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ABSTRACT

Utilizing 1966 data derived from interviews conducted with 6,500 tenth grade students from the Deep-South (South Carolina, Georgia, Alabama, and Mississippi), this study's primary objective as a multi-phase explanatory analysis of the relationship between levels of occupational aspiration and four selected structural variables which have been found most frequently to be related to variations in occupational aspirations. Considered to be indicators of structural situations which are associated with long-run variations in occupational placement, the four variables examined were: (1) father's education; (2) father's occupation; (3) race (black and white); and (4) residence (rural vs urban). Coleman's multi-variate attribute techniques and the "Backward Elimination Procedure" developed in regression analysis were utilized in a secondary explanatory analysis of the data. Examination of the four models constructed revealed that: (1) social class indicators accounted for the largest effect estimates; (2) residence was associated with a smaller, yet statistically significant portion of the variation; and (3) the effect of race was negligible when controls were applied. Application of the "most efficient" model to black and white subsamples separately revealed race differences in both composite effect estimates and the rank order of effect estimates.

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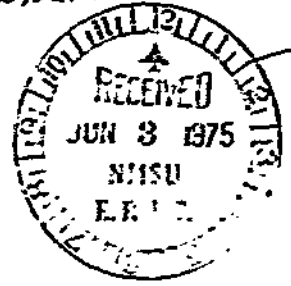
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STRUCTURAL MODELS AND OCCUPATIONAL MOBILITY
ASPIRATIONS: RACIAL VARIATIONS IN THE
DEEP-SOUTH*

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ABSTRACT

Coleman's multi-variate attribute techniques and the "Backward Elimination Procedure" developed in regression analysis were utilized in a secondary explanatory analysis of the occupational aspirations of deep south adolescents. An examination of the four models constructed revealed that: (1) social class indicators accounted for the largest effect estimates; (2) residence was associated with a smaller, yet statistically significant portion of the variation; and (3) the effect of race was negligible when controls were applied. Application of the "most efficient" model to black and white subsamples separately revealed race differences in both composite effect estimates and the rank order of effect estimates. Implication of these findings are discussed in terms of a development perspective of occupational choice and hypotheses for further research are suggested.



STRUCTURAL MODELS AND OCCUPATIONAL MOBILITY
ASPIRATIONS: RACIAL VARIATIONS IN THE
DEEP-SOUTH

Introduction

Relatively few sociological enterprises have received as much empirical attention as have the recent studies of the occupational intentions of youth, particularly those of disadvantaged adolescents (Kuvlesky and Ohlendorf, 1967). Past studies have generally focused on the occupational choices of youth who have relatively limited access to prestigious occupations. It has been thoroughly documented that lower-class, black and rural youth are underrepresented in the more prestigious occupations (Blau and Duncan, 1967 and Lipset, 1955). The majority of aspiration studies on disadvantaged students ^{has} been primarily concerned with identifying variables related to variations in aspiration levels. Unfortunately only a minimal amount of systematic multivariate analysis directed toward evaluating the relative effects of the relevant structural variables has been conducted.¹

The primary objective of this study was a multi-phase explanatory analysis of the relationship between levels of occupational aspiration and four selected structural variables which have most frequently been found to be related to variations in occupational aspirations. The four variables incorporated in this study, father's education, father's occupation, race and residence, are considered to be indicators of structural situations which are associated with long-run variations in occupational placement.

Conceptual Model

Occupational choice is an extensive process beginning early in life and continuing throughout the adult years (Ginzberg, et al., 1951: 62-95; Rodgers, 1966: 217-224; and Musgrave, 1967: 36-37).

In the pre-adolescent period, the child selects those occupations which he perceives as being pleasurable (Ginzbert, et al., 1951: 62). These early "goal-centered" choices^x are thought to be tentative, frequently very high in status and often unrealistic in terms of the actual occupation which the individual will eventually enter.

