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ABSTRACT

This paper explores three research issues on adolescent development using an elaborated effects model: (1) Are there consistent sex main effects on a variety of student outcomes? (2) What are the relative influences of family status, family processes, school processes, and individual ability on academic and nonacademic behavior of males and females? and (3) Do the same influence processes operate for males and females or are there important sex interaction effects with family or school characteristics? The study utilizes survey data from 4,079 white students in 10 middle schools and six high schools in Maryland that differ significantly in authority structure. The sample of students from grades 6, 7, 9 and 12 is diverse in social and family processes. Results show: (1) significant sex main effects of five outcomes--self esteem, college plans, academic subject preference, adjustment in school and report card grades; (2) clear differences in patterns of influence of variables--family and school processes are more important for personality and school coping skills, and family status and individual ability are more important for college plans and standardized achievement; and (3) no consistent, significant sex interactions. (Author/MFD)

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SEX DIFFERENCES IN FAMILY AND SCHOOL INFLUENCE ON STUDENT OUTCOMES

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Introductory Statement

The Center for Social Organization of Schools has two primary objectives: to develop a scientific knowledge of how schools affect their students, and to use this knowledge to develop better school practices and organization.

The Center works through three programs to achieve its objectives. The Policy Studies in School Desegregation program applies the basic theories of social organization of schools to study the internal conditions of desegregated schools, the feasibility of alternative desegregation policies, and the interrelation of school desegregation with other equity issues such as housing and job desegregation. The School Organization program is currently concerned with authority-control structures, task structures, reward systems, and peer group processes in schools. It has produced a large-scale study of the effects of open schools, has developed the Teams-Games-Tournament (TGT) instructional process for teaching various subjects in elementary and secondary schools, and has produced a computerized system for school-wide attendance monitoring. The School Process and Career Development program is studying transitions from high school to post secondary institutions and the role of schooling in the development of career plans and the actualization of labor market outcomes.

This report, prepared by the School Organization Program, investigates the effects of family and school processes on student academic and nonacademic outcomes, emphasizing sex differences in outcomes.

Abstract

This paper explores three research issues on adolescent development using an elaborated effects model: (1) Are there consistent sex main effects on a variety of student outcomes? (2) What are the relative influences of family status, family processes, school processes, and individual ability on academic and nonacademic behavor of males and females? and (3) Do the same influence processes operate for males and females or are there important sex interaction effects with family or school characteristics?

The study utilizes survey data from 4079 white students in ten middle schools and six high schools in Maryland that differ significantly in authority structure. The sample of students from grades 6, 7, 9 and 12 is diverse in social class and family processes.

Results show (a) significant sex main effects on five outcomes--self esteem, college plans, academic subject preference, adjustment in school and report card grades; (b) clear differences in patterns of influence of variables--family and school processes are more important for personality and school coping skills, and family status and individual ability are more important for college plans and standardized achievement; and (c) no consistent, significant sex interactions.

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This study examines sex main and interaction effects on a variety of academic and nonacademic outcomes in an elaborated model of the influence of family and school processes on student development. The study includes proximate measures of family and school authority-control practices along with family status and individual abilities to examine the origin of sex differences on student outcomes.

A recent review of literature documents over 1400 new studies reporting sex comparisons within the last decade (Maccoby and Jacklin, 1974). However, most of the previous research has been piecemeal, focusing on restricted age ranges, narrow sets of outcome variables, or limited socialization settings. There are many studies of very young children and college students, but few which cover a significant range of the adolescent years. There are many single investigations of sex differences on one or two outcome variables, but few which cover attitudinal, personality and behavioral outcomes. (Examples of exceptions include the Fels longitudinal study, Kagan and Moss, 1962; Project Talent, Bachman, 1969 and 1970, Flanagan and Jung, 1971; and Nesselroade and Baltes, 1974.)

Recent attempts to synthesize research findings on the influence of the family on child development show critical points of dissension on the major dimensions of the home environment. This is particularly clear in the comparison of data and discussions by Becker (1964) and Baumrind (1970). Discussions of critical issues by Kagan and Moss (1960, 1962), Bronfenbrenner (1960), Becker (1964) and others point to the need for analyses of age and sex differences on individual responses to different patterns of familial control. While some have noted a high degree of uniformity in family socialization practices, i.e. restrictiveness vs.

autonomy, toward sons and daughters (Bronfenbrenner, 1960; Kagan and Moss, 1962; Barry et al, 1964; Hoffman and Hoffman, 1964; Elder, 1963, 1968; Kohn, 1969; Kandel and Lesser, 1970; Maccoby and Jacklin, 1974), there is little information on whether or how differences for males and females in family experiences comprise separate influences or interact with other social contexts to influence individual attitudes and behavior.

There are many studies of differences in family socialization patterns alone, or of school influences alone, but few studies of the two environments in combination; and these few usually consider only a single dependent variable. (For example, Herriot, 1962; Simpson, 1962; Brittain, 1963; Alexander and Campbell, 1964; McDill and Coleman, 1965; Douvan and Adelson, 1966; and Kandel and Lesser, 1970; Williams, 1973; Picou and Carter, 1976.) These studies disagree about the relative influence of parents, teachers and peers on high school students' college plans.

Among the variables examined in sociological studies in greatest depth for sex differences are college plans, post secondary attainment and related achievements (Sewell and Shah, 1967, 1968; Alexander and Eckland, 1974; Alexander and McDill, 1974; DeBord, Griffin, and Clark, 1977). In simplified summary, these studies note that females are less likely than males to plan to attend college and less likely to actually attend college. In addition, female post-secondary plans and actual attainment are more highly related to family origins (ascribed status), while male plans and attainment are more highly related to individual ability (achieved status). This work is informative and provides an excellent base with which to compare student development on outcomes other than aspirations and attainment, and with which to compare recent data on these same outcomes to study stability or change in noted sex

differences over time. However, the earlier research is limited in coverage of outcomes, and little has been done to chart the developmental nature and origins of the sex differences across grade levels on academic and non-academic outcomes. The studies have been restricted by the lack of proximate measures of family socialization practices and significantly varied school processes.

In short, despite numerous studies, the limited coverage has not provided adequate knowledge of sex differences and the source of the differences across the adolescent years. This paper attempts to contribute new knowledge by addressing three issues: (1) Are there systematic patterns of sex differences across grade levels on academic and nonacademic variables? (2) For males and females, at points in time throughout adolescence, what is the relative influence of family, school and individual characteristics on the selected outcomes? and (3) Do the same social influence processes operate for males and females or are there important interactive effects of sex with family and school characteristics?

The Sample and Measures

Sample

The sample is the total population of students from grades 6, 7, 9, and 12 in 10 middle schools and 6 high schools in a district in Maryland. For these analyses, the 4079 white student population is used.

The district was chosen because it contains significantly different school environments at the secondary school level. At each grade level, there are schools in this sample with "open" instructional programs and other schools in the sample with "traditional" programs. (See McPartland and Epstein, 1976; Epstein and McPartland, 1975.) The student population

also provides significant variation in family characteristics, both in social class variables and parent-child authority structures.

The sample is representative of major elements of the general population. Although the average family in the sample school district is more economically and educationally advantaged than the average American family, the sample is diverse, with significant proportions of the population at all economic and educational levels. Appendix A describes the characteristics of the student sample and provides comparative data of the district and the general population.

For this report the sample has been limited to white students to focus on sex differences in the student group found to maximize these distinctions (see Orum, et al, 1974; DeBord, et al, 1977). Race differences and race-by-sex differences will be examined in a separate report.

Measures:

The Independent Variables.

Four characteristics of the family and school environments are examined for their influence on student behavior. The measures are detailed in Appendix B.

1. Family status (STATUS) is measured by parents' education, material possessions in the home, and family size.
2. Family process (FAM) is measured in terms of the degree of participation of student in decision-making at home, and the level of regulation established for the student.

3. School process (SCH) is measured by the authority-control system governing instructional practices--the "openness" of the student's instructional program, and the degree of participation of the student in decision-making in the classroom.

4. Individual characteristics (INDIV) include ability measures of verbal IQ and report card grades. In selected analyses, as appropriate, this cluster of variables includes only report card grades (omitting the redundent verbal IQ for achievement analyses) or only IQ (when report card grades are examined as an outcome).

The four clusters differ in the degree to which the conditions represented are manipulable. STATUS and INDIV are relatively difficult to manipulate, but FAM and SCH, which involve organizational procedures based on participation and cooperation between students and adults, are more amenable to social change.

