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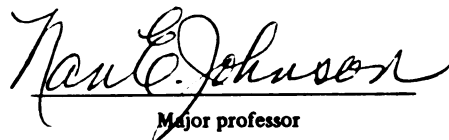
MINORITY-GROUP STATUS AND THE
FERTILITY OF BLACK AMERICANS, 1965: A RE-
PLICATION AND EXTENSION

presented by

RAMADAN SENUSSI BEL-HAG

has been accepted towards fulfillment
of the requirements for

MASTER degree in SOCIOLOGY


Major professor

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MINORITY-GROUP STATUS AND THE FERTILITY
OF BLACK AMERICANS, 1965:
A REPLICATION AND EXTENSION

By
Ramadan Senussi Bel-Hag

A THESIS

Submitted to
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ABSTRACT

MINORITY-GROUP STATUS AND THE FERTILITY
OF BLACK AMERICANS, 1965:
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By
Ramadan Senussi Bel-Hag

The explanation of the relationship between minority-group status and fertility has been dominated by two major perspectives: the characteristics hypothesis and the minority-status hypothesis. Using 1960 data Goldscheider and Uhlenberg (1969) found support for the strong form of the minority status hypothesis; Johnson (1979) on the other hand found support for the weak form of characteristics hypothesis by using data from the 1970 National Fertility Study. Furthermore, work by Sly (1970) and Ritchey (1975) suggested that the effect of race and education on fertility might interact with region. A decade of profound changes in the socio-economic and political statuses of blacks intervened. Consequently the present study by using data from the 1965 National Fertility Study examined the two hypotheses at the midpoint of that decade. A three-way of interaction was found between race, education and region.

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INTRODUCTION

The last century witnessed great changes in the black population of the United States. Most obvious has been the change in legal status resulting from the Emancipation Proclamation. Moreover, from a sociological viewpoint, important changes have occurred in the living conditions and social position of blacks. Although slavery was abolished during the Civil War, assimilation and acceptance of blacks did not immediately follow; nor were their political and legal rights clearly established. For a relatively long time after Emancipation, most blacks remained isolated in the rural South, and their life styles and cultural practices were little altered.

Industrialization associated with World War I initiated the out-migration of blacks from the South, and in the last fifty years the geographical location and social characteristics of the black population have changed greatly. In 1860, 92 percent of the black population lived in the South, and by 1910 approximately 90 percent still lived there. However, by 1950, the percentage of blacks living in the South dropped to 68 percent and, in 1960, it had decreased to 60 percent. It continued to drop to 53 percent by 1970 (U.S. Bureau of the Census, 1970). By 1970, also, the black population was more urbanized than the white, for three out of every five blacks in the United States lived in central cities of a major metropolitan area (U.S. Bureau of the Census, 1970). During the decade of 1960-1970, the black population in metropolitan areas increased

by four million (U.S. Bureau of the Census, 1971). Table 1 is an illustration of the distributional change of black and white populations inside and outside metropolitan areas: 1960 and 1970.

The educational and occupational characteristics of blacks have changed greatly. By 1960, manufacturing replaced agriculture as the modal industrial category for employed blacks (U.S. Bureau of the Census, 1960). Between 1960-1970, total employment of blacks and other races increased 22 percent, but their employment in professional, technical, and clerical occupations doubled. Changes in educational attainment also occurred. Blacks reaching age 18 just after World War I had attained a median of 5 years of schooling. In 1970, 56 percent of all young adult blacks 25 to 29 years old had completed high school compared with 38 percent in 1960. By 1970 about 17 percent had at least one year of college. In comparison, approximately 78 percent of the whites had a high school education and about one-third had received some college training (U.S. Bureau of the Census, 1970).

These changes in the social characteristics and residence of blacks should have implications for their demographic rates. Demographers might predict that as long as blacks remained in the rural South, fertility would remain high but that the rapid migration of blacks away from farms and to the North with concomitant increments in educational attainment, occupational status and earning power would produce lower fertility rates (Farley, 1966, p. 189). Nevertheless, black fertility rates began declining in the 1880s, well before the large-scale exodus of blacks from the rural South. In fact, evidence presented by Farley (1966) suggested that fertility rates of blacks had declined fifty percent by the 1930s.

Table 1. Black-White Distribution and Change, Inside and Outside Metropolitan Areas: 1960-1970

(numbers in millions)

	Population			
	Black		White	
	1960	1970	1960	1970
United States	18.9	22.7	158.8	177.6
Metropolitan areas.	12.8	16.8	106.4	121.3
Central cities.	9.9	13.1	50.1	49.5
Outside central cities. . .	2.8	3.7	56.3	71.8
Outside metropolitan areas.	6.1	5.8	52.5	56.4
	Change, 1960-1970			
	Black		White	
	Number	Percent	Number	Percent
United States	3.8	20	18.8	12
Metropolitan areas.	4.1	32	14.9	14
Central cities.	3.2	33	.6	-1
Outside central cities. . .	.8	29	15.5	28
Outside metropolitan areas.	-.3	-4	3.9	7

Source: U.S. Bureau of the Census, "The Social and Economic Status of Negroes in the United States, 1970," Current Population Reports, series P-23, No. 38.

