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Educational Attainment:
The Effects of Socioeconomic Differences
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May 9, 1994

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EDUCATIONAL ATTAINMENT:
THE EFFECTS OF SOCIOECONOMIC DIFFERENCES

I. INTRODUCTION

Education has important functions in contemporary American society. In economics, it is considered an investment in human capital which enhances the recipient's future productivity. The human capital theory has established a direct relationship between higher education and higher income. Sheldon Danziger summarizes the relationship in the following way:

In any year, individuals who have completed a greater number of years of schooling are likely to have higher earnings and lower rates of unemployment and poverty than those who have less education (p.139).

A disturbing trend in recent years has been the rising poverty rates among all demographic groups. It appears that higher levels of education may be required to fight poverty than in the past (Danziger, 1992). In the past, obtaining a high school diploma protected youth from low earnings and poverty. Today, a college degree assures the same economic security as did a high school diploma two decades ago.

There is another problem. Although the U.S. is a nation which promotes equality for its ethnically diverse peoples, there has long been a degree of variability in educational attainment levels among race/ ethnic groups. The phenomenon is especially true for minorities from economically disadvantaged backgrounds. It has been argued that post-secondary education only "confers increased chances for income, power and prestige on people who are fortunate enough to obtain it (Sewell, p.793)."

Educational attainment is a topic that has been discussed in both economics and sociology. Economic research has focused on the importance of socioeconomic factors, mainly race/ ethnic origins and poverty status (Wolfe, 1973; Hoffman, 1987; Krein & Beller, 1988; Kominski, 1990; Courtless, 1991). Research in sociology has also dealt with other important factors such as attitudes and influences of significant others (Sewell, 1971; Featherman, 1972; Hauser, 1973; Featherman, 1980; Velez, 1986). Little has been done to incorporate both types of research. While sociological research took important factors into account such as attitudes, many of the initial models were constructed for studying whites. My research will predict educational attainment more accurately by integrating the models from both areas. It also tests to determine if the model predicts differently for four prominent population groups-- whites, blacks, Hispanics and Asians.

The paper proceeds in the following manner. Section II discusses the literature on the topic. A theoretical framework, using a cost-benefit model is developed in Section III, followed by the hypotheses. Section IV introduces the empirical model to test those hypotheses. The empirical model is designed to determine which factors influence the educational attainment levels for each race/ ethnic group in the sample, with special attention given to how earlier educational aspirations influence achievement later on. Section IV also describes the database and defines the variables. Section V discusses the results obtained

from descriptive statistics and a series of Ordinary Least Squares regressions. Finally, conclusions and policy implications are presented in Section VI.

II. LITERATURE REVIEW

The literature which will be reviewed in this section focuses on several categories of determinants of educational attainment. These categories are important in my own theoretical model (Section III) and empirical model (Section IV). It will be hypothesized that educational attainment of an individual depends on that individual's 1) socioeconomic background factors, 2) influence of significant others, 3) ability, and 4) aspirations and other attitudes. This way of thinking about educational attainment receives a lot of support from sociological literature.

Most of the pioneering studies on the impact of socioeconomic background and other intervening factors on educational attainment were done between the late 1960s and the mid-1970s. William H. Sewell was a sociologist who specialized in conducting research on "social stratification" in the United States. He laid the foundations for research in this area in the early 1970s. Since then, many researchers have used Sewell's basic educational attainment model. I too will use some of his framework to build my model.

Sewell completed a series of longitudinal studies and a summary of his works appeared in the American Sociological Review

in 1971. His sample consisted of 9000 Wisconsin high school graduates. Although he included mostly white males in his analysis, he had results that are pertinent to my research. For example, one of his findings was that "opportunities for higher education are contingent on characteristics that are not relevant to learning-- most notably, sex, socioeconomic origin, race and ethnic backgrounds (Sewell, p.794)" as well as those that are relevant, such as ability. To illustrate the inequality of opportunity, he used Ordinary Least Squares (OLS) to estimate the following equation:

$$\text{Educational Attainment} = b_0 + b_1\text{SES} + b_2\text{Ability} + b_3\text{High School Performance} + b_4\text{Educational Aspirations} + b_5\text{Influence of Significant Others}$$

where SES (socioeconomic status) is defined as a function of race, sex, parents' income, their educational attainments and occupations. The significant others' influence, including encouragement from teachers, peers or parents, was the biggest predictor. He also found that the individual's ability and aspirations were important intervening variables.

Both Robert M. Hauser and David L. Featherman conducted follow-up studies on Sewell's Wisconsin study. Hauser tested to determine if there were differential returns to education by socioeconomic background. He hypothesized the following:

Students with favorable social origins have resources in the form of higher academic ability, more motivation, or greater social support by parents, teachers and peers that permit them to profit from the experience of schooling (p.130).

To him, this was one explanation of differences in educational

attainment across groups. On the contrary, his results indicated that there were no differential returns to schooling except the negative effects of race and farm origin. The other socioeconomic variables were insignificant and did not completely support his hypothesis that there might be varying rates of return to investment in human capital for individuals from different social origins.

Featherman took a different approach and focused on how early background variables affected youths' attitudes as well as socioeconomic status (Featherman, 1972; p.132). He applied path analysis techniques to predict educational attainment. Like Sewell, he also used longitudinal data only for white males living in metropolitan areas. What was different from Sewell's work is that Featherman focused on how early background variables affect educational attainment through a complex set of intervening variables.

Hauser and Featherman also conducted joint research, realizing the limitations to studying just white males. They enlarged the sample by including an oversampling of minorities (blacks and Hispanics) and women (Hauser, 1973). Featherman made an important observation that standard intelligence tests and scholastic aptitude tests may not be good proxies for ability since they were "culturally biased" by nature (Featherman, 1980; p.670). These tests were made by non-minority males, with the assumption that the human development process was the same for everyone, regardless of cultural differences among ethnic groups.

By 1980, it was clear that environments and interactions with others shaped youths' IQ. For example, students were more likely to score low if they were from broken or large families, phenomena predominantly associated with blacks.

Since the studies by Sewell, Hauser and Featherman, others have conducted research on educational attainment. In the last decade, differences in ethnic origin/ race became important as researchers acknowledged the fact that cultural differences existed between minority groups-- blacks Hispanics and Asians-- as well as in comparison to whites. It is crucial to recognize that these categories are only "mental constructs" of how individuals see themselves and are still open to criticism. Obviously subgroups within these categories (e.g., Japanese and Filipinos within the Asians; and Mexicans and Puerto Ricans within the Hispanics) have different cultural values. Nonetheless, general patterns of behavior have been observed in these broad artificial groupings.

