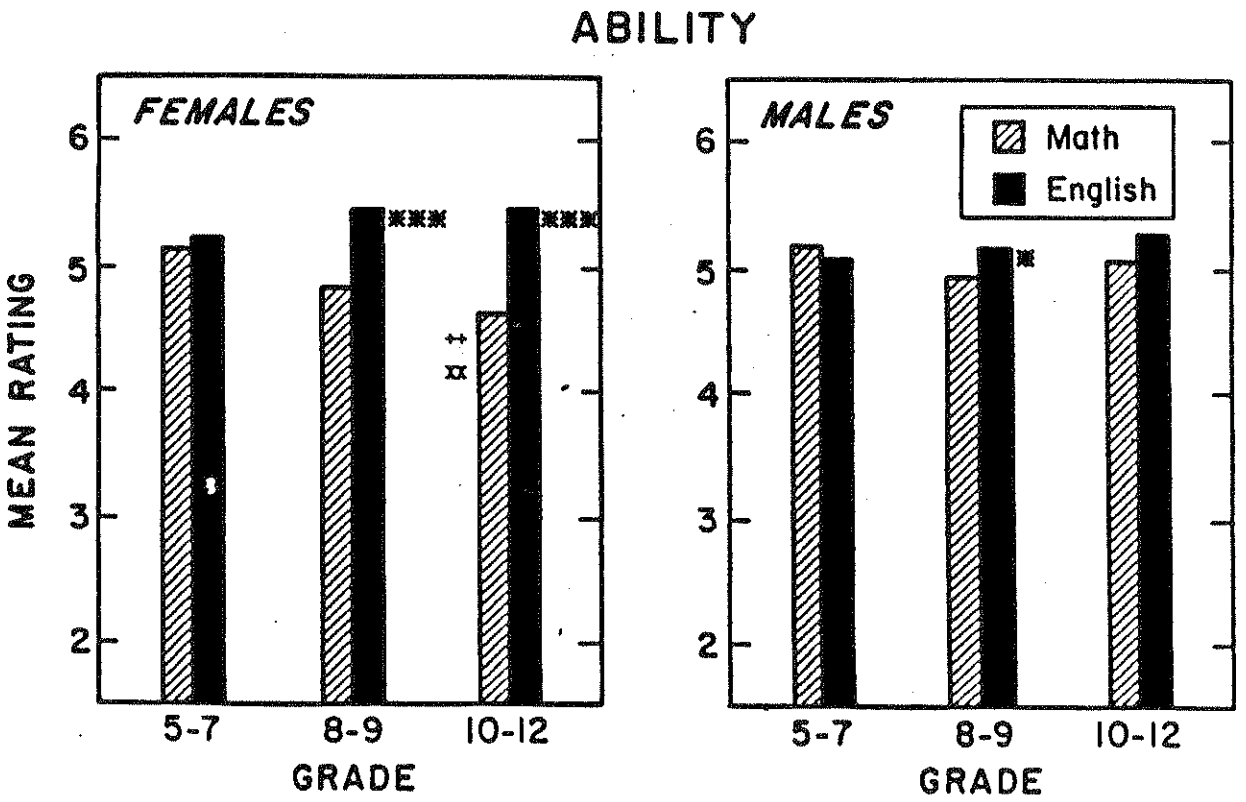


*** Subject Domain Comparisons Significant

++ Sex Comparison within Age Group and Subject Domain Significant

XX Age Comparison within Sex and Subject Domain Significant

Figure 8

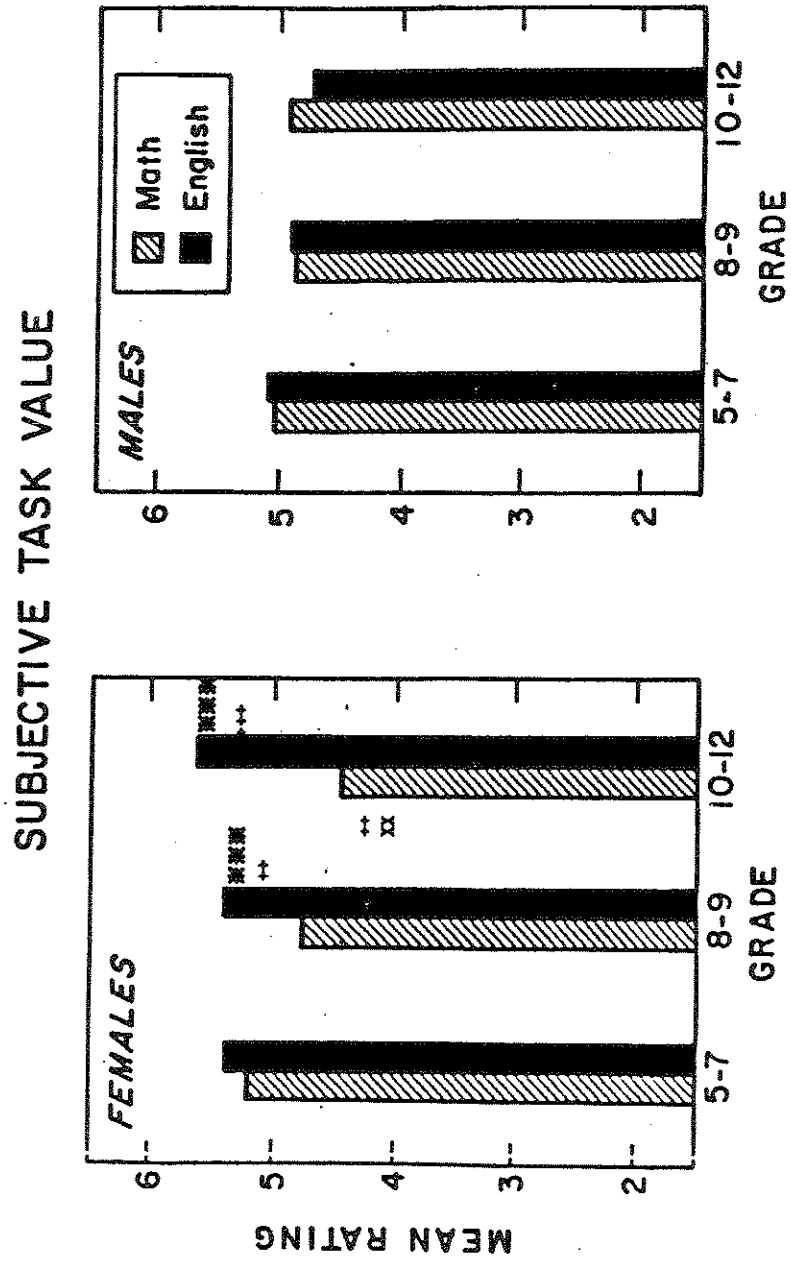


Figure 9

Characteristics of Effective Classrooms

Frequent Use of Cooperative Learning Opportunities

Frequent Use of Individualized Learning Opportunities

Infrequent Use of Competitive Motivational Strategies

Frequent Use of Hands-On Learning Opportunities

Frequent Use of Practical Problems as Assignments

Active Career and Educational Guidance Aimed at Broadening Students' View of Math and Physical Sciences