Moreover, after the Depression of the 1930s, rural-to-urban migration became a significant form of geographic mobility for blacks and attended their improvements in educational attainments and occupational levels. As the black population made these advances, demographic transition theory would predict that their fertility would become controlled and that moderate sized families would become the norm. Oddly, black fertility rates climbed, and the percentage of black women having large families increased rather than decreased in the 1940s and early 1950s. That black fertility rates fell when one would have expected them to be relatively constant and rose when one would have expected them to decline is an enigma which exemplifies the need for greater theoretical understanding of minority-group fertility.

BACKGROUND

One explanation of black-white differences in fertility has been called the "characteristics hypothesis." The characteristics hypothesis assumes that differences in socio-economic and demographic composition completely explain black-white fertility differentials. For example, Lunde (1965) argued that the decrease in black fertility since 1957 can be explained in terms of their advancement in health, urbanization and educational attainment. An implication of this approach is that as the socio-economic and demographic characteristics of two groups (e.g., blacks and whites) become similar, so will their level of fertility. Thus, Farley (1966) concluded that "lower fertility rates (among blacks) may be indicative of an increasing involvement of blacks in (the) American society...as status differences disappear so may fertility differences" (Farley, 1966, p. 203).

Johnson (1979) wrote that the characteristics hypothesis could be cast in two forms. For example, if race were regressed upon education, one could correlate the residual (unexplained) variance in race with a measure of fertility. If the resultant semipartial correlation be zero, the "strong form" of the characteristics hypothesis would be supported, since race and fertility would be unrelated at every level of education. Another way of viewing these relationships is that the regression line of fertility upon education would be the same for blacks and whites (Diagram A, Figure 1). Thus, the "strong form" of the characteristics hypothesis holds that when the differences in the socio-economic and demographic characteristics between blacks and whites are rendered similar through statistical controls, race will have no net effect on fertility at each level of education.

The weak form of the characteristics hypothesis argues that if the differences in the socio-economic and demographic characteristics between blacks and whites are rendered similar through social change, the racial differences in fertility between blacks and whites will disappear first among the highly educated, since it is this class which is thought to gain first access to more favorable social and demographic statuses. For example, using the 1970 National Fertility Study (NFS II) data, Johnson (1979) re-examined the interrelationship between race, education and fertility and concluded that support was found for the "weak form" of the characteristics hypothesis (Diagram B, Figure 1). The explanation for the disappearance of fertility differences between blacks and whites among those having attended college may be the greater integration of these blacks into educational, political, and economic institutions (Johnson, 1979, pp. 15-16). Goldscheider and Uhlenberg (1969) argued that a lack of potential for social mobility could reduce incentive for rational fertility controls and thus account for higher black than white fertility at lower education levels.

Another perspective, known as the "minority-group status hypothesis," holds that race has an independent effect upon fertility beyond the effects of relevant compositional factors. As blacks begin to compete more generally with whites for upward social mobility, they are thought to encounter greater barriers to achievement and to experience greater insecurities (Goldscheider and Uhlenberg, 1969). The personal insecurities are thought to lead to greater deferments or limitations of child-bearing for upwardly mobile blacks than upwardly mobile whites. Goldscheider and Uhlenberg (1969) argued that this approach illuminates the lower fertility of Jews and Japanese-Americans, as well. An

Figure 1. "Four possible interactive relationships between race and education upon fertility."¹

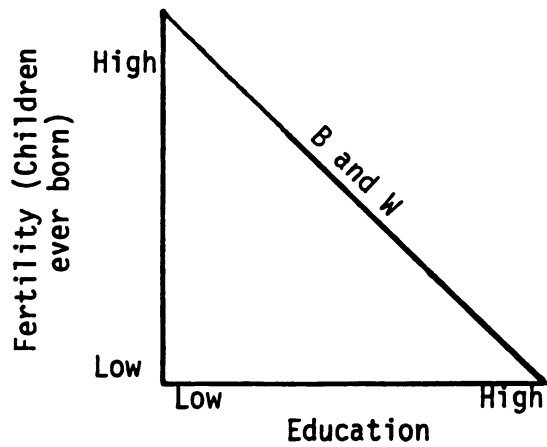


Diagram A. Strong form of the characteristics hypothesis.

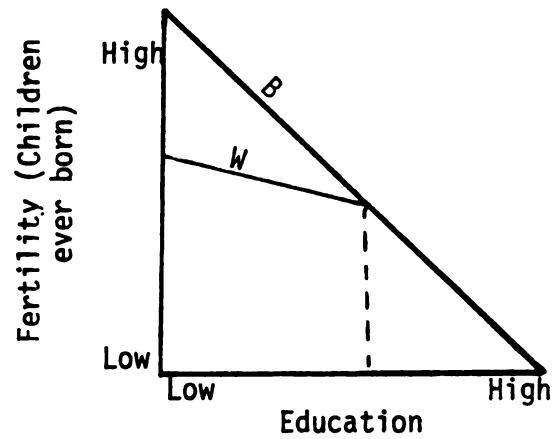


Diagram B. Weak form of the characteristics hypothesis.