At various stages in the choice process, different types of choices can be delineated. Although there may be a considerable lack of consensus on appropriate terminology, and perhaps even the nature of the conceptualization, for research purposes it is useful to distinguish between at least two dimensions of choice. First, there are occupational aspirations in which the individual's choice is based upon occupations he desires to enter as his life's work; and secondly, there are occupational expectations in which the individual's choice of a particular occupation is based upon what he expects or anticipates entering as his life's work (Kuvlesky and Bealer, 1966: 269-276).²

Following the Ginzberg (1951) model, choices during the adolescent years become increasingly realistic. The range and type of desired and expected occupations are greatly narrowed, and the adolescent becomes concerned with the means required to obtain his occupational goals. As he considers the necessary means required to obtain his choice, he may perceive obstacles or blocks which are viewed as limiting or

obstructing chances of obtaining earlier, "goal-centered" choices. If the individual perceives the blocks to be insuperable he may tend to lower the level of his occupational goals. Furthermore, the severity of perceived blockage should vary according to the actual disparity in occupational chances existing in the social situation.

One group of potential blocks to occupational attainment can be operationalized in terms of structural disparity. As noted previously, many adolescents have relatively limited access to higher level occupational positions. According to this perspective, it could be expected that adolescents who are characterized by structural limitations tend to view their social situation as impeding occupational goal attainment and would, therefore be inclined to lower their level of occupational aspiration. Thus, as could be anticipated, students in the lower classes (as indicated by father's education and occupation), rural students, and black students would have the lowest level occupational aspirations. Extending the logic of this perspective, a youth experiencing multiple structural limitations should manifest even lower aspiration levels. This assumption should hold true if multiple structural limitations have an additive effect on aspiration levels.

The Data

The data for this study were obtained from interviews conducted in 1966 with 6500 tenth grade students in the four deep-south states of South Carolina, Georgia, Alabama, and Mississippi. A probability sample, stratified by the size and predominant race of school, was

utilized in South Carolina. Purposive sampling procedures based on the socioeconomic characteristics of counties were employed in Georgia, Alabama, and Mississippi. This design insured representation of schools located in counties with low socioeconomic levels.

Technique of Analysis

The researchers utilized a number of multi-variate procedures designed specifically for attribute data.³ These procedures allowed the ranking of effects of particular independent variables on a dependent variable and additionally allowed for a comparison of the effects of different combinations of the various independent variables.

Computation of effects were derived from formulas provided by Coleman (1964: 189-240). These computational procedures for effect estimates were employed in conjunction with an adaptation of the "Backward Elimination Procedure" (Draper and Smith, 1966: 167-169). This technique allowed for a systematic deletion of variables which were found to contribute very little to the estimate of the dependent variable.

Bivariate Relationships

In order to determine the comparability of these data with that used in previous studies, simple contingency tables were constructed to examine the relationship between aspirations and each of the independent variables. Tests of statistical significance were computed for illustrative purposes. Statistically significant associations were found in each of the four tests as determined by Chi-square (See Table 1). It should be pointed out that as a result of the large sample, the Chi-

square analysis yielded statistical significance when there were relatively small differences in the observed and expected frequencies.

(Table 1 About Here)

High-level occupational aspirations were found to be associated with high-level fathers' occupation and education, urban residence and white race. Although all the associations were found to be statistically significant, it should be noted that the strength of the association in the various tests ranges from moderate to very weak (e.g., from $V = .20$ for father's education to $V = .07$ for race).

Although the degree of association was somewhat less than expected in the various tests, the results generally agreed with both the theoretical notions concerning aspirations and the bulk of empirical research relating aspirations to the four structural variables. Numerous studies have found that the lower class student, the rural student, and the black student tend to have low-level occupational aspirations. For example, studies by Sewell et al. (1957), Haller and Miller (1963), and Harrison (1969) reported a positive association between social class and level of aspiration. Studies by Grigg and Middleton (1960), Burchinal (1961), and Sewell and Orenstein (1965) found that urban students tend to have higher aspirations than their rural counterparts.⁴ Also, research conducted by Middleton and Grigg (1959) and Sprey (1962) found that white students tend to have higher aspirations than black students.

TABLE 1. THE BIVARIATE RELATIONSHIPS BETWEEN LEVELS OF OCCUPATIONAL ASPIRATIONS AND THE FOUR STRUCTURAL VARIABLES

5a

Variable	d.f.	χ^2	Cramer's V	Description of the Relationship
X (1) Father's Education	2	290.90	.20	Students whose fathers had at least a high school education had higher aspirations than students whose fathers had less formal education.
X (2) Father's Occupation	4	195.31	.11	Students whose fathers had high level occupations had higher aspirations than students whose fathers had moderate or low level occupations. Very slight differences in aspirations were observed between students with father's who had moderate and low level occupations.
X (3) Residence	6	233.75	.12	Urban students had higher aspirations than small-town, rural non-farm, and farm boys. Only slight differences were observed between small-town, rural non-farm, and farm students.
X (4) Race	2	42.54	.07	White students had slightly higher aspirations than black students.