Table 1 summarizes the means and standard deviations of females and males on the independent variables used in the analyses. No significant differences exist for status variables. Family process variables show a mixed pattern with females in the lower grades significantly more involved in the family decision-making process than males. There is a tendency for males in the upper grades to be less regulated at home (fewer rules than females). School process variables show that females are significantly more involved in the classroom decision-making process; but the openness of the school program does not significantly differ for

Table 1

Means and Standard Deviations for Family Status, Family and School Process Measures, by Sex, by Grade

Family Environment	Female Mean	Female SD	Male Mean	Male SD	t-test
STATUS					
Parents' Education					
6	27.45	4.66	27.86	4.83	-1.47
7	27.35	4.84	27.05	4.97	0.98
9	26.57	4.80	27.21	4.77	-2.21
12	26.39	4.54	26.50	4.66	-0.32
Material Possessions					
6	17.31	3.30	17.48	3.26	-0.87
7	17.75	3.03	17.45	3.57	1.39
9	17.84	3.44	18.06	3.06	-1.01
12	18.12	3.11	18.17	2.78	-0.19
Family Size					
6	2.42	1.52	2.48	1.55	0.67
7	2.72	1.73	2.56	1.69	1.50
9	2.72	1.71	2.66	1.64	0.56
12	2.73	1.79	2.51	1.60	1.64
FAMILY PROCESS					
Family Decision-making					
6	6.58	2.18	6.32	2.09	2.06
7	6.90	2.36	6.46	2.19	3.07
9	6.58	2.69	6.84	2.38	-1.70
12	7.70	2.69	7.73	2.37	-0.16
Level of Regulation					
6	7.68	2.70	7.53	2.81	0.92
7	8.21	2.94	8.03	2.68	1.01
9	8.31	2.73	8.85	2.75	-3.24
12	10.04	2.60	10.37	2.64	-1.70
SCHOOL PROCESS					
Openness of Program					
6	63.45	20.92	62.47	20.09	0.82
7	65.29	16.86	64.32	17.07	0.92
9	76.81	30.88	71.14	32.92	2.97
12	81.34	30.93	78.53	31.51	1.22
Classrom Decision-making					
6	13.54	7.30	13.50	6.61	0.07
	13.52	7.15	11.54	6.59	3.47
9	11.68	6.45	12.21	6.52	-1.06
12	12.06	6.88	11.19	6.23	1.42

males and females.[1/] Family and school process variables show expected developmental trends for males and females. The older the student, the more opportunities for responsibility and decision-making at home and at school.

Previous research suggests that girls may be more strongly influenced than boys by environmental influences (see Kagan and Moss, 1960; Coleman, 1961; McDill and Coleman, 1965; Douvan and Adelson, 1966; Kandal and Lesser, 1970; McDill and Rigsby, 1973; and Alexander and Eckland, 1974). However, Maccoby and Jacklin (1974) question this conclusion in their review of numerous studies. From Table 1 we have some indication that there are at least minor differences in the family and school environmental conditions reported by males and females, although the differences are not always consistent across grade levels, and the developmental patterns of differences are not easily explained. Later analyses of the influence of environmental clusters of variables will reexamine the unadjusted differences in mean scores noted here.

The Dependent Variables.

Four types of outcome variables entail measures of student development. Details of the measures are reported in Appendix B.

[1/] To check for differences in experiences in open schools, individual level reports of openness were examined. No consistent significant pattern of sex differences in perceived openness of instructional programs is noted.

Personality:

1. Self-reliance is an 18-item scale of student ability to operate independent of adult direction or peer support.
2. Self-esteem is a 4-item self evaluation of personal worth and ability.
3. Control of environment is a 9-item scale that concerns the degree to which a student feels control over actions and events in the environment.

School Coping Skills:

4. Quality of school life is a 27-item scale that measures student perceptions of school, classwork, and student-teacher relations (see Epstein and McPartland, 1976).
5. Prosocial (school-task) behavior is a 6-item scale which requires students to report their behavioral reactions to work-related demands characteristic of the school setting.
6. Disciplinary adjustment is a 9-item scale that concerns the extent to which students are involved in actions in class requiring the teacher to admonish or punish them.
7. Low school anxiety is a 5-item assessment of student feelings of ease or comfort as opposed to tension in school.

Orientations:

8. College plans is a single-item indicator of expected directions for education in the future.
9. Academic subject preference is a rank ordering of students' preferences for English, math, social studies and science.

Academic success:

10. Standardized achievement: English (Reading), math, and composite achievement test scores are from the Iowa Tests of Basic Skills (ITBS) in grades 5, 7, and 9 and the reading comprehension subtest from the Test of Academic Progress (TAP) in grade 12. (See McPartland and Epstein, 1977)
11. Report card grades in English and math, recorded by the student, are the students' most recent grades at the time of the survey.

The following sections address the three major issues of this paper: 1) sex main effects, 2) relative influence of family, school, and ability variables, and 3) sex interaction effects.

Issue 1: Sex main effects

Table 2 summarizes means and standard deviations for males and females on the outcome measures selected for this paper. These unadjusted mean scores show the direction and size of differences in male and female scores on the selected dependent variables. However, because of some evidence from Table 1 of differences on the independent variables for males and females at different grade levels, we must consider whether the differences shown in Table 2 reflect other inequalities of influential conditions for males and females. In other words, do sex differences on outcomes remain when the differences in family, school and individual ability measures are taken into account?

Table 3 presents the results of analyses of sex main effects for the selected dependent variables. The table reports the test statistic for the gain in explained variance when sex of student is added to the

Table 2
Mean Scores, Standard Deviations, and T-Tests
For Males and Females for Academic and
Nonacademic Outcomes, by Grade Level

Outcome and Grade	Female Mean	Female SD	Male Mean	Male SD	t-test
PERSONALITY					
Self Reliance(+)[a]					
6	9.38	3.00	9.83	2.63	-2.65
7	10.39	2.99	10.15	2.88	1.29
9	11.12	3.28	11.01	2.90	0.58
12	12.38	3.17	12.07	3.02	1.34
Self Esteem(+)					
6	2.91	1.08	2.98	1.07	-0.85
7	2.97	1.00	3.10	0.95	-1.63
9	2.84	1.09	3.20	0.95	-4.52
12	3.21	1.02	3.27	0.95	-0.64
Control of Environment(+)					
6	6.23	1.63	6.09	1.75	1.12
7	6.33	1.75	6.23	1.72	0.74
9	6.22	1.87	6.54	1.75	-2.37
12	6.74	1.68	6.51	1.72	1.47
SCHOOL COPING SKILLS					
Quality of School Life (+)					
6	13.54	7.30	13.50	6.61	0.07
7	13.51	7.15	11.53	6.59	0.35
9	11.68	6.45	12.21	6.52	-0.10
12	12.06	6.88	11.19	6.23	0.15
Prosocial School Behavior(-)					
6	1.35	1.45	1.61	1.53	-2.80
7	1.56	1.50	1.94	1.56	-3.81
9	1.99	1.49	2.25	1.54	-2.74
12	2.01	1.57	2.34	1.43	-2.86
Adjustment To School(+)					
6	25.26	4.07	20.91	5.85	6.25
7	22.50	4.45	20.62	5.42	4.83
9	21.88	4.72	21.01	5.45	2.27
12	23.45	3.66	21.96	4.53	3.97
Low School Anxiety (+)					
6	2.90	1.40	2.68	1.33	2.12
7	2.94	1.37	2.49	1.40	4.10
9	2.95	1.35	2.96	1.35	-0.10
12	3.10	1.34	3.04	1.42	0.48
ORIENTATIONS					
College Plans (+)					
6	0.46	0.50	0.54	0.50	-2.71
7	0.43	0.50	0.47	0.50	-1.28
9	0.40	0.49	0.48	0.50	-2.68
12	0.55	0.50	0.48	0.50	1.90
Academic Subject Preference[b]					
6	0.46	0.50	0.54	0.50	-2.70
7	0.51	0.50	0.54	0.50	-0.71
9	0.49	0.50	0.61	0.49	-3.95
12	0.30	0.46	0.38	0.49	2.19
ACADEMIC SUCCESS					
Std. Ach. Composite (+)[c]					
7	56.73	25.36	49.58	27.88	4.29
9	55.67	26.82	53.55	27.20	1.27
12	55.04	10.17	53.64	11.45	1.53
Report Card + Grades					
6	8.17	1.40	7.60	1.60	5.86
7	8.07	1.37	7.43	1.47	6.81
9	7.70	1.58	7.08	1.72	6.04
12	8.02	1.39	7.31	1.70	5.10

[a] Sign in parenthesis shows direction of scoring.
[b] (+)science and math preference; (-)English and social studies preference.
[c] Composite achievement for Grades 7 and 9; Grade 12 standardized reading achievement only. Grade 6 was not tested.

Table 3

F-Statistic for Gain in Amount of Variance Explained (Increased R^2) Due to Addition of Sex of Student to Full Model.[a/]

OUTCOME	Grade 6	7	9	12
Personality				
Self-Reliance	29.67	2.46	0.01	0.09
Self-Esteem	8.01	11.37	37.11	2.61
Control of Environment	2.22	2.73	12.86	0.21
School Coping Skills				
Quality of School Life	1.34	3.79	9.64	0.51
Prosocial Behavior	1.66	2.68	3.19	3.99
Adjustment in School	24.90	11.95	1.07	7.27
Low Anxiety in School	0.41	4.83	1.35	0.32
Orientations				
College Plans	10.24	10.31	15.86	0.23
Academic Subject Preference	14.36	10.17	22.70	6.92
Academic Success				
English Achievement	--	0.46	0.01	1.05[b/]
Math Achievement	--	0.04	5.33	--
Composite Acheivement	--	3.42	0.18	--
Report Card Grades	27.23	28.45	32.83	32.31

a/ Level of significance: 3.85 = .05 level; 6.66 = .01 level. The full model includes nine family, school and individual characteristics: parents' education, possessions in the home, family size, family decision-making, family regulations, school openness, classroom decision-making, individual ability, and report card grades.

b/ Only reading achievement test administered to grade 12.

full effects model. A significant increase in R^2 means that sex of student is a significant factor after all other family, school, and individual variables are controlled. Five outcome measures show significant, consistent sex main effects: self-esteem; college plans; academic subject preference; adjustment; and report card grades. These results are described using information from table 2 for elaboration.