A recent study by the Family Economics Research Group in 1991 revealed that education is perceived differently among minority groups (Courtless, 1991). Because Asians were not a large minority group compared to blacks and Hispanics, they tended to be excluded from analyses until recently. This research showed that they should not be overlooked; Asians were twice as likely as blacks and Hispanics to complete college education. One explanation is that they had more income to spend on education. Some of the mean characteristics of minorities

between the ages of twenty-five and forty-four that this study found were that Asians had a mean family income of \$35,115, whites of \$33,355, Hispanics of \$24,286 and blacks of only \$19,218 (Courtless, 1991). Percentages of those below the poverty line also showed major differences. They ranged from the lowest of 9% for whites and the highest of 32% for blacks.

Asians, although a "minority," were more similar to whites than they were to the other two minority groups. They enjoyed earning high incomes with very few below the poverty line and could spend a lot on education. Therefore, it would be misleading to exclude Asians altogether or to lump them together with the blacks and Hispanics as "minorities" as did some previous studies.

Robert Kominski, in his research on estimating the national dropout rates, has suggested that blacks and Hispanics have different attitudes about education. While the high school dropout rate for blacks is decreasing and approaching the whites' level, the Hispanic rate is increasing rapidly (Kominski, 1990). An even more discouraging trend is the fact that their dropout rates were the highest among all levels of high school, from ninth to twelfth grade compared to the levels for the other race/ethnic groups. Kominski attributed the lower educational attainments to their immigrant status since most of them migrated to the U.S in recent years. Because they could get by in their communities speaking Spanish, they did not have the desire to continue their education while learning a new language.

William Julius Wilson painted yet another picture for the blacks in his book, The Truly Disadvantaged. For them, he reasoned that information regarding higher education was important in formulating educational choices. This is because the environment that they spent their childhood in affected their behaviors later on in their lives. The economically disadvantaged, which he called the underclass, "create norms and patterns of behavior that take the form of a 'self-perpetuating pathology' (Wilson, p.4)." He suggested that living under the influences of delinquent activities in segregated inner cities have caused a portion of blacks to develop negative attitudes about themselves. Lacking knowledge about the range of possible occupations that they could pursue, other than the dominant blue-collar jobs, many had no incentive to pursue higher education. Also many did not have the social support from family members if they were in financial difficulties.

Other researchers have added important variables to the educational attainment model. Emily Hoffman used a "knowledge of the world of work" variable to predict educational and occupational goals. Her reasoning was that "children are influenced in their career choices by observing the association between education and occupational attainment of their parents (Hoffman, p.6)." William Velez measured educational aspirations by using the number of years of schooling that respondents had desired (Velez, 1985) rather than using a psychological measure like others had. He mentioned that plans about post-secondary

education had to do with the degree of future uncertainties. In his study, minorities had a tendency to leave out survey questions that dealt with their aspirations because these high school students either had no desire to go to college or may have wanted to go, but could not be certain of their immediate plans in terms of their financial situations and moral support from family members.

Using these studies as background material, I developed my empirical model which will be discussed in Section IV, after a brief discussion of the theoretical framework.

III. THEORETICAL FRAMEWORK

The cost-benefit analysis is appropriate when formulating an economic model of choices regarding educational attainment.

"Investing in college education is worthwhile if the present value of the benefits (monetary and psychic) is at least as large as the costs (Ehrenberg & Smith, p.303)." Mathematically, this idea can be expressed in the following way:

$$\frac{B_1}{1+r} + \frac{B_2}{(1+r)^2} + \dots + \frac{B_T}{(1+r)^T} \geq \frac{C_1}{1+r} + \frac{C_2}{(1+r)^2} + \dots + \frac{C_T}{(1+r)^T}$$

where B stands for the benefits (e.g., additional lifetime earnings), r the discount rate, T the number of time periods (years), and C the costs (monetary and opportunity) involved in college education. Put simply, individuals will decide to pursue additional education if they foresee the present value of benefits as exceeding the present value of costs. Figure 1 illustrates this graphically. Individuals will choose the level

of education at point X where the marginal benefit curve (MB) crosses the marginal cost curve (MC). For example, a particular youth's optimum level may be at point X equalling sixteen years of education; any other point will yield lower net benefits for him/her (i.e. the optimum level occurs where $MB=MC$). For others, the same point may not necessarily have the same value because they will have their unique benefit and cost curves.

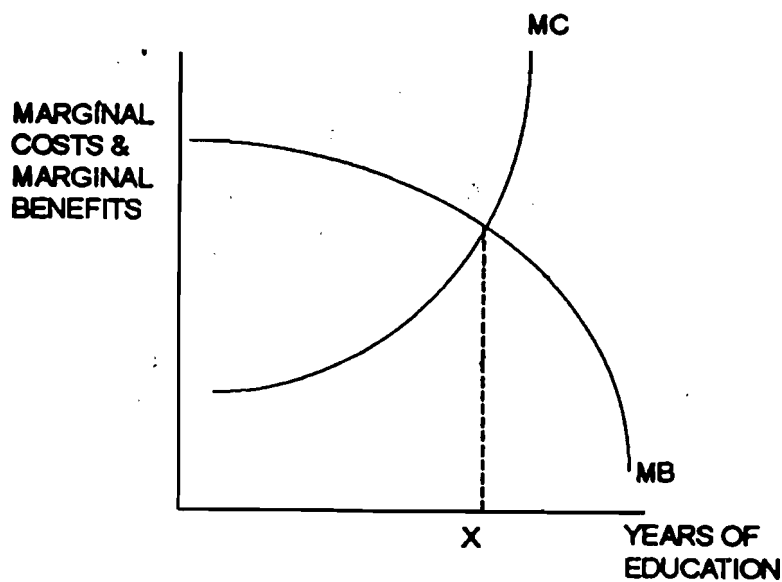
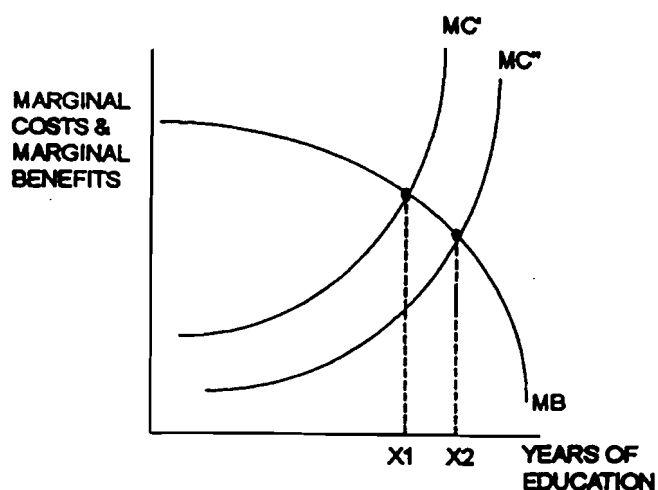


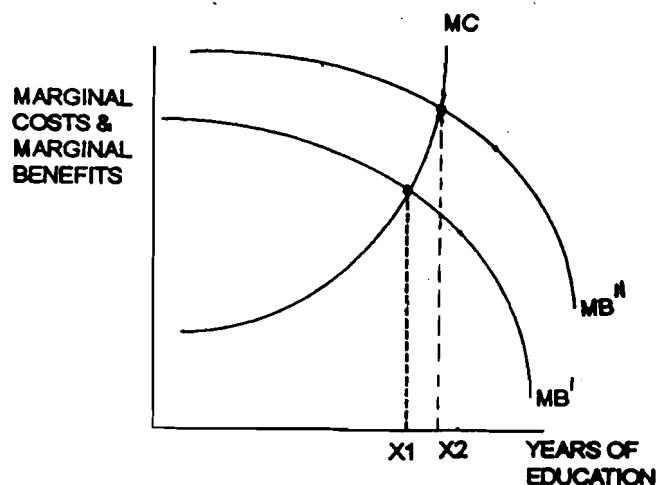
Figure 1. The optimum level of education.