Frequent Use of Strategies Designed to Create Full Class Participation

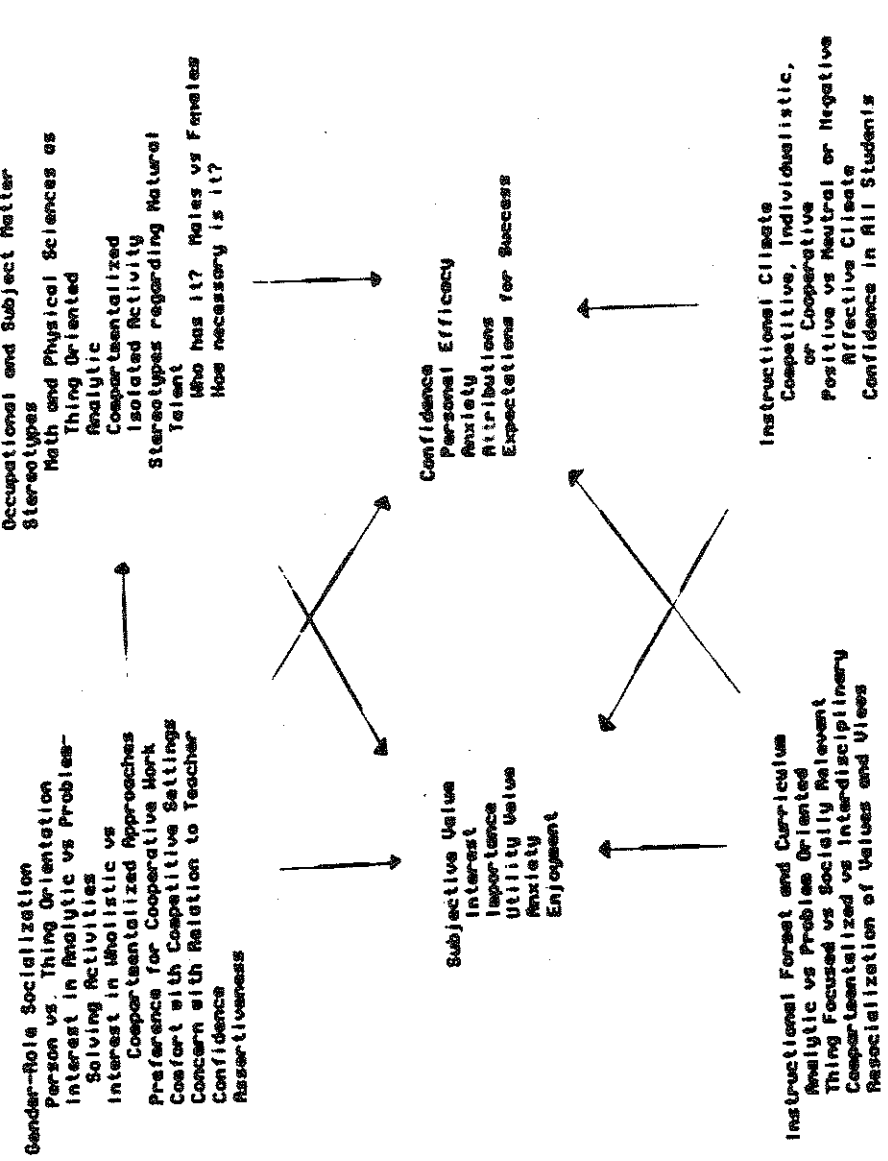


Figure 1

Variable	TYPE 1	TYPE 2	TYPE 3	TYPE 4
Course Taking Plans:1	M>F		F>M	
Course Taking Plans: 2	M>F		F>M	F>M
Worry about getting work done: 1				
Worry about getting work done: 2				F>M
Nervous if have to work too fast: 1				
Nervous if have to work too fast: 2				
Self-Concept: 1	M>F		F>M	F>M
Self-Concept: 2	M>F		F>M	F>M
Expectancy: 1	M>F		F>M	
Expectancy: 2	M>F		F>M	F>M
Utility Value Math: 1	M>F		F>M	
Utility Value Math: 2	M>F		F>M	
Intrinsic Value of Math: 1	M>F		F>M	
Intrinsic Value of Math: 2	M>F		F>M	F>M
Frustration with Math: 1	M<F			
Frustration with Math: 2	M<F	F<M		
Worry over Math Work: 1				
Worry over Math Work: 2	M<F	F<M		
Test Anxiety: 1	M<F			F<M
Test Anxiety: 2	M<F	F<M		
Somatic Signs of Math Anxiety: 1	M<F	F<M		
Somatic Signs of Math Anxiety: 2	M<F	F<M	F>M	
Task Difficulty: 1	M<F			
Task Difficulty: 2	M<F			
Number of Classrooms	37	33	16	3

Note: 1 refers to Wave 1, 2 refers to Wave 2.