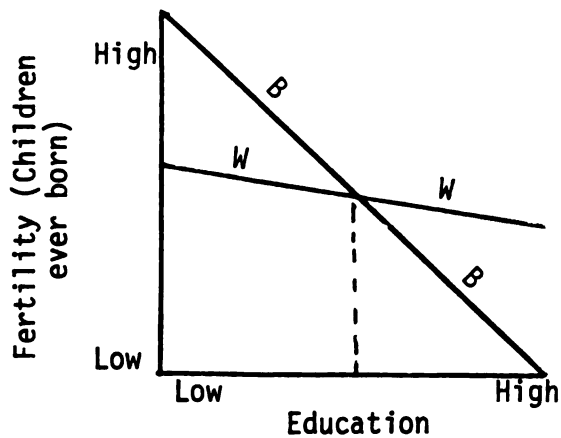


Diagram C. Strong form of the minority-status hypothesis.

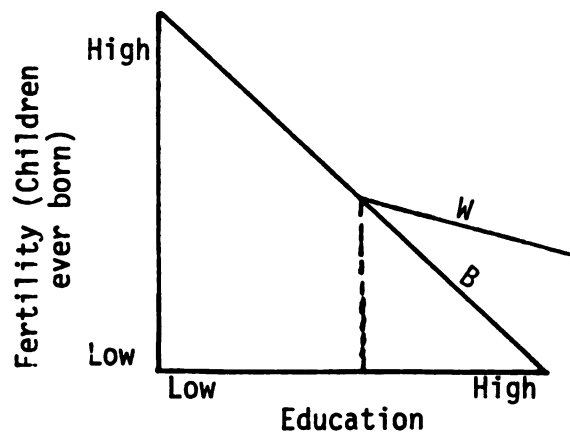


Diagram D. Weak form of the minority-status hypothesis.

Note. B = black; W = white.

¹Source: (Johnson, 1979).

implication of this perspective is that even when the social, economic, and demographic characteristics of blacks and whites are similar, black fertility will remain distinctive.

Johnson (1979) argued that the minority-status hypothesis can also assume a "strong form" and a "weak form." The strong form would predict racial differences in fertility at every level of education: higher black than white fertility at lower education levels, lower black than white fertility at higher education levels. Support for the strong form of the minority-status hypothesis was found in Goldscheider and Uhlenberg's (1969) analysis of 1960 census data (Diagram C, Figure 1). In contrast, support for the weak form of the minority-status hypothesis would show no fertility differences between blacks and whites at lower educational levels but lower black than white fertility at higher educational levels (Diagram D, Figure 1).

Recent work suggested that the minority status effect upon fertility may vary by ecological setting. For example, Sly (1970) used 1960 census data to test: (1) the relationship between minority-group status and fertility, (2) the relationship between each of the socio-economic factors (education, income and occupation) and fertility, and (3) the interaction effect of each of the compositional factors (education, income and occupation) and minority-group status (race) on fertility. Sly (1970) claimed that an analysis of variance technique could serve this purpose. By comparing the white-non-white differences in fertility by the socio-economic factors mentioned above, Sly (1970) first found support for the minority-status hypothesis, since significant effects were found due to race, education and their interaction. When the South was excluded from the analysis, non-whites showed lower fertility than whites regardless of the level of education. In other words, the interaction term between the

socio-economic factors, race and fertility disappeared when the South was excluded. Therefore, Sly (1970) argued that this non-Southern fertility pattern could be explained by the characteristics hypothesis.

Ritchey (1975) made use of the 1970 census data to construct an aggregate measure of racial inequity for each U.S. state. Ritchey (1975) hypothesized that race and education interact to affect fertility and this interaction is positively related to racial inequity. Blacks would have higher fertility than whites at the lower educational level and this difference in fertility would decrease as racial inequity decreased. At higher educational levels, blacks would have lower fertility than their white counterparts and this would be most evident in areas of higher racial inequity. The findings strongly suggested that an interactive relationship among education, race and fertility still existed in the 1970 census public-use sample. Consequently, Ritchey's findings challenged Sly's (1970) earlier conclusion that minority-status effect upon fertility operates only in the South (Johnson, 1979, p. 6).

The purpose of the present study is to re-examine the previous inquiries into the race-fertility relationship. The results of Johnson's (1979) study supported the weak form of the characteristics hypothesis, while Goldscheider and Uhlenberg's (1969) findings corroborated the strong form of the minority-status hypothesis. However, these outcomes are not necessarily inconsistent. Goldscheider and Uhlenberg's (1969) data were from the 1960 census, whereas Johnson's data came from the 1970 National Fertility Study (NFS II). A decade of profound changes in the social, economic, and political statuses of blacks intervened. Consequently, one task of the present study is to explore the interrelationships of race, education, and fertility at the midpoint of that decade. Inasmuch as Johnson's statistical methodology shall be employed, the

present effort may be viewed as a partial replication of her work. Inasmuch as these interrelationships shall be examined separately for the South and the non-South, the current study may be viewed as an extension of previous inquiries.

PROCEDURES

The data used in the analysis were obtained from the 1965 National Fertility Study (NFS I). A probability sample of 5,617 currently married women under 55 years old and living in the conterminous United States were interviewed. A comprehensive discussion of the sample design is available in Ryder and Westoff (1971). Since the present study was interested in the investigation of black and white fertility, all women whose race was neither black nor white were excluded from the analysis. Also omitted were those having invalid codes for dependent or independent variables; those whose husband's were students, were in the armed forces, had never worked, or were unemployed; and women wed more than once. The effective sample size thus became 4,533, of whom 3,679 were white and 854 were black.

