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## PARENTS' EDUCATION AND CHILDREN'S EDUCATIONAL ASPIRATIONS AND ACHIEVEMENTS \*

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*In this study of a large randomly selected cohort of Wisconsin high school seniors, who were followed for a seven-year period, multivariate cross-tabular and regression analyses showed that father's education has a slightly stronger effect than mother's education on perceived parental encouragement, college plans, college attendance, and college graduation for males, but that both father's and mother's education have almost equal effect for females. Mother's education has a modest effect independent of father's education, but the independent effect of mother's education is stronger for females than for males. When parents have discrepant levels of educational achievement, the answer to the question of which parent's education has more effect on educational aspiration and achievement depends on the child's sex and intelligence level as well as on each parent's level of educational achievement. In terms of the additional amount of variance explained, the interaction effect is negligible for all of the dependent variables. Discrepancy in parents' educational achievements is far less important in motivating children to high-level aspiration and achievement than is consistently high educational achievement of both parents.*

**A**N important and consistent finding in the area of stratification research is that the children of higher social-class origins are more likely to aspire to high educational and occupational goals than are the children of lower social-class origins.<sup>1</sup> Similar results are also reported regarding the relationship between social class and educational and occupational achievements. This relationship is further substantiated by the fact that, whatever the nature of samples, the age level of subjects, and the measurement procedures, sizable social class differences in aspiration and achievement persist when

certain individual characteristics and contextual variables are statistically controlled. However, some lower-class children aspire to and achieve high-level educational and occupational goals despite the limitations imposed on them by their social-class origins. This suggests that not only do some lower-status families allocate their limited resources disproportionately to higher education, but also socialize their children to high levels of aspiration and achievement. Therefore, without denying the importance of social class as a general indicator of the structure of the family, the need is emphasized for locating and specifying variables in the family milieu which instill in children, in direct and subtle ways, parental expectations and value orientations.<sup>2</sup>

Past studies attempting to examine the

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<sup>1</sup> There is a vast literature in this regard. References to important studies in this area are given in William H. Sewell and Vimal P. Shah, "Socioeconomic Status, Intelligence, and the Attainment of Higher Education," *Sociology of Education*, 40 (Winter, 1967), pp. 1-23.

<sup>2</sup> For important references, see William H. Sewell and Vimal P. Shah, "Social Class, Parental Encouragement, and Educational Aspirations," *American Journal of Sociology*, 73 (March, 1968), pp. 559-572.

influence of family milieu on educational and occupational aspirations and achievements can be grouped into two categories:

(1) Those purporting to examine the influence of the social-psychological properties of the family milieu; for example, value orientations, parental expectations, parental encouragement, and other variables related to the motivational aspects of aspiration and achievement.

(2) Those examining the structural characteristics of the family unit as indicators of its social and economic properties; for example, levels of educational and occupational achievements of the parents, income, size of the family, and number and order of siblings.

Since the studies employing a single or composite measure of social class of the family refer to one or more structural characteristics from the second category, the issue seems to be concerned with specifying the link from the variables in the second category to the variables in the first category, which presumably have both direct and subtle influences on aspirations and achievements of children. For example, it is suggested that if either or both parents are dissatisfied with their own position in the stratification system, they are likely to project their aspirations onto their children and consequently will strive to motivate their children to high levels of aspiration and achievement. Some researchers have therefore tried to look for the sources of parental dissatisfaction in the structural characteristics of the family. The link from the family structural characteristics to parental dissatisfaction to children's motivation for high levels of aspiration and achievement is suggested by Kahl, Ellis and Lane, and Krauss.<sup>3</sup>

Kahl has suggested that parents who are dissatisfied with their own achievements encourage their sons to take school seriously and to aim for college. In a questionnaire study of 3,971 sophomore and junior boys from public high schools in eight towns of

the Boston metropolitan area, it was found that family socioeconomic status and intelligence were not good predictors of the college plans of bright boys whose fathers were in "common man" occupations—minor white-collar workers or skilled laborers. To explore the possibility of parental influence on the aspirations of this selected group, Kahl conducted an intensive interview study of 24 bright boys selected from the larger sample.<sup>4</sup> He found that most of the boys who were encouraged by their parents for a "better" life aspired to go to college. The parents of these boys believed in "getting ahead," but indicated that their own lack of education was a major factor in their failures.

In a four-year panel study of 194 matriculants at Stanford University, Ellis and Lane observed that Kahl's emphasis on the father's role in the mobility process might have been misplaced.<sup>5</sup> They suggested that a father may be dissatisfied with his achievement, but that his dissatisfaction may stem from the presence of a wife who is all too willing to remind him of his failure to measure up to her standards of achievement. A distinctive feature of upward mobility, according to Ellis and Lane, is that the mother's educational or occupational achievement outranks that of the father. In a study of high school seniors in four San Francisco Bay Area high schools, Krauss also concluded that one major source of high educational aspirations of working-class youths in his sample was status discrepancy between the parents; in those families in which the mother either held a nonmanual job or had some college training, while her husband held only a manual job or had only completed high school, the educational aspirations of the children were likely to be high.<sup>6</sup>

These studies have several limitations from the viewpoint of sample, data, and analytical procedures which restrict their conclusions. The samples in all three studies were non-probability and local samples of small size.

<sup>3</sup> Joseph A. Kahl, "Educational and Occupational Aspirations of 'Common Man' Boys," *Harvard Educational Review*, 23 (Summer, 1953), pp. 186-203; Robert A. Ellis and W. Clayton Lane, "Structural Supports for Upward Mobility," *American Sociological Review*, 28 (October, 1963), pp. 743-756; and Irving Krauss, "Sources of Educational Aspirations Among Working-Class Youth," *American Sociological Review*, 29 (December, 1964), pp. 867-879.

<sup>4</sup> All of these boys had IQ scores in the top three deciles of their school, but half of them were in the college preparatory course and definitely planned to go to college while the remaining boys were not in the college preparatory course and did not plan to go to college. All of the boys had fathers who were minor white-collar, skilled, or semiskilled workers.

<sup>5</sup> Ellis and Lane, *op. cit.*, p. 744.

<sup>6</sup> Krauss, *op. cit.*, p. 877.

While Kahl's detailed interview study is of importance in suggesting a variety of social-psychological processes in the family milieu, there may be considerable overemphasis on the part that the father's dissatisfaction plays in leading the parents to encourage their boys to plan on college. In the absence of similar data on girls, one wonders whether his findings would apply equally to bright girls from working-class backgrounds. One also wonders whether similar social-psychological processes operate in the family milieu of boys and girls with modest abilities from high socioeconomic status backgrounds. Ellis and Lane are justified in their attempts to infer social-psychological processes in the family milieu from its structural characteristics, but the highly selective nature of their sample of low socioeconomic status students who matriculated at Stanford University restricts their generalizations to that highly select few who have succeeded in gaining admission to a top quality, private educational institution. Krauss' findings are severely limited by his failure to control for either sex or intelligence, both of which are related to social class and educational aspiration.

In short, the discrepancy in the educational achievements of parents has been suggested as a major source of dissatisfaction among parents, which presumably leads them to motivate their children to high levels of aspiration and achievement. Because of their methodological shortcomings, past studies of the influence of discrepancy in parents' educational and occupational achievements on their children's aspirations and achievements do not provide convincing evidence to support this thesis. The purpose of the present paper is to examine the relationship of discrepancy and of consistency in parents' educational achievements to several aspects of educational aspirations and achievements of their children—to perceived parental encouragement, to college plans, to college attendance, and to college graduation.