Figure 12

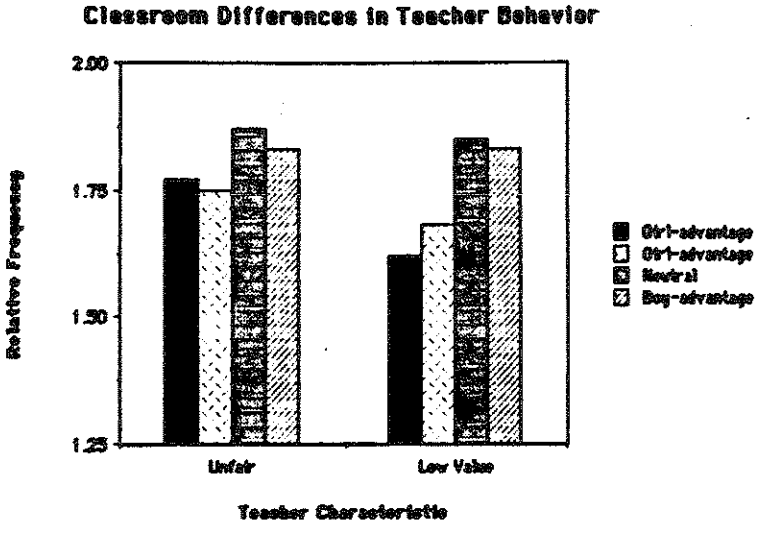


Figure 13

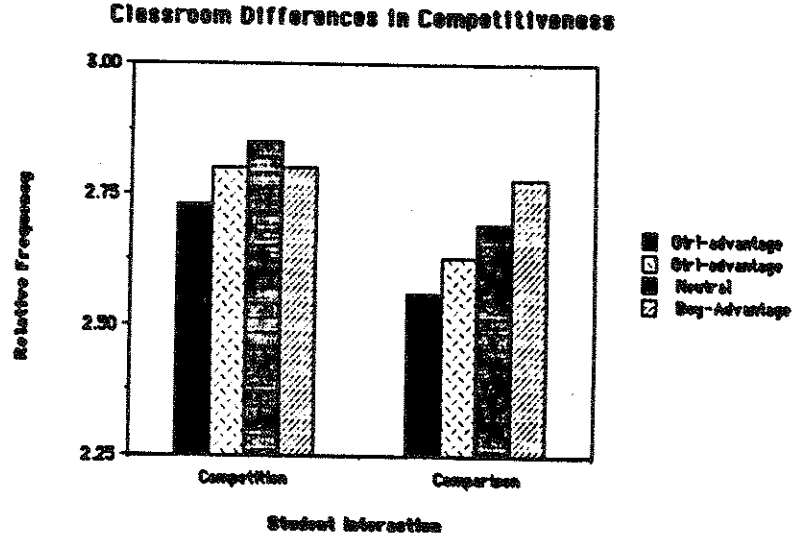


Figure 14

Changes in Motivation Associated with Junior High School Transition

- Decline in General Interest in School
- Increase in Extrinsic Motivational Orientation for School Work
- Decrease in Intrinsic Motivational Orientation for School Work
- Decline in General Self-Esteem
- Decline in Confidence in Some Academic Disciplines
- Decline in Subjective Task Value attached to Some Academic Subjects
- Increase in Anxiety and in the relationship of Anxiety to School Performance and Intrinsic Motivation
- Decrease in the Relationship between Academic Performance and Confidence in One's Academic Abilities
- Increase in Confusion regarding the Causes of One's Academic Performance
- Increase in Self-Focused Motivation
- Increase in Endorsement of View that Academic Abilities are Stable