In order to explore the interrelationship between education, race and fertility, it is necessary to hold constant the effect of social, economic and demographic factors that are related to fertility and that are known to differentiate blacks and whites. Black women are more likely to be working, to reside in urban places, to prefer a non-Catholic religion, to experience divorce or widowhood, and to be young. Each of these characteristics has been associated with lower fertility in past research. Thus, female labor force participation, urban residence, religion, marital instability and age would minimize the degree to which black fertility exceeds white fertility. These variables were scored in

the following way: Wife's working status was coded (1) working and (2) not-working. Place of residence was measured (0) rural and (1) urban. Wife's religious preference was (0) Catholic and (1) non-Catholic. Marital instability was controlled in two ways. First, analysis was limited to women who were currently married and in the first union. Secondly, duration of marriage was recorded as (1) 0-4 years; (2) 5-9; (3) 10-14; (4) 15-19; (5) 20-24; (6) 25-29; and (7) 30+ years. Finally, age was coded in century months by subtracting the date of birth from the date of interview.

Factors which are thought to maximize black-white differences in fertility are: occupational status, income and age at first marriage. Black men and women are likely to hold low status jobs, to be poor and to get married at a younger age. Each of these characteristics has been associated with higher fertility in past research. Therefore, these variables must be controlled and were measured as follows: Occupation was shown by husband's occupation and was coded by an ordinal variable: (1) professional, technical, and kindred workers; (2) managers, officials and proprietors (except farm); (3) clerical, sales and kindred; (4) craftsmen, foremen and kindred; (5) operatives, kindred and service workers; (6) private household workers and laborers (except farm); (7) farmers and farm managers; (8) farm laborers and foremen. Income was operationalized as combined income of husband and wife (family income) and was coded (0) under \$2,000; (1) \$2,000 to 2,999; (2) \$3,000 to 3,999; (3) \$4,000 to 4,999; (4) \$5,000 to 5,999; (5) \$6,000 to 6,999; (6) \$7,000 to 7,999; (7) \$8,000 to 9,999; (8) \$10,000 to 14,999; (9) \$15,000 or more. Age at first marriage was coded in century months by subtracting the date of marriage from the date of the interview.

After these several social, demographic and economic variables have been controlled statistically, it will be possible to examine the inter-relationship among race, education and fertility. Race was categorized as (1) white and (2) black. The respondent's years of completed schooling was measured by five categories: (1) elementary school 0-8 years; (2) high school 1-3 years; (3) high school 4 years; (4) college 1-3 years; (5) college 4 or more years. Region was measured as: (0) South and (1) non-South. Fertility was measured as the total number of children ever born alive to respondent.

Since the characteristics hypothesis gives priority to the several compositional factors in determining the black-white differences in fertility, it was first necessary to determine whether the main effect of race and the interactive effect of race and education upon fertility were negligible after social, economic, and demographic variables had been controlled. For this purpose, a hierarchical multiple regression model with the following three inclusion levels was deemed most appropriate: (1) the social, economic and demographic variables; (2) race; (3) the race-education interaction.

Since the weak form of the characteristics hypothesis and the strong and the weak forms of the minority-status hypotheses all predict a race-education interactive effect on fertility, such an interactive effect must be decomposed before one of these hypotheses can be confirmed. For this purpose, an analysis of variance technique was chosen. Since race was measured by two categories and education by five, the variance in fertility jointly accounted for by race and education would yield nine degrees of freedom: one for race, four for education, and four for their interaction. By associating each degree of freedom with an orthogonal

vector (Table 2), it would be possible to describe the joint variance completely by nine contrasts of group means. Thus, the joint effects of race and education on fertility could be separated into four effects produced by the educational-group differences (Table 2, rows 1-4) and five effects created by the racial differences in natality within each education group (Table 2, rows 5-9).

FINDINGS

Table 3 provides the general characteristics of the effective sample. It shows that blacks had borne an average of (3.438) children which is higher than the mean number of children ever born for whites (2.591). Furthermore, blacks had an earlier mean age at first marriage, less education, less prestigious occupations, lower family incomes and lower rates of wife's employment as compared to the whites. These racial differences in fertility can be partially accounted for by the differences in socio-economic and demographic characteristics of these two populations.

Table 4 gives the mean number of children ever born for five educational groups for U.S. blacks and whites. Within every educational category except four or more years of college blacks had higher fertility than whites. Excess black fertility ranged from 1.472 (4.970-3.498) more children than whites for those with an elementary school education to .041 more children than whites for women having completed 1-3 years of college. Among women having four or more years of college, whites had an average of .657 (2.119-1.462) more children than did blacks.

Table 5 provides the mean number of children ever born by educational groups for the South. Within each educational category blacks had higher fertility than whites with the exception of the last category. Among women who had an elementary school education blacks had an average of 1.174 (5.114-3.400) more children than whites. This difference decreased

Table 2. "Contrast vector coefficients and group-mean comparisons for decomposition of joint race-education effect on fertility."¹

Contrast vector coefficients	Elementary school		High school, 1-3 yrs.		High school, 4 yrs.		College, 1-3 yrs.		College, 4 or more yrs.	
	B ^a	W ^b	B	W	B	W	B	W	B	W
Elementary school, 1-8 years, cf. ^c	1	1	-1	-1	0	0	0	0	0	0
High school, 1-3 years										
Less than high school, 4 years, cf.	1	1	1	1	-2	-2	0	0	0	0
High school, 4 years										
Less than college, 1-3 years, cf.	1	1	1	1	1	1	-3	-3	0	0
College, 1-3 years										
Less than at least 4 years, college cf.	1	1	1	1	1	1	1	1	-4	-4
College, 4 or more years										
Elementary school, 1-8 years: Blacks cf. whites	1	-1	0	0	0	0	0	0	0	0
High school, 1-3 years: Blacks cf. whites	0	0	1	-1	0	0	0	0	0	0
High school, 4 years: Blacks cf. whites	0	0	0	0	1	-1	0	0	0	0