THE DATA

The data for the present study come from two sources: (1) a questionnaire survey of all high school seniors in Wisconsin public, private, and parochial schools in 1957, and (2) a follow-up study conducted in 1964-1965 of approximately a one-third probabil-

ity sample of these students.<sup>7</sup> As a result of three waves of mail questionnaires and a telephone interview, responses were obtained in the follow-up study for 9,007 or 87.2 percent of the one-third sample drawn from the original survey.<sup>8</sup> The data reported in the present paper come from these 9,007 respondents in the follow-up study.

The variables *father's education* and *mother's education* refer to the highest levels of father's and mother's educational achievements as reported by the respondents in the 1957 questionnaire survey.<sup>9</sup> Each of these variables was coded into six categories, namely: (1) elementary school; (2) some high school; (3) completed high school, or attended trade or business school; (4) some college; (5) completed college; and (6) graduate work. In view of the fact that the completion of high school graduation made substantial differences in subsequent occupational achievement during the 1930's and 1940's, and assuming that parents with some college experience are more likely to motivate their children to obtain higher education than parents without college experience, the

<sup>7</sup> Details regarding the nature of information gathered in the questionnaire survey and the follow-up study are described in Sewell and Shah, "Socioeconomic Status, Intelligence, and the Attainment of Higher Education," *op. cit.*

<sup>8</sup> Various tabulations comparing the known characteristics of the students indicated nonsignificant differences between those for whom responses were obtained and those for whom responses were lacking. The follow-up procedures and other details concerning the resulting sample are described in a manuscript now being revised for publication as a journal article under the title "Characteristics of Willing and Reluctant Respondents."

<sup>9</sup> The respondents were asked to check the appropriate category of the highest level of education attained by their parents. The exact format of the question follows:

Education of father and mother (check highest level attained)

	Father	Mother
High School:		
did not attend	_____	_____
attended	_____	_____
graduated from	_____	_____
Trade or Business School:		
attended	_____	_____
College:		
attended	_____	_____
graduated from	_____	_____
has Master's or Ph.D. degree	_____	_____
Do not know	_____	_____

above six categories are collapsed in this paper into three categories, namely: (1) less than high school graduation, labelled Low; (2) high school graduation, labelled Middle; and (3) some college education, labelled High. In the regression analysis the low, middle, and high categories of these variables are scored as 1, 2, and 3, respectively. The trichotomized variables for father's and mother's education not only refer to substantively meaningful distinctions, but also provide adequate cell frequencies in the multivariate cross-tabular analysis. For consistency, the trichotomized variables are used in both the cross-tabular and the regression analyses.

The variable *intelligence* is based on scores on the Henmon-Nelson Test of Mental Ability which is administered annually to all high school juniors in Wisconsin.<sup>10</sup> In the cross-tabular analysis, the categories used represent the division of the one-third random sample into approximately equal thirds in measured intelligence, labelled High, Middle, and Low. In the regression analysis, the percentile ranks of measured intelligence, according to established statewide norms, are used.

The variable *perceived parental encouragement* is based on the student's response to four statements intended to record his perception of his parents' attitude toward his college plans. The students were asked to check *any one* of the following four statements: (1) My parents want me to go to college; (2) My parents do not want me to go; (3) My parents do not care whether I go; and (4) My parents will not let me go. The students checking the first statement are considered to have perceived positive parental encouragement to plan on college; all others are categorized as not having perceived positive parental encouragement to plan on college. The variable is dichotomized accordingly into High and Low parental encouragement categories.

The variable *college plans* is based on a statement by the student, when he was a senior in high school, that he definitely planned to enroll in a degree-granting college or university (or one whose credits are acceptable for advanced standing by the Uni-

versity of Wisconsin). The variable is dichotomized into "High" for those who planned on college and "Low" for all others.

The variable *college attendance* indicates that the student had enrolled in a degree-granting college or university at some time between 1957 and 1964. It includes those who had graduated as well as those who had not yet received a bachelor's degree.<sup>11</sup> The variable is dichotomized into "High" for those who attended college and "Low" for all others.

The variable *college graduation* means that the student had obtained a bachelor's degree. The variable is dichotomized into "High" for those who graduated from college and "Low" for all others.

In the regression analysis, the low and the high categories of each dependent variable are scored as "1" and "2," respectively.

#### PURPOSES AND STATISTICAL TECHNIQUES

The major purpose of this paper is to examine the relationship of both discrepancy and consistency in parents' educational achievements to children's perceptions of parental encouragement, college plans, college attendance, and college graduation. The specific purposes of this paper are as follows:

- (1) To examine the relationships of father's education, mother's education, and child's measured intelligence to perceived parental encouragement, college plans, college attendance, and college graduation;
- (2) To examine the relationship of parents' education (combination of father's and mother's education) to perceived parental encouragement, college plans, college attendance, and college graduation for each category of child's measured intelligence;
- (3) To determine the effects of father's education, mother's education, and child's measured intelligence, while controlling for one another, on perceived parental encouragement, college plans, college attendance, and college graduation;
- (4) To determine and test for the interaction effects of father's education and mother's education on perceived parental encouragement, college plans, college attendance, and college graduation; and finally,
- (5) To determine the effect of parents' education (combination of father's and mother's

<sup>10</sup> V. A. C. Henmon and M. J. Nelson, *The Henmon-Nelson Test of Mental Ability*, Boston: Houghton Mifflin Co., 1942.

<sup>11</sup> Because the subsequent analysis deals only with higher education, a category is not included for those students who continued their education beyond high school in vocational and technical schools which do not offer college-level curricula.

education), while controlling for child's measured intelligence, on perceived parental encouragement, college plans, college attendance, and college graduation.

Bivariate and multivariate cross-tabular analyses are employed to examine the relationships mentioned in (1) and (2). The statistical significance of association is determined by the chi-square test using the 0.05 significance level. Beta weights are used to determine the effects of father's education, mother's education, and child's measured intelligence, while controlling for one another, on each of the dependent variables.<sup>12</sup> The technique of stepwise multiple-regression analysis using dummy variables is employed to determine and test for the interaction effects of father's and mother's education on each of the dependent variables. The statistical significance of the interaction effects is determined by the F-test using the 0.05 significance level. And finally, beta weights are used to determine the effect of parents' education, while controlling for child's measured intelligence, on each of the dependent variables. Throughout the analysis, separate tabulations are made for males and females because of known differences in their propensity to pursue higher education as well as possible differences in the influence of parents' education on educational aspirations and achievements of males and females.

There are several advantages of the present study over the past studies. First, it is

<sup>12</sup> Since the dependent variables are dichotomous, the conditional expectation of  $y$  given the  $x$ 's may be interpreted as the conditional probability that the event will occur given the  $x$ 's. Then the calculated value of  $y$  is interpreted as an estimate of this conditional probability. However, a weakness of this procedure is that the classical assumption of homoscedasticity is untenable. For a discussion of the alternative approaches to the problem of dichotomous dependent variables, see Arthur S. Goldberger, *Econometric Theory*, New York: John Wiley and Sons, Inc., 1964, pp. 248-251. We have chosen to use here the most commonly used linear probability function. For an example of a similar use of the linear probability function of a dichotomous dependent variable, see Guy H. Orcutt *et al.*, *Microanalysis of Socioeconomic Systems: A Simulation Study*, New York: Harper and Brothers, 1961, pp. 224-231. An interesting discussion about the choice of parametric and nonparametric statistical procedures is given in Edgar F. Borgatta, "My Student, The Purist: A Lament," to be published in *Sociological Quarterly*, Winter, 1967.

based on a large probability sample of a cohort of all high school seniors in a state with a large and diverse population. Second, it attempts to examine the effect of discrepancy in parents' education on their child's perception of parental encouragement, college plans, college attendance, and college graduation, all of which present an opportunity to determine the relative effects of both discrepancy and consistency in parents' education at several points in the process of educational aspiration and achievement. Third, the multivariate cross-tabular analysis specifies the subgroups of youth which indicate differential levels of educational aspiration and achievement simultaneously by sex, measured intelligence, father's education, and mother's education. Fourth, the multiple-regression analysis using dummy variables provides estimates of the additive and interaction effects of father's and mother's education on various aspects of educational aspirations and achievements of their children. Finally, the separate analysis for males and females furnishes an opportunity to determine whether or not similar relationships hold for both sexes.