Figure 15

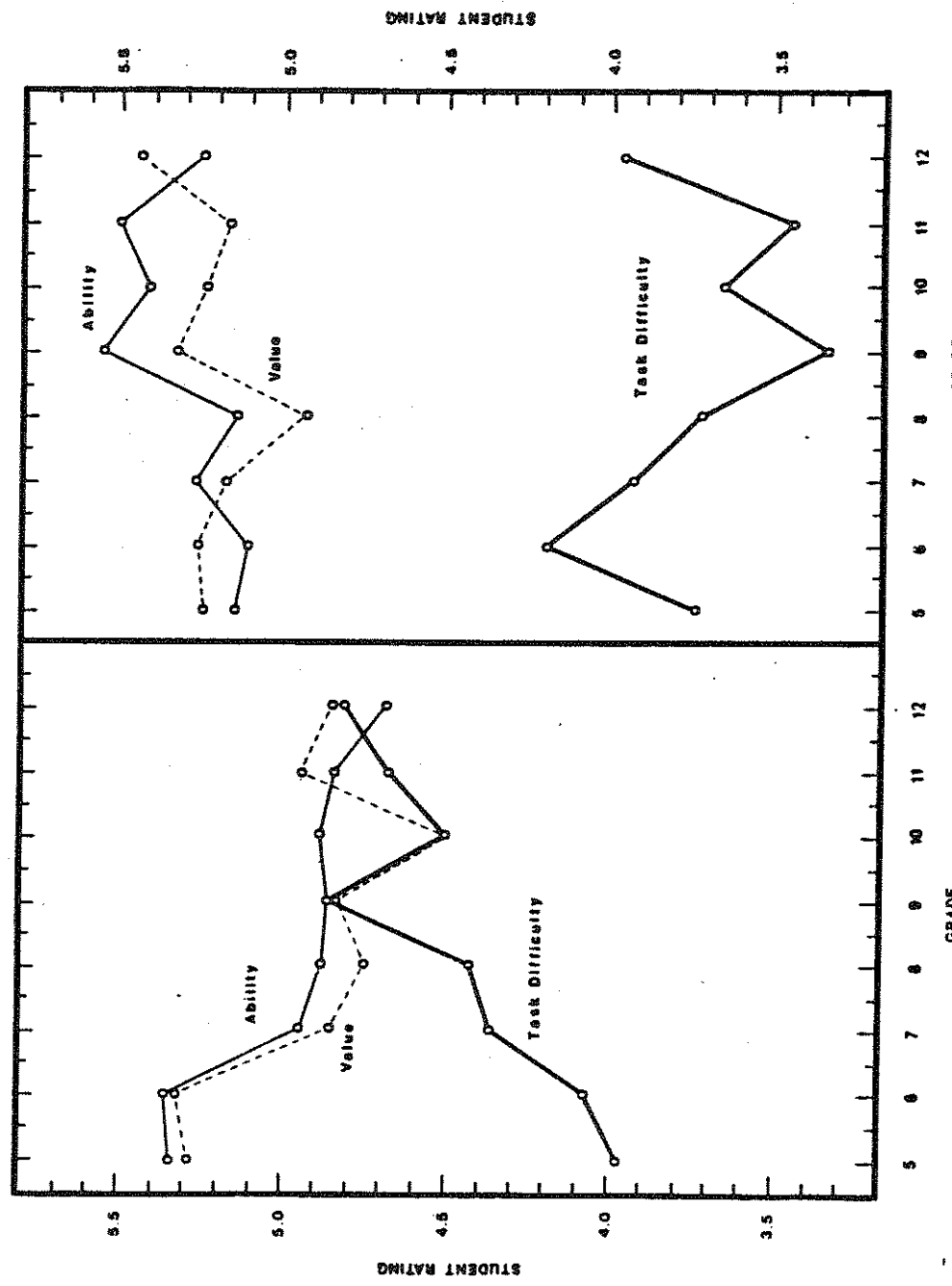


Figure 16