Selected Multi-Variate Cases

Each of the independent variables were redefined in terms of "high" and "low" states. The "high" state referred to that state of the variable which was linked with high aspirations, and, conversely, the low state referred to that state which was associated with low aspirations. Aspiration observations were taken in the form of the proportion of a given sub-class which aspired to professional, technical, managerial, or glamour-type occupations. For each structural variable the following "high" and "low" states were isolated:

X(1): High State = Fathers who had 12 years or more of formal education.

Low State = Fathers who had less than 12 years of formal education

X(2): High State = Fathers who had professional, technical, managerial, or glamour occupations.

Low State = Fathers with other type occupations.

X(3): High State = Residence in a place of 2500 or more.

Low State = Residence in a place of less than 2500.

X(4): High State = Whites

Low State = Blacks

A frequency distribution was carried out controlling on each independent variable, resulting in a factorial arrangement with sixteen sub-class observations. The first impression that one receives upon examining Table 2 is the generally high-level of aspiration manifested by most students. The proportion with high aspirations ranged from .45 to .82. Approximately fifty-six per cent of the students in the most

"disadvantaged" sub-class had high occupational aspirations, i.e., the sub-class composed of students whose fathers had low-level occupational and educational backgrounds, who were rural residents, and who were blacks.

(Table 2 About Here)

Effect Estimates

The next phase of the analysis was to partition the variation in aspiration levels. Utilizing procedures outlined by Coleman (1964: 199-201), effect estimates were computed for each independent variable, as well as for random shock (unexplained variation). Intuitively, this approach to estimating variable effects is based on the averages of differences in proportions between sub-classes in which the independent variables were in a high state, and the sub-classes in which independent variables were in a low state. A composite effect estimate equaling the sum of the individual effect estimates was also calculated. The random shock estimate was used as an estimate of unexplained variation.

The effect estimates for each of the variables, as well as the corresponding tests of significance are reported in Table 3. These estimates indicated that the major portion of the variation was explained by father's occupation, father's education, and residence. Also, the effect estimates for each of these variables were found to be statistically significant. The composite effect of .289 suggest that the model accounted for only a moderate amount of the variation in aspirations among the various sub-classes.

(Table 3 About Here)

TABLE 2. PROPORTION OF STUDENTS WITH HIGH OCCUPATIONAL ASPIRATIONS
IN THE VARIOUS SUB-CLASSES^a

X(1) Father's Education	X(2) Father's Occupation	X(3) Residence	X(4) Race	Proportion with High Aspiration
+	+	+	+	.82
+	+	+	-	.78
+	+	-	+	.77
+	+	-	-	.51
+	-	+	+	.67
+	-	+	-	.64
+	-	-	+	.58
+	-	-	-	.58
-	+	+	+	.55
-	+	+	-	.88
-	+	-	+	.48
-	+	-	-	.57
-	-	+	+	.51
-	-	+	-	.60
-	-	-	+	.45
-	-	-	-	.53

^a(+) = High State and (-) = Low State.

TABLE 3. COMPARISON OF VARIABLE EFFECT ESTIMATES FOR FOUR VARIABLE MODELS

Variable	Effect Estimate	Z-Score	Statistical Significance ^a
X(1) Father's Education	.099	3.616	Pr [X*(1) ≤ 0] < .01
X(2) Father's Occupation	.100	3.652	Pr [X*(2) ≤ 0] < .01
X(3) Residence	.123	4.492	Pr [X*(3) ≤ 0] < .01
X(4) Race	-.033	1.205	Pr [X*(4) ≤ 0] = .11
Composite Effect	.289	-----	-----

^aThe cumulative normal distribution was used to determine the probability that the population effects X*(i) differ from zero. The computation of effect variances was based on a pooling of sub-class proportion variances where each sub-class variance = $P_j (1-P_j)/N_j$ (See Coleman, 1966: 205-210).

The effect estimate for race was not found to be statistically significant. In fact, even the sign of the estimate was in the direction opposite to that expected. Thus, the original bivariate association between aspiration and race disappeared when controls were applied. The original relationship may be explained in terms of the disproportionate number of blacks in the lower education, lower occupation and rural groupings.