#### RESULTS

Tables 1, 2, 3, and 4 show the percentages of Wisconsin high school seniors who perceived parental encouragement to plan on college (Table 1), the percentages who planned on college (Table 2), the percentages who actually attended college (Table 3), and the percentages who graduated from college (Table 4) for each category of sex, intelligence, father's education, and mother's education. In each table the major columns are for Males, Females, and Total; the major rows are for High, Middle, Low, and Total categories of intelligence. Each cell of these major columns and major rows consists of a three-by-three table plus marginals for father's education and mother's education. The numbers on which the percentages shown in the table are based are given in parentheses in Table 1. While the data presented in these tables may be of interest from several points of view, the discussion will be focused only on major findings directly relevant to the purpose of this paper. Similarly, major differences in the relationships among males and females will be pointed out, but

TABLE 1. PERCENTAGE WHO PERCEIVED PARENTAL ENCOURAGEMENT BY SEX, INTELLIGENCE, FATHER'S EDUCATION, AND MOTHER'S EDUCATION \*

Father's Education	Males				Females				Total							
	High		Low		High		Low		High		Low		Total			
	+	-	+	-	+	-	+	-	+	-	+	-	+	-		
High	91.4	83.9	66.2	78.5	86.4	66.1	50.2	64.6	88.8	75.0	58.1	71.5	86.4	73.2	64.3	76.9
	(327)	(566)	(595)	(1,488)	(361)	(560)	(604)	(1,525)	(688)	(1,126)	(1,199)	(3,013)	(147)	(142)	(70)	(359)
Middle	80.9	68.4	59.0	66.6	79.6	52.2	32.2	48.0	80.2	60.5	45.0	57.3	80.2	60.5	45.0	57.3
	(47)	(218)	(139)	(404)	(49)	(205)	(152)	(406)	(96)	(423)	(291)	(810)	(96)	(423)	(291)	(810)
Low	68.0	61.1	48.7	52.9	66.7	44.8	33.3	38.6	67.2	52.6	40.5	45.2	67.2	52.6	40.5	45.2
	(50)	(211)	(598)	(859)	(78)	(232)	(679)	(989)	(128)	(443)	(1,277)	(1,848)	(128)	(443)	(1,277)	(1,848)
Total	78.3	66.7	51.4	59.9	78.1	50.7	34.2	45.2	78.2	58.8	42.3	52.2	78.2	58.8	42.3	52.2
	(166)	(513)	(773)	(1,452)	(205)	(495)	(865)	(1,565)	(371)	(1,008)	(1,638)	(3,017)	(371)	(1,008)	(1,638)	(3,017)
Mother's Education	a. High Intelligence				b. Middle Intelligence				Total							
	90.2	85.7	92.6	92.6	69.0	61.8	76.5	76.5	69.0	61.8	76.5	76.5	69.0	61.8	76.5	76.5
	(102)	(35)	(323)	(323)	(58)	(34)	(170)	(170)	(58)	(34)	(170)	(170)	(58)	(34)	(170)	(170)
Mother's Education	a. High Intelligence				b. Middle Intelligence				Total							
	70.6	58.8	67.8	67.8	52.2	32.2	48.0	48.0	52.2	32.2	48.0	48.0	52.2	32.2	48.0	48.0
	(238)	(131)	(444)	(444)	(205)	(152)	(406)	(406)	(205)	(152)	(406)	(406)	(205)	(152)	(406)	(406)

EDUCATIONAL ACHIEVEMENT

		c. Low Intelligence										
High	88.6 (35)	60.4 (53)	60.7 (28)	69.0 (116)	82.4 (34)	54.8 (42)	53.9 (26)	63.7 (102)	85.5 (69)	57.9 (95)	57.4 (54)	66.5 (218)
Middle	++56.7 (30)	47.0 (181)	38.6 (101)	45.2 (312)	70.0 (30)	45.6 (136)	31.7 (142)	41.6 (308)	63.3 (60)	46.4 (317)	34.6 (243)	43.4 (620)
Low	40.9 (44)	40.3 (211)	29.4 (765)	32.2 (1,020)	43.6 (39)	25.9 (193)	22.1 (887)	23.5 (1,119)	42.2 (83)	33.4 (404)	25.5 (1,652)	27.6 (2,139)
Total	60.6 (109)	45.4 (445)	31.4 (894)	37.9 (1,448)	64.1 (103)	36.4 (371)	24.2 (1,055)	29.8 (1,529)	62.3 (212)	41.3 (816)	27.5 (1,949)	33.8 (2,977)
		d. Total										
High	92.1 (290)	81.0 (252)	72.0 (100)	84.6 (642)	92.0 (298)	76.7 (202)	68.4 (95)	83.0 (595)	92.0 (588)	79.1 (454)	70.3 (195)	83.8 (1,237)
Middle	81.4 (140)	69.2 (640)	61.7 (384)	68.2 (1,164)	75.3 (154)	58.2 (579)	40.2 (425)	53.9 (1,158)	78.2 (294)	64.0 (1,219)	50.4 (809)	61.1 (2,322)
Low	66.3 (172)	58.9 (632)	42.9 (1,778)	48.4 (2,582)	68.2 (217)	40.9 (645)	30.8 (2,004)	35.9 (2,866)	67.4 (389)	49.8 (1,277)	36.5 (3,782)	41.8 (5,448)
Total	82.2 (602)	66.9 (1,524)	47.4 (2,262)	58.9 (4,388)	80.4 (669)	53.0 (1,426)	33.8 (2,524)	46.5 (4,619)	81.3 (1,271)	60.2 (2,950)	40.2 (4,786)	52.6 (9,007)

\* All chi squares, except the one designated by +, for each column in this table for any set of three categories of Father's Education are significant beyond the 0.05 level.

All chi squares, except those designated by ++, for each row in this table for any set of three categories of Mother's Education are significant beyond the 0.05 level.



