Direct and Indirect Effects of School Learning Variables on the Academic Achievement of African American 10th Graders

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In focusing on the direct and indirect effects of certain school learning variables on the academic achievement of African American 10th graders, a model was proposed. The model considered those variables associated with student background characteristics (i.e., gender and socioeconomic status); the school (i.e., students' perceptions of the school environment, teachers, and teaching); the family (i.e., parental expectations and involvement); and students (i.e., student educational aspirations and motivation). It was tested using data from African American students who participated in the National Educational Longitudinal Study of 1988. A revised model was developed after only socioeconomic status, prior academic achievement, and students' perceptions of teachers and teaching quality were found to have statistically significant effects on achievement.

Introduction

The academic achievement of high school students has long been of concern to parents, academicians, policymakers, and the general public. Many models have been developed to explain variability in student achievement (Donovan, 1984; Keith & Benson, 1992; Keith & Page, 1985; Martinez–Ponz & Zimmerman, 1990; Reynolds, 1989). For minority students, research historically has focused on their background characteristics alone. That is, attempts have been made to predict or explain minority students' academic achievement based on the background characteristics of their families (i.e., socioeconomic status [SES] or home possessions as indicators of affluence); the students themselves (e.g., ethnicity or gender); and/or characteristics ascribed to them (typically ability, self-esteem, locus of control, and motivation) (Burlew, 1979; Curry et al., 1978; Flaugher, 1971; Frye & Coe, 1980; Heussenstamm & Hoepfner, 1971; Johnsen & Medley, 1978; Lloyd, 1967; Suchman, 1968). Other studies have sought to explain varying minority graduation rates by looking at factors that inhibit or enhance their persistence in high school and college (American Council on Education [ACE], 1988, 1989; Astin, 1982; Fleming, 1984; Ogbu, 1990; Spring, 1989).

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From these and similar studies, the term "at-risk" has been applied to students who were more likely than others to drop out of school. More often than not, at-risk status has been ascribed to students by virtue of their membership in an ethnic minority group (i.e., typically African American or Hispanic American) and/or a social minority group (i.e., teenage females considered at risk of dropping out of school due to pregnancy), or their belonging to impoverished inner-city families (Jones & Watson, 1990). Although background and SES undoubtedly factor into at-risk status for poor and minority students, these variables may only partially explain the level of academic achievement attained. Furthermore, they may play merely an indirect role in explaining the at-risk phenomenon's relationship to other causal factors. Thus, models focusing on background characteristics of students alone often cannot explain why students possessing one or more risk characteristics do not drop out of school, nor can they explain why students possessing none of these characteristics drop out. Moreover, reliance on these models seldom leads to improvements in educational service delivery because student backgrounds are difficult, if not impossible, to change.

Many researchers have used national data sets to look at achievement patterns and their relationship with variables such as school experience, motivation, self-concept, and aspirations (Rasinski, Ingels, Rock, & Pollack, 1993; Rock, Owings, & Lee, 1994; Rock & Pollack, 1995). For example, Rasinski et al.'s research noted a narrowing of the gap in mathematics achievement between European/Asian American students and African/Hispanic American students. Tate (1997) later concurred with this finding, maintaining that while the former two groups' mathematics achievement continues to be higher, the latter two groups closed some of the gap by making greater gains.

Other national data set-based research on the interrelationships between prior achievement, SES, course work, and aspirations has shown that many students between the 8th and 10th grades are called upon to make curriculum-related decisions that ultimately influence their achievement in core academic subjects such as mathematics and science. Rock et al. (1994) concluded that although low achievement in the earlier grades limits the opportunities for taking advanced courses in later grades, postsecondary aspirations remain strong determinants of both course taking and career directions in post-high school course planning. They noted that students who had fallen behind by 8th grade were least likely to do well in high school and continued to fall further behind, while those who had college aspirations were likely to have higher mathematics proficiency. Further, African and Hispanic American students were likely to take fewer courses in mathematics and science compared to European and Asian Americans. Among students with similar SES levels, no significant differences were found in the number of courses completed between these ethnic groups; yet students from higher SES families completed more courses in mathematics and science than did students from lower SES families. Thus, given the ethnicity-based differences in SES, Rock et al. concluded that African American students are less likely to complete advanced academic courses because many of them come from lower SES families.

