Outline of AERA Talk, April 1991, Chicago
Motivation: New Directions in School-based Research
Changing the classroom
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Goals of talk

Outline some of the types of work that has been done on classroom effects on motivation

Discuss briefly the theoretical rationale underlying this work - Pointing out how different aspects of the classroom environment are linked conceptually to different aspects of motivation (see figure on different types of motivation)

Point out concerns with the work regarding the limitations of its applicability to the complex social context of the classroom and the multiple goals operating in that context

Discuss the work from a developmental perspective focusing on what it can tell us about changing motivational orientation as children pass through the school system. Will focus primarily on the junior high school transition period.

First- need to outline briefly two background issues for this talk:

a - Defining motivation - There are many definitions of classroom relevant motivational constructs.

Show Figure on different types of motivation from the students' point of view

It is important to note that:

1. Different classroom characteristics are assumed to be associated with these various forms of motivation and different aspects of motivation are assumed to affect different aspects of learning and classroom behavior.

2. Often the characteristics that are assumed to facilitate one form of motivation may undermine another form of motivation.

3. Very few researchers look at more than one type of classroom characteristic or one type of motivation so we have very few studies that help us understand interplay between various classroom characteristics and various motivational outcomes. Lots of advocating for one approach without considering multiple goals or conflicting consequences across motivational and learning outcomes

b - Developmental change - Junior high school transition effects

There is evidence of consistent pattern of changes in motivational orientation with transition to junior high school. These are shown in Table entitled Changes in motivation associated with junior high school transition. (I've included as an appendix to this outline a copy of a paper summarizing these changes and the relevant research we have done on the topic.) I'll be pointing out when changing classroom context may be contributing to these changes.

Types of research done on classroom effects on motivation - I'll talk about two types of research: Studies of within classroom effects and studies of between classroom effects.

Within Classroom Effects

Theoretical Basis - Primarily differential treatment by teacher impacts on children's motivation to work in classroom as well as on the actual amount, and type, of instruction they receive. The work on teacher expectancy effects provides an excellent example of this type of work.

Secondary theoretical basis: Differential behavior/characteristics of kids. These studies complicate our interpretation of effects because isn't easy to differentiate "accuracy effects" from "expectancy effects".

For examples of both types of expectancy effect studies see work by Brophy and his colleagues, Lee Jussim, Eccles and her colleagues, Marlene Lockheed, Harris Cooper, and David Reuman)

Between Classroom Effects

These studies look for some characteristic of classroom climate or teacher that will affect the majority of children's motivation through various theoretically generated mechanisms.

Ability grouping Effects - There are four primary theoretical mechanisms proposed to underlie the impact of ability grouping on motivation. (3 classical approaches and one new approach). These don't yield the same predictions and, since they focus on different characteristics of environment and different presumed mediators, we rarely have the right type of information to compare the various theories across studies and settings.

A. The person-environment fit perspective assumes that a more appropriate match between student abilities and the material being presented ought to optimize motivation and learning. Therefore ability grouping should have positive effects for all levels.

B. The social comparison perspective assumes that people judge their competence in light of the competence of those around them. As a consequence, changing the context by ability grouping will change the inferences made by the students about their competence and thus change their motivation. According to this view, low competence students should develop a more positive view of their ability if they are placed in a low ability tracked classroom than if they are placed in a heterogeneously tracked classroom. The opposite effect would hold for high competence students.

C. The social labelling perspective assumes that people become the type of people they are labeled as by the school i.e. the self fulfilling prophecy effect. According to this view being placed in a low ability tracked classroom will lead to a decline the students' view of their own ability and vice versa for high performing students.

D.　New possibility: The life course trajectory perspective assumes that being placed in particular social contexts will affect the peer group one hangs out with and the people one is exposed to as role models. It will also change other aspects of one's life like the other courses one can sign up for or the extracurricular opportunities one is likely to be exposed to. By narrowing the range of one's experiences, ability tracking will isolate high and low performing students from one another and will increase the likelihood that they will end up on different life paths as they pass through secondary school.

Teacher　Warmth/Supportiveness.　Many studies assume that warm relationships with a teacher increase her/his power of influence because it increases children's desire to do what teacher says (either due to identification or the increased power of teachers' social reinforcement properties). Therefore, variations in teacher warmth/supportiveness should impact of the value kids attach to working hard in the classroom. But teacher warmth and supportivenss should have this affect only if there are clear guidelines on what to do - i.e. its impact on motivation and performance will depend on the extent to which the teacher also runs a well managed classroom. This last idea is analogous to Baumrind's conclusions regarding the greater effectiveness of authoritative parenting.

There are significant changes in teacher warmth associated with the transition to junior high school. Seventh grade students report their teachers being less supportive and less trusting than they reported their sixth grade teachers being while they were in the sixth grade. The key developmental issue may be more support and respect than warmth per se. As children get older they want a different type of support and warmth - i.e. they want the teacher to trust them and treat them like an emerging adult. We have found clear evidence of decline in warmth and trust with transition to junior high school and, as predicted, experiencing this type of decline leads to a decline in the value attached by the students to the subject area. This result is especially true for low achieving students. (see attached paper for details.)