Table 2, continued

Contrast vector coefficients	Elementary school		High school, 1-3 yrs.		High school, 4 yrs.		College, 1-3 yrs.		College, 4 or more yrs.	
	B ^a	W ^b	B	W	B	W	B	W	B	W
College, 1-3 years: Blacks cf. whites	0	0	0	0	0	0	1	-1	0	0
College, 4 or more years: Blacks cf. whites	0	0	0	0	0	0	0	0	1	-1

^aB = Black mean fertility.^bW = White mean fertility.^cCf. = "compared to."¹Source: (Johnson, 1979).

Table 3. Means and standard deviations for the two populations (Blacks and Whites).^a

Variables	Blacks		Whites	
	Means	Standard Dev.	Means	Standard Dev.
Fertility	3.438	2.875	2.591	1.834
Duration of Marriage	3.135	1.836	3.350	1.709
Age at First Marriage	243.817	49.792	249.809	44.840
Age	400.559	116.324	419.434	111.182
Place of Residence	.770	.421	.769	.422
Region of Residence	.355	.479	.706	.455
Education	2.311	1.067	2.858	1.899
Religion	.932	.252	.711	.454
Husband Occupation	4.298	1.657	3.197	1.863
Family Income	4.002	2.209	5.878	2.176
Working Status	1.584	.493	1.682	.466

^aData for this and subsequent tables were from the 1965 National Fertility Study.

Table 4. Means, standard deviations, and sizes for ten race-by-education groups. (The Nation)

Group	Mean no. of children ever born	Standard deviation	N
Elementary school, 0-8 yrs.:			
Blacks	4.970	3.648	236
Whites	3.498	2.412	466
High school, 1-3 yrs.:			
Blacks	3.416	2.560	303
Whites	2.870	1.831	832
High school, 4 yrs.:			
Blacks	2.554	2.081	269
Whites	2.374	1.636	1855
College, 1-3 yrs.:			
Blacks	2.215	1.663	65
Whites	2.174	1.558	476
College, 4 or more yrs.:			
Blacks	1.462	1.253	39
Whites	2.119	1.605	311

Table 5. Means, standard deviations, and sizes for ten race-by-education groups. (The South)

Group	Mean no. of children ever born	Standard deviation	N
Elementary school, 0-8 yrs.:			
Blacks	5.114	3.698	201
Whites	3.400	2.464	215
High school, 1-3 yrs.:			
Blacks	3.670	2.732	191
Whites	2.472	1.632	263
High school, 4 yrs.:			
Blacks	2.824	2.180	136
Whites	2.156	1.589	475
College, 1-3 yrs.:			
Blacks	2.281	1.571	32
Whites	1.920	1.351	113
College, 4 or more yrs.:			
Blacks	1.536	1.374	28
Whites	1.770	1.309	74

to only .361 (2.281-1.920) more children for blacks than whites among women having completed 1-3 years of college. For women having completed four or more years of college whites had an average of .234 (1.770-1.536) more children than blacks.

Table 6 shows that outside the South, the relationships between race, education and fertility were different from those inside the South. While blacks with an elementary school education had an average of .561 (4.143-3.582) more children than did whites, blacks with higher levels of education had fewer children than did whites. The excess of white over black fertility ranged from .073 (3.055-2.982) children for women with 1-3 years of high school to .955 children for women having completed at least four years of college. Since the racial difference in fertility declined gradually with the rise in educational levels and within each education group, it seemed that education had depressed the black and white fertility progressively and was stronger for blacks than whites for the nation as a whole and the South and non-South. Also, it looked like race and education had a significant interaction effect upon fertility.

The characteristics hypothesis assumes that differences in socio-economic and demographic composition completely explain black-white fertility differentials, such that when these compositional factors have been controlled, race will not exert a significant effect on fertility. In order to test whether the differences in mean fertility between blacks and whites that varied by education level might be explained solely by the compositional differences between blacks and whites, I regressed the number of children ever born upon ten compositional variables as a first inclusion level. The second level of inclusion was race and the third

Table 6. Means, standard deviations, and sizes for ten race-by-education groups. (Non-South)

Group	Mean no. of children ever born	Standard deviation	N
Elementary school, 0-8 yrs.:			
Blacks	4.143	3.273	35
Whites	3.582	2.367	251
High school, 1-3 yrs.:			
Blacks	2.982	2.181	112
Whites	3.055	1.892	569
High school, 4 yrs.:			
Blacks	2.278	1.944	133
Whites	2.449	1.645	1380
College, 1-3 yrs.:			
Blacks	2.152	1.770	33
Whites	2.253	1.610	363
College, 4 or more yrs.:			
Blacks	1.273	.905	11
Whites	2.228	1.675	237

was the race-education multiplicative term. These procedures were applied first for the nation, then for the South and the non-South regions separately (Tables 7,8,9).