Of the personality measures only self-esteem shows significant sex differences in three of four grades: Males have higher self-esteem scores. No consistent significant pattern emerges for self-reliance or control of environment. Table 2 shows that scores on all three measures show the expected developmental trend for males and females with older students in almost every instance more self-reliant, higher in self-esteem and more in control of their environment.

For measures of school coping skills, a significant sex main effect appears consistently only for adjustment: Girls are involved in fewer disciplinary incidents. No significant, consistent sex differences are noted for quality of school life,[1/] prosocial school behavior, or school anxiety when family, school and individual characteristics are taken into consideration, though the unadjusted mean scores of table 2 suggest females have some advantage in school coping skills. Across the grades both sexes become less positive about their experiences in school, behave in less socially accepted ("ideal") ways, and become less anxious about school.

[1/] Though, as in earlier research females are more satisfied with school in general, the current work based on a multidimensional measure shows no overall differences in student reactions to school life (see Epstein and McPartland, 1976).

A sex main effect is present for the two orientation measures. First, for college plans, males have more definite plans to attend college. Grade 12 is the single exception. On the average, younger students have higher aspirations than older students, but 12th grade girls again are an exception to this pattern. Second, in their academic subject preference, males are significantly more attracted to math and science while females show preference for English and social studies. Maccoby and Jacklin (1974) note sex differences in verbal and mathematical ability which may translate into the kind of verbal and abstract subject preferences noted here.

On achievement measures, no consistent significant sex main effects are noted for standardized achievement scores, but females have decidedly higher report card grades.

These main effects are especially interesting since they show that with other family and school factors considered:

- Given equal ability, females receive higher grades.
- Given equal ability, males report more definite college plans.
- Given equal ability, males have higher self-esteem.
- Given equal ability, males prefer science and math.
- Given equal ability, males are involved in more discipline problems than females.

Across the grades, higher male college plans and self-esteem exist despite lower report card evaluations in school. Greater preference by females for English and social studies and males for science and math appears despite no significant difference in achieved ability on standardized tests.

It is equally important to note that sex main effects were not large for other outcomes studied. There are no consistent significant differences in students' scores on self-reliance, control of environment, perceived quality of school life, prosocial (task-related) behavior, or standardized achievement.

Even though we can document sex main effects for some variables, we are not well informed on how different student outcomes are affected by significant environmental and individual influences. The outcome measures selected for study represent a diversity of personal and school behaviors and abilities. The next section examines the influence of independent factors included in our model on the several outcomes.

Issue 2: Relative influence of variable clusters

Table 4 summarizes the results of a commonality analysis of the relative influence of family status, family and school processes, and individual abilities on academic and nonacademic outcomes for males and females, according to grade level. The table shows the partitioning of explained variance among the four clusters of variables -- STATUS, FAMILY process, SCHOOL process, and INDIVIDUAL abilities--for males and females for each of the dependent variables. The unique contribution (UNIQ) is the portion of variance for a given outcome that is attributable to a particular cluster of variables after all other clusters are taken into account. The larger the unique contribution, the more definite the importance of the variable cluster to the defined model. The joint contribution (JOINT) is the sum of explained variation the variable cluster shares with other variable clusters. These commonalities reflect intercorrelation among sets or groups of variables in the

Table 4

Percent of variance accounted for by Family Status (STATUS), Family Process (FAM), School Process (SCH), Individual Abilities (INDIV) for outcomes by sex, by grade.

GRADE AND OUTCOME		1 UNIQ STATUS	2 UNIQ FAM	3 UNIQ SCH	4 UNIQ INDV	5 JOINT WITH STATUS	6 JOINT WITH FAM	7 JOINT WITH SCH	8 JOINT WITH INDV	9 TOT % VAR EXPL[a/]	10 MAXIMUM % due to FAM & SCH
Grade 6											
1. Self-reliance	M	0.81	7.45	1.85	3.60	0.67	4.26	3.82	2.33	18.70	14.13
	F	0.64	5.41	3.72	3.48	2.95	7.73	9.10	10.22	25.75	20.25
2. Self-esteem	M	0.55	1.68	0.46	9.36	1.17	1.02	1.20	1.86	14.23	3.64
	F	4.21	3.64	0.31	2.62	4.11	3.92	1.49	6.65	18.44	7.94
3. Control of Environment	M	1.48	7.14	0.16	13.40	1.92	2.17	2.08	3.00	26.15	10.28
	F	1.06	3.81	2.54	5.64	3.33	7.03	7.37	9.97	24.69	16.26
4. Quality of School Life	M	0.53	6.28	6.24	2.84	0.48	3.57	5.01	3.21	21.50	17.82
	F	0.68	5.55	14.53	2.42	0.07	6.98	9.50	3.01	31.71	28.77
5. Prosocial Behavior	M	0.36	6.81	1.69	3.81	0.62	2.08	2.04	1.55	15.57	11.06
	F	0.24	4.50	5.07	1.90	0.44	4.53	5.36	3.17	17.68	15.38
6. Adjustment to School	M	1.11	3.94	3.61	2.47	0.37	1.21	2.51	0.79	13.56	10.20
	F	0.31	1.16	6.30	4.37	0.25	1.84	2.95	1.68	15.46	10.52
7. Low Anxiety in School	M	0.28	4.88	1.84	2.97	-0.02	3.09	3.00	1.17	13.43	10.14
	F	1.35	5.40	4.31	3.80	1.27	7.70	6.94	7.75	24.90	18.91
8. College Plans	M	5.62	0.21	1.36	2.60	3.66	-0.03	0.41	2.36	13.17	2.12
	F	6.90	0.31	0.53	0.83	4.25	0.90	3.45	4.31	13.90	4.47
9a. English Ach.	M										
	F										
9b. Math Ach.	M										
	F										
9c. Composite Ach.	M										
	F										
10a. English Rept. Cd.	M	1.40	0.19	2.41	8.18	3.24	0.69	0.74	3.31	15.92	2.39
	F	1.69	1.49	2.08	3.51	4.52	4.05	5.84	7.65	17.80	10.74
10b. Math Rept. Cd.	M	1.07	0.74	0.92	2.97	1.51	1.51	1.02	1.48	8.24	3.18
	F	0.68	0.12	4.34	2.45	0.90	0.60	3.10	3.90	11.14	7.58

Students in grade 6 were not administered standardized achievement tests.

Table 4

Percent of variance accounted for by
Family Status (STATUS), Family Process (FAM),
School Process (SCH), Individual Abilities (INDIV)
for outcomes by sex, by grade.

GRADE AND OUTCOME		1 UNIQ STATUS	2 UNIQ FAM	3 UNIQ SCH	4 UNIQ INDV	5 JOINT WITH STATUS	6 JOINT WITH FAM	7 JOINT WITH SCH	8 JOINT WITH INDV	9 TOT % VAR EXPL[a]	10 MAXIMUN % due to FAM & SCH
Grade 7											
1. Self-reliance	M	1.01	5.43	0.27	5.20	4.57	2.49	3.15	5.90	18.77	09.33
	F	0.72	8.93	1.58	3.57	4.02	5.34	5.90	7.67	24.24	17.85
2. Self-esteem	M	0.59	1.22	0.03	2.53	2.76	0.02	0.62	2.66	7.07	1.70
	F	1.30	0.83	2.20	4.39	3.73	2.13	3.52	6.93	16.70	8.03
3. Control of Environment	M	1.48	1.99	1.95	4.47	5.17	1.61	2.55	6.76	17.25	6.57
	F	0.80	10.70	0.51	6.37	3.40	4.73	4.89	7.15	26.42	17.30
4. Quality of School Life	M	0.31	1.29	10.57	1.55	0.20	2.80	4.38	2.26	18.35	16.42
	F	1.57	6.87	9.92	2.82	1.22	0.66	4.46	2.57	24.74	20.69
5. Prosocial Behavior	M	0.66	4.62	3.16	6.66	0.95	2.76	5.68	3.15	20.87	13.17
	F	0.69	6.85	5.09	1.17	0.32	2.74	4.05	3.13	18.25	16.29
6. Adjustment to School	M	0.72	5.62	3.45	5.48	0.59	1.06	4.05	1.27	18.82	12.14
	F	0.59	3.29	8.74	2.32	0.67	0.00	2.27	2.59	17.48	14.34
7. Low Anxiety in School	M	0.73	2.31	5.74	1.93	0.27	2.84	3.76	1.98	14.97	11.86
	F	0.24	6.69	4.07	3.25	0.70	5.85	7.77	6.63	23.35	19.73
8. College Plans	M	3.25	0.35	1.09	3.78	9.11	1.03	5.09	9.09	19.05	6.69
	F	7.31	1.78	0.40	1.71	6.04	-0.11	3.38	6.16	17.92	5.16
9a. English Ach.[b]	M	13.44	0.14	0.13	5.97	7.05	0.64	2.51	7.94	27.92	2.98
	F	10.16	0.26	0.58	5.30	6.71	1.00	3.62	7.59	24.59	4.59
9b. Math Ach.[b]	M	15.78	0.13	1.49	3.33	3.06	0.57	1.06	3.17	24.54	3.06
	F	12.60	0.34	0.33	7.54	4.06	1.79	2.91	4.50	26.44	4.45
9c. Composite Ach.[b]	M	17.05	0.14	0.87	4.31	8.41	0.76	3.90	8.65	31.74	5.03
	F	13.24	0.15	0.33	10.65	7.49	1.81	5.43	8.98	34.26	6.47
10a. English Rept. Cd.	M	1.53	0.38	7.80	4.74	6.45	-0.22	4.49	7.30	21.98	12.51
	F	2.09	0.69	3.34	5.80	6.47	2.66	5.98	8.64	22.01	10.45
10b. Math Rept. Cd.	M	1.09	0.26	0.83	1.39	2.57	0.04	1.12	2.61	6.35	2.23
	F	1.06	0.24	2.54	3.31	0.44	1.14	2.81	2.21	9.77	5.68