Control/Autonomy　.　Researchers like Deci, Lee, and Boggiano have argued that intrinsic motivation is good for learning. Furthermore, classroom environments that are overly controlling and do not provide an adequate amount of autonomy undermine intrinsic motivation. They have found some support for this hypothesis in laboratory studies. But the key issue is defining the term adequate amount of autonomy and for adequate for whom. Studies of well managed classrooms show clear evidence of the importance of teacher control in keeping a large group focused on the learning activities. Researchers in these two areas aren't addressing the same issues and aren't working out the conceptualizations in such a way that we can compare across these studies to find out exactly what aspects of control are good and what aspects undermine intrinsic motivation. In our work we find few effects of various measures of teacher control and student autonomy while we find significant effects of other classroom characteristics such as teacher efficacy, and teacher warmth/trust/support.

Developmentally, this particular aspect of classroom climate is very important. Lee argued for person-environment fit idea- i.e. as kids gets older they want more autonomy over own learning but teachers do not increase the amount of autonomy given. He also argued that teachers do not provide an increasing opportunity for the students to play a more autonomous role in their learning as they move into junior high school. As a consequences there is a growing mismatch between

amount of autonomy wanted and amount provided by the classroom environment. This should lead to declines in intrinsic motivation, and declines in the value attached to the subject matter and to doing what the teacher asks. We get clear evidence of this effect as early adolescents make the transition into junior high school. Opportunities for autonomy actually decline and the discrepancy between desire and opportunity increases. Furthermore, this change is related to declines in the value components of motivation. (Reuman et al., Mac Iver & Reuman; see attached paper)

One interesting side finding. Boggiano and her colleagues had teachers teach small groups of children a set of tasks using either a controlling strategy or a less controlling strategy. The sessions were video-tapped. They asked observers to rate the quality of the teachers shown on the video tapes. People rated the more controlling teachers as the better teachers even though the children did better in terms of learning and learning transfer under the less controlling teacher.

   Teacher Efficacy. Researchers such as Bandura and Webb have argued that teachers' feelings of efficacy will influence the motivation of the children to learn through their impact on the children's own sense of efficacy. If teachers don't feel like they can teach all children, then they will not try to teach/motivate all kids, will communicate their feelings to children in class' (leading to within classroom expectancy effects), and will potentially bring down the feelings of efficacy of other teachers in school. There is some supportive evidence for this prediction.

   Developmentally this appears to be a very important classroom characteristic. The biggest difference we have found between sixth and seventh grade teachers is on the teacher efficacy measure (see attached paper). Seventh grade teachers feel much less efficacious than sixth grade teachers. Furthermore, moving from an efficacious sixth grade teacher to a non-efficacious seventh grade teacher clearly undermines the self-confidence that low performance students have in their ability to master the material in the course.

   More complex models. It is clear that there are individual differences in the impact of all of the characteristics listed above on children. And there are often good theoretical reasons for predicting such interactions, e.g. teacher efficacy, ability grouping effects. Person-environment fit models of the impact of environments on individual provide an interesting theoretical approach to these interactions. Some very interesting studies are beginning to emerge that adopt this perspective. Several examples of this type approach are outlined below.

General Teaching Practices Linked to Self-Evaluation. People like Rosenholtz & Simpson, 1984, Mac Iver, 1988 have suggested that there is a cluster of teaching practices (e.g. individualized/differentiated versus whole group instruction; ability grouping practices; publicness of feedback) make ability differences in classroom very salient to the students. They assume that this will affect motivation of students by making everyone more focused on extrinsic motivators, social comparison behaviors and the perception of ability as an entity state rather than an incremental condition. Alternatively this teaching style could differentially affect low and high performing children differently leading to decrements in the motivation of low performing children because they will be aware of relative low standing.

There has been very little work actually testing these hypotheses and testing the impact of these strategies on motivation and on the link between self-perceptions and either behavior or learning.

Developmental link - Some of thee types of practices linked to high levels of social comparison do increase in frequency over the transition to junior high school (e.g. whole class instruction, normative performance based grading). Others do not (e.g. within class ability grouping, publicness of evaluation. We don't know if these changes are linked to increase in extrinsic motivation and increase in use of social comparison process at this age but could be and should be studied.

Girls and math (Girl-friendly classrooms). There is evidence emerging that there may be sex differences in children's preference for different types of learning contexts and that this may interact with subject area in such a way as to yield a sex difference in interest in different subject areas. Work is just beginning on this issue but the basic argument is shown in the figure. Our own work and that others in the field (e.g. Casserly and Kahle) suggests that females respond more positively to math and science instruction if it taught in a cooperative or individualized manner rather than a competitive manner, if it is taught from an applied/ person centered perspective rather than a theoretical/abstract perspective, if it is taught using a hands-on approach rather than a "book learning" approach, and if the teacher avoids sexism in its many subtle forms.