For the purpose of my research, assume that teenagers are able to picture the shapes of their own cost-benefit functions in their minds when they are choosing between post-secondary education and alternative choices. Socioeconomic background factors, significant other's influence, ability and attitudes (including aspirations) will affect how youth evaluate costs and

benefits associated with education. For example, for a poor youth, financial constraints and discouragement of significant others will create negative attitudes and thus will depress further educational attainment. For such youth, part of the costs of education may be associated with these environmentally-based negative attitudes. Figure 2a shows how the MC and MB curves may be different for youth from different socioeconomic status. Holding the marginal benefits constant, the MC curve is higher for a economically disadvantaged youth (MC') while the curve for youth from a higher socioeconomic status is located at a lower position (MC''). Their attitudes affect evaluation of costs regarding education; the youth with the higher MC curve has less years of education (point X_1).



2a. Holding MB constant



2b. Holding MC constant

Figure 2. Optimum levels of education for individuals from different socioeconomic status.

The analysis is also true when holding marginal costs constant and shifting the marginal benefit curve (Figure 2b).

The above theoretical framework suggests several testable hypotheses for predicting educational attainment for youth.

A. Socioeconomic Background Factors

In general, unfavorable socioeconomic background influences are deduced as both decreasing the perceived benefits from education and increasing the perceived costs. The effect is to lower educational attainment. (See, for example, Hoffman, 1987; Krein & Fitzgerald, 1988; Smith, 1984; Wolfe, 1973.)

Specific hypotheses are:

- H₁: Parents' educational attainment will have a positive effect;
- H₂: Parents' occupations will have a positive effect for white-collar jobs and a negative effect for blue-collar jobs;
- H₃: Living in an urban area will have a negative effect (delinquent activities are associated with inner cities);
- H₄: Poverty status will have a negative effect;
- H₅: Being female will have a negative effect;
- H₆: Race/ ethnic origin will have positive or negative effects-- being white or Asian will have a positive effect and being black or Hispanic will have a negative effect.

B. Significant Other's Influences

On the other hand, favorable influences from significant others, ability and aspirations (and other attitudes) will both increase the expected benefits from education and decrease the expected costs. The effect is to raise educational attainment.

(See, for example, Hauser, 1973; Featherman, 1972; Featherman, 1991; Sewell, 1971.)

Specific hypotheses are:

- H₇: The educational attainment of the oldest sibling will have a positive effect;
- H₈: A friend's aspiration will have a positive effect;
- H₉: Knowledge of the world of work will have a positive effect (knowing that high-paying jobs are associated with higher levels of education).

C. Ability

- H₁₀: Ability will have a positive effect.

D. Aspirations and Other Attitudes

- H₁₁: Aspirations will have a positive effect;
- H₁₂: Negative attitudes, such as having a low esteem, will have a negative effect.

These hypotheses were tested using the empirical model which is introduced in the following section.

IV. EMPIRICAL MODEL

My empirical work built on the past works of economics and sociology introduced in Section II. The diagram (Figure 3) illustrates how the model works. The independent variables that affect educational attainment can be grouped into the four categories on the left-hand side. These variables and their definitions are shown individually in Table 1. Ordinary Least Squares (OLS) regressions were run to test the effects of all the variables on educational attainment.

A limitation of my empirical model is that indirect and intervening effects are not controlled for. A path analysis (Featherman, 1972) would take the problems into account, but

Table 1. VARIABLE DEFINITIONS

VARIABLE	CATEGORY	TYPE	PREDICTED SIGNS	DEFINITIONS
ATTAINMENT	Educational Attainment	Dependent		Highest grade completed in years (1979);
ONTARGET	Educational Attainment	Dependent		1 - Aspirations minus Attainment is less than or equal to 1; 0 - Otherwise. (*NOTE: This variable will be discussed later)
COLPARENT	Socioeconomic Background	Independent	+	1 - At least one parent had completed 4 years of college (1979); 0 - Otherwise.
HSPARENT	Socioeconomic Background	Independent	+	1 - At least one parent had completed high school (1979); 0 - Otherwise.
BLUEWORK	Socioeconomic Background	Independent	-	1 - At least one parent had a blue-collar job (1979); 0 - Otherwise.
PROFMNGR	Socioeconomic Background	Independent	+	1 - At least one parent had a professional/managerial job (1979); 0 - Otherwise.
RESIDENCE	Socioeconomic Background	Independent	-	1 - Area of residence was urban (1979); 0 - Otherwise.
POVERTY	Socioeconomic Background	Independent	-	1 - The family's poverty status was poor (1979); 0 - Otherwise.
FEMALE	Socioeconomic Background	Independent	-	1 - The respondent is female (1979); 0 - Otherwise.
COLSIBLING	Significant Other's Background	Independent	+	1 - The oldest sibling had completed 4 years of college (1979); 0 - Otherwise.
HSSIBLING	Significant Other's Influence	Independent	+	1 - The oldest sibling had completed high school (1979); 0 - Otherwise.
EDFRIEND	Significant Other's Influence	Independent	+	Highest grade completed that the closest friend desired (1979);
KNOWLEDGE	Significant Other's Influence	Independent	+	Cumulative score on 9 of the 'Knowledge of the World of Work' questions (1979). (**NOTE: See Appendix A)
AFQT	Ability	Independent	+	Armed Forces Qualification Test (AFQT) percentile score (1981);
ASPIRATIONS	Aspirations & Other Attitudes	Independent	+	Highest grade completed that the respondent would like (1979);
LOW_ESTEEM	Aspirations & Other Attitudes	Independent	-	1 - The respondent answered "yes" to "I sometimes think I am 'no good' at all" (1980); 0 - Otherwise.

resource and time constraints made it impossible to pursue this method. Instead, my empirical model estimated the direct effects of all explanatory variables in a single equation OLS model, leaving the exploration of indirect and interactions to future research.