TABLE 2. PERCENTAGE WHO PLANNED ON COLLEGE BY SEX, INTELLIGENCE, FATHER'S EDUCATION, AND MOTHER'S EDUCATION \*

Father's Education	Males				Females				Total					
	Mother's Education													
	High	Middle	Low	Total	High	Middle	Low	Total	High	Middle	Low	Total		
	a. High Intelligence													
			+											
High	89.3	87.8	55.6	85.2	86.0	74.5	68.6	80.5	87.6	81.6	62.0	82.9		
Middle	85.7	66.0	53.5	64.7	62.7	50.0	40.5	49.3	73.2	58.0	47.3	57.1		
Low	55.1	54.8	45.3	49.2	62.0	37.3	28.1	35.2	59.0	45.8	36.5	42.0		
Total	80.4	66.3	47.9	62.0	74.5	49.5	33.1	48.9	77.3	57.9	40.5	55.4		
	b. Middle Intelligence													
			+											
High	71.0	50.0	36.1	55.0	79.5	56.9	38.2	63.5	75.5	52.8	37.1	59.1		
Middle	51.1	39.5	30.9	37.9	49.0	31.7	17.1	28.3	50.0	35.7	23.7	33.1		
Low	++	36.0	32.7	26.8	28.8	37.2	24.1	17.1	20.3	36.7	28.2	21.6	24.2	
Total	54.8	38.4	27.9	34.7	56.1	31.1	17.9	27.1	55.5	34.8	22.7	30.8		
	c. Low Intelligence													
			+											
High	++	48.6	32.1	21.4	34.5	++	50.0	26.2	30.8	35.3	49.3	29.5	25.9	34.9
Middle	43.3	16.6	15.8	18.9	43.3	20.6	13.4	19.5	43.3	18.3	14.4	19.2		
Low	27.3	14.2	9.5	11.3	30.8	8.3	7.6	8.5	28.9	11.4	8.5	9.8		
Total	38.5	17.3	10.6	14.8	40.8	14.8	8.9	12.5	39.6	16.2	9.7	13.6		
	d. Total													
High	80.0	63.5	39.0	67.1	80.2	59.4	47.4	67.9	80.1	61.7	43.1	67.5		
Middle	65.0	43.0	35.4	43.1	54.6	36.6	23.1	34.0	59.5	40.0	28.9	38.6		
Low	42.4	33.9	23.7	27.4	47.5	23.9	15.3	19.6	45.2	28.8	19.2	23.3		
Total	65.8	42.6	26.4	37.4	63.7	34.1	17.8	29.5	64.7	38.5	21.8	33.3		

\* All chi squares, except those designated by +, for each column in this table for any set of three categories of Father's Education are significant beyond the 0.05 level.

All chi squares, except those designated by ++, for each row in this table for any set of three categories of Mother's Education are significant beyond the 0.05 level.

All percentages in this table are based on the N's given in the respective cells of Table 1.

TABLE 3. PERCENTAGE WHO ATTENDED COLLEGE BY SEX, INTELLIGENCE, FATHER'S EDUCATION, AND MOTHER'S EDUCATION \*

Father's Education	Males				Females				Total			
					Mother's Education							
	High	Middle	Low	Total	High	Middle	Low	Total	High	Middle	Low	Total
	a. High Intelligence											
High	93.6	92.2	66.7	90.2	88.7	74.5	60.0	81.1	91.1	83.9	63.4	85.8
Middle	85.7	75.9	67.4	74.6	++60.0	53.8	45.0	52.3	71.7	64.9	56.7	63.5
Low	65.4	62.4	52.3	56.8	66.0	38.2	28.5	36.3	65.7	50.0	40.1	46.1
Total	85.3	74.2	56.8	69.7	76.5	51.4	33.9	50.4	80.7	62.9	45.3	59.9
	b. Middle Intelligence											
High	++76.8	61.9	63.9	67.7	80.8	56.9	41.2	64.7	78.9	59.9	52.9	66.3
Middle	70.2	50.9	46.8	51.7	51.0	35.1	21.7	32.0	60.4	43.3	33.7	41.9
Low	46.0	35.1	29.6	31.9	42.3	25.0	16.9	20.8	43.8	29.8	22.9	26.0
Total	65.7	46.2	34.3	42.1	59.0	32.9	18.7	28.5	62.0	39.7	26.1	35.0
	c. Low Intelligence											
High	65.7	47.2	32.1	49.1	+50.0	28.6	19.2	33.3	58.0	39.0	25.9	41.7
Middle	43.3	24.3	20.8	25.0	40.0	23.5	14.8	21.1	41.7	24.0	17.3	23.1
Low	34.1	15.2	11.1	12.9	33.3	13.0	7.8	9.6	33.7	14.1	9.3	11.2
Total	46.8	22.7	12.9	18.4	40.8	18.6	9.0	13.5	43.9	20.8	10.8	15.9
	d. Total											
High	86.2	72.6	56.0	76.2	82.2	59.9	42.1	68.2	84.2	67.0	49.2	72.4
Middle	71.4	52.8	47.7	53.4	53.3	40.1	26.6	36.9	61.9	46.8	36.6	45.1
Low	51.7	37.5	26.9	31.2	51.6	25.9	15.4	20.5	51.7	31.6	20.8	25.6
Total	72.9	49.7	31.7	43.6	65.6	36.5	18.3	30.8	69.1	43.3	24.7	37.0

\* All chi squares, except the one designated by +, for each column in this table for any set of three categories of Father's Education are significant beyond the 0.05 level.

All chi squares, except those designated by ++, for each row in this table for any set of three categories of Mother's Education are significant beyond the 0.05 level.

All percentages in this table are based on the N's given in the respective cells of Table 1.

TABLE 4. PERCENTAGE WHO GRADUATED FROM COLLEGE BY SEX, INTELLIGENCE, FATHER'S EDUCATION, AND MOTHER'S EDUCATION \*

Father's Education	Males				Females				Total				
					Mother's Education								
	High	Middle	Low	Total	High	Middle	Low	Total	High	Middle	Low	Total	
			+		a. High Intelligence								
High	64.5	60.0	36.1	59.9	62.4	48.0	40.0	55.4	63.4	54.4	38.0	57.7	
Middle	++63.5	46.1	35.4	45.1	38.7	26.9	22.1	27.5	50.0	36.5	29.1	36.3	
Low	42.3	37.1	28.0	32.3	35.0	22.3	14.6	19.5	38.2	29.5	21.1	25.7	
Total	59.0	45.6	30.3	42.4	49.9	28.9	17.7	29.4	54.2	37.3	23.9	35.8	
			+		b. Middle Intelligence								
High	42.0	32.1	25.0	34.4	41.0	29.3	14.7	31.8	41.5	31.0	20.0	33.2	
Middle	36.2	18.8	20.1	21.3	26.5	15.1	7.9	13.8	31.3	17.0	13.8	17.5	
Low	++22.0	11.9	12.0	12.6	++19.2	8.6	5.0	7.0	20.3	10.2	8.3	9.6	
Total	34.3	18.1	14.1	17.8	29.3	13.7	5.9	11.4	31.5	16.0	9.8	14.5	
			+		c. Low Intelligence								
High	25.7	17.0	0.0	15.5	+	23.5	2.4	0.0	8.8	24.6	10.5	0.0	12.4
Middle	++10.0	2.2	4.0	3.5	13.3	5.2	4.2	5.5	11.7	3.5	4.1	4.5	
Low	6.8	6.6	2.2	3.3	7.7	0.5	1.1	1.3	7.2	3.7	1.6	2.2	
Total	13.8	6.1	2.4	4.4	14.6	2.4	1.5	2.6	14.2	4.4	1.9	3.5	
					d. Total								
High	54.5	41.7	22.0	44.4	52.4	33.2	20.0	40.7	53.4	37.9	21.0	42.6	
Middle	42.9	24.4	21.6	25.7	29.9	17.6	11.1	16.8	36.1	21.2	16.1	21.3	
Low	27.3	18.5	11.5	14.3	24.4	10.9	5.4	8.1	25.7	14.6	8.3	11.0	
Total	44.0	24.8	13.7	21.7	38.1	16.8	6.9	14.5	40.9	20.9	10.1	18.0	

\* All chi squares, except those designated by +, for each column in this table for any set of three categories of Father's Education are significant beyond the 0.05 level.