Other analyses of national data sets reveal that growth in achievement between 8th to 12th grade is strongly related to course-taking patterns (Hoffer, Rasinski, & Moore, 1995). For example, students who take more advanced and academic courses were found to have higher achievement score gains regardless of race/ethnicity, gender, and SES. Rock and Pollack (1995) have noted a similar relationship between course taking and achievement gains in mathematics.

Rasinski et al. (1993) conducted analysis of data from high school sophomores included in the comprehensive National Educational Longitudinal Study of 1988 (National Center for Education Statistics [NCES], 1992) and the large-scale High School and Beyond study

to determine if learning opportunities were more equally and equitably distributed in 1990 compared to a decade ago. They reviewed four aspects related to educational equity: program placement, mathematics achievement, students' postsecondary aspirations, and parental and school press for students' college-going. Among their findings was a substantial improvement in the number of African American students enrolling in college preparatory programs as opposed to vocational programs. Further, by 1990, African American sophomores were equally as likely as their European American peers to be enrolled in college preparatory programs. Rasinski et al. also noted that, in 1990, African American students and students from low-SES families tended to hold higher aspirations for college-going than did European American students. Although students' educational expectations and aspirations may not always be realized, Rasinski et al. concluded that these factors serve as good indicators of the academic decisions and ambitions of high school sophomores. Student aspirations also point to the educational goals valued by sophomores. In related broad-based research, Ekstrom, Goertz, and Rock (1988) examined the impact of the expectations of adults on students' motivation to learn, persist in schooling, and go on to postsecondary education. They determined that the four critical sources of adult influence are fathers, mothers, teachers, and counselors.

Despite numerous studies examining the interrelationships among achievement and important family and school variables, achievement studies examining ethnic groups separately or those focusing solely on African American high schoolers are few. However, it is entirely possible that the relationships among individual, family, and school characteristics and academic achievement may differ according to subpopulation characteristics. Given that African American students, particularly African American males, have consistently lagged behind in academic achievement, it is especially important to identify which individual, family, and school characteristics promote academic achievement among these students. To help fill this void in the literature, the present study examines the direct and indirect effects of variables believed to influence the academic achievement of African American 10th graders.

This focus on high school sophomores is not arbitrary. The 10th-grade year is an important one because the academic decisions made by 10th graders either limit or expand both the future choices of academic subjects to which these students have access as well as their postsecondary options. Examining the academic achievement of African American 10th graders provides a much-needed link for building a longitudinal understanding of high school achievement and its antecedents.

Because academic achievement is a function of schools, parents, and students operating synchronously and synergistically, a model of the interrelationships among the variables that influence it must include several measures (see Figure I). Among these measures are: students' perceptions of the school environment, teachers, and teaching; parents' educational aspirations for their children and their parental involvement; and the characteristics of students themselves (i.e., measures of students' educational aspirations and motivation to achieve). By simultaneously including multiple variables in such a model, one can draw some inferences about which of these variables exert significant, unique influence on academic achievement. Furthermore, the proposed model examines both direct and indirect effects of these variables because this permits examination of mediational processes implied by school learning theory.

Method

Sample

In the spring of 1988, NCES instituted the first stage of NELS:88 as part of a comprehensive effort to obtain data related to students' school experiences and activities, values,