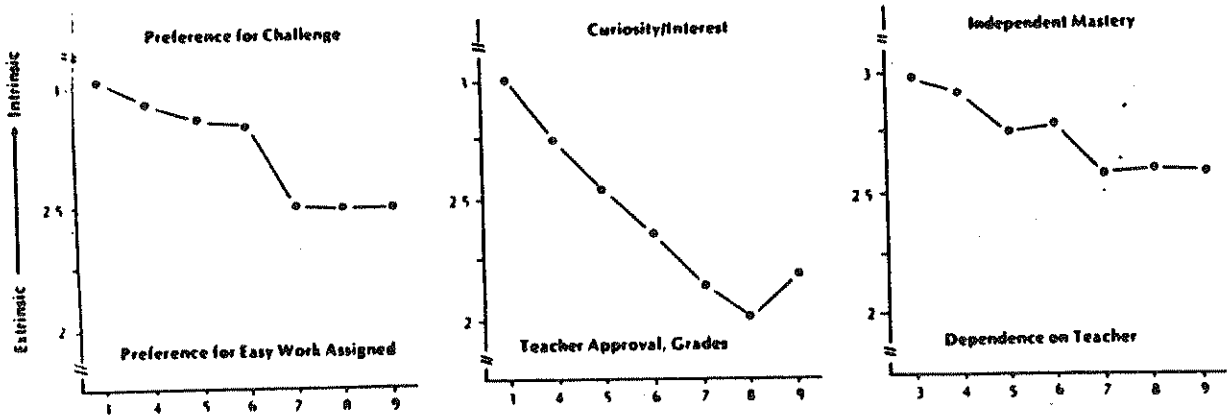
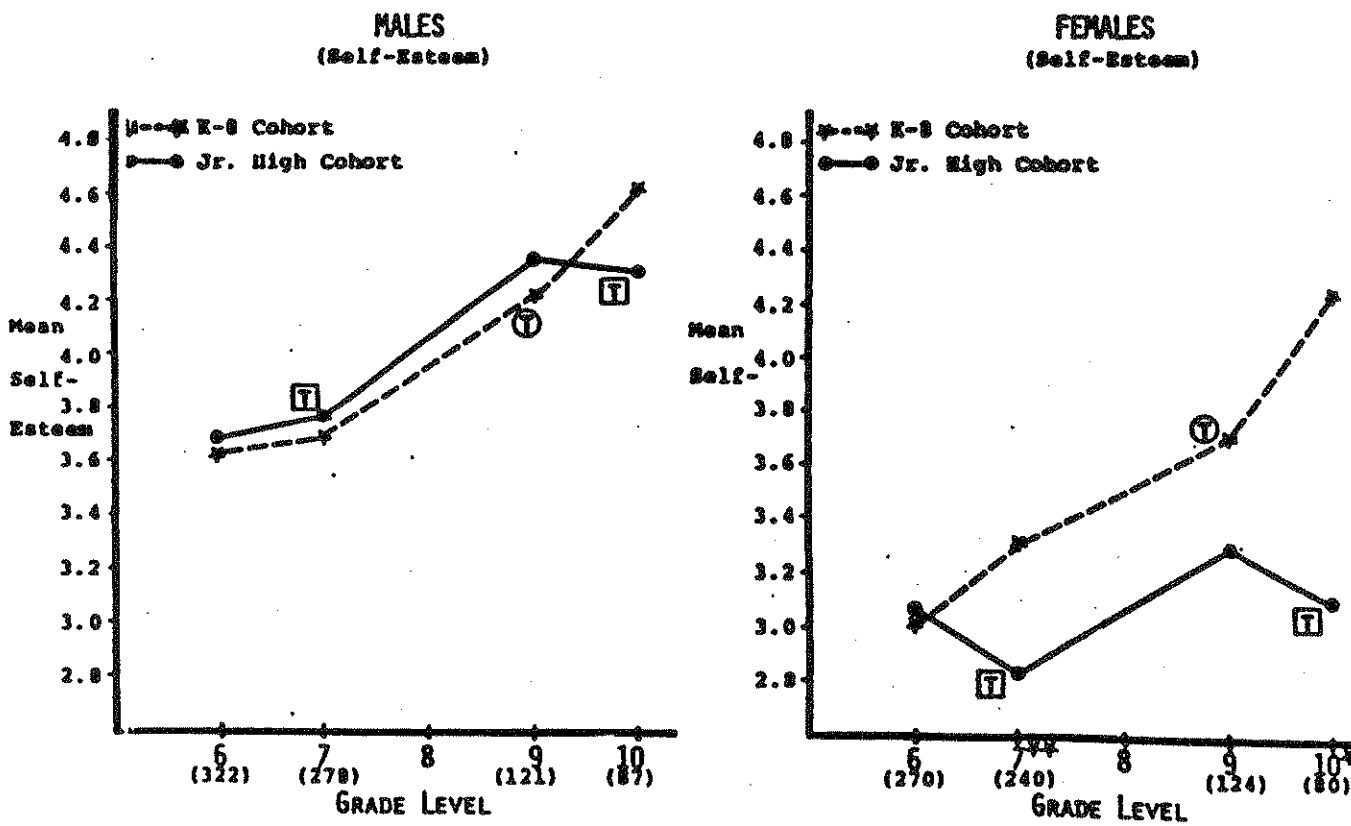