Table 4

Percent of variance accounted for by
Family Status (STATUS), Family Process (FAM),
School Process (SCH), Individual Abilities (INDIV)
for outcomes by sex, by grade.

GRADE AND OUTCOME		1 UNIQ STATUS	2 UNIQ FAM	3 UNIQ SCH	4 UNIQ INDV	5 JOINT WITH STATUS	6 JOINT WITH FAM	7 JOINT WITH SCH	8 JOINT WITH INDV	9 TOT % VAR EXPL[a]	10 MAXIMUM % due to FAM & SCH
Grade 9											
1. Self-reliance	M	1.11	4.04	2.26	4.04	6.68	5.73	7.11	9.73	22.97	15.16
	F	2.98	1.96	0.65	2.59	7.44	2.15	3.59	7.72	17.11	7.23
2. Self-esteem	M	0.97	2.92	0.12	11.70	3.08	3.64	3.75	5.60	21.42	8.45
	F	2.29	0.78	0.29	4.81	4.68	1.74	2.14	5.95	14.55	4.19
3. Control of Environment	M	1.81	6.84	0.68	8.83	5.20	7.10	7.16	10.06	29.61	17.65
	F	0.48	6.30	0.79	2.55	2.81	4.34	3.20	5.58	16.93	12.10
4. Quality of School Life	M	0.44	5.68	5.25	4.07	1.68	4.83	8.03	6.03	24.07	19.70
	F	0.92	5.39	4.98	5.60	4.11	3.26	3.64	4.08	23.18	15.54
5. Prosocial Behavior	M	0.29	7.93	1.85	1.34	0.70	4.54	5.38	4.20	17.31	15.76
	F	0.69	3.17	1.04	2.02	1.17	2.14	1.79	2.10	9.97	6.89
6. Adjustment to School	M	1.63	4.67	1.15	4.17	3.86	4.62	5.13	6.90	19.50	12.71
	F	1.11	2.32	4.20	2.89	3.34	4.02	4.82	5.30	17.99	12.35
7. Low Anxiety in School	M	0.24	4.85	2.19	3.61	2.05	4.34	5.62	5.00	17.58	13.59
	F	0.91	5.05	2.37	1.41	1.27	1.46	1.28	1.23	12.05	9.44
8. College Plans	M	6.43	0.72	0.40	6.61	10.41	2.73	3.98	11.67	26.03	6.23
	F	8.54	1.12	0.47	5.95	10.47	2.16	1.26	11.62	27.48	4.45
9a. English Ach.[b]	M	10.76	0.91	1.73	3.10	6.84	3.47	4.98	5.90	24.63	8.73
	F	10.01	0.74	0.63	9.15	11.35	2.09	4.10	12.29	33.10	6.57
9b. Math Ach[b]	M	12.65	0.53	4.24	6.38	1.73	2.58	0.61	1.46	25.34	6.49
	F	20.74	0.54	4.44	5.62	-0.32	1.56	-1.95	1.40	31.00	3.90
9c. Composite Ach[b]	M	13.35	0.96	2.37	5.53	7.55	4.38	5.58	7.79	31.39	10.54
	F	18.49	0.82	2.42	9.96	7.48	2.60	0.45	9.24	39.44	5.34
10a. English Rept. Cd.	M	0.35	0.33	4.79	3.81	5.24	1.68	5.73	5.92	16.60	10.98
	F	0.90	1.08	2.16	8.93	10.48	2.26	4.72	9.82	24.56	9.15
10b. Math Rept. Cd.	M	2.03	0.34	5.82	3.58	3.26	1.83	5.32	3.76	17.08	11.60
	F	1.88	0.58	3.47	2.65	0.85	0.76	1.40	1.04	9.86	5.61

Table 4

Percent of variance accounted for by
Family Status (STATUS), Family Process (FAM),
School Process (SCH), Individual Abilities (INDIV)
for outcomes by sex, by grade.

GRADE AND OUTCOME		1 UNIQ STATUS	2 UNIQ FAM	3 UNIQ SCH	4 UNIQ INDV	5 JOINT WITH STATUS	6 JOINT WITH FAM	7 JOINT WITH SCH	8 JOINT WITH INDV	9 TOT % VAR EXPL[a]	10 MAXIMUM % due to FAM & SCH
Grade 12											
1. Self-reliance	M	1.17	3.53	1.97	7.22	3.20	4.29	3.31	7.92	22.24	11.59
	F	0.97	1.78	0.04	10.50	5.25	2.44	0.78	6.65	20.04	4.62
2. Self-esteem	M	0.52	3.23	0.02	10.12	1.18	4.12	1.92	6.00	19.84	7.92
	F	0.94	2.64	0.66	0.36	1.16	1.66	1.17	1.79	7.14	5.14
3. Control of Environment	M	1.02	5.18	1.74	6.30	1.40	6.54	5.62	8.10	23.89	15.16
	F	0.76	7.04	0.37	1.12	0.65	1.72	0.96	1.69	11.65	9.49
4. Quality of School Life	M	3.70	0.79	11.86	5.08	1.30	2.71	3.81	3.34	26.42	17.00
	F	0.61	3.12	12.53	3.30	1.12	2.62	6.75	2.81	26.13	22.40
5. Prosocial Behavior	M	1.80	2.73	5.26	0.57	0.24	1.65	1.37	0.65	12.03	9.26
	F	1.10	5.07	1.61	1.88	0.42	1.90	2.65	0.50	12.31	9.45
6. Adjustment to School	M	0.43	1.31	7.79	0.83	0.26	0.96	2.41	0.89	12.36	11.21
	F	1.27	1.58	3.70	4.04	0.49	2.46	3.93	1.25	14.49	9.04
7. Low Anxiety in School	M	1.76	3.60	16.83	2.78	1.36	3.48	2.91	2.06	29.79	24.85
	F	0.81	3.83	4.93	3.07	1.23	4.01	5.42	2.31	18.80	14.73
8. College Plans	M	9.93	2.47	1.26	12.20	8.05	2.66	4.17	9.91	37.57	9.10
	F	11.96	0.36	0.50	8.22	13.47	1.59	1.56	14.09	35.36	3.39
9a. English Ach.[b]	M	7.17	0.35	2.55	10.45	4.97	5.87	4.70	12.98	32.77	10.46
	F	8.59	0.75	1.85	7.84	4.11	3.69	4.06	5.92	26.68	9.08
9b. Math Ach.[b]	M										
	F										
9c. Composite Ach.[b]	M	Students in grade 12 were not administered math and composite standardized tests.									
	F										
10a. English Rept. Cd.	M	0.88	1.78	3.25	11.91	5.11	3.78	3.22	6.93	26.38	9.92
	F	2.03	0.65	2.95	3.37	5.20	4.91	2.16	6.68	16.34	8.88
10b. Math Rept. Cd.	M	2.12	2.87	2.46	2.68	-1.18	2.85	0.39	0.49	11.19	7.59
	F	0.79	0.85	3.29	3.31	-0.68	0.24	-0.25	-0.21	7.59	4.17

[a] Total percent of variance is not sum of unique and joint contributions because joint categories include redundant combinations of variables.