Issues - These gender differences however are small like all others. Do we create different learning settings for different types of kids? How do insure that kids will be exposed to different teaching styles in each subject area as one way to overcome this problem.

Developmental Transitions - There is also interesting work emerging to suggest that there may be important age differences in the impact of various teaching styles on students' motivation and interest. I have already pointed out several examples of this. Middle school philosophy is another example of way people are talking about it but this tends to focus on school as the context rather than the classroom as the context. But this is key question, how do we study the association between what happens in the school and what happens in specific classrooms to specific children. The meaning of particular teaching styles will vary depending n the norms in the larger social context. This needs to be taken into account in studying these relations. Taking the developmental perspective also makes it very clear that one needs to take multiple goals into account. We need to think about motivation for what. Engineering classrooms to facilitate one type of motivational or performance outcome will have effects on other motivational and performance outcomes - sometimes these effects will have negative short term and/or long term consequences for the children and the school. Need to think about these issues in designing studies to look at the basic relationships and in designing interventions based on these studies.

MOTIVATION: A STUDENT'S VIEW

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

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

Gender-Role Socialization
Person vs. Thing Orientation
Interest in Analytic vs Problem—
Solving Activities
Interest in Wholistic vs
Compartmentalized Approaches
Preference for Cooperative Work
Comfort with Competitive Settings
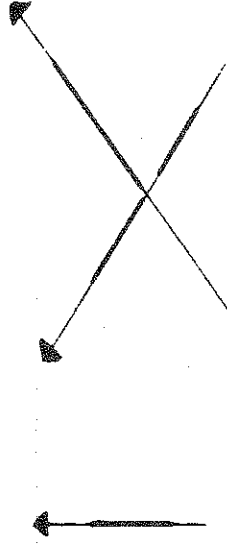Concern with Relation to Teacher
Confidence
Assertiveness

Occupational and Subject Matter
Stereotypes
Math and Physical Sciences as
Thing Oriented
Analytic
Compartmentalized
Isolated Activity
Stereotypes regarding Natural
Talent
Who has it? Males vs Females
How necessary is it?

Confidence
Personal Efficacy
Anxiety
Attributions
Expectations for Success

Instructional Climate
Competitive, Individualistic,
or Cooperative
Positive vs Neutral or Negative
Affective Climate
Confidence in All Students

Subjective Value
Interest
Importance
Utility Value
Anxiety
Enjoyment

Instructional Format and Curriculum
Analytic vs Problem Oriented
Thing Focused vs Socially Relevant
Compartmentalized vs Interdisciplinary
Resocialization of Values and Views

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

Jacquelynne S. Eccles

Invited Address
American Psychological Association
New York, August, 1987

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 and subjective task value) on both performance and enrollment decisions in 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 school district. Figure 3 illustrated the direct and indirect influence of various factors on students' math grades and intentions to take more math. Figure 4 illustrates the relative influence of subjective task value and confidence on these same students' decisions regarding enrollment in mathematics in their twelfth grade year. Figures 5 and 6 illustrate similar path analyses for a second, larger, more representative school 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 as 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 guessed, 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 as well as 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 distinguishing characteristics emerge with great regularity 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 goal 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

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 positive 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 basically 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.

These variables are quite reasonable if you think about how gender roles are likely to have induced differences between females and males especially during the adolescent years. A summary of the process 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 subjec 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' motivatio 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 schoo 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, Janis Jacobs, Dave Kinger, Dougla Constance Flanagan, Rena Goldsmith, Janis Jacobs, Dave Kinger, Dougla MacIver, Carol Midgely, Christy Miller, David Reuman, Allan Wigfield and Doris Yee. The work I'll be presenting in the remainder of my tall 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 classroom in which girls ha particularly favorable attitudes toward math and then to identify thos characteristics of the classroom environment that distinguished thes

INSERT FIGURES 14 AND 15

Some of these changes are especially marked at the junior high school transition. For example, our data (see Figure 13) 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-9, 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, & Carleton-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 &

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 classroom characteristics. Similar effects have been reported by Fennema and Peterson 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 effected by competition and negatively affected by cooperatively learning strategies (Fennema & Peterson, 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 Midgley, 1988. The major changes are listed on Figure 14. Some of these changes vary across subject areas. For example, Figure 15 illustrates the changes in sixth 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.

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

INSERT FIGURES 18 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 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

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 environment that is important. Imagine 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 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 organizational, instructional, and climate variables, including task structure, task complexity, grouping practices, evaluation techniques, motivational 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

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 transition to junior high school involves a move from a small, informal, relatively homogeneous school to a more bureaucratic 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 Midgley, 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, seventh 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 teachers their specialty.

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 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 amongst 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

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.