All chi squares, except those designated by ++, for each row in this table for any set of three categories of Mother's Education are significant beyond the 0.05 level.

All percentages in this table are based on the N's given in the respective cells of Table 1.

no special attention will be given to the pattern of relationships in the total group. Also, the discussion in regard to the four dependent variables will generally be concurrent.

The relationships of father's education and mother's education to perceived parental encouragement, college plans, college attendance, and college graduation may be examined from the column and row marginals given at the bottom of each table under the heading "d. Total." The relationship of intelligence to each dependent variable may be examined from the lower right-hand marginals of the subtables in each category of intelligence.

Several important inferences may be drawn from these marginals for males and females. First, at each of the four stages in the process of educational aspiration and achievement, males make a more favorable showing than females. Second, the differential levels of parental encouragement perceived by males and females seem to reflect the differential role expectations of the sexes in American society. Third, the almost negligible difference in the percentage of females who planned on college and attended college indicates that females are more likely than males to have realistic plans for higher education. Fourth, the fact that a significantly higher percentage of males actually attended college than planned on college suggests that experience in the labor market or in military service is likely to cause males to revise their plans upward.<sup>13</sup> Finally, progress through the process of higher education is by no means automatic. Only 21.7 percent of the males and 14.5 percent of the females from the total cohort graduated from college within seven years following their graduation from high school. However, if only those seniors who attended college are considered, 49.8 percent of the males and 47.0 percent of the females graduated from college. This indicates that if a student once attends col-

lege, the probability of success in graduating from college is, on the whole, only slightly dependent on the student's sex.

Father's education, mother's education, and child's measured intelligence are positively and monotonically related to parental encouragement, college plans, college attendance, and college graduation of males as well as females. All of these relationships are statistically significant. The higher the level of father's education, mother's education, or child's measured intelligence, the greater the proportion of males and of females who perceived parental encouragement, who planned on college, who attended college, and who graduated from college. In each category of father's education, mother's education, and child's measured intelligence, there is a greater proportion of males than of females who perceived parental encouragement, planned on college, attended college, and graduated from college. In other words, males continue to have advantages over females throughout the process of aspiration and achievement when father's education, mother's education, and child's measured intelligence are separately controlled.

The differences by intelligence increase greatly as one moves forward in the process of educational aspiration and achievement. Among males, those in the high intelligence category are twice as likely to perceive parental encouragement, four times as likely to plan on college and attend college, and more than ten times as likely to graduate from college as those in the low intelligence category. Similarly, among females, those in the high intelligence category are twice as likely to perceive parental encouragement, almost four times as likely to plan on college and attend college, and almost twelve times as likely to graduate from college as those in the low intelligence category. Thus, the importance of intelligence for progress in higher education is manifestly a reflection of the growth and development of an educational system based on merit rather than on ascription.

The picture is essentially the same when the children are classified either by father's education or by mother's education. The percentage differences between the low and the high categories of father's as well as mother's education increase considerably as one proceeds from perceived parental en-

<sup>13</sup> Among those who attended college, 58.0 percent of the males and 71.9 percent of the females had enrolled in college immediately after their high school graduation in 1957, 31.4 percent of the males and 17.7 percent of the females had enrolled in college some time during 1958-1964, and data regarding the first year of college attended by 10.6 percent of the males and 10.4 percent of the females were not available.

couragement to college plans, to college attendance, to college graduation, but these differences are less pronounced than the differences by intelligence. Also, for each of the dependent variables the proportions of males and females in each category of father's education are almost equal to the proportions of males and females in the respective categories of mother's education. In other words, in terms of the percentages of males and females perceiving parental encouragement, planning on college, attending college, and graduating from college, the differences by father's education are very similar to the differences by mother's education, and there is no indication that the educational level of one of the parents has any stronger relationship than the educational level of the other parent.<sup>14</sup>

<sup>14</sup> The percentage distribution of intelligence separately by father's education and mother's education is not shown here; it can be easily computed from the N's given in Table 1. It should, however, be pointed out that the relationships of father's education and mother's education to children's intelligence are positive, monotonic, and statistically significant. The higher the level of father's or mother's education, the greater the proportion of males and females with high intelligence.

A summary view of the interrelationships between father's education, mother's education, intelligence, and the four dependent variables can be obtained from the following matrix of zero-order correlation coefficients.

Males							
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Father's Education	...	.462	.234	.276	.288	.332	.254
(2) Mother's Education	...	...	.231	.260	.278	.287	.244
(3) Child's Intelligence	...	...	...	.357	.431	.452	.405
(4) Perceived Parental Encouragement	...	...	...	...	.532	.523	.369
(5) College Plans	...	...	...	...	...	.680	.563
(6) College Attendance	...	...	...	...	...	...	.599
(7) College Graduation	...	...	...	...	...	...	...
Females							
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Father's Education	...	.450	.244	.317	.340	.340	.293
(2) Mother's Education	...	...	.279	.326	.342	.353	.295
(3) Child's Intelligence	...	...	...	.314	.351	.348	.331
(4) Perceived Parental Encouragement	...	...	...	...	.547	.521	.363
(5) College Plans	...	...	...	...	...	.783	.582
(6) College Attendance	...	...	...	...	...	...	.617
(7) College Graduation	...	...	...	...	...	...	...

The relationship of father's education to perceived parental encouragement, college plans, college attendance, and college graduation continues to be generally positive, monotonic, and statistically significant for males as well as for females when mother's education and child's intelligence are simultaneously controlled. Similarly, the relationship of mother's education to perceived parental encouragement, college plans, college attendance, and college graduation continues to be generally positive, monotonic, and statistically significant when father's education and child's intelligence are simultaneously controlled. These findings are not surprising in view of the independent relationship of socioeconomic status to parental encouragement, college plans, college attendance, and college graduation, as established in two earlier papers based on the same data.<sup>15</sup>

Since the major purpose of this paper is rooted in the speculations in the past literature about the influence of parents' education when one parent's level of educational achievement is higher than the other's, the subsequent discussion focusses on each combination of father's and mother's education. For this purpose the attention of the reader is directed to the three-by-three subtables in each category of sex and intelligence. To read the table one should first examine the percentages in the lower right-hand cell and then gradually move to the left and upward in each subtable.

Several interrelated inferences are possible. First, when the educational levels of both parents are taken into account, males rank higher than females at each of the four stages in the process of educational aspiration and achievement. Further, when intelligence is controlled, males continue to rank higher than females. In each category of child's measured intelligence, father's education, and mother's education, the proportion of males who perceived parental encouragement, planned on college, attended

<sup>15</sup> The measure of socioeconomic status used in these papers was a weighted score of six family background characteristics, including father's and mother's education. See Sewell and Shah, "Socioeconomic Status, Intelligence, and the Attainment of Higher Education," *op. cit.*, and Sewell and Shah, "Social Class, Parental Encouragement, and Educational Aspirations," *op. cit.*

college, and graduated from college is generally greater than that of females. Second, although there are small reversals in some of the adjacent categories of father's and mother's education, the higher the level of parents' education considered jointly, the greater the proportion of males and females perceiving parental encouragement, planning on college, attending college, and graduating from college. When child's intelligence is controlled, this pattern generally continues with the exception of some reversals between those whose parents are both high school graduates and those who had one parent with some college education.<sup>16</sup> Third, for males as well as for females in each combination of father's and mother's education, intelligence is associated with perceived parental encouragement, college plans, college attendance, and graduation from college. However, these differences are reduced as one moves from the lower right-hand cell for those whose parents have less than high school education to the upper left-hand cell for those whose parents have some college education. These observations only strengthen the earlier findings. Further discussion of the data is focussed on discrepancies in parents' education since the core purpose of this paper is concerned with this problem.