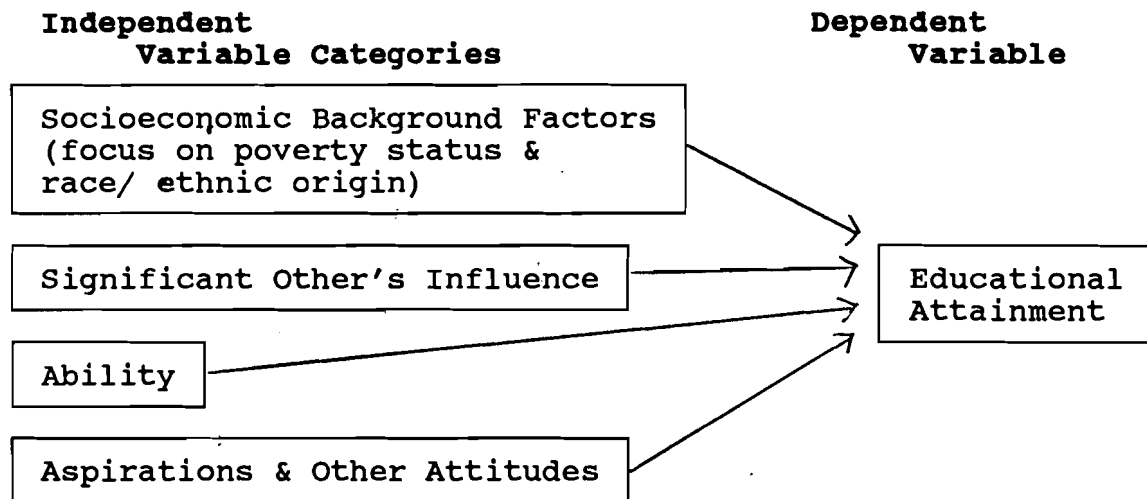


Figure 3. The general framework of the model.

The data are taken from the National Longitudinal Survey of Youth (Center for Human Resource Research). The longitudinal database consists of 12,686 youth who were between fourteen and twenty-two years old in 1979, the initial interview year. These same individuals were interviewed every year until the present. For my analysis, respondents who were between fourteen and eighteen in 1979 were selected from a representative sample plus a supplementary sample of minorities and poor whites. The year 1979 was when most of the background survey questions were asked of the respondents. The age group was chosen because it is the

age when many decisions are made concerning education. The variables in 1979 were used to predict their educational attainment later on in 1990 when they were older. The minorities (especially the economically disadvantaged) were oversampled to get larger numbers of blacks, Hispanics and especially Asians for the race/ ethnic group study.

A. An Analysis of Educational Attainment

Initial descriptive statistics of educational attainment for the four racial/ ethnic groups are shown in Figure 4. The pie charts indicate that educational attainment levels varied significantly across the groups. For example, whites and Asians had the highest percentages of individuals with post-secondary education. On the other hand, blacks and Hispanics had the highest percentages of those without post-secondary education. In particular, the Hispanics had the biggest high school dropouts and youth who finished their education with just high school.

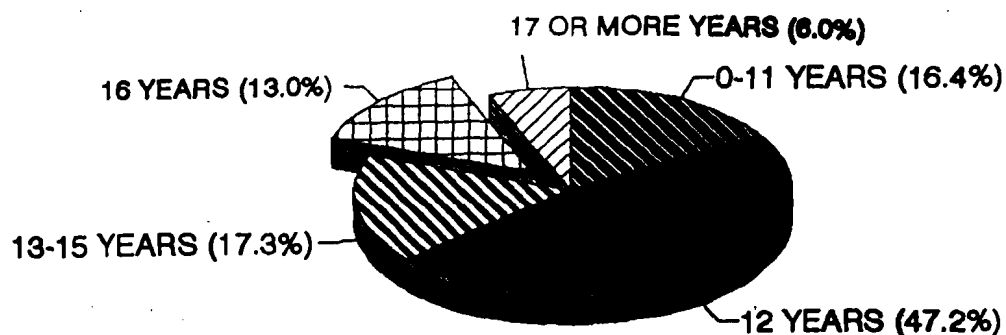
When divided into two groups according to their poverty status, the mean levels of educational attainment showed more striking differences:

Table 2. Mean Years and Standard Deviations of Educational Attainment

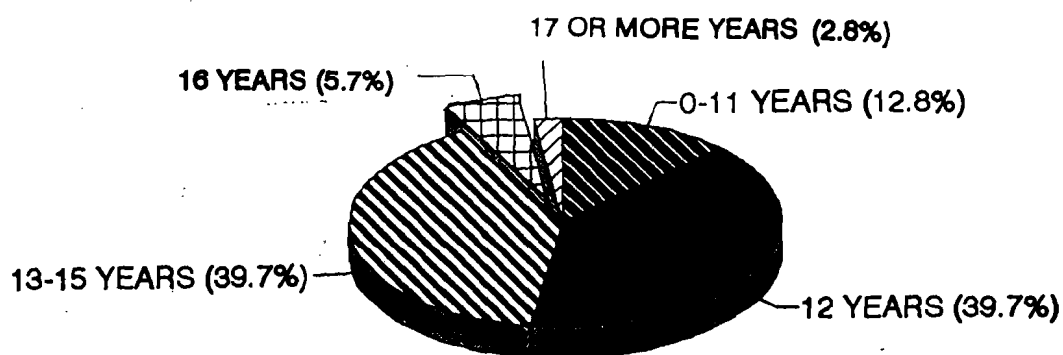
	NONPOOR			POOR		
	Mean Years	Standard Deviation	(N)	Mean Years	Standard Deviation	(N)
WHITE	13.08	2.32	(2696)	11.43	2.14	(691)
BLACK	12.87	1.98	(855)	12.02	1.82	(685)
HISPANIC	12.47	2.05	(482)	11.56	2.19	(339)
ASIAN	13.63	2.49	(43)	12.80	2.68	(15)
(ALL)	12.97	2.23	(4076)	11.70	2.05	(1730)

Figure 4. Years of school completed (by racial/ethnic groups).