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 24-26: 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 autonomy and their perceptions of their opportunity for autonomy affect motivation? Person-Environment Fit theories suggest that a mismatch between one's needs and the environmental affordances will lead to decline in motivation 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 their own performance in math; and they engaged in less misbehavior according to own and their

17

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 2

MOTIVATION: A STUDENT'S VIEW

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

Sex of Student

Subjective Value of Math

Self-Concept of Math Ability

Enrollment in Twelfth-Grade Mathematics

.27

.19

.40

R² = 18%

Figure 5

.23

MATH GRADE:0

MATH GRADE:2
R²=14%

ACT Q
R²=23%

.26

.23

.22

.44

SUBJECTIVE MATH VALUE:1
R²=5%

COURSE PLANS:2
R²=9%

.19

.23

.14

7

MATH SELF CONCEPT:1
R²=22%

.16

7

SEX

.20

GRADES 8-11

N=234

ENGLISH GRADE:0 — .52 → (top connection)

ENGLISH GRADE:0 — .20 → ENGLISH GRADE:2 $R^2 = 16\%$

.12 → ACT V $R^2 = 24\%$

.28

-.18

-.15

SEX

-.24

SUBJECTIVE ENG. VALUE:1 $R^2 = 3\%$

ENG. SELF CONCEPT:1 $R^*= 8\%$

.27

.23

.17

COURSE PLANS:2 $R^2 = 21\%$

.15

GRADES 8-11   N=206

Figure 7

ABILITY

*** Subject Domain Comparisons Significant

++ Sex Comparison within Age Group and Subject Domain Significant

xx Age Comparison within Sex and Subject Domain Significant

Figure 8

SUBJECTIVE TASK VALUE
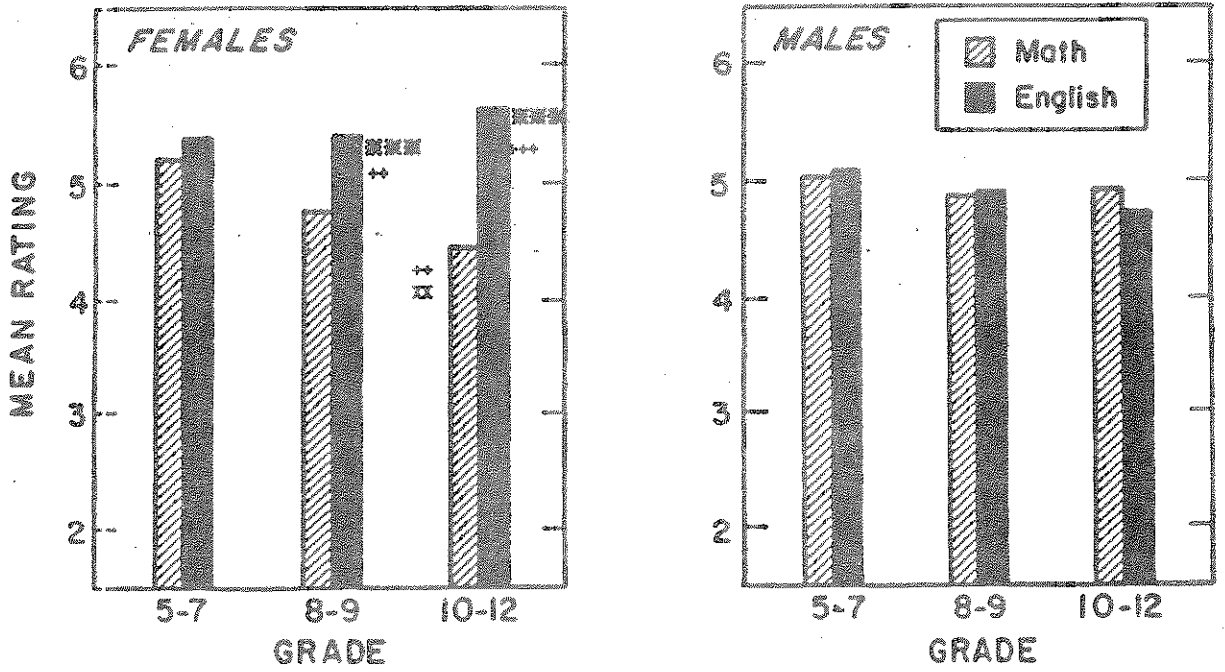
Figure 9

Characteristics of
Effective Classrooms

Frequent Use of Cooperative Learning
Opportunities

Frequent Use of Individualized
Learning Opportunities

Infrequent Use of Competitive
Learning 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 10

Gender-Role Socialization
  Person vs. Thing Orientation
  Interest in Analytic vs Problem-
    Solving Activities
  Interest in Wholistic vs
    Compartmentalized Approaches
  Preference for Cooperative Work
  Comfort with Competitive Settings
  Concern with Relation to Teacher
  Confidence
  Assertiveness

Occupational and Subject Matter
Stereotypes
  Math and Physical Sciences as
    Thing Oriented
    Analytic
    Compartmentalized
    Isolated Activity
  Stereotypes regarding Natural
    Talent
      Who has it? Males vs Females
      How necessary is it?