When the number of children ever born was regressed upon the twelve independent variables for the nation (Table 7), 24.9% of the variance was explained ($p < .001$). Of the ten compositional variables, education had the strongest relationship with the dependent variable ($\text{Beta} = .414$, $p < .001$). The direct relationship between education and fertility was unanticipated. One possible explanation for this anomaly is that the strong correlation ($r = .87$, Appendix A) between the main effect of education and the interactive effect between race and education may have produced an unstable regression coefficient estimate for education (Althauser, 1971). As such, the sign of the beta coefficient for education may have been reversed from negative to positive. Duration of marriage bore the weakest relationship to the dependent variable ($\text{Beta} = .029$), and its effect was not significant. After the differences among the blacks and whites in the socio-economic and demographic characteristics had been controlled, race showed a significant increment in explained variance in the number of children ever born ($F = 148.710$, $p < .001$). Blacks had more children than whites. Moreover, the race-education interaction had a significant non-additive effect upon fertility in the nation (Table 7), in the South (Table 8), and in the non-South (Table 9). Since the race-education multiplicative term had been the last variable added to the regression equation, the probability that it would explain significant portions of variance in fertility had been reduced. Therefore, it appeared unlikely that the interactive effect of race and education on fertility was spurious.

Table 7. Hierarchical regression of children ever born upon compositional variables, race, and race-education interaction (The Nation).

Independent Variables	Simple r	R ²	b	Beta	F ^a _{SR}	F ^b _{HR}
1. Duration of marriage	.336	.113	.035	.029	.156	
2. Family income	-.182	.153	-.042	-.046	7.494	
3. Age at first marriage	-.216	.179	-.013	-.293	72.421*	
4. Working status	.134	.193	.617	.139	101.765*	
5. Religion	-.038	.201	-.559	-.116	70.072*	
6. Age	.234	.205	.006	.325	17.204*	
7. Husband occupation	.134	.208	.047	.042	7.786*	
8. Place of residence	-.139	.211	-.340	-.068	23.474*	
9. Education	-.170	.212	.481	.414	49.184*	
10. Region of residence	-.053	.212	.201	.046	9.946*	F ₁₋₁₀ =118.367*
11. Race	.158	.238	2.149	.401	159.925*	F ₁₁ =148.710*
12. Race x education	-.127	.249	-.499	-.494	61.783*	F ₁₂ =61.783*

Note - N = 4,399; intercept = .761. The overall F ratio calculated by F_{HR} is 121.085, which is significant at P<.001 at 12 and 4386 degrees of freedom.

^aThis is the standard regression F-ratio. It tests the significance of the change in R² due to the addition of variable i after all other independent variables are in the equation:

$$F_{SR} = \frac{r^2_{y(i \cdot 1, 2, \dots K)/1}}{(1 - R^2_{y(1, 2, \dots i, \dots K)})/(N - K - 1)}.$$

Table 7, continued.

^bThis is the hierarchical regression F-ratio. It tests the significance of the change in R^2 due to the addition of variables to the restricted model to obtain the full model:

$$F_{HR} = \frac{(R_F^2 - R_R^2)/(K_F - K_R)}{(1 - R_F^2)/(N - K_F - 1)}$$

* $p < .001$.

Table 8. Hierarchical regression of children ever born upon compositional variables, race, and race-education interaction (The South).

Independent Variables	Simple r	R ²	b	Beta	F _{SR}	F _{HR}
1. Duration of marriage	.352	.124	.441	.334	7.620	
2. Family income	-.264	.195	-.052	-.052	3.119	
3. Age at first marriage	-.224	.218	-.007	-.140	6.739	
4. Education	-.331	.228	.378	.174	6.424	
5. Working status	.120	.233	.539	.106	22.256*	
6. Husband occupation	.167	.236	.047	.036	2.125	
7. Place of residence	-.190	.238	-.358	-.070	9.125*	
8. Religion	.008	.238	-.590	-.075	11.797*	
9. Age	.248	.238	-.000	-.019	.024	F ₁₋₉ =54.323*
10. Race	.272	.291	2.299	.448	78.407*	F ₁₀ =117.000*
11. Race x education	-.151	.300	-.429	-.308	18.090*	F ₁₁ =18.090*

Note - N = 1573; intercept = .628. The overall F ratio calculated by F_{HR} is 60.665, which is significant at P<.001 at 11 and 1561 degrees of freedom.

*p<.001.

Table 9. Hierarchical regression of children ever born upon compositional variables, race, and race-education interaction (The non-South).

Independent Variables	Simple r	R ²	b	Beta	F _{SR}	F _{HR}
1. Duration of marriage	.323	.105	-.216	-.192	4.201	
2. Age at first marriage	-.203	.142	-.017	-.413	85.816*	
3. Working status	.150	.171	.658	.164	87.335*	
4. Religion	-.086	.185	-.521	-.130	57.572*	
5. Age	.228	.195	.010	.583	33.417*	
6. Family income	-.097	.201	-.032	-.034	3.015	
7. Husband occupation	.102	.203	.043	.043	5.146	
8. Place of residence	-.077	.204	-.258	-.051	8.669*	
9. Education	-.118	.205	.362	.399	10.647*	F ₁₋₉ =80.660*
10. Race	.013	.209	1.395	.227	21.590*	F ₁₀ =13.959*
11. Race x education	-.120	.212	-.381	-.453	12.466*	F ₁₁ =12.466*

Note - N = 2826; intercept = 1.712. The overall F-ratio calculated by F_{HR} is 68.976, which is significant at P<.001 at 11 and 2814 degrees of freedom.