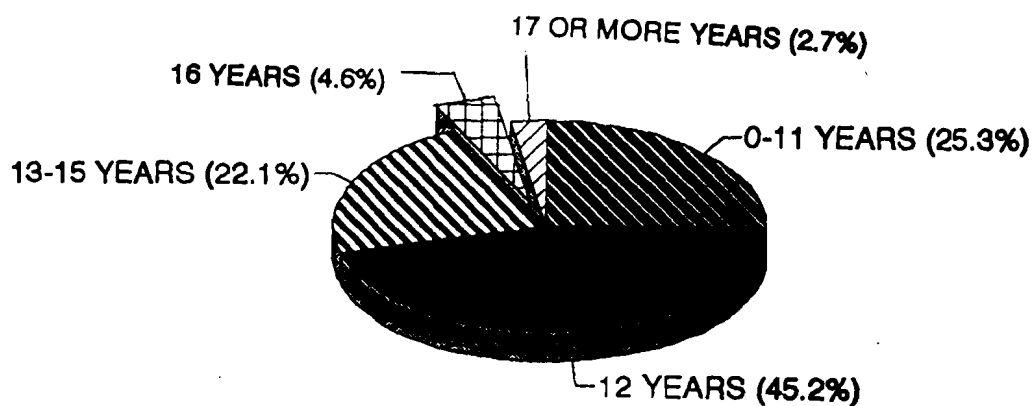
WHITE



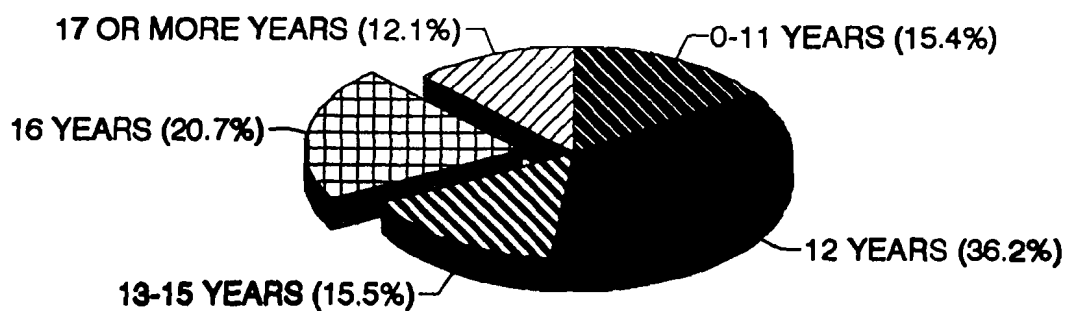
BLACK



HISPANIC



ASIAN



Poor blacks had completed the second most years of school among the racial/ ethnic groups. Poor whites, on the other hand, had completed the least average years, less than the sample mean. This pattern did not prevail for the nonpoor. It should also be noted that the standard deviation figures show significant variation in educational attainment for all groups.

The individuals' educational aspirations were broken down in the same way as shown in Table 3. Aspirations were higher than attainment for every group. But it is surprising that both nonpoor and poor whites had the lowest levels of educational aspirations than any of the other race/ ethnic groups. Although the nonpoor whites had desired the lowest levels of education in 1979, they had completed the second highest levels by 1990.

Table 3. Mean Years and Standard Deviations of Educational Aspirations

	NONPOOR			POOR		
	Mean Years	Standard Deviation	(N)	Mean Years	Standard Deviation	(N)
WHITE	14.32	2.17	(2696)	13.05	2.15	(691)
BLACK	14.61	2.20	(855)	13.72	2.05	(685)
HISPANIC	14.37	2.20	(482)	13.70	2.19	(339)
ASIAN	15.14	1.95	(43)	13.80	1.93	(15)
(ALL)	14.40	2.18	(4076)	13.45	2.14	(1730)

B. Two Measures of Educational Attainment

A surprising observation is how similar the educational aspirations were across the four groups (Table 3). But actual attainment, as shown in Table 2, varied across the groups. For example, nonpoor Asians and whites had attained more education

than nonpoor blacks and Hispanics. The first proxy for educational attainment was the years of education completed in 1990 (ATTAINMENT). A second way to measure attainment is to subtract actual attainment from aspirations to see how short the youth were in reaching their target levels or how much they overachieved them. The differences ranged from -7 to +11. The continuous variable was converted into a dichotomous variable, ONTARGET, which was assigned the value 1 if the difference between attainment and aspirations was less than or equal to one ($\text{Aspirations} - \text{Attainment} \leq 1$) or 0, otherwise.

My later analysis used ONTARGET as a dependent variable in analyzing whether youth were successful in attaining their educational aspirations. Regressions were run against the same determinants that were used in the ATTAINMENT regression (See Table 1), using ONTARGET as the dependent variable. Because the ONTARGET regression was not the original focus of the paper, the complete results are reported in Appendix B.

V. RESULTS

The effects of the exogenous variables on ATTAINMENT were tested for the four race /ethnic groups and for the overall sample (as a control), using OLS regressions. The results are shown in Table 4. Because there were numerous variables, categories of them are examined and reported in the following sub-sections.

Table 4.

OLS REGRESSION RESULTS: Dependent= ATTAINMENT

INDEPENDENT:	Predicted signs	TOTAL SAMPLE	WHITE	BLACK	HISPANIC	ASIAN
(CONSTANT)		6.636 (0.183)	6.197 (0.251)	8.192 (0.332)	7.122 (0.544)	8.602 (2.662)
BLACK	-	0.804 *** (0.058)	N/A	N/A	N/A	N/A
HISPANIC	-	0.299 *** (0.070)	N/A	N/A	N/A	N/A
ASIAN	+	0.651 *** (0.216)	N/A	N/A	N/A	N/A
COLPARENT	+	0.418 *** (0.617)	0.464 *** (0.077)	0.244 ** (0.124)	0.497 ** (0.216)	0.352 (0.571)
HSPARENT	+	0.150 *** (0.045)	0.206 *** (0.060)	0.149 * (0.082)	-0.041 (0.144)	0.158 (0.552)
COLSIBLING	+	0.376 *** (0.065)	0.329 *** (0.083)	0.352 *** (0.123)	0.522 *** (0.201)	1.296 * (0.763)
HSSIBLING	+	0.083 * (0.048)	0.043 (0.064)	0.095 (0.086)	0.140 (0.141)	0.824 (0.616)
EDFRIEND	+	0.082 *** (0.012)	0.091 *** (0.016)	0.093 *** (0.024)	0.060 * (0.033)	-0.222 (0.156)
BLUEWORK	-	-0.129 *** (0.050)	-0.239 *** (0.068)	-0.012 (0.088)	0.011 (0.133)	0.654 (0.603)
PROFMNGR	+	0.389 *** (0.064)	0.433 *** (0.075)	0.212 (0.150)	0.055 (0.231)	0.460 (0.721)
RESIDENCE	-	-0.071 (0.052)	-0.034 (0.062)	-0.153 (0.101)	-0.286 (0.258)	0.406 (0.727)
POVERTY	-	-0.238 *** (0.052)	-0.276 *** (0.075)	-0.242 *** (0.087)	-0.240 * (0.132)	0.284 (0.620)
FEMALE	-	0.166 *** (0.043)	0.104 * (0.056)	0.290 *** (0.079)	0.187 (0.120)	0.619 (0.505)
LOW_ESTEEM	-	-0.107 ** (0.052)	-0.062 (0.064)	-0.194 * (0.114)	-0.121 (0.141)	-0.757 (0.588)
ASPIRATIONS	+	0.225 *** (0.013)	0.244 *** (0.017)	0.165 *** (0.024)	0.253 *** (0.034)	0.376 ** (0.156)
KNOWLEDGE	+	-0.030 ** (0.013)	-0.0008 (0.017)	-0.060 ** (0.024)	-0.049 (0.036)	-0.221 (0.165)
AFQT	+	0.038 *** (0.001)	0.034 *** (0.001)	0.043 *** (0.003)	0.037 *** (0.004)	0.054 *** (0.013)
Adjusted R ²		0.486	0.533	0.381	0.378	0.567
N		5806	3387	1540	821	58

* indicates significance at the 0.10 level.