Among those who have one parent who is a high school graduate while the other is not, it is apparent that males whose fathers are high school graduates are slightly more likely to perceive parental encouragement, to plan on college, to attend college, and to graduate from college than those whose mothers are high school graduates. But there is practically no difference in educational aspirations and achievements of females whose fathers are high school graduates and those whose mothers are high school graduates. When child's intelligence is controlled, this relationship becomes clearer for females but not for males. For females in the low and

the high intelligence categories, father's high school graduation shows a more favorable relationship to educational aspiration and achievement than does mother's high school graduation, but this pattern of relationship is reversed for the females in the middle intelligence categories. For males the relationship is inconsistent except that father's high school graduation has favorable influence on son's college attendance in each category of intelligence.

Among males whose parents are both high school graduates or who have one parent with some college education but the other with less than high school graduation, those who have fathers with some college education are more likely to perceive parental encouragement and to attend college than those who have mothers with some college education; the trend is reversed, however, in regard to college plans and college graduation. For females in this group there are no differences in parental encouragement and college plans, but those who have mothers with some college education are more likely to attend college and to graduate from college than those who have fathers with some college experience. When child's intelligence is controlled, the frequencies for those with either parent having some college education become very small, and care must be taken in interpreting the findings. However, it may be observed that for males and females in the low intelligence group, those who have mothers with some college education are more likely to plan on college, to attend college, and to graduate from college than those who have fathers with some college education. In the middle intelligence group the above pattern generally continues for females; but among males, those who have fathers with some college education are somewhat more likely to plan on college, to attend college, and to graduate from college than those who have mothers with some college education. In the high intelligence group, father's rather than mother's college education is generally favorable for high-level educational aspirations and achievements of males as well as females. Finally, among those who have one parent with high school graduation and the other with some college education, father's education is slightly more important than mother's education for high-

<sup>16</sup> When the categories of father's and mother's education were grouped according to their numerical scores (i.e., 1=Low, 2=Middle, and 3=High), with or without controlling for child's intelligence, the relationships of parents' education to parental encouragement, college plans, college attendance, and college graduation were generally positive, monotonic (except for a few random categories showing slight reversals), and statistically significant.

level aspirations and achievements of highly intelligent males and females, but mother's education is slightly more important than father's education for high-level aspirations and achievements of males in the middle intelligence category and females in the low intelligence category.

In short, the cross-tabulations presented in Tables 1, 2, 3, and 4 show that (1) males are in more favorable circumstances than females at all levels of the higher education process, (2) parents' education, when considered separately or jointly, is positively related to educational aspirations and achievements of both sexes, (3) differences in aspiration and achievement by intelligence

is one parent with middle education but the other with high education, it is generally father's rather than mother's education which exerts greater influence on aspirations and achievements of highly intelligent children, but it is generally mother's rather than father's education which exerts greater influence on aspirations and achievements of children with low intelligence.

The effects of father's education, mother's education, and child's measured intelligence (controlling for the others) on perceived parental encouragement, college plans, college attendance, and college graduation are measured by beta weights, shown separately for males and females in Table 5.<sup>17</sup> Among

TABLE 5. BETA WEIGHTS OF FATHER'S EDUCATION, MOTHER'S EDUCATION, AND CHILD'S INTELLIGENCE, SEPARATELY FOR MALES AND FEMALES \*

Independent Variable	Males				Females			
	Perceived Parental Encouragement	Planned on College	Attended College	Graduated from College	Perceived Parental Encouragement	Planned on College	Attended College	Graduated from College
Father's Education	.150	.143	.192	.122	.181	.196	.191	.164
Mother's Education	.123	.127	.110	.107	.184	.183	.198	.152
Intelligence	.294	.368	.381	.352	.218	.252	.246	.249

\* All beta weights in this table are statistically significant at the 0.05 level. For the purposes of the regression analysis presented in this table, the low, middle, and high categories of father's and mother's education were scored as 1, 2, and 3, respectively; actual percentile ranks of child's intelligence were used.

continue, and (4) among those who have parents with discrepant educational levels, the answer to the question of which parent's education is more likely to induce high-level aspiration and achievement depends on the sex as well as the intelligence level of the child, and on the levels of parents' education. If there is a discrepancy between the parents with low and middle education, it is generally father's rather than mother's education which exerts greater influence on aspirations and achievements of children. If there is a discrepancy between the parents with low and high education, then it is also generally father's rather than mother's education which exerts greater influence on aspirations and achievements of highly intelligent children, but it is generally mother's rather than father's education which exerts greater influence on aspirations and achievements of children with low intelligence. Similarly, if there

the three independent variables, child's intelligence has the strongest effect on each of the dependent variables. However, its coefficients are greater for males than for females. Father's education shows a slightly stronger effect than does mother's education on perceived parental encouragement, college plans, college attendance, and college graduation for males; but in the case of females, both father's and mother's education have almost equal effect. Nevertheless,

<sup>17</sup> Beta weights are the adjusted partial slopes of the independent variables, and they provide a comparable measure of the relative ability of each independent variable to produce changes in the dependent variable. Note that beta weights are also called path coefficients in path analysis. Hubert M. Blalock, *Social Statistics*, New York: McGraw-Hill Book Company, Inc., 1960, pp. 343-346; Otis Dudley Duncan, "Path Analysis: Sociological Examples," *American Journal of Sociology*, 72 (July, 1966), pp. 1-16.

the coefficients of father's as well as of mother's education are greater for females than for males. Thus, it seems that parental education exerts more influence on females than on males at all levels of the higher education process.

Although the beta weights indicate that on the whole father's education has slightly more influence than mother's education on educational aspiration and achievement, one question still remains to be answered, namely, what happens if father's education is higher than mother's, or vice versa? In statistical terms the question refers to the interaction effects of father's and mother's education on each of the four dependent variables. Thus it is necessary to determine whether there is any significant contribution made by the interaction of father's and mother's education in explaining the variance in each of the dependent variables. One simple way to answer this question is to construct dummy variables for father's and mother's education and to see if the combination of these constructed variables explains any variance over and above the variance explained by father's education, mother's education, and intelligence.<sup>18</sup>

The use of dummy variables is also a simple and useful method of introducing into a regression analysis information contained in variables that are not conventionally measured on a numerical scale. Although it is possible to scale father's education as well as

mother's education, difficulties arise in scaling their combined categories. Since the major issue of this paper concerns the influence of discrepancies in father's and mother's education, no assumption can be made regarding the order of their combined categories; each combination needs to be treated as a dummy variable. Thus, the use of dummy variables not only provides an adequate test of interaction effects of the independent variables, but it also allows flexibility in treating each combination of a set of independent variables as a separate variable which can be used in multiple regression analysis for determining its effect on the dependent variable.