Backward Elimination

An adaption of the Backward Elimination procedure (Draper and Smith, 1966) was used in conjunction with the multi-variate techniques developed by Coleman (1964). The Backward Elimination procedure was originally developed as a multiple-regression techniques to aid the researcher in selecting the best regression equation from a set of independent variables. As noted above, this is primarily a procedure which successively deletes those variables from the model which contributes least to the estimate of the dependent variable.

- Step I: The highest order model was considered first. The effect estimate for each variable was computed according to formulas provided by Coleman (1964). The Composite effect was also computed.
- Step II: Probability levels were associated with each variable effect estimate according to Coleman.
- Step III: The variable with the least statistical significance was deleted from the model (in this case the one with the smallest effect estimate).
- Step IV: The researcher returned to Step I and continued until all the variables were deleted from the model. In this manner, attention was focused on four selected models rather than all possible combinations.

The highest order model, Model I, consisting of variables X(1), X(2), X(3), and X(4) has already been discussed. The racial variable was deleted in the construction of Model II. There was a slight increase in the magnitude of the composite effect estimate over the first model. The effect estimates for all three variables [X(1), X(2), and X(3)] in Model II were found to be statistically significant. The two class-associated variables, father's education and occupation, accounted for the majority of the model's explanatory power. The variable configurations, the effect estimates, the level of statistical significance, and the composite effect estimate for each model derived from the Backward Elimination is reported in Table 4.

(Table 4 About Here)

The residence variable, which had the smallest effect estimate of the variables in Model II, was deleted in the construction of Model III. The effect estimates for father's education and occupation were found to be statistically significant with a composite effect estimate of .270. Father's occupation was deleted, leaving only father's education in the last model. Again, the effect estimate for father's education was significant.

Model II was judged the most efficient model of those considered, and was selected for further analysis. This model was judged as being the most efficient because it had the largest composite effect estimate, and because each of the variables in the model [X(1), X(2), and X(3)] had statistically significant variable effect estimates.

TABLE 4. SUMMARY TABLE OF THE ANALYSIS OF THE FOUR MODELS OBTAINED BY BACKWARD ELIMINATION

Model	X(1) Father's Education	X(2) Father's Occupation	X(3) Residence	X(4) Race	Composite Effect Estimate	Estimate of Unexplained Variation
I X(1)+X(2)+X(3)+X(4)	.99*	.100*	.123*	-.033 ^{ns}	.289	.711
II X(1)+X(2)+X(3)	.167*	.097*	.082*	Deleted	.346	.654
III X(1)+X(2)	.180*	.090*	Deleted	Deleted	.270	.730
IV X(1)	.180*	Deleted	Deleted	Deleted	.180	.820

* = $\Pr[X^*(i) < 0] < .01$ and ^{ns} = $\Pr[X^*(i) < 0] > .05$.

Sub-Models By Race

To this point in the analysis, the only finding that runs counter to previous research was that race apparently had little direct effect upon aspiration levels. This finding was especially surprising because of the rather sharp disparity in occupational chances between whites and blacks in the deep south. It was decided to further investigate the relationship between aspiration and race by treating both the white and black sub-groups as two distinct populations and applying Model II separately to each population. The resulting effect estimates for the white, black and total population are reported in Table 5.

(Table 5 About Here)

A composite effect estimate of .384 was obtained when Model II was applied to the white population, as an estimate of greater magnitude than that obtained in any of the previously considered models. All variable effect estimates were found to be statistically significant. The two class-linked variables accounted for the majority of the composite effect estimate; i.e., the effect estimate for father's education was .213, for father's occupation was .103 and for residence was only .068.

However, when Model II was applied to the black population, different results were obtained. The composite effect estimate was .258, a value smaller than that for either the total, or for the white population. The variable effect estimates for father's occupation (.098) and residence (.178) were found to be statistically significant while the estimate for father's education (-.018) was not found to be significant. Also, the rank order of the variable effect estimates for

TABLE 5. SUMMARY TABLE OF MODEL II APPLIED TO THE TOTAL, WHITE AND BLACK POPULATIONS^a

	X(1) Father's Education	X(2) Father's Occupation	X(3) Residence	Composite Effect Estimate	Estimate of Unexplained Variation
Total Population	.167*	.097*	.082*	.346	.654
White Population	.213*	.103*	.068*	.384	.616
Black Population	-.018 ^{ns}	.098*	.178*	.258	.742

^a* = Pr[X*(i) < 0] < .01 and ^{ns} = Pr[X*(i) < 0] > .05.

blacks was reversed from the ordering observed in both the total and white populations.