FIGURE 17 Mean Self-Esteem From Grade 6 to Grade 10 by School Type for Each Sex Separately

The symbol (T) indicates a year of transition for the Jr. High Cohort;
(T) indicates a year of transition for the K-8 Cohort.



Note: Although the study is longitudinal, there is a decreasing N for each grade level due to sample loss.

Figure 18

Environmental Changes
associated with
Junior High School Transition

General Changes

- Move to Larger, More Bureaucratic Institution
  - Departmentalized Instruction
  - Multiple Teachers
  - Greater Anonymity
  - Increased Student Load for Teachers
- Disruption of Friendship Networks
- Exposure to Broader Range of Individuals
- Reduced Family Involvement

Figure 19

Environmental Changes
associated with
Junior High School Transition

Classroom-Specific Changes

- Increase in Extrinsic Motivational Strategies
- More Rigorous Grading Practices resulting in Lower Average Grades
- Increase in Practices likely to focus Students' Attention on Ability Assessment
  - Ability Grouping
  - Whole Class Instruction
  - Normative Performance-Based Grading Practices
  - Competitive Motivational Strategies
- Increase in Teacher Concern with Control
- Decrease in Teachers' Trust of Students
- Decrease in Opportunity for Student Participation in Classroom Decision-Making
- Decrease in Student Autonomy
- Decrease in Teachers' Sense of Efficacy
- Initial Decrease in the Cognitive Level of the Tasks Required of Students