[b] When concurrent IQ is included in the equation for achievement, the percent of explained variation ranges across the grades from 57%-75% for English achievement, 54%-63% for math achievement, and 79%-82% for composite achievement.

model (Mood, 1971; Kerlinger and Pedhazur, 1973). In Table 4, the JOINT contributions are derived separately for each variable cluster and are not mutually exclusive. (For example, the common variance explained by STATUS and FAM would be one element of the summed JOINT component in both the "Joint with STATUS" and "Joint with FAM" columns, col. 5 and 6 respectively.) Therefore, the total percent of variance is not the sum of these unique and joint contributions.

In this discussion we focus on two sets of values; (a) Columns 1-4 report the relative importance of the unique contributions of the four clusters for the dependent variables; and (b) Column 10 shows the maximum percent of variance attributable to the manipulable school and family environmental variable clusters (i.e. Gain in R^2 from adding both FAM and SCH measures, after STATUS and INDIV).

By reading across columns 1-4, differences may be noted in patterns of unique contributions of the four clusters within outcome for males and females; and by reading down columns 1-4, differences may be noted in the outcomes most influenced by each cluster for each sex.

This section discusses the important patterns in columns 1-4 and column 10.

Relative unique influences

1. Cluster: STATUS

For males and females, family status makes the greatest unique contribution to the explained variance of the outcomes of aspirations and achievement. Unique STATUS contributes between 3%-17% of explained variance on these outcomes for males and between 7% and 21% of explained variance on these outcomes for females. Proportionally, these percents of unique variance represent 17%-64% and 30%-67% of total explained

variance of these outcomes for males and females, respectively. As suggested in earlier research, females are more influenced by status on these outcomes, and males are more influenced by individual ability (Sewell and Shah, 1967, 1968; Alexander and Eckland, 1974). However, the partitioning of variance shows the influences of both status and individual ability are very high for both sexes, so that fine distinctions on these contributions may be misleading.

Interestingly, status is not a highly influential unique cluster for males or females in any grade for any other outcome besides aspirations and achievement, not even the cognitively related measure or report card grades.

2. Cluster: FAMILY PROCESS

Family authority-control variables make significant unique contributions to the explained variance of measures of personality (except self-esteem) and school coping skills for both males and females. On self-reliance and control of environment the unique contribution of family process cluster ranges from 2%-7% for males, 2%-10% for females. Proportionately, these percents of unique variance represent 16%-40% and 9%-60% of the total explained variance on these outcomes for males and females, respectively. For school coping skills the unique contribution of family process ranges from 1%-8% for males, 2%-8% for females (or, as proportions of total explained variance, 3%-46% and 8%-42% for males and females, respectively).

Differences in influence patterns of the family process cluster for males and females are neither dramatic nor systematic, except in two instances. First, although the unique influence of the family

process cluster declines for both males and females with age, males are more influenced by the family process cluster on self-reliance at each grade level. Second, differences between males and females are greatest for the outcome measure of school adjustment. In grades 6, 7, and 9 the family process variables make a greater unique contribution to explained variance for adjustment for males, whereas females are more highly influenced by the school process variables on this outcome. Since other analyses show males have poorer adjustment than females, it may be that messages about school behavior from home and school are different for males, whereas females receive similar expectations from family and school environments about behavior. This set of variable relationships deserves closer attention in the future.

3. Cluster: SCHOOL PROCESS

The cluster of school process variables, including openness of the student's school program and student's participation in classroom decisions, make unique and sizeable contributions to explained variance of school coping skills and a lesser but notable unique contribution to report card grades. This is clear for males and females on the measure of quality of school life and is particularly strong for grade 12 males and females (the grade for which the greatest variation in school process variables occurs) on all school coping skills. Between 1%-17% (or, proportionately between 10%-63%) of the total variance explained for school coping skills and report card grades is due to the unique contribution of the school variable cluster. This is evidence of the importance of school process variables on concurrent school-related outcomes.

Differences between males and females in the influence of school coping skills are not consistent. The greatest differences occur in grade 6 on the Quality of School Life outcome, and in grade 12 on school anxiety, but these are single, uninterpretable instances. The one consistent pattern relating to adjustment--males are more influenced by family process and females are more influenced by school process--is discussed in the previous section.

4. Cluster: INDIVIDUAL ABILITY

For different outcome variables, this cluster is entered into the model in different forms. For achievement variables, only report card grades are included, since concurrent IQ and achievement tests measure approximately the same ability. When report card grades are examined as an outcome, only IQ is included in the variable cluster.

The individual ability variables are most important for the outcomes of achievement, college plans, self-esteem and control of environment. The cluster contributes least in unique form to the explained variance of the measures of school coping skills.

Overall, the ability cluster is more influential for males than females, though the evidence suggests that this distinction should not be overinterpreted since the contribution of ability to the explained variance of every outcome is clearly important for both sexes.

It is interesting that the total percent of variance explained for college plans and achievement increases with age. As students get closer to college, and as they approach maturity, student abilities and social class are increasingly realistic determinants of these outcomes.

For personality, school coping skills, and report cards, the effects model remains relatively stable in explanatory power, but where it does not, it becomes more applicable for males and less explanatory for females. For these outcomes the importance of age or practice may be different for males and females, and other unmeasured variables including sex-specific social expectations may be influencing the responsiveness of the model for females.

Importance of family and school process variables

One objective of this study is to examine the importance of manipulable variables such as family and school processes for student development. The last column of Table 4 (column 10) shows the maximum percent of explained variance attributable to the family process (FAM) and the school process (SCH) clusters of variables. Across the years of adolescence, the percent of the total explained variance attributable in full or in part to school and family environmental qualities is sizeable for all outcomes at all grade levels with the exceptions of college plans and achievement. The percentages in column 10 are underestimated to the extent that verbal ability and report card grades are functions of school and family environments. The percentages are overestimated to the extent that portions of joint variances are not attributable to school or family processes, but rather are more a function of family status or individual abilities.

The importance of column 10 should not be minimized. The influences of family and school process variables, unique or in combination with other variables, are quite large for the outcomes of personality, school coping skills, and report card grades. This is true in spite of the "gross" nature of survey measures for such variables. A clear pattern

emerges of selective influence of family and school processes on student personality and school coping skills, just as a clear pattern of influence of status and ability appear for aspiration and standardized achievement. The patterns persist for males and females across the years of adolescence. Family and school processes appear important for short term or immediate measures of behavior and attitudes, while status and ability conditions appear to be more important for measures that affect long term abilities and directions. Whether the short-term practices have consequences on aspirations and achievement in the long run remains speculative, and examining the question would require longitudinal data collected over many years. Even the JOINT contributions of STATUS with other variables (column 5) is minimal for personality and school coping skill outcomes. At all grade levels, for males and females, it is more often the case that family process, school process, and individual ability and success variables have interrelated, perhaps inseparable, influence on personality and school coping skills.

Regression coefficients.

Table 5 presents the standardized regression coefficients for the full model to summarize the effects of ten independent variables on eleven dependent variables, for males and females. To conserve space, rather than present separate regression coefficients by sex and by grade, grade level has been included in the regression equation as an independent variable. For some outcomes grade level is itself a significant variable for males or females. In these cases interpretations of effects could differ in analyses conducted separately by grade.

Table 5 shows the size and direction of effects of the component variables

Table 5

Standardized regression coefficients showing effects of Family, School, and Individual Variables on Academic and Nonacademic Outcomes, with All Other Variables Controlled

Independent Variable	Outcome										
	Personality			School Coping Skills				Orientations		Academic Success	
	Self-Reliance	Self-Esteem	Control of Environment	Quality of School Life	Prosocial School Behavior	Adjustment	Low Anxiety in School	College Plans	Academic Subject Preference	Standardized Achievement	Report Card Grades
Males											
Grade Level	.190	..075	.038	-.133	.214	.081	.036	-.031	-.068	.055	-.177
Parents' Education	.031	-.018	-.017	-.022	.017	-.037	-.008	.154	-.036	.293	.047
Material Possessions	.019	-.009	.043	-.021	.014	.017	.006	.132	.008	.109	.037
Family Size	-.029	-.051	-.076	-.014	.004	-.060	.020	-.059	-.005	-.056	.026
Family Decision-Making	.214	.176	.247	.171	-.251	.192	.181	.066	.042	.048	.051
Level of Regulation	.023	-.077	-.071	-.184	.126	-.183	.023	-.060	-.020	.026	.007
Openness of School	.017	.033	-.010	.023	-.003	-.082	-.066	..029	.023	-.048	.146
Classroom Decision-Making	.118	-.002	.087	.303	-.164	.169	.223	.017	-.084	.087	.164
Verbal Ability (IQ)	.192	.250	.276	.046	-.106	.133	.106	.201	.053	x	.272
Report Card Grades	.083	.118	.104	.159	-.095	.115	.089	.081	.091	.222	x
R^2	.2454	.1444	.2253	.2110	.1705	.1484	.1591	.1888	.0245	.2518	.1829
N	1997	1217	1217	1156	1997	1217	1156	1997	1997	1268	1997
Females											
Grade Level	.275	.065	.068	-.152	.188	.034	-.012	.096	-.114	.001	-.144
Parents' Education	.068	.079	.044	.100	-.032	.047	-.010	.278	-.003	.274	.054
Material Possessions	.043	.060	-.014	-.046	.036	-.050	-.017	.072	.022	.058	-.011
Family Size	-.038	-.042	-.023	.013	-.001	-.035	-.067	-.043	.010	-.060	.031
Family Decision-Making	.193	-.147	.299	.208	-.237	.127	.225	.075	-.021	.045	.072
Level of Regulation	-.015	-.023	-.085	-.200	.113	-.120	.005	-.072	.032	-.013	.038
Openness of School	.016	-.024	-.020	.038	.035	-.137	-.052	-.017	.011	-.029	.131
Classroom Decision-Making	.106	.075	.093	.333	-.173	.220	.220	.033	-.030	.076	.144
Verbal Ability (IQ)	.200	.153	.186	-.102	.038	-.005	.035	.107	.003	x	.286
Report Card Grades	.051	.088	-.089	.203	-.158	.201	.161	.126	.075	.288	x
R^2	.2668	.1320	.2012	.2554	.1584	.1481	.1783	.2078	.0211	.2648	.1885
N	2082	1330	1330	1252	2082	1330	1252	2082	2082	1394	2082