Analysis of Residuals

A set of predicted proportions was derived for each model (Coleman, 1964: 195-197). By comparing the predicted proportions $P^*(i)$ with the actual $P(i)$, it was possible to determine deviations from the assumptions of the technique. Table 6 reveals the analysis of residuals for Model II when applied to the total, white and black populations.

(Table 6 About Here)

When Model II was applied to the total and white populations, relatively small deviations were observed in all the sub-classes. There was no deviation of .05 or greater. However, large deviations were obtained when Model II was applied to the black population. Five of the eight sub-classes had deviations greater than .05. Thus, it appeared the additive Coleman-type model has considerable utility in explaining aspiration levels for the white population and the total population, but appeared to be inadequate for the black population. A refinement of Model II including multiplicative and/or interactional effects might improve the black model's efficiency.

Conclusions and Implications

The levels of occupational aspiration of these deep-south, tenth graders were found to be relatively high, even in the more "disadvantaged" sub-groups. When this finding is viewed in terms of a developmental

TABLE 6. ANALYSIS OF RESIDUALS FOR MODEL II APPLIED TO THE TOTAL, WHITE AND BLACK POPULATIONS^a

Population		P(123)	P(12)	P(13)	P(1)	P(23)	P(2)	P(3)	P(.)	Departure from the Model ^b
Total	P(i) Actual	.82	.74	.67	.58	.61	.50	.54	.49	Relatively good fit [only small deviations were observed in the various subclasses]
	P*(i) Estimated	.79	.70	.69	.61	.62	.54	.53	.45	
	P(i)-P*(i)	+.03	+.04	-.02	-.03	-.01	-.04	+.01	+.04	
White	P(i) Actual	.82	.77	.67	.58	.55	.48	.51	.45	Relatively good fit [only small deviation was observed in the various subclasses]
	P*(i) Estimated	.79	.73	.69	.62	.58	.51	.48	.41	
	P(i)-P*(i)	+.03	+.04	-.02	-.04	-.03	-.03	+.03	+.04	
Blacks	P(i) Actual	.78	.51	.64	.58	.88	.57	.60	.53	Poor fit [large deviations ($D > .05$) were observed in five subclasses; the researchers were unable to determine a systematic pattern in the deviations]
	P*(i) Estimates	.67	.59	.67	.49	.75	.61	.68	.51	
	P(i)-P*(i)	+.11	-.08	-.03	+.09	+.13	-.03	-.08	.02	

^aThe notation used for identifying proportions is such that the numbers in parentheses refer to variables X(1), X(2), and X(3). The variable number appears when that variable is in a high state, e.g., P(23) refers to the proportion of students with high aspirations in the subclass where X(2) and X(3) were in a high state. P(.) refers to the appropriate proportion in the subclass where all variables were in a low state. P*(i) refers to the expected or estimated proportions for the various subclasses.

^bFor reason of convenience, deviations of .05 or greater were considered large (Coleman, 1966:199).

framework, there exists the potential for further lowering of occupational goals. Apparently, a serious consideration of the means required for high-level occupational attainment has not developed for the majority of the students at this stage of occupational-choice development. A sharp increase in awareness of limiting factors followed by further lowering of aspirations probably occurs when the student nears the completion of high school and is confronted with decisions concerning job placement, further education, military service, or marriage.

The most efficient Coleman-type additive model utilizing variable X(1), X(2), and X(3) accounted for only 38 percent of the variations in aspirations among whites. Although recognizing that improvements in measurement along with the utilization of a more elaborate model would probably raise this index somewhat, it appears that these variables leave a large portion of the variation unexplained. Perhaps the importance of these variables has often been over-estimated by previous researchers, leading one to believe that other, more important, variables exist at this stage of development.⁶

The effects of social class (father's education and occupation) on aspiration levels was stronger than the effects of the other variables considered. The residence variable ranked second in magnitude of effect estimate. These findings suggest the following hypothesis:

Lower class students, regardless of race and residence, tend to perceive at an earlier stage in the occupational choice process the limiting factors related to lower class position than other types of structural blocks. ?