Figure 20

DEVELOPMENTAL CHARACTERISTICS OF EARLY ADOLESCENTS

Increased Desire for Autonomy

Increased Salience of Identity Issues

Continuing Need for Safe Environment in which to explore Autonomy and Identity

Increased Peer Orientation

Increased Importance of Heterosexuality

Increased Self-Focus and Self-Consciousness

Increased Cognitive Capacity with Movement toward Formal Operational Thought

Physical and Hormonal Changes Associated with Pubertal Development

Figure 21

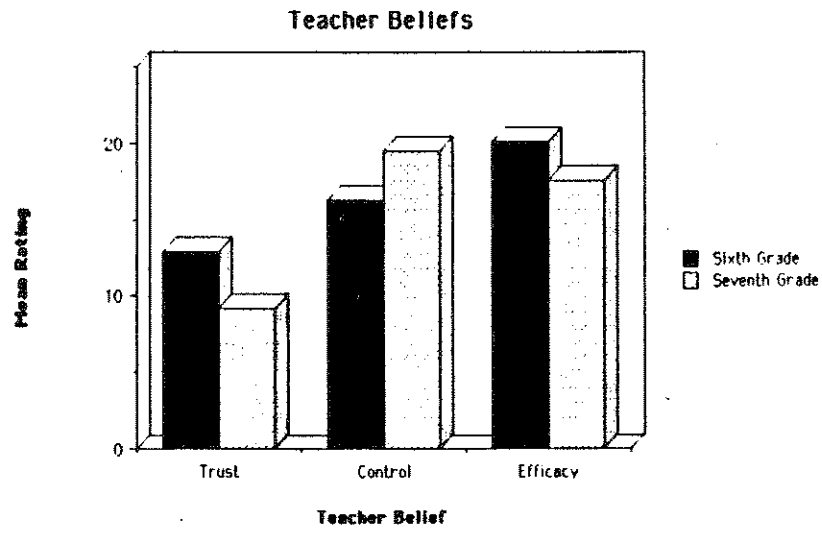


Figure 22

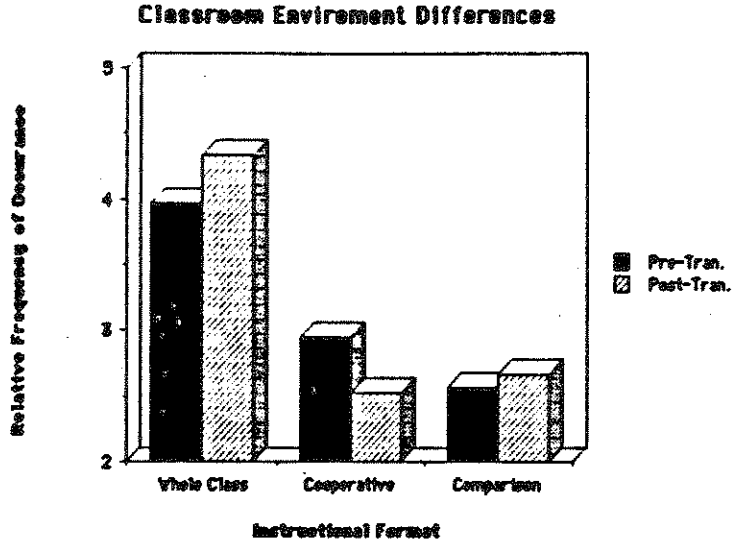
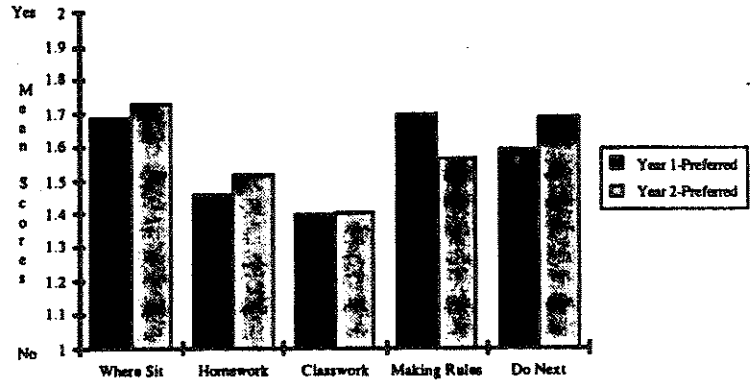