The stepwise multiple correlation coefficients and the amount of variance explained by father's education, mother's education, interaction between father's and mother's education, and child's intelligence are given in Table 6.<sup>19</sup>

Several observations should be made in regard to the data in Table 6. First, it is apparent that father's education, mother's education, interaction between father's and mother's education, and child's intelligence together explain from less than one-fifth to one-fourth of the variance in perceived parental encouragement, college plans, college

<sup>19</sup> The dummy variables for father's education, mother's education, and interaction terms used in the stepwise multiple regression analysis were coded as follows:

- X<sub>1</sub>=1 if the respondent's father had at least some college education, and 0 otherwise;
- X<sub>2</sub>=1 if the respondent's father was a high school graduate, and 0 otherwise;
- X<sub>3</sub>=1 if the respondent's mother had at least some college education, and 0 otherwise;
- X<sub>4</sub>=1 if the respondent's mother was a high school graduate, and 0 otherwise;
- X<sub>5</sub>=1 if X<sub>1</sub>X<sub>3</sub>=1, and 0 otherwise;
- X<sub>6</sub>=1 if X<sub>1</sub>X<sub>4</sub>=1, and 0 otherwise;
- X<sub>7</sub>=1 if X<sub>2</sub>X<sub>3</sub>=1, and 0 otherwise;
- X<sub>8</sub>=1 if X<sub>2</sub>X<sub>4</sub>=1, and 0 otherwise.

Note that, on account of the nonsingularity constraint, only two of the three categories of father's education and mother's education are successively dichotomized; nevertheless the omitted category is not slighted—it has its own coding of 0's to distinguish it from the other two categories coded as dummy variables. Thus the effect of father's education is captured by X<sub>1</sub> and X<sub>2</sub>, the effect of mother's education is captured by X<sub>3</sub> and X<sub>4</sub>, and the effects of interaction between father's and mother's education are captured by X<sub>5</sub>, X<sub>6</sub>, X<sub>7</sub>, and X<sub>8</sub>.

<sup>18</sup> Given a set of T joint observations on the 1+K variables, y, x<sub>1</sub>, . . . , x<sub>K</sub>, the multiple regression equation is of the following general form:

$$y = \alpha + \beta_1 x_1 + \dots + \beta_K x_K.$$

Let,

$$y_t = \beta_0 x_{t0} + \dots + \beta_H x_{tH} + \beta_{H+1} x_{t, H+1} + \dots + \beta_K x_{tK} + e_t$$

where  $x_{t0} \equiv 1$ , so that  $\beta_0$  is the intercept  $\alpha$ , and  $x_{t1}, \dots, x_{tH}$  is the set of independent variables, and  $x_{t, H+1}, \dots, x_{tK}$  is the set of interaction terms.

Then, on the null hypothesis for the interaction

terms  $\beta_{H+1} = \dots = \beta_K = 0$ ,  $\frac{\Delta SSR/(K-H)}{SSE/(T-K-1)}$  is distributed as  $F_{T-K-1}^{K-H}$

where  $\Delta SSR = \text{Change in sum of squares} = \Sigma \hat{u}_t^2 - \Sigma \hat{e}_t^2$

$SSE = \text{Error sum of squares} = \Sigma \hat{e}_t^2 = SST - SSR$ , and

$\Sigma \hat{u}_t^2 = \text{Conditional sum of squares.}$

See Arthur S. Goldberger, *Econometric Theory*, New York: John Wiley and Sons, Inc., 1966, p. 177, and Jacob Cohen, "Multiple Regression As A General Data-Analytic System" (Mimeographed).



TABLE 6. STEPWISE MULTIPLE CORRELATION COEFFICIENTS OF FATHER'S EDUCATION, MOTHER'S EDUCATION, INTERACTION BETWEEN FATHER'S AND MOTHER'S EDUCATION, AND CHILD'S INTELLIGENCE, SEPARATELY FOR MALES AND FEMALES †

Independent Variable(s)	Perceived Parental Encouragement		Planned on College		Attended College		Graduated from College	
	R	% Variance Explained	R	% Variance Explained	R	% Variance Explained	R	% Variance Explained
Males								
Father's education	.276	7.6	.290	8.4	.332	11.0	.257	6.6
Father's education plus Mother's education	.315	9.9	.333	11.1	.366	13.4	.296	8.8
Father's education, Mother's education, plus Interaction between them	.317	10.0	.338	11.4*	.367	13.5	.301	9.1*
Father's education, Mother's education, Interaction between them, plus Child's intelligence	.424	18.0	.490	24.0	.518	26.9	.452	20.5
Females								
Father's education	.320	10.2	.351	12.3	.346	12.0	.305	9.3
Father's education plus Mother's education	.380	14.5	.410	16.8	.413	17.0	.358	12.8
Father's education, Mother's education, plus Interaction between them	.383	14.7*	.410	16.8	.414	17.2	.361	13.0*
Father's education, Mother's education, Interaction between them, plus Child's intelligence	.436	19.0	.476	22.7	.476	22.7	.432	18.7

† For the purposes of the regression analysis presented in this table, dummy variables were used for father's education, mother's education, and interaction terms; actual percentile ranks of child's intelligence were used.

\* F-value for the additional variance explained by interaction between Father's education and Mother's education is statistically significant at the 0.05 level for the designated dependent variables.

attendance, and college graduation. The large amounts of residual variance to be explained suggest the need for bringing additional variables into the system. Second, child's intelligence explains the greatest amount of variance in the four dependent variables despite the fact that it was put in last in the multiple regression equations.<sup>20</sup>

<sup>20</sup> When child's intelligence was put in first in the multiple regression equations, the stepwise additional variance explained by father's and mother's education was reduced but not eliminated. Father's education explained about 4 to 8 percent of the variance over and above the variance explained by child's intelligence; mother's education explained about 1 to 4 percent of the variance over and above

This indicates that, throughout the process of educational aspiration and achievement, child's intelligence has a consistently strong effect, which is independent of both father's and mother's education as well as of interaction between them. Third, father's education explains only 6 to 13 percent of the variance in the four dependent variables; therefore, the additional 2 to 5 percent of the variance explained by mother's education suggests that mother's education has a modest effect which is independent of father's education. Also, for each dependent vari-

the variance explained by both child's intelligence and father's education.

TABLE 7. BETA WEIGHTS OF EACH COMBINATION OF FATHER'S EDUCATION AND MOTHER'S EDUCATION, AND OF CHILD'S INTELLIGENCE FOR PERCEIVED PARENTAL ENCOURAGEMENT, COLLEGE PLANS, COLLEGE ATTENDANCE, AND COLLEGE GRADUATION, SEPARATELY FOR MALES AND FEMALES \*

Independent Variable		Males				Females			
		Perceived Parental Encouragement	Planned on College	Attended College	Graduated from College	Perceived Parental Encouragement	Planned on College	Attended College	Graduated from College
Father's Education	Mother's Education								
L	M	.086	.039	.038	.026 <sup>+</sup>	.046	.035	.049	.024 <sup>+</sup>
M	L	.074	.026 <sup>+</sup>	.074	.028	.036	.028	.049	.025 <sup>+</sup>
M	M	.147	.088	.129	.059	.143	.111	.134	.071
L	H	.063	.038	.059	.039	.129	.115	.133	.081
H	L	.072	.027	.067	.019 <sup>+</sup>	.093	.084	.067	.044
M	H	.107	.112	.118	.097	.133	.124	.117	.094
H	M	.138	.139	.160	.120	.157	.162	.162	.126
H	H	.178	.201	.206	.175	.246	.286	.294	.265
Child's Intelligence		.294	.369	.381	.352	.220	.254	.247	.250

\* All beta weights in this table, except those designated by +, are statistically significant at the 0.05 level.

able mother's education has a stronger independent effect for females than for males. Fourth, in terms of the additional variance explained, the independent effect of interaction between father's education and mother's education is negligible. Although the interaction terms are statistically significant for college plans and college graduation of males and for perceived parental encouragement and college graduation of females, their statistical significance—in view of the large sample of this study—should not draw attention away from the major finding that there are only negligible interaction effects. In brief, the multiple regression analysis using dummy variables shows that mother's education has some effect independent of the effect of father's education on perceived parental encouragement, college plans, college attendance, and college graduation of males as well as of females, but there is only a negligible effect of interaction between father's and mother's education.