*P < .001.

An analysis of variance was employed to decompose the variance in fertility jointly explained by race and education into nine uncorrelated segments, each associated with a contrast in group means. Data for the United States as a whole (Table 10) showed that each successive level of educational attainment was associated with lower fertility than that for preceding levels. Moreover, among those who never graduated from high school, blacks had significantly higher fertility than did whites. Among those graduating from high school or attending college for one-to-three years, black and white fertility did not differ ($F=1.956$ and 0.025 , respectively). However, among those graduating from college, blacks had substantially fewer children than did whites ($F=3.835$; $p<0.05$). The interactive pattern of race, education, and fertility traced the inter-relationship predicted by the strong form of the minority-status hypothesis (see Figure 1, Diagram C).

These relationships were reexamined separately for the South (Table 11) and the non-South (Table 12). For both areas, it was found that increases in educational attainment brought declines in fertility with one exception: persons outside the South with only one-to-three years of high school had borne the same number of children as had those not entering high school. Among persons who had only elementary - school educations, who had attended but not finished high school, and who had graduated from high school, Southern blacks had significantly higher fertility than did Southern whites. Outside the South, higher black than white fertility among elementary - school dropouts approached statistical significance ($F=2.934$; $p<0.09$); but no differences in natality were found among blacks and whites who had attended or graduated from high school. Among those attending but not graduating from college, black and white

Table 10. Analysis of variance in fertility jointly explained by race and education (The Nation).

Source of Variance	Sum of Squares	Degrees of Freedom	Mean Square	F
<u>Between Contrasts</u>	<u>2204.907</u>	<u>9</u>	<u>244.990</u>	<u>62.721</u>
1. Elementary cf. High school, (1-3) years	173.740	1	173.740	44.484***
2. Elementary and high school, (1-3) years cf. High school, (4) years	888.408	1	888.408	227.466***
3. Less than college, (1-3) years cf. college, (1-3) years	484.383	1	484.383	124.021***
4. Less than college, (4) or more years cf. college (4) or more years	229.859	1	229.859	58.853***
5. Elementary school: Blacks cf. whites	339.674	1	339.674	86.970***
6. High school, (1-3) years: Blacks vs. whites	66.130	1	66.130	16.932***
7. High school, (4) years: Blacks vs. whites	7.639	1	7.639	1.956
8. College, (1-3) years: Blacks cf. whites	.096	1	.096	.025
9. College, (4) or more years: Blacks vs. whites	14.978	1	14.978	3.835*
<u>Within Contrasts</u>	<u>18,911.251</u>	<u>4842</u>	<u>3.906</u>	
Total	21,116.158	4851		

*p<0.05

***p<0.001

Table 11. Analysis of variance in fertility jointly explained by race and education (The South).

Source of Variance	Sum of Squares	Degrees of Freedom	Mean Square	F
<u>Between Contrasts</u>	<u>1731.617</u>	<u>9</u>	<u>192.402</u>	<u>39.138</u>
1. Elementary cf. High school, (1-3) years	308.188	1	308.188	62.698***
2. Elementary and high school, (1-3) years cf. High school, (4) years	550.986	1	550.986	112.092***
3. Less than college, (1-3) years cf. college, (1-3) years	227.507	1	227.507	46.284***
4. Less than college, (4) or more years cf. college (4) or more years	129.113	1	129.113	26.267***
5. Elementary school: Blacks cf. whites	305.337	1	305.337	62.118***
6. High school, (1-3) years: Blacks cf. whites	158.978	1	158.978	32.342***
7. High school, (4) years: Blacks cf. whites	47.142	1	47.142	9.591***
8. College, (1-3) years: Blacks cf. whites	3.248	1	3.248	.661
9. College, (4) or more years: Blacks cf. whites	1.118	1	1.118	.227
<u>Within Contrasts</u>	<u>8444.771</u>	<u>1718</u>	<u>4.916</u>	
Total	10,176.388	1727		

***p<0.001

Table 12. Analysis of variance in fertility jointly explained by race and education (The non-South).

Source of Variance	Sum of Squares	Degrees of Freedom	Mean Square	F
<u>Between Contrasts</u>	<u>603.310</u>	<u>9</u>	<u>67.034</u>	<u>20.332</u>
1. Elementary cf. High school, (1-3) years	.170	1	.170	.052
2. Elementary and high school, (1-3) years cf. High school, (4) years	270.182	1	270.182	81.943***
3. Less than college, (1-3) years cf. college, (1-3) years	214.217	1	214.217	64.969***
4. Less than college, (4) or more years cf. college (4) or more years	95.152	1	95.152	28.858***
5. Elementary school: Blacks cf. whites	9.674	1	9.674	2.934**
6. High school, (1-3) years: Blacks cf. whites	.490	1	.490	.149
7. High school, (4) years: Blacks cf. whites	3.521	1	3.521	1.068
8. College, (1-3) years: Blacks cf. whites	.314	1	.314	.095
9. College, (4) or more years: Blacks cf. whites	9.590	1	9.590	2.908**
<u>Within Contrasts</u>	<u>10,267.494</u>	<u>3114</u>	<u>3.297</u>	
Total	10,870.804	3123		

**p<0.09

***p<0.001

fertility was similar both for the South ($F=0.661$) and for the non-South ($F=0.095$). Thus, the higher black than white fertility reported at the national level for persons never graduating from college (Table 4) resulted primarily from residence in the South. Among persons having finished at least four years of college, black and white fertility did not differ significantly in the South ($F=0.227$); but outside that region, the lower black than white fertility approached statistical significance ($F=2.908$; $p<0.09$). As such, the pattern of lower fertility for black than for white college graduates observed in national data (Table 4) occurred mainly among women outside the South.