When controls were applied for father's occupation, father's education and residence, the original bivariate relationship between aspirations and race disappeared. However, when additive models utilizing father's occupation, father's education, and residence were applied separately to the white and non-white populations markedly different results were obtained for each population. The observed composite effect estimates indicated that the white model had considerably greater explanatory power than the model for blacks. Also, the ranking of effect estimates within each model was reversed. In the model for whites, father's education ranked first, father's occupation second, and residence third, while in the model for non-whites, residence ranked first, father's occupation second, and the effect estimate for father's education was not found to be statistically significant. When an analysis of residuals was made, the theoretical model corresponded very closely to the observed data for whites, but differed considerably for non-whites.

This analysis of models by racial groupings implies that the theoretical conceptualizations concerning disparity as employed in this research provides a reasonable adequate explanatory tool for understanding aspiration levels among white students. It also points to the need for alternative explanations for non-white groupings, i.e., the failure of the black student to follow the general aspirational pattern which was found in the total population, and the white population presents a problem of rejecting, or reformulating the theoretical framework. ?

It is, of course, possible that the original theoretical framework was inadequate and should be rejected in favor of other formulations with superior utility. However, this alternative does not appear viable for the following reasons: (1) the findings of one study focusing on aspirations at a single stage in the developmental process can hardly be considered sufficient grounds for either accepting or rejecting the overall framework; (2) the framework does appear to explain adequately a significant proportion of the variation in aspiration levels among white students, and to a lesser degree, among blacks; and (3) the effects observed among the non-whites were in the general direction anticipated, even though the rank of the effect estimates was different, and the model had a relatively poor "goodness of fit." Since the researchers could neither accept or reject the overall framework on the basis of the data analyzed in this study, two possible reformulations are suggested which focus specifically on the black population.

First, the non-white student may develop his occupational choices in a pattern that differs markedly from the white youth. In other words, instead of one developmental process, it may prove useful to speak of developmental types. The black student may begin to seriously consider means related to occupational attainment at a later period than the white youth, and thus, his perception of blockage tends to occur at a later age. Also it could possibly prove useful to look for mechanisms in the black student's family, community, school, and peer groups which tend to insulate the student from knowledge of the difficulties,

requirements, and limitations he may face. In Ginzberg's terminology, the fantasy stage of occupational development may extend much further for non-white youth as a result of the possible insulation factors noted above.

Second, there may also be a factor which influences the non-white population in a manner which tends to keep the level of occupational aspirations relatively high, even when the non-white student is aware of present racial limitations to high occupational attainment. The effect of the Civil Rights movement in the South and related changes in black adolescents' attitudes toward black pride and black power may have engendered an atmosphere of optimism for these students concerning future occupational attainment.

FOOTNOTES

¹Notable exceptions to this contention include several studies which have employed path-analytic techniques ~~of analysis~~. Occupational and educational aspirations and expectations have been utilized both as independent and dependent variables in these very informative research ventures. For further information see, Sewell and Shah, 1968; Duncan, et al., 1968; Sewell, et al., 1969; Spaeth, 1968; 1970; Wegner, 1969; Curry and Picou, 1971; and Chad Gordon, 1971.

²This conceptualization is somewhat similar to the formulations of Haller and Miller (1963).

³A linear model analysis of the data was rendered impossible because of the different coding procedures utilized in the various states.

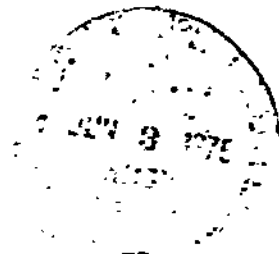
⁴Exceptions to this trend have been noted for black youth. For example see: Middleton and Grigg (1959) and Picou, et al. (1970).

⁵The analysis of bivariate relationships presented in Table 1 was conducted on collapsed levels of a modified version of the census occupational classification scheme. Occupational aspirations were classified as follows: high aspirations included youth who desired future employment in professional, managerial, and glamour-type occupations (professional sports and entertainers); moderate aspirations included youth who desired future employment in clerical and sales, crafts and foreman and enlisted military occupational categories; low aspirations included youth who desired future employment in the operatives, service workers and unskilled laborers categories.

⁶Future studies which incorporate social psychological variables may ameliorate this situation. Current research indicates that such variables as "significant-other influence" and "ambition" may account for a significant portion of the variation for occupational aspirations. Future refinement of social-psychological variables and increased precision in measurement are necessary before these possibilities can be adequately explored. For examples of current investigations along these lines, see: Duncan, et al., 1968.

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