** indicates significance at the 0.05 level.

*** indicates significance at the 0.01 level.

NOTE: Standard Errors are in parentheses.

A. Socioeconomic Background Factors

1. Overall:

In general, Table 4 shows that socioeconomic background is extremely important in determining educational attainment. An unexpected result is that race/ ethnicity and gender are significant with the wrong signs. This means that, *ceteris paribus*, being black, Hispanic, Asian or female actually increases the level of attainment. This interesting result seems to contradict the descriptive statistics presented earlier which showed that blacks and Hispanics actually attained lower levels of education, on average, than whites. It could be that the positive direct effect of race/ ethnicity on educational attainment that we observe in the coefficients are offset by indirect effects operating through other variables in the equation. For example, being black could be directly related to subsequent poverty status which, in turn, is negatively related to educational attainment, as mentioned earlier. Sociological literature has focused on some of these indirect effects through path analysis and other techniques.

The educational attainment of a parent (COLPARENT & HSPARENT) and his/ her white-collar occupation (PROFMNGR) are very significant positive determinants of educational attainment for the total sample (first column in Table 4). For example, the regression coefficient for COLPARENT shows that having a parent with college education adds about 0.4 years of education compared to respondents without parents who are graduates. Parents

created favorable environments for youth to pursue more education. On the other hand, the poverty status and a parent's blue-collar job had negative effects on educational attainment. These results are consistent with past research. The 'knowledge of the world of work' variable had a negative effect instead of a positive effect. A possible explanation is that there were more questions dealing with blue-collar jobs which require less skill. It could be that youth from such families tend to pursue less education but have greater knowledge of the job market.

2. Race/ Ethnic Groups:

Separate regressions were run for each of the four race/ethnic groups (Table 4). Some differences in the effect of socioeconomic background variables on ATTAINMENT are found between these groups. The variables are consistently more significant predictors for whites than for the other minority groups. For example, a parent's occupation (BLUEWORK and PROFMNGR) is significant for whites only. Also, a parent's education seems to have a stronger influence on the educational attainment of white youth than on the educational attainment of others. It raises the level by about 0.7 years for whites but 0.4 years for the minorities.

Gender (FEMALE) was a very significant determinant for blacks, but not for the other groups. Growing up in poverty (POVERTY) seems to have a strong negative effect on educational attainment for everyone, about a quarter of a year.

B. Significant Other's Influence

1. Overall:

The regression results show the importance of the influence of significant others on educational attainment. The college experience of the oldest sibling in the family (COLSIBLING) was especially important as it served as a valuable asset for youth to evaluate the relevance of post-secondary education and a role model. The closest friend's aspirations also had a big positive impact as hypothesized since youth are likely to be influenced by their friends.

2. Race/ Ethnic Groups:

The regressions that were run separately for the four groups show that the same pattern emerged. The influence of significant others on attainment is important for all groups, except Asians whose variables were not significant due to their smaller sample size.

C. Ability

1. Overall:

AFQT (Armed Forces Qualification Test), a proxy for measuring ability, had a positive effect as hypothesized, at the 0.01 level. Having the capacity to do well in school helped attainment later on.

2. Race/ Ethnic Groups:

AFQT was a very significant positive determinant of educational attainment for all groups. This contradicted Featherman's notion that intelligence tests were culturally

biased because they had profound positive effects for all of them.

D. Aspirations and Other Attitudes

1. Overall:

ASPIRATIONS was another variable with a strong positive effect. Having higher aspirations meant that youth were more likely to pursue a quarter of a year of higher education. Having low esteem (LOW_ESTEEM), on the other hand, depressed attainment, as predicted.

2. Race/ Ethnic Groups:

ASPIRATIONS, like ability, was a strong predictor, regardless of race/ ethnic origin. LOW_ESTEEM, on the other hand, was only significant for the blacks; it did not matter for the other groups. The results indicated that they are less likely to go on with further education if they lacked high self-esteem.

E. Comparison of Regression Coefficients Across Race/ Ethnic Groups

Because of the differences between the sample sizes, comparison of regression coefficients across race/ ethnic groups is difficult. For example, there were only 58 Asians in the total sample, as opposed to 3387 whites. More variables may have been significant for the Asians if there were as many of them as whites. The same is true for blacks and Hispanics. The coefficients could not be interpreted according to a uniform criterion. To get around this problem, a statistical test used by Krein & Beller (231) was used to compare across racial groups.

T-statistics were computed to compare if the regression coefficients differed significantly for blacks, Hispanics and Asians, using whites as a reference group. 'B' stands for the coefficient and 'SE' stands for the standard error in the equations below. The subscripts indicate the race/ ethnic groups ('w' for white, 'b' for black, 'h' for Hispanic and 'a' for Asian).

To compare blacks with whites:

$$t_{(N_w+N_b-2K)} = (B_w - B_b) / \text{sqrt}(SE_w^2 + SE_b^2)$$

To compare Hispanics with whites:

$$t_{(N_w+N_h-2K)} = (B_w - B_h) / \text{sqrt}(SE_w^2 + SE_h^2)$$

To compare Asians with whites:

$$t_{(N_w+N_a-2K)} = (B_w - B_a) / \text{sqrt}(SE_w^2 + SE_a^2)$$

The results of this complicated procedure are presented in Table 5. The actual differences between the coefficients are presented next to the t-statistics.

The results of this method indicate that although some coefficients were not significant in the race/ ethnicity-specific regressions, they were significantly different from the white coefficients. This test made better comparison between groups since it took the sample sizes into account. The three minority groups differed amongst themselves and from whites. These were also important findings to draw policy implications from.

VI. CONCLUSIONS

This study suggested that research on educational attainment

Table 5.