Subjective Value
  Interest
  Importance
  Utility Value
  Anxiety
  Enjoyment

Confidence
  Personal Efficacy
  Anxiety
  Attributions
  Expectations for Success

Instructional Format and Curricula
  Analytic vs Problem Oriented
  Thing Focused vs Socially Relevant
  Compartmentalized vs Interdisciplinary
  Resocialization of Values and Views

Instructional Climate
  Competitive, Individualistic,
    or Cooperative
  Positive vs Neutral or Negative
    Affective Climate
  Confidence in All Students

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				
Worry about getting work 2	M>F		M>F	
Number of DAYS IT RANK FROM WORK 1				
Number of DAYS IT RANK FROM WORK 2				
Self-Concept: 1	M>F	M>F		
Self-Concept: 2	M>F	M>F	M>F	M>F
Expectancy: 1	M>F		M>F	
Expectancy: 2	M>F		M>F	
Utility Value Math: 1	M>F		F>M	
Utility Value Math: 2	M>F		F>M	
Intrinsic Value of Math: 1			M>F	
Intrinsic Value of Math: 2	M>F		F>M	
Frustration with Math: 1	M>F		F>M	
Frustration with Math: 2	M>F		F>M	M>F
Worry over Math Work: 1	M>F		F>M	
Worry over Math Work: 2	M>F		F>M	
Test Anxiety: 1	M>F			
Test Anxiety: 2	M>F			
Somatic Signs of Math Anxiety: 1	M>F	M>F		
Somatic Signs of Math Anxiety: 2	M>F			
Task Difficulty: 1	M>F		F>M	
Task Difficulty: 2	M>F	M>F		
Number of Classrooms	37	33	16	3

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

Figure 11

Figure 13

Classroom Differences in Competitiveness

Figure 12

Classroom Differences in Teacher Behavior

Figure 15

ENGLISH

MATH

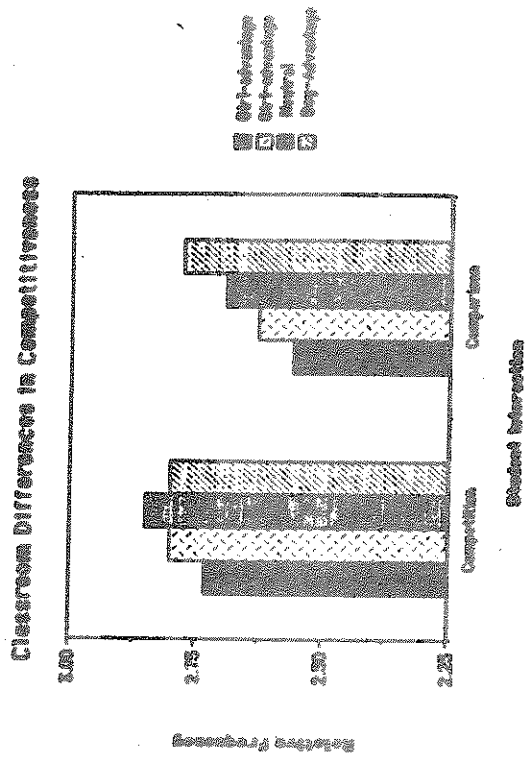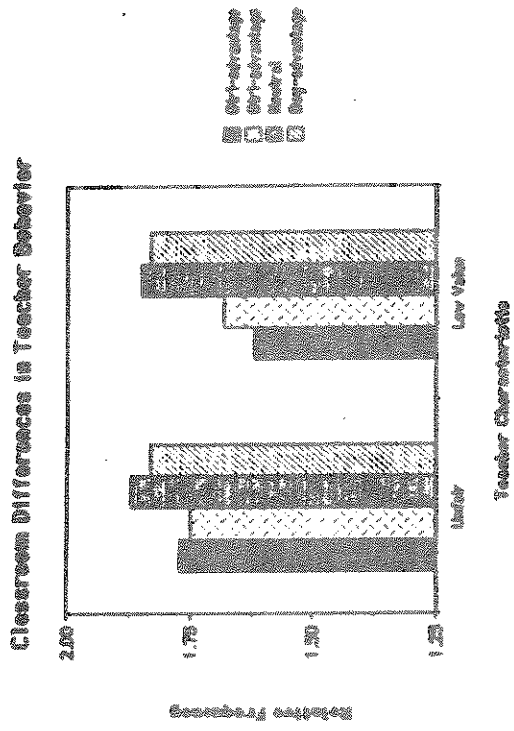
Figure 14