CONCLUSION

Two complementary explanations of black-white fertility differences were examined in the present study. The characteristics hypothesis holds that race may affect fertility only indirectly by determining one's social, economic and demographic characteristics. Thus, it argues that once the socio-economic and demographic characteristics of blacks and whites become similar, so will their fertility. On the other hand, the minority-status hypothesis holds that race has an independent effect beyond relevant compositional factors, since minority group status itself represents a unique barrier to upward social mobility. From this latter perspective, black-white differences will remain, even after their social, economic and demographic characteristics have become similar.

Each of these interpretations might take one of two forms, known as the strong form and the weak form. The strong form of the characteristics hypothesis argues that when the differences in the socio-economic and demographic characteristics between blacks and whites are rendered similar through statistical controls, race will have no net effect on fertility

at any level of education. In contrast, the strong form of the minority-status hypothesis predicts racial differences in fertility at every level of education, higher black than white fertility at lower educational levels and lower black than white fertility at the higher educational levels. The weak form of the characteristics hypothesis argues that if the differences in the socio-economic and demographic characteristics between blacks and whites are rendered similar through social change, the racial differences in fertility between blacks and whites will disappear first among the highly educated, while higher black than white fertility remains for a while among those having little education. On the contrary, the weak form of the minority-status hypothesis predicts no fertility differences between blacks and whites at lower educational levels but lower black than white fertility at higher educational levels.

Support for the strong form of the minority-status hypothesis was found in Goldscheider and Uhlenberg's (1969) analysis of 1960 census data. In contrast, the results of Johnson's (1979) study supported the weak form of the characteristics hypothesis by using data from the 1970 National Fertility Study. A decade of profound changes in the socio-economic and political statuses of blacks intervened. Consequently, the present study tried to explore the interrelationship among race, education and fertility at the midpoint of that decade.

The findings indicated that social, economic and demographic factors did account for a significant proportion of variance in the number of children ever born. After the differences among blacks and whites in the compositional characteristics had been removed, race and the race-education multiplicative term added significant increments to explained variance. By using orthogonal contrast vectors, the total variance in fertility explained jointly by race and education was then broken down

into its uncorrelated components. Black women had higher fertility than white women among those who had elementary school education or one to three years of high school. There were no significant differences in average number of live births to black and white women who had completed four years of high school or one-to-three years of college. Among college graduates, black women had significantly fewer children than white women. That these interrelationships, in the national data for 1965 supported the strong form of the minority-status hypothesis was consistent with Goldscheider and Uhlenberg's earlier analyses of the 1960 U.S. census.

While lower white than black fertility at low levels of education and higher white than black fertility at high levels of education were observed in national data for 1960 (Goldscheider and Uhlenberg, 1969), work by Sly (1970) and Ritchey (1975) suggested that this race-education effect on fertility might interact with region. For example, contingency tables of mean fertility by education and race of women in the 1960 census suggested that this strong form of the minority-status hypothesis might exist only for the South, since nonwhites had lower fertility than whites in every educational category for other regions (Sly, 1970). Sly's (1970) analysis of variance showed that education and race did interact with fertility when the national data was used but that this interaction vanished when the South was excluded. He thus concluded that the minority-status hypothesis interpreted nonwhite-white fertility differentials in the South but that the characteristics hypothesis provided a better explanation for those differentials in other regions.

To investigate the interrelationship among race, education, region, and fertility in 1965, the current study undertook analyses of variance in fertility separately for the South and the non-South. In the South,

significantly higher black than white fertility was found among women who had never attended college, but no racial differential was found for women who had ever attended college. Therefore, the interaction of race and education on fertility in the South suggested the weak form of the characteristics hypothesis. These results are inconsistent with those of Sly, who reported that in 1960, the South provided the only empirical evidence for a minority-status effect. Yet as Sly did not decompose the interactive term found in the South between race, education, and fertility, his conclusion was premature, since the weak form of the characteristics hypothesis also posits an interactive effect among the three variables. Future research may profitably explore Sly's findings by using the statistical technique employed in the present analysis.

Outside the South, no important white-black fertility differences were uncovered except for those who had elementary - school educations, (where blacks had somewhat higher fertility than whites) and for those who had college degrees (where blacks had somewhat lower fertility than whites). The black-white fertility differences for these two education categories approached statistical significance ($p < 0.09$). Since no racial differences in natality had been observed in the South among those at the highest education level, the lower black than white fertility observed in the national data for college graduates arose primarily in non-Southern regions. Since blacks were thought to encounter fewer structural barriers to upward mobility in non-Southern regions in 1965, new sociological explanations should be sought for the lower black than white fertility occurring among college graduates in these areas.

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APPENDIX A

Correlation Coefficients for the Nation

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Fertility A B C D E F G H I J K

APPENDIX B

Correlation Coefficients for the South

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APPENDIX C

Correlation Coefficients for the Non-South

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