The relative effect of each combination of father's and mother's education, controlling for child's intelligence, is measured by beta weights, which are given in Table 7 for each of the dependent variables.<sup>21</sup> Several inferences are indicated from this table.

<sup>21</sup> In a multiple regression analysis using K-1 dummy variables (where K=the number of classifications), the weight of the omitted category would

First, for males as well as for females in each category of parents' education, except those females who have both parents with some college education, child's intelligence

be included in the constant term. Unstandardized regression coefficients would generally be quite satisfactory for determining the relative strength of dichotomous variables, but the design of this paper requires that child's intelligence be controlled while estimating the relative effect of each combination of father's and mother's education. Since the full percentile range of measured intelligence is used in the regression analysis, beta weights rather than raw regression coefficients are used as measures of the relative strength of the independent variables. This also means that no separate quantity indicating the strength of the omitted category, i.e., the combined category for low father's education and low mother's education, can be obtained. Nevertheless, the omitted category serves as a reference group, and the weights of the dummy variables included in the multiple regression analysis suggest their relative effect. It should be mentioned that the means for each combination of father's and mother's education, adjusted for child's intelligence, show their relative strength to be similar to that indicated by the partial beta weights given in Table 7. In any event, the data presented in Table 7 provide the reader with a useful summary of Tables 1, 2, 3, and 4, when the full percentile range of measured intelligence is taken into account. When the interest is in determining the importance of a whole set of coefficients involved in a characteristic, an analogous procedure to the beta weights may be used, as by James N. Morgan *et al.*, *Income and Welfare in the United States*, New York: McGraw-Hill Book Company, Inc., 1962, pp. 508-511.

has a considerably stronger effect than parents' education at each stage in the process of educational aspiration and achievement.

Second, for both males and females, comparison of the partial beta weights for each level of one parent's educational achievement indicates that the higher the level of the other parent's education the greater the probability that the child will perceive parental encouragement, plan on college, attend college, and graduate from college. When both parents have a high level of educational achievement, their children are much more likely to have high levels of educational aspiration and achievement than in any other situation.

Third, among both males and females who have one parent who is a high school graduate and the other who has some college education, father's seems to be more important than mother's education at all stages in the process of educational aspiration and achievement. However, males who have parents who are both high school graduates seem to be in a more advantageous situation than males who have one parent with some college education and one with less than high school graduation. For males in the latter category no clear pattern is observed, but females whose mothers have some college education are in an equally advantageous situation with those who have parents who are both high school graduates; females whose fathers have some college education but whose mothers have not graduated from high school are in the least advantageous situation. Thus consistency in the achievements of parents who are moderately educated seems to provide a more advantageous social-psychological environment and greater support for high-level educational aspiration and achievement than does extreme discrepancy in parents' educational achievements. Nevertheless, in discrepant situations where one parent has some college education but the other has less than high school graduation, mother's rather than father's education seems to exert the greatest influence on the educational aspirations and achievements of their children, especially their daughters.

Finally, among the seniors who have one parent who is a high school graduate but the other is not, mother's rather than father's education has a slightly greater effect on

perceived parental encouragement and college plans of both males and females. However, father's rather than mother's education has a greater effect on college attendance of males, but each has an equal effect on college attendance of females. Both have almost equal effects on college graduation of males and females. From this it may be inferred that among those who have one parent who is a high school graduate but the other not, mother's rather than father's education is slightly more important in creating a favorable social-psychological environment for high-level educational aspiration; however, father's rather than mother's education—perhaps reflecting the father's earnings—is slightly more important in determining educational achievement, especially of sons.

#### SUMMARY AND CONCLUSIONS

In this study the influence of parents' education on the educational aspirations and achievements of their children was examined for a randomly selected cohort of Wisconsin high school youth who were followed for a seven-year period (1957–1964) after graduation from high school. The results can be summarized briefly as follows:

- (1) Both father's and mother's educational achievements are positively and significantly related to perceived parental encouragement, college plans, college attendance, and college graduation with or without controlling for child's intelligence.
- (2) The percentage differences in educational aspiration and achievement by father's education are very similar to those by mother's education, and there is no indication that the educational level of one of the parents by itself has any stronger relationship than has the educational level of the other parent.
- (3) The relationships between one parent's education and each of the four dependent variables continue to be generally positive, monotonic, and statistically significant for males as well as for females even when education of the other parent and child's intelligence are simultaneously controlled.
- (4) When parents' educational achievement is considered jointly, the higher the level of parents' education the greater the proportion of males and females perceiving parental encouragement, planning on college, attending college, and graduating from college. Similarly, for each category of parents' education, the child's intelligence is associated with educational aspiration and achievement. Also, males continue to be in a more favorable

position than females at each of the four stages in the process of educational aspiration and achievement.

(5) When parents have discrepant levels of educational achievement, the answer to the question of which parent's education is more likely to induce high-level aspiration and achievement depends on the sex and the level of intelligence of the child as well as on the parents' levels of educational achievement. If there is a discrepancy between the parents with low and middle education, generally it is father's rather than mother's education which exerts more influence on aspiration and achievement. If there is a discrepancy either between the parents with low and high education or between the parents with middle and high education, then also it is generally father's rather than mother's education which exerts more influence on aspirations and achievements of children with high intelligence, but it is mother's rather than father's education which exerts more influence on aspirations and achievements of children with low intelligence.

(6) The beta weights for father's education showed a slightly stronger effect than did those for mother's education at each stage in the process of educational aspiration and achievement for males, but both father's and mother's education indicated almost equal effect for females. However, parents' education had slightly more effect on females than on males at all levels of the higher education process.

(7) The multiple regression analysis using dummy variables showed that mother's education had a modest effect independent of father's education; the independent effect of mother's education was stronger for females than for males. However, in terms of the additional amount of variance explained, the effect of interaction between father's and mother's education was negligible for all of the dependent variables.

(8) The beta weights for each combination of father's and mother's education and for child's intelligence generally support the above-mentioned findings. Consistency in the educational achievements of parents who are moderately educated seems to provide a more advan-

tageous social-psychological environment than does extreme discrepancy in parents' educational achievements. When both parents have high levels of educational achievement, their children are much more likely to have high levels of educational aspiration and achievement than in any other situation.

Thus, the one most important finding that emerges from the present study is that discrepancy in parents' educational achievements is far less important a condition for motivating children to high-level aspiration and achievement than is consistently higher educational achievements of both parents. Further, the findings of this study lend direct support to Kahl's study, in regard to the importance of a "common man" father's role in motivating his son for high-level aspiration, but no direct support for the Ellis-Lane results. However, the importance of mother's rather than father's educational achievement in motivating children with modest abilities, as found in this study, lends some credence to the suggestion derived from the Ellis-Lane study that mother's education may have somewhat greater importance for certain subgroups. The present study also extends and specifies the findings of the earlier studies: when parents have discrepant levels of educational achievements, the answer to the question of which parent's education is more likely to induce high-level aspiration and achievement depends on the sex and the level of intelligence of the child as well as on the parents' levels of educational achievement. And finally, the findings of this study cast doubts on the applicability of the theory of status crystallization to youths' educational aspiration and achievement when discrepancy is defined in terms of the educational achievements of their parents.