of the variable clusters used in the commonality analyses in table 4. Given the large sample size, coefficients of about .10 or larger would be considered of substantive importance, though coefficients of .06 would be statistically significant. A selective summary focusing on family and school processes shows that with all other independent variables controlled, high levels of family participation and communication are clearly important positive influences for males' and females' personality measures and school-coping skills. However, low level of regulation at home is more often associated with lower perceived quality of school life, lower socially approved behavior in school, more disciplinary incidents in school, lower self-esteem, and lower control of environment for males and females. School openness shows negative effects on adjustment but positive effects on report card grades for males and females. High levels of participation in classroom decision-making shows positive impact on school coping skills, report card grades, and self-reliance.

Differences of more than .05 between male and female standardized regression coefficients should be examined with some interest. For example, with all other independent variables held constant, the largest coefficients for family status variables (parents' education, material possessions in the home, and family size) appear for the outcomes of college plans and standardized achievement, for males and females. However, high parents' education shows more positive effects on college plans for females than males (.278 to .154). For males, ability has more positive impact on college plans (.201 to .107). However, both variables are significant for both sexes. Similarly, other patterns noted in the commonality analysis for self-esteem are clarified by the greater positive coefficients of ability on self-concept of males than females. (.250 to .153 for IQ; .118 to .088 for report card grades). On self-

esteem, family status (parents' education) shows the greater positive consequences for females (.079 to -.018). We are also better informed about adjustment to school. Males are more positively affected on adjustment by family decision-making style than females (.193 to .127) while females are more positively affected by classroom decision-making style (.220 to .169). Examination of the component variables of the family and school process clusters shows an interesting pattern for both males and females on adjustment. Greater participation in family decision-making and classroom decision-making has positive consequences on adjustment for males and females, but less restriction (fewer rules) at home and less structure in school have negative consequences for male and female adjustment. For a more complete discussion of the differences in family process component variables see Epstein and McPartland, 1977.

The interplay between family status, family process, school process, and individual ability is complex. We are only beginning to understand what the important variables are that must be considered within a model to adequately estimate the important influences on student academic and nonacademic development. The analyses reported here contribute to this understanding by documenting patterns of influence across grade levels for males and females for a variety of cognitive and subjective behaviors.

Issue 3: Sex interaction tests

The commonality analyses and standardized regression coefficients show patterns and size of influence for males and females of the family status, family process, school process and individual ability variables. While some differences in influence or "effect" of these variables for males and females were noted, the question remains: Are the differences

different enough to emerge as significant and interpretable interactions, indicating different social influence processes for males and females?

Tests for homogeneity of group regressions were performed to determine whether the regression equations are equivalent for males and females (Kerlinger and Pedhazur, 1973; Tatsuoka, 1971). If the null hypothesis of homogeneity of group regressions is rejected, it is evidence of significant interaction between sex and at least one other family, school, or individual background variable in the model. Table 6 presents the results of these tests for each outcome variable. Because a large number of tests are conducted, and some interaction effects would be expected to be significant due to chance, it is required that significant interactions be of theoretical importance and patterned in a systematic way, either across grade levels for a given outcome, or within grade levels for similar types of outcomes or similar interactive variable combinations.

Table 6 shows the percent of variance explained for the group or multiple model (separately by sex) compared with the explained variance for a common or single model which includes sex of student as an additional independent variable. The table also reports the F-statistic to determine whether the multiple model explains a significantly greater proportion of variance than the common model.

The table shows a clear lack of interaction effects of sex with other variables in the model for almost every dependent variable. While the percent of variance explained by the multiple model is always slightly greater than that explained by the common model, the differences are not significant except in apparently random instances. One exception to this

Table 6

Tests for interactions of sex of student with other family, school, or individual characteristics for academic and nonacademic outcomes, by grade.

Outcome and Grade	% of Variance Explained by: Multiple Model[a]	Single Model[b]	% Increase	F-Statistic[c]
PERSONALITY:				
Self-Reliance				
6	23.08	22.64	0.44	0.73
7	21.65	20.72	0.93	1.34
9	19.85	18.67	1.18	1.83
12	21.05	19.92	1.13	1.15
Self-Concept				
6	16.69	15.18	1.51	1.54
7	12.36	10.97	1.39	1.19
9	20.06	18.80	1.26	1.26
12	12.86	11.64	1.22	0.74
Control of Environment				
6	25.46	24.42	1.04	1.19
7	21.94	20.18	1.76	1.70
9	23.39	22.36	1.03	1.08
12	17.87	16.20	1.67	1.08
SCHOOL COPING SKILLS:				
Quality of School Life				
6	27.14	25.69	1.45	1.37
7	23.58	21.32	2.26	1.91*
9	26.63	23.07	0.36	0.54
12	26.55	25.10	1.45	1.01
Prosocial School Behavior				
6	16.48	15.64	0.84	1.30
7	20.78	19.61	1.17	1.68
9	14.36	13.27	1.09	1.55
12	13.03	11.47	1.56	1.45
Adjustment to School				
6	16.84	16.62	0.22	0.22
7	20.78	19.16	1.62	1.54
9	19.26	17.87	1.39	1.38
12	15.91	14.48	1.43	0.90
Low Anxiety in School				
6	20.77	17.78	2.99	2.61*
7	21.13	20.22	0.91	0.75
9	15.54	14.24	1.30	1.14
12	23.48	21.07	2.41	1.61

Table 6 (continued)

Outcome and Grade	Multiple Model[a]	Single Model[b]	% Increase	F-Statistic[c]
ORIENTATIONS:				
College Plans				
6	17.02	12.44	4.58	7.09***
7	18.56	17.35	1.21	1.68
9	26.84	26.75	0.09	0.15
12	35.28	34.83	0.45	0.56
Subject Area Preference				
6	10.68	5.92	4.76	6.84*
7	4.22	1.15	3.07	3.62*
9	6.48	4.59	1.89	1.99*
12	6.20	3.19	3.01	2.59*
ACADEMIC SUCCESS:				
English Achievement				
7	27.30	27.01	0.29	0.50
9	28.84	28.27	0.57	1.06
12	29.97	28.91	1.06	1.03
Math Achievement				
7	25.58	25.31	0.27	0.46
9	28.58	28.10	0.48	0.88
Composite Achievement				
7	34.07	33.59	0.48	0.91
9	35.63	35.28	0.35	0.72
English Report Card				
6	20.26	19.91	0.35	0.53
7	29.15	26.35	2.80	4.44*
9	25.61	24.25	1.36	2.33*
12	27.48	26.22	1.26	1.04
Math Report Card				
6	9.55	9.53	0.02	0.03
7	9.16	7.51	1.65	2.04*
9	13.76	13.16	0.60	0.89
12	10.89	8.85	2.04	1.37

[a] Independent variables include: parents' education, material possessions, family size, child's verbal ability, family decision-making, regulations at home, openness of school program, classroom decision-making style, and report card grades.

[b] Sex of student is added to the model as a dummy variable where male = 1 and female = 0.

[c] Level of significance: 1.89 = .05 level; 2.43 = .01 level.

pattern, academic subject preference, shows consistent significant interactions of sex and at least one other variable across grades. Because of the general lack of interactions among the 56 tests conducted, the single exception for subject preference could be considered a chance occurrence. However, the consistency across grade levels makes it unlikely that the interaction is accidental. The outcome was subjected to additional analyses to determine if the significant sex interactions were due to consistent combinations of variables across the grades. A consistent sex-by-ability interaction pattern is found for grades 6, 9 and 12, with high IQ males showing greater preference for science than low IQ males, but both high IQ and low IQ females preferring English. The patterns of interaction are not due to family or school processes operating differently for sex. Because the total explained variance on this outcome is small, we must postpone elaborate interpretation of the interactive pattern until alternative exploratory variables are included in the model.

The interrelationships among variables for males and females presented in earlier tables are very complex. The analyses of interaction effects takes into account the multivariate complexities in yielding an estimate of multiple group variance. While some differences of patterns of influence for males and females from the selected clusters or within cluster variables appear, the interaction analysis shows that the differences are not large enough or consistent enough to be considered theoretically or practically important.