COMPARISON OF REGRESSION COEFFICIENTS
(Between whites and the minority groups)

	BLACK			HISPANIC			ASIAN		
	Bw-Bb	(t-statistics)		Bw-Bh	(t-statistics)		Bw-Ba	(t-statistics)	
COLPARENT	0.220	(-1.208)		-0.033	(-1.703)	**	0.112	(-0.147)	
HSPARENT	0.057	(-1.260)		0.247	(0.469)		0.048	(-0.079)	
COLSIBLING	-0.023	(-2.043)	**	-0.193	(-2.071)	**	-0.967	(-1.360)	*
HSSIBLING	-0.052	(-0.843)		-0.097	(-0.861)		-0.781	(-1.288)	*
EDFRIEND	-0.002	(-3.133)	***	0.031	(-1.545)	*	0.313	(1.507)	*
BLUEWORK	-0.227	(-0.131)		-0.250	(-0.313)		-0.893	(-1.317)	*
PROFMNGR	0.221	(-0.831)		0.378	(0.207)		-0.027	(-0.202)	
RESIDENCE	0.119	(1.257)		0.252	(1.064)		-0.440	(-0.590)	
POVERTY	-0.034	(1.831)	**	-0.036	(1.305)	*	-0.560	(-0.731)	
FEMALE	-0.186	(-2.891)	***	-0.083	(-1.308)	*	-0.515	(-1.114)	
LOW_ESTEEM	0.132	(1.422)	*	0.059	(0.719)		0.695	(1.218)	
ASPIRATIONS	0.079	(-5.366)	***	-0.009	(-6.412)	***	-0.132	(-2.152)	**
KNOWLEDGE	0.059	(2.039)	**	0.048	(1.230)		0.220	(1.332)	*
AFQT	-0.009	(-13.564)	***	-0.003	(-8.940)	***	-0.020	(-4.108)	***

* indicates significance at the 0.10 level.

** indicates significance at the 0.05 level.

***indicates significance at the 0.01 level.

is more successful when incorporating elements of both economics and sociology. Elements of sociology, such as the influences of significant others and attitudes of the educational attainment of youth turned out to be significant determinants. Analyses focusing on race/ ethnic groups indicated that poverty status was not the only important predictor for all groups. Because most of the pioneering studies on educational attainment were done by whites for whites, it is not surprising that the model predicted well for them.'

Studying each minority group separately allowed cultural differences to stand out. For example, it was found that for blacks, esteem played a major role. Negative esteem depressed educational attainment as well as being poor and being female increased additional education. Hispanics and Asians were very much influenced by their ability and aspirations, although their mean attainment levels were on two extremes. This research indicated that the minority groups have different factors that encourage or discourage educational attainment.

Important policy implications for the current education system are raised through this study. Educational attainment was found to have an inter-generational effect; education in a generation promotes education in the following generation, as parents have significant effects on youth. If this generation's attainment level can be raised, the succeeding generations will automatically benefit from the process. Other ways to increase educational attainment are to reduce poverty and or raise the

educational aspirations of youth so that they will have targets to shoot for.

As mentioned earlier, a limitation of this research was that it failed to account for indirect and interaction effects. Future research, therefore should focus on a method similar to the path analysis. Attitudes and influences are actually shaped by the environments that youth are brought up in so they should be treated as intervening variables. Figure 5 is a suggestion.

Future research should also focus on exploring the deviation of educational attainment from initial aspirations (ONTARGET). If it is possible, a more detailed breakdown of ethnic groups, such as countries of origin should be used.

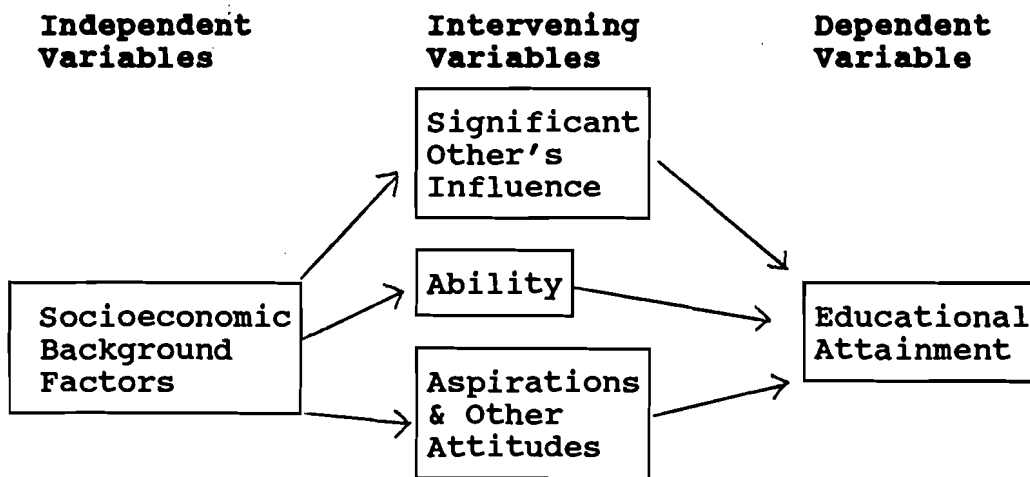


Figure 5. A model for future research.

APPENDIX A

CONSTRUCTION OF THE 'KNOWLEDGE' VARIABLE

Many of the variables that were used for this study were created by combining or recoding variables that were initially extracted from the National Longitudinal Survey of Youth. This process was critical to come up with the desired variable for the empirical model.

One of the variables in this study, KNOWLEDGE, was created out of nine survey questions since the database lacked a cumulative score for them. It deserves special attention here because of its complex construction process. The "knowledge of the world of work" questions were administered to all respondents in 1979, to measure how precisely they could relate to specific occupations. They were:

- 1) A hospital orderly's duties.
- 2) A department store buyer's duties.
- 3) A keypuncher operator's duties.
- 4) A fork lift operator's duties.
- 5) A medical illustrator's duties.
- 6) A machinist's duties.
- 7) A dietitian's duties.
- 8) An economist's duties.
- 9) An assembler's duties.

The respondents were asked to choose the one correct answer out of three descriptions. The cumulative score for everyone was combined from adding up the correct answers.

Emily Hoffman had used the same database and the same "knowledge of the world of work" variable in her study (Hoffman, 1987). But she failed to describe the details as to how she combined them so I had to come up with my own variable.

APPENDIX B

REGRESSION RESULTS USING 'ONTARGET'

Table 6 shows the results of using ONTARGET as a proxy for educational attainment. The same set of variables were used as independent variables. Logit regressions were run because the dependent variable was a dichotomous variable. Table 7 shows a comparison across regression coefficients, a method that was used in the paper.

For the total sample, BLACK was insignificant. To see what caused this to happen, a series of logit regressions were run by including more variables at each step. The results of these are shown in Table 8. The variable became insignificant when RESIDENCE and KNOWLEDGE, two highly correlated variables with BLACK, were added.

Table 6.