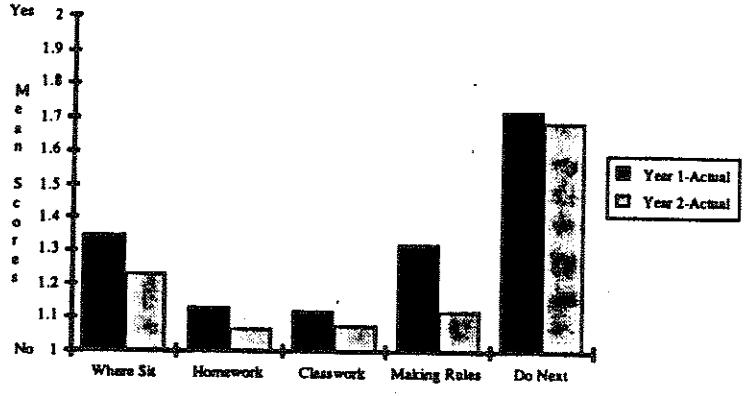
Figure 23



Note. N = 2210

Fig. 6. Students - Year 1 versus Year 2 Preferred Decision-Making

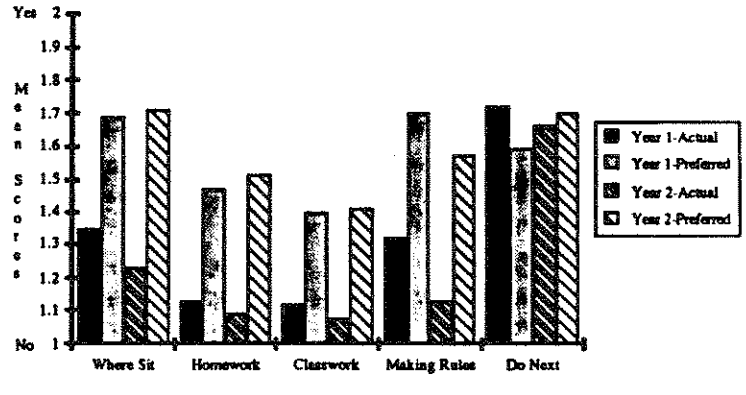
Figure 24



Note. N = 2210

Fig. 3. Students - Year 1 versus Year 2 Actual Decision-Making

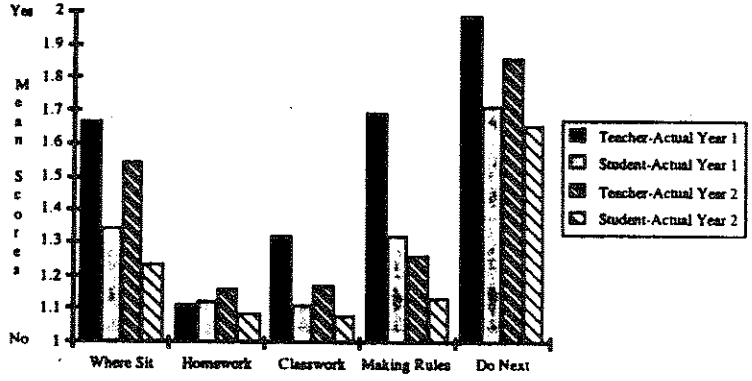
Figure 25



Note. N = 2210

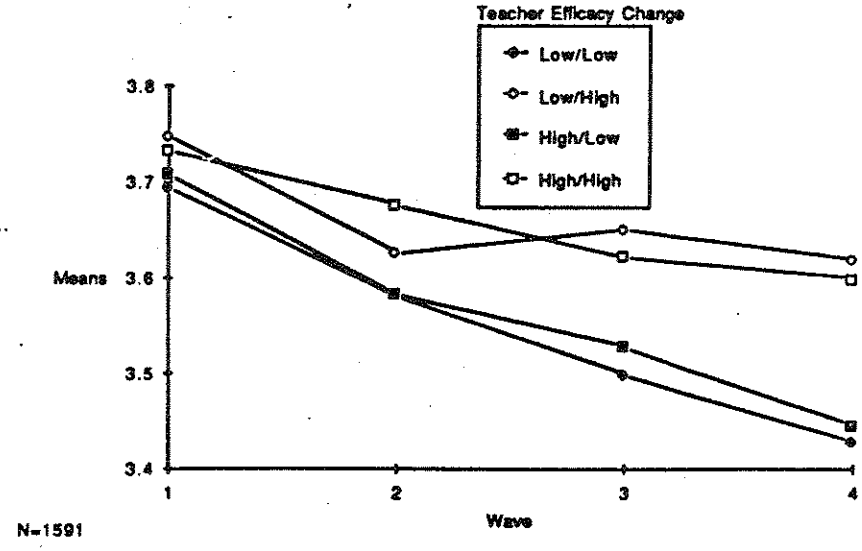
Fig. 2. Student Actual versus Preferred Decision-Making

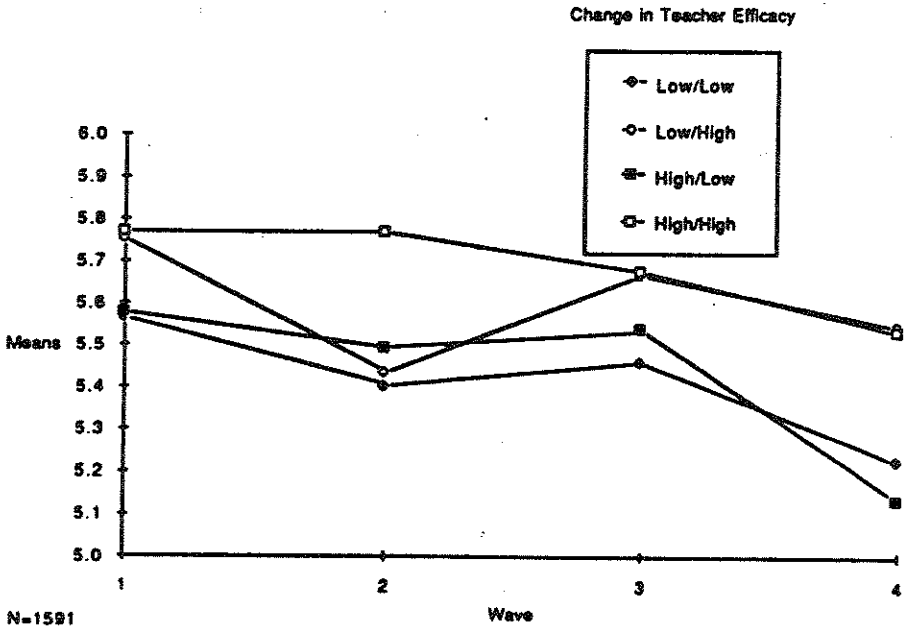
Figure 26



Note. Year 1 Classroom N=117; Year 2 Classroom N=137; student scores were aggregated to the classroom level using within classroom means.

Fig. 1. Teacher versus Student Actual Decision-Making




Change in Teacher Efficacy
Low/Low
Low/High
High/Low
High/High
6.0
5.9
5.8
5.7
5.6
Means 5.5
5.4
5.3
5.2
5.1
5.0
1
2
3
4
N=1591
Wave