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
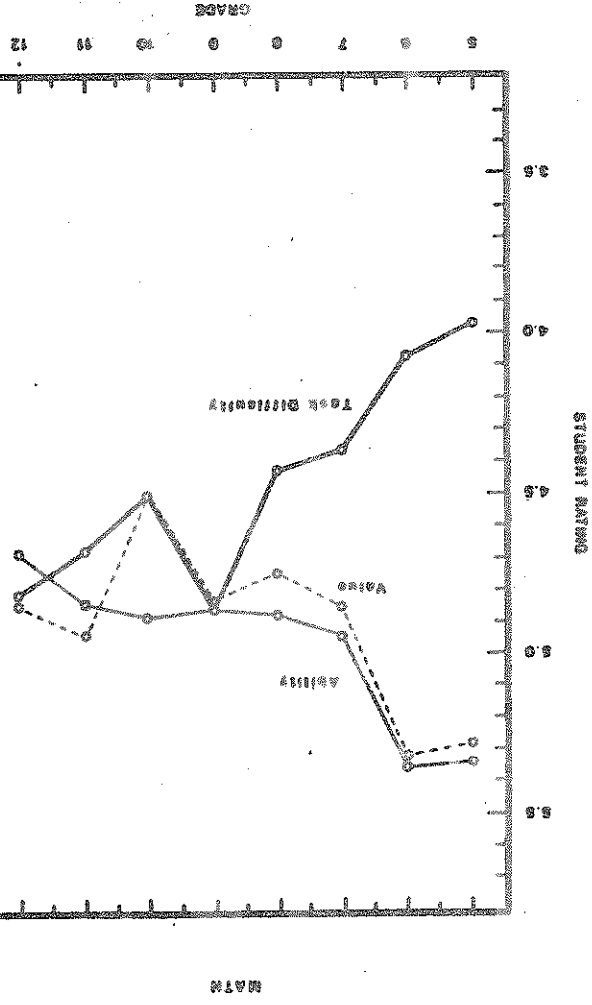
Figure 16
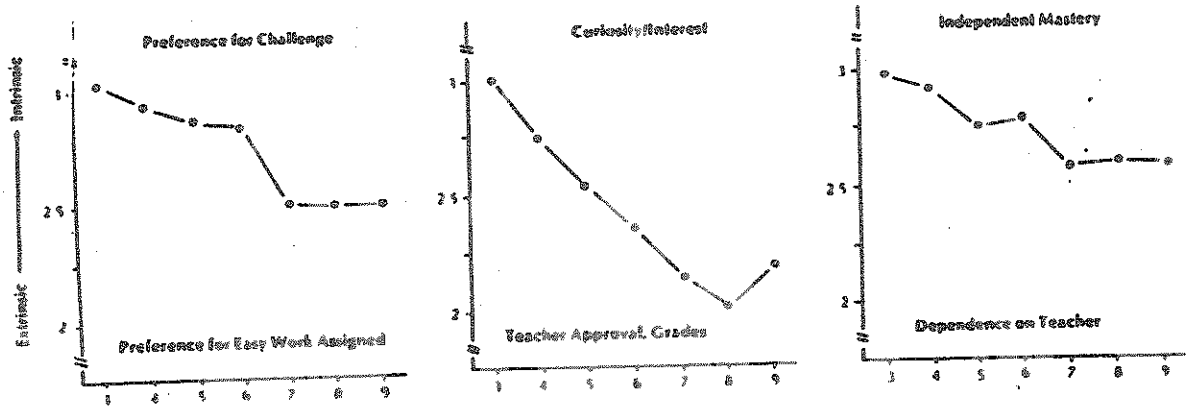
FIGURE 17 Mean Self-Esteem From Grade 6 to Grade 10 by School Type for Each Sex Separately