If males and females are treated differently at home or at school, the effects of these differences are not in evidence in standard statistical tests for interactions. As far as the model is specified, including

family status, family and school process and ability variables, similar social influence patterns operate for white males and females. These results support earlier research by Kohn (1969) and others on similarities of treatment at home for white, middle class children. Additional research is underway to examine the patterns of influence and interaction for black students in the sample.

The results do not mean that differences in social influence processes for males and females might not exist for other outcome measures, or if more specific measures of family sex-socialization or social-learning experiences were included as independent variables in the model. These analyses do suggest that there is no reason to believe that family or school authority-control practices, family status, or individual ability operate significantly differently for males and females on the nonacademic and academic outcomes selected for this study.

Summary

Sex Main Effects.

The patterns of main sex effects in this study support and extend the conclusions of earlier research:

Current research using same measures across adolescent years	Previous research and syntheses of studies[1] with different methods and measures, limited age coverage.
Sex differences in at least three of four grades:	
1. Males higher college plans	1. Males higher aspirations and attainment
2. Males higher self-esteem	2. Males higher self-confidence of ability
3. Females higher report card grades	3. Females higher report card grades
4. Males involved in more disciplinary (adjustment) incidents in school	4. Males more aggressive
5. Males prefer science and math, females English and social studies	5. Males higher analytic skills; females higher verbal ability
6. No sex differences (in three of four grades or as tested):	6. No sex differences:
self-reliance	independence/dependence
control of environment	control of environment
standardized achievement	cognitive learning
anxiety in school	2/
prosocial behavior	2/
quality of school life	3/

1/ .See especially Maccoby and Jacklin, 1974; also, Alexander and Eckland, 1974; DeBord, et al, 1977; Fennema and Sherman, 1977; Gottfredson and Holland, 1975; Holland, 1973; Sewell and Shah, 1967, 1968; Walberg, 1969.

2/. Lack of comparable measures cited, Maccoby and Jacklin, 1974. However recent work by Douvan and Locksley(1977) reports equal stress for males and females in high school though sometimes for different reasons.

3/ While, as in previous research, we find females more satisfied with school, our measures incorporate commitment to school work and reactions to teachers on which there are no sex differences (Epstein and McPartland, 1976.)

The sex main effects are interesting for the constellation of behaviors represented. The picture emerges of females receiving more immediate rewards and fewer punishments from school, but males developing more demanding long term directions and orientations.

Relative influence of variable clusters.

Table 7 summarizes the outcome variables that show the greatest unique proportion of variance explained by family status, family process, school process and individual ability variables for males and females. This table shows that particular outcomes are most directly influenced by specific clusters and, conversely, that specific clusters have their strongest effect on a particular subset of outcomes.

Family STATUS is most important (but not exclusively predictive) for college plans and achievement. Though highly significant for both sexes for these outcomes, the cluster is more often of greatest unique importance for females. FAMILY PROCESS variables contribute the greatest proportion of explained variance to personality and school coping skills, while SCHOOL PROCESS variables are most influential for school coping skills and report card grades (especially math grades). INDIVIDUAL ABILITY measures contribute most to explained variance for personality outcomes and achievement. Overall, this cluster is more often highly influential for males, though other analyses show no important interactive effects.

This is a very selective summary, and readers are referred to table 4 for detailed information on the unique and joint contributions of the several clusters of variables and to table 5 for the summary of

Table 7

Summary: Outcome variables with largest contribution to explained variation by each major cluster, by sex, by grade

		Greatest unique proportion of explained variance by */			
		Family Status	Family Process	School Process	Individual Abilities
Grade 6	Male	8	14567	4	23cd
	Female	28	17	456d	3c
Grade 7	Male	ab	16	47c	12358d
	Female	8ab	1357	46	2cd
Grade 9	Male	8ab	14567	4cd	1238
	Female	18b	3457	46d	24ac
Grade 12	Male			4567d	1238acd
	Female	8a	235	467d	16cd

NOTE: In many cases the greater proportion of unique variance explained is not much greater than other contributions, and we have not considered the influence of joint effects. In cases of less than 2 percent difference, outcome codes appear in more than one column.

*/ Code for outcomes:

1. Self reliance
2. Self esteem
3. Control of environment
4. Quality of school life
5. Personal school behavior
6. Adjustment in school
7. Low school anxiety
8. College plans
a. English std. achievement (7,9,12 only)
b. Math std. achievement (7,9 only) (IQ excluded as independent variable from a and b)
c. English report card
d. Math report card (report card grades excluded as independent variables from c and d)

regression analyses. However, the reduction of information in table 7 calls attention to the fact that different outcomes are clearly and consistently influenced by different individual, social or environmental factors. There is ample evidence that family and school processes influence the development of personality and school coping skills. When family and school processes are included, we are able to explain far more variance on these outcomes than when such variables are omitted from the model.

Family and school processes significantly affect students' nonacademic behavior. Most previous sociological research has limited its interest (or been limited by available data) to measures of family status and individual ability as independent variables, and achievement, aspirations, and attainment as dependent measures. In other research, social class is used as a proxy measure for the experiences of children at home. The current work suggests the inadequacy of social class as a single environmental measure, and shows the benefits gained from more specific measures of experiences in both the family and school environments especially when outcomes other than achievement and aspirations are studied. The nature and extent of communication and control in the family and school settings have pronounced influence net of status and ability on student attitudes and behaviors in this research.

On the average, controlling for social class and ability, both males and females are likely to be more self-reliant, more satisifed, more task-oriented, and have higher aspirations if they experience home

and school environments that encourage their participation in decision-making. The findings extend the work of Hess and Shipman (1973) which reports that maternal behaviors are more useful than social class or intelligence in predicting cognitive behavior of young children.

Strodtbeck (1958) suggests that equality of power in the family leads to higher achievement orientation and better ability of students to move to new roles in new settings as they move from high school, to college or to work. The constellation of behaviors that we find are positively influenced by opportunities for students to share in family and school decision-making supports this early contention.

Sex interaction tests

No consistent interpretable interaction effects of sex with other family, school or individual characteristics were found in this study. The differences for males and females in the contributions by variables or variable clusters to the explained variance on student outcomes are not strong enough or specific enough to warrent a conclusion that different social influence processes operate for males and females. The single significant sex interaction across grades--academic subject preference--appears to be an IQ-by-sex ordinal interaction or due to unmeasured interactive variables across the grades. In all cases this outcome is poorly explained by the model.

In their extensive review, mainly of studies of infants and young children, Maccoby and Jacklin (1974) conclude that there is no real difference between males and females in susceptibility to environmental influence. The conclusion of the current research is similar: there appears to be no significant, interpretable interaction with sex of the environmental

influences included here on student outcomes examined.

The situational theory of sex differences posits that if opportunities and demands are different for males and females, differences in behavior will result. While this may be true for as yet untested conditions, we must conclude that differences at home and school in participation in decision-making and opportunities for shared authority are not different enough to result in different behaviors for males and females. The sex main effects found in this research are not explained by the family and school situational processes studied. As did Orum et al. (1974), we must leave open the possibility that social-learning, modeling, or expectation theories, or other measures of opportunities will explain the significant sex main effects.

The pattern of results from these analyses contribute to a continuing debate about interaction effects. One point for discussion is whether significant interactions are found only where there are significant main effects (Blalock, 1960) or whether significant disordinal or some ordinal interactions mask a main effect (see Berliner and Cahen, 1973; Spady, 1976). Of course, significant main effects do not guarantee the presence of significant interactions. The main effects may be due to the biological nature of sex, or more likely, to unmeasured explanatory variables. The lack of sex main effects is not due, in these analyses, to masking of main effects by interaction of sex with other variables in the model. Rather, the similarity of social influence processes in this study seems to explain the lack of sex main effects on most variables.

Appendix A: Sample Characteristics

Table A.1

Characteristics of Standardization Sample by Grade Level

Grade	5	6	7	9	12
N	1700	1698	1570	1457	935
Sex					
% male	49.8	50.3	51.0	49.0	47.3
% female	50.2	49.7	49.0	51.0	52.7
Race					
% white	86.8	88.4	87.7	89.7	88.6
% black	13.2	11.6	12.3	10.3	11.4
Parents' education[a]					
% 24 or more years completed	74.3	72.5	68.9	61.7	59.7
% under 24 years completed	25.7	27.5	31.1	38.3	40.3
Neighborhood					
% rural	11.2	12.4	12.2	12.9	14.5
% suburban	53.9	49.9	50.8	55.3	72.3
% small city	35.0	37.7	37.0	31.9	13.2
Standardized Achievement					
Name/date	ITBS-1974	ITBS-1973[b]	ITBS-1974	ITBS-1974	TAP (Reading) 1974
Grade Equivalent					
Range	2.1-8.8	2.1-9.1	4.0-11.5	4.3-12.6	18-79[c]
Average					
National %ile	56.15	54.5	49.90	50.56	—

[a] Years of schooling completed by mother and father combined.