LOGIT REGRESSION RESULTS:

Dependent= ONTARGET

		TOTAL SAMPLE	WHITE	BLACK	HISPANIC	ASIAN
Independent:	Predicted					
(CONSTANT)	signs	3.017 (0.209)	2.127 (0.273)	4.787 (0.427)	3.086 (0.613)	21.595 (8.007)
BLACK	-	0.007 (0.072)	N/A	N/A	N/A	N/A
HISPANIC	-	-0.228 *** (0.088)	N/A	N/A	N/A	N/A
ASIAN	+	0.258 (0.273)	N/A	N/A	N/A	N/A
COLPARENT	+	-0.046 (0.079)	-0.084 (0.097)	-0.120 (0.173)	0.516 ** (0.263)	-0.552 (1.003)
HSPARENT	+	-0.004 (0.058)	0.041 (0.075)	0.065 (0.113)	-0.255 (0.178)	-2.771 ** (1.387)
COLSIBLING	+	0.202 ** (0.083)	0.248 ** (0.106)	0.004 (0.170)	0.245 (0.245)	4.972 ** (2.493)
HSSIBLING	+	0.090 (0.062)	0.147 * (0.081)	-0.006 (0.118)	-0.117 (0.172)	1.081 (1.145)
EDFRIEND	+	-0.229 *** (0.015)	-0.179 *** (0.019)	-0.330 *** (0.030)	-0.217 *** (0.038)	-1.651 *** (0.575)
BLUEWORK	-	-0.044 (0.063)	-0.071 (0.085)	-0.110 (0.121)	0.139 (0.162)	2.114 * (1.271)
PROFMNGR	+	0.158 * (0.082)	0.180 ** (0.095)	0.129 (0.208)	-0.083 (0.284)	1.308 (1.793)
RESIDENCE	-	-0.166 (0.066)	-0.093 (0.079)	-0.432 *** (0.139)	-0.174 (0.307)	-0.414 (1.210)
POVERTY	-	-0.124 * (0.066)	-0.117 (0.094)	-0.201 * (0.119)	-0.207 (0.162)	-0.400 (1.145)
FEMALE	-	0.007 (0.055)	0.004 (0.071)	0.019 (0.108)	-0.019 (0.147)	1.751 (1.184)
LOW_ESTEEM	-	-0.033 (0.067)	-0.022 (0.081)	-0.013 (0.156)	-0.062 (0.172)	-1.222 (1.201)
KNOWLEDGE	+	-0.024 ** (0.016)	0.016 (0.021)	-0.051 (0.033)	-0.087 ** (0.044)	-0.848 * (0.517)
AFQT	+	0.014 *** (0.014)	0.011 *** (0.002)	0.015 *** (0.004)	0.010 ** (0.004)	0.161 ** (0.064)
-2 Log Likelihood		7667.410	4499.278	1967.082	1077.783	37.280
Model Chi-Square		364.425 ***	136.404 ***	166.666 ***	48.398 ***	42.503 ***
N		5806	3387	1540	821	58

* indicates significance at the 0.10 level.

** indicates significance at the 0.05 level.

*** indicates significance at the 0.01 level.

NOTE: Standard Errors are in parentheses.

Table 7.

COMPARISON OF REGRESSION COEFFICIENTS
(Between whites and the minority groups)

	BLACK		HISPANIC		ASIAN	
	Bw-Bb	(t-statistics)	Bw-Bh	(t-statistics)	Bw-Ba	(t-statistics)
COLPARENT	0.036	(0.521)	-0.600	(-1.925) **	0.468	(0.448)
HSPARENT	-0.024	(-0.438)	0.296	(1.361) *	2.812	(2.036) **
COLSIBLING	0.244	(0.228)	0.003	(-0.670)	-4.724	(-1.745) **
HSSIBLING	0.153	(0.189)	0.264	(0.762)	-0.935	(-0.796)
EDFRIEND	0.151	(9.114) ***	0.038	(4.929) ***	1.472	(2.691) ***
BLUEWORK	0.039	(0.673)	-0.210	(-0.831)	-2.185	(-1.731) **
PROFMNGR	0.051	(-0.384)	0.263	(0.457)	-1.128	(-0.548)
RESIDENCE	0.339	(2.609) ***	0.081	(0.456)	0.321	(0.248)
POVERTY	0.084	(1.208)	0.090	(0.988)	0.283	(0.231)
FEMALE	-0.015	(-0.143)	0.023	(0.120)	-1.747	(-1.472) *
LOW_ESTEEM	-0.009	(0.052)	0.040	(0.304)	1.200	(0.993)
KNOWLEDGE	0.067	(1.320) *	0.103	(1.800) **	0.864	(1.655) **
AFQT	-0.004	(-3.343) ***	0.001	(-2.225) ***	-0.150	(-2.503) ***

* indicates significance at the 0.10 level.

** indicates significance at the 0.05 level.

*** indicates significance at the 0.01 level.

Table 8.

LOGIT REGRESSION RESULTS: Dependent: ONTARGET

Independent:	Predicted signs	Restricted Model 1		Restricted Model 2		Restricted Model 3		Restricted Model 4		Unrestricted Model	
(CONSTANT)		0.267	(0.035)	0.286	(0.072)	2.743	(0.194)	2.839	(0.198)	3.017	(0.209)
BLACK	-	-0.321	(0.062) ***	-0.299	(0.064) ***	-0.247	(0.066) ***	-0.226	(0.067) ***	0.007	(0.072)
HISPANIC	-	-0.509	(0.078) ***	-0.489	(0.082) ***	-0.410	(0.084) ***	-0.363	(0.086) ***	-0.228	(0.088) ***
ASIAN	+	-0.059	(0.266)	-0.041	(0.267)	0.142	(0.273)	0.165	(0.273)	0.258	(0.273)
POVERTY	+			-0.105	(0.063) *	-0.191	(0.065) ***	-0.202	(0.065) ***	-0.124	(0.066) *
FEMALE	+			-0.028	(0.053)	0.005	(0.054)	0.004	(0.054)	0.007	(0.055)
BLUEWORK	+			-0.041	(0.061)	-0.007	(0.062)	-0.080	(0.063)	-0.044	(0.063)
PROFMNGR	+			0.117	(0.079)	0.232	(0.081) ***	0.232	(0.081) ***	0.158	(0.082) *
COLPARENT	+			-0.132	(0.073) *	0.079	(0.076)	0.095	(0.076)	-0.046	(0.079)
HSPARENT	-			-0.027	(0.056)	0.050	(0.057)	0.060	(0.057)	-0.004	(0.058)
COLSIBLING	+			0.144	(0.080) *	0.265	(0.082) ***	0.268	(0.082) ***	0.202	(0.083) **
HSSIBLING	-			0.095	(0.060)	0.089	(0.061)	0.095	(0.061)	0.090	(0.062)
EDFRIEND	-					-0.188	(0.014) ***	-0.187	(0.014) ***	-0.229	(0.015) ***
LOW_ESTEEM	-					-0.073	(0.065)	-0.077	(0.065)	-0.033	(0.066)
RESIDENCE	-							-0.157	(0.066) **	-0.166	(0.066)
KNOWLEDGE	+									-0.024	(0.016)
AFQT	+									0.014	(0.002)
-2 Log Likelihood		7975.393		7962.268		7766.105		7760.382		7667.41	
Model Chi-Square		56.442 ***		69.567 ***		265.730 ***		271.453 ***		364.425 ***	
N		5806		5806		5806		5806		5806	

* indicates significance at the 0.10 level.

** indicates significance at the 0.05 level.

*** indicates significance at the 0.01 level.

NOTE: Standard Errors are in parentheses.

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