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

MALES
(Self-Esteem)
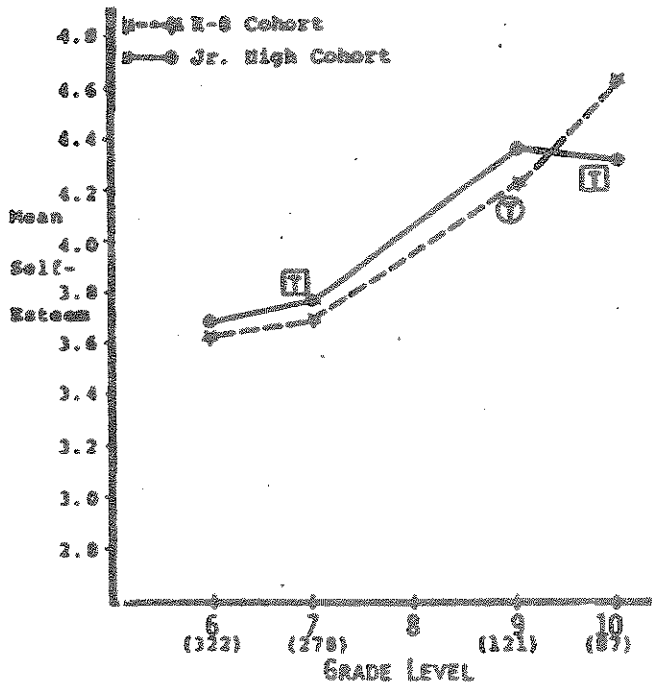
FEMALES
(Self-Esteem)
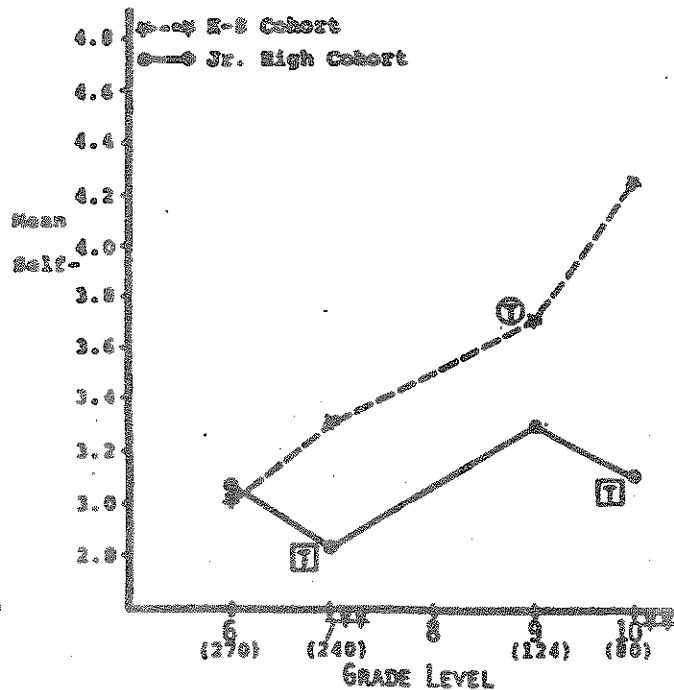
Note: Although the study is longitudinal, there is a decreasing N for each grade level due to sample loss.

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 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 21

Teacher Beliefs

Item Rating

Trust   Control   Efficacy

Teacher Belief

Sixth Grade
Seventh Grade

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 23
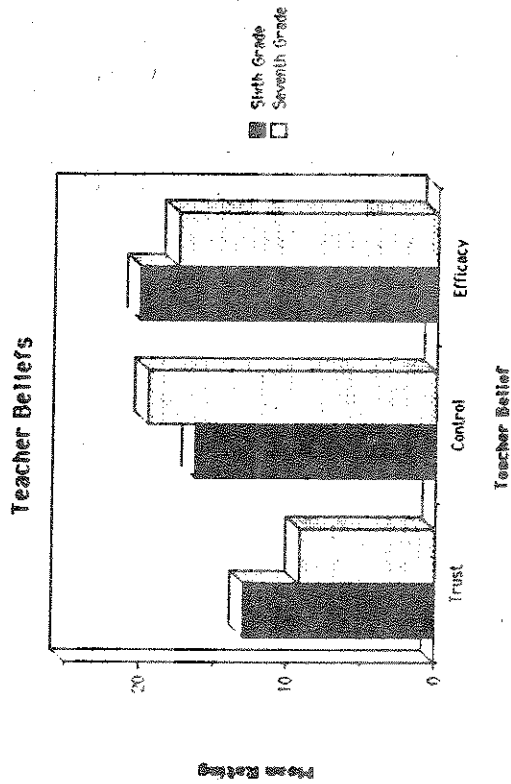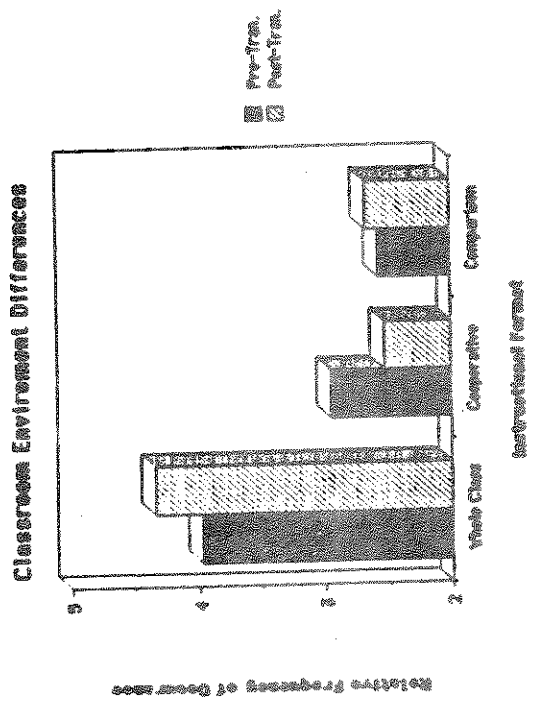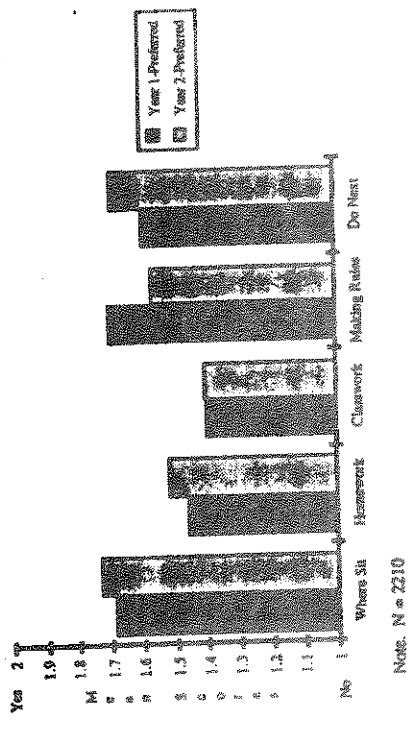
Figure 22