[b] Scores are reported for ITBS scores of these students in grade 5. They were untested in grade 6.

[c] For grade 12 only, standard scores are reported.

Table A.2

Comparison of Sample District with U.S.
and U.S. Urban Fringe, 1970 Census

	Sample District	U.S.	U.S. Urban Fringe*
1. Average IQ (public schools)	106.7	100.0	
Standard Deviation	15.7	15.0	
2. Race (% white)	91%	88%	
3. Age (% 18 years or older)	60.8%	65.6%	
4. Median age	26.7	28.3	
5. Median school years completed	12.4	12.1	12.3
6. Farm (% of population)	3.0	1.3	
7. Percent urban	34.8	73.5	
8. Percent males employed as:			
Professional/Manager	36.4	23.2	
Clerk/Sales	24.8	25.1	
Craftsmen/Foremen	14.0	13.9	
9. Per capita income	$3,819	$3,119	$3,745
10. Median family income	$13,461	$9,586	$13,877
11. Family income, percent:			
Less than $3,000	3.8%	10.3%	
3,000 - 4,999	4.4	10.0	
5,000 - 6,999	9.7	11.9	
7,000 - 9,999	14.5	20.6	
10,000 - 14,999	29.6	26.6	
15,000 - 24,999	32.2	16.0	
Over 25,000	8.8	4.6	

*The Urban Fringe is composed of that part of the Standard Metropolitan Statistical Areas (SMSA's) which exclude the Central City. Only limited data are available for this category.

Appendix B

Measures of Independent and Dependent Variables

Independent Variables

I. Family Status

A. Parents' education is the sum of the score on two student questionnaire items: "How far in school did your father go?" and "How far in school did your mother go?" The item scoring used for the seven response categories to these questions ranged from 8 for "Did not go to high school" to 18 for "Attended graduate or professional school after college." This scoring represents the approximate number of years of school completed for the particular response category.

B. Material possessions in the home is the number of items checked by an individual student from a list of 23 possessions. For example, the check list included the following: vacuum cleaner, air-conditioner, electric dishwasher, dictionary, three or more magazine subscriptions, color T.V., typewriter. The reliability coefficient for this scale equals .79.

C. Family size is measured by one student questionnaire item: "How many brothers and sisters do you have?" (range 0-9).

II. Family Process

A. Family decision-making style is a scale composed of the sum of scores on twelve items on the student questionnaire to measure the degree to which a student participates in decisions at home. The items include: I do not have to ask my parents for permission to do most things (True = 1, False = 0); My parents trust me to do what they expect without checking up on me (T = 1, F = 0); How much do you take part in making family decisions about yourself (Very much = 1,

Much = 1, Some = 0, Very little = 0, None = 0). The reliability coefficient for this scale is .71.

B. Level of regulation is the number of behaviors from a check-list of 14 possibilities for which a student indicates that his parents have definite rules. For example, this check-list includes: Time to be in on school nights, time spent watching T.V., use of telephone, clothes you may wear, doing the dishes, doing other jobs around the house. The reliability coefficient for this scale equals .75.

III. School Process

A. The open school scale. This basic measure of the openness of the school environment is based on the average of student response to a 28-item index. Each of seven questions in the student questionnaire was repeated four times to refer separately to each of four academic subjects. The first of the seven questions appeared in the following form:

> Read each sentence below. Then, for each of the subjects, check the line that tells how often the statement is true for you in each subject.
>
> 1. In class, I can talk to other students while I work

	Always	Often	Sometimes	Seldom	Never
English	____	____	____	____	____
Math	____	____	____	____	____
Social Studies	____	____	____	____	____
Science	____	____	____	____	____

The remaining six questions, which also followed the same subject-specific format, were:

2. In class, I must sit next to the same students.
3. In class, I can move about the room without asking the teacher.
4. In class, the teacher stands in front of the room and works with the class as a whole.

5. When I am working on a lesson, the other students in my class are working on the same lesson.
6. Most days there are several assignments the teacher tells me I could select, and I choose the one I want to work on.
7. I could fall behind in my work without the teacher finding out about it for a couple of weeks or more.

For each of the 28 items (7 questions x 4 subjects) the percent of students who reported the program as "open" was calculated in each grade in each school. The measure of "school openness" is the average percent across the 28 items and is assigned according to the school and grade in which each individual student is enrolled. For example, a score of 25.0 for a particular school and grade means that on the average item 25 percent of the students report that their classes are usually "open" in mode of operation. Theoretically, the score on this continuum could range from 0 to 100 percent. The actual range of scores for this sample on the School Openness measure is 11.5 to 39.7 in grade 5, 10.2 to 35.3 in grade 6, 14.4 to 37.3 in grade 7, 16.5 to 53.1 in grade 9, and 17.4 to 58.1 in grade 12.

Tests were performed that show significant differences in openness of instruction at every grade level. (Epstein and McPartland, 1975.)

B. Classroom decision-making style is a scale composed of the sum of scores on ten items from the student questionnaire, which include the same items as the family-decision making scale described above but with teachers rather than parents as the referent. The scale measures the degree to which a student participates in class. The reliability coefficient for this scale is .70.

IV. Individual Ability

A. Child's verbal ability is the student score on the Cognitive

Abilities Test, verbal intelligence subscale, administered by the school district.

B. Report card grades in math and English, reported by the student on the questionnaire, were coded A = 5, B = 4, C = 3, D = 2, and E = 1 for each subject and summed.

Dependent Variables

I. Personality Variables

A. Self-Reliance is a scale of 18 items for the secondary school level. The scale has a reliability coefficient of .70. Items include:

	Scoring
I feel very uncomfortable if I disagree with what my friends think. ——— .	F = 1, T = 0
When the teacher tells me to keep busy on my own, I'm lost and I do not know what to do.	F = 1, T = 0
I think it will not be very hard for me to face "the cold, cruel world."	F = 0, T = 1
I just cannot say "No" when my friends call me to do something with them.	F = 1, T = 0
Even though I may not agree with my friends, I will often give in because I don't want to upset things.	F = 1, T = 0
I usually cannot get started on a writing assignment until I get some ideas from my teacher.	F = 1, T = 0

B. Self-Esteem is a four item measure with a reliability coefficient of .58. Items include:

	Scoring
I can do many things well.	T = 1, F = 0
If I could change, I would be someone different from myself.	T = 0, F = 1

C. Control of Environment is a nine item scale with a reliability coefficient of .68. Items include:

	Scoring
Luck decides most things that happen to me.	T = 0, F = 1
When I make plans, I am almost always certain that I can make them work.	T = 1, F = 0
Good luck is just as important as hard work for success.	T = 0, F = 1

II. School Coping Skills

A. Quality of School Life (QSL) is a 27 item scale with a reliability coefficient of .87. The complete psychometric properties are described in Epstein and McPartland, 1976. Items include:

	Scoring
I enjoy the work I do in class.	Always, Often = 1
Work in class is just busy work and a waste of time.	Seldom, Never = 1
I feel I can go to my teacher with the things that are on my mind.	Always, Often = 1

B. Prosocial School-task Behavior is a 5-item scale with a reliability coefficient of .63. Items are scored in the negative direction so that a low score indicates reports of "ideal" task behavior. Items include:

	Scoring
If there were no report cards, I would still work just as hard in school.	T = 0, F = 1
If I knew the teacher was not going to collect my homework, I would not do my best.	T = 1, F = 0

C. Disciplinary Adjustment is a nine-item weighted scale with a reliability coefficient of .77. Items include:

	Scoring
During this school year have you ever been suspended from school?	Yes = 0, No = 3
During this school year were you ever sent to the office for getting into trouble?	Several times = 0 Once or twice = 2 Never = 3
During this school year were you ever scolded in class for fooling around (and 6 other infractions).	Several times = 0 Once or twice = 2 Never = 3

D. Low Anxiety in School is a 5-item assessment with a reliability coefficient of .53. Items include:

	Scoring
I often feel lost in school.	T = 0, F = 1
I often can feel the tension build up in me when I'm in school.	T = 0, F = 1

III. Orientations

A. College Plans is a single item indicator of plans to attend college "as a full-time student right after high school."

B. Subject Area Preference is a rank ordering of 4 academic subjects with first choice English or Social Studies scored 0; first choice of math or science scored 1.

IV. Academic Success

A. Measures of Academic Achievement

Achievement test scores are from the Iowa Tests of Basic Skills (ITBS) in grades 7, and 9; and the Reading Comprehension Subtest from the Test of Academic Progress (TAP) in grade 12. The

ITBS includes a reading test; a language skills test comprised of spelling, capitalization, punctuation, and usage subtests; a work-study (social studies) skills test comprised of maps, graphs, and reference skills subtests; and an arithmetic test comprised of concepts and problem-solving subtests. Each total test contains from 70-170 items. The TAP reading comprehension test for grade 12 is a 66 item subtest of the total TAP battery.

B. Report Card Grades in math and English reported by the student in the questionnaire were coded A = 5, B = 4, C = 3, D = 2, E = 1 for each subject and summed.

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