Fig. 6. Students - Year 1 versus Year 2 Preferred Decision-Making
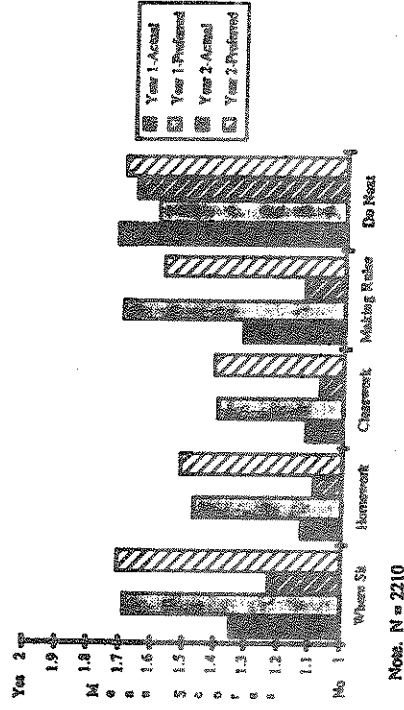
Note. N = 2210

Classroom Environment Differences

Figure 25

Fig. 2. Student Actual versus Preferred Decision-Making

Note. N = 2210
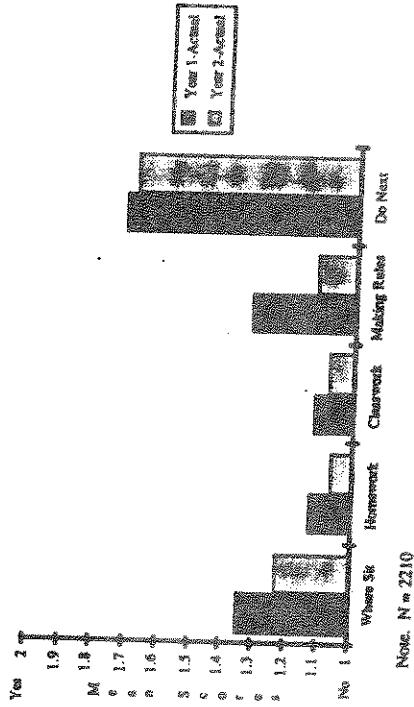
Figure 24

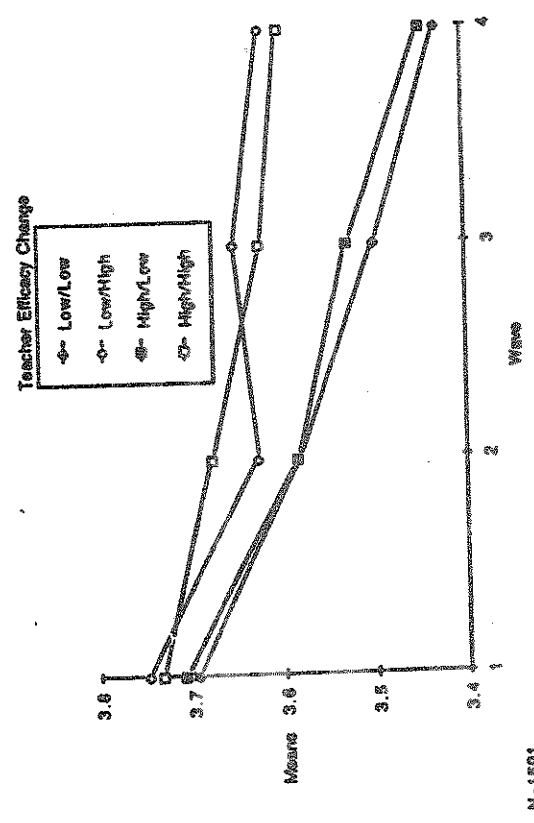Fig. 3. Students - Year 1 versus Year 2 Actual Decision-Making

Note. N = 2210

PERCEIVED MODIFIABILITY OF ABILITY-MATH

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

Figure 20

PERCEIVED EXPECTANCIES IN MATHEMATICS