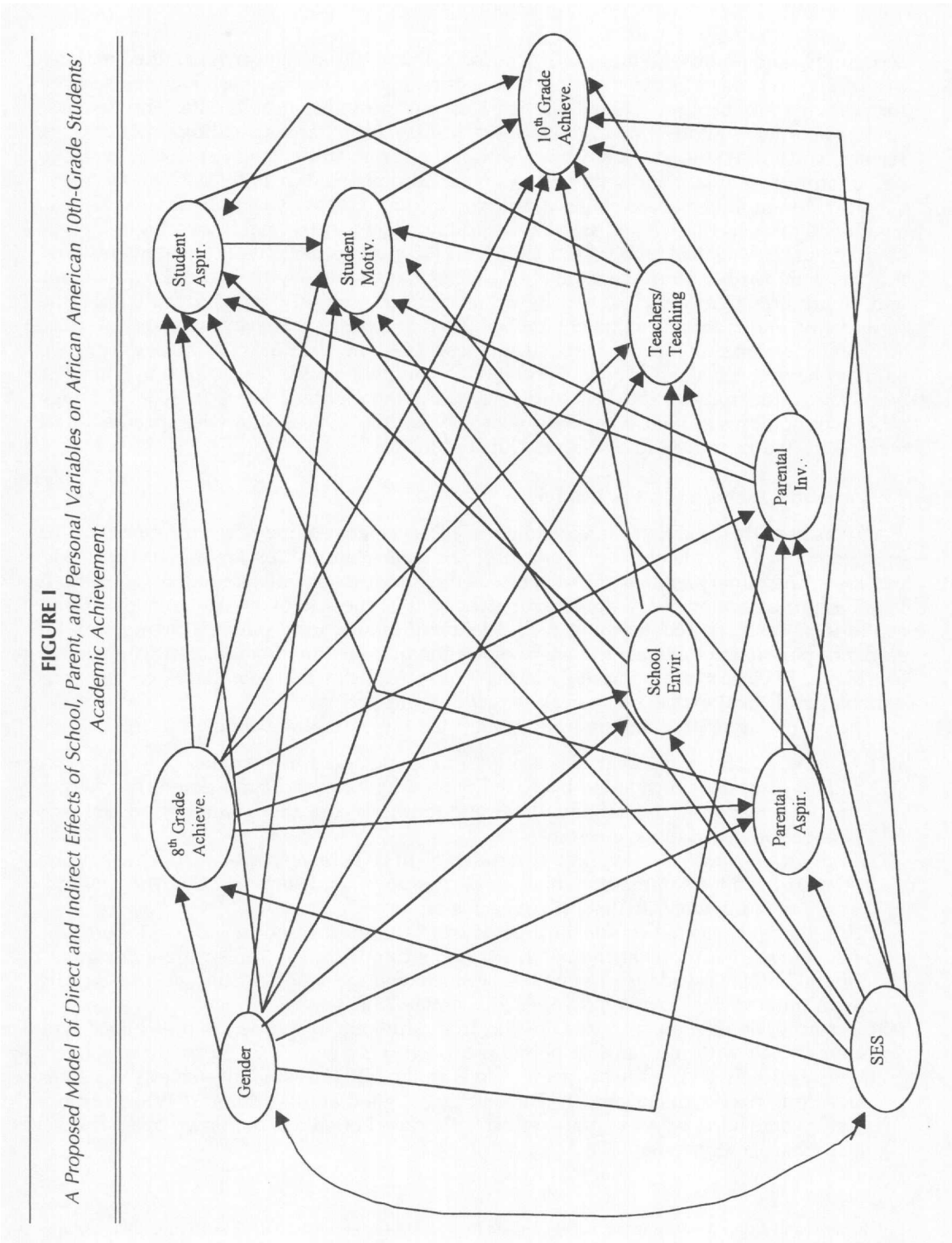

FIGURE I

A Proposed Model of Direct and Indirect Effects of School, Parent, and Personal Variables on African American 10th-Grade Students' Academic Achievement

aspirations, and family and home characteristics. In the 1988 base year, a stratified national probability sample of 24,599 eighth graders attending 1,052 middle schools was selected for participation. Of these, 20,062 participated and provided usable data. The database contains students' scores on cognitive tests in four subject areas: reading, mathematics, science, and social studies. Data were also collected from students' parents, teachers, and school administrators. Follow-up surveys were administered in 1990, 1992, and 1994.

NELS:88 employed a two-stage, stratified random probability sample design to obtain a nationally representative sample.[1] The sampling strata were drawn from schools by type of governance or control: public (77%), Catholic (9%), and other private (14%) institutions. Schools were further stratified by the nine Census divisions, by their racial composition and eighth-grade enrollments, and by urbanicity (i.e., central city, county surrounding central city, and rural areas). In 1990, when the first follow-up surveys were taken, 2,220 African American students participated. Of these, 1,766 met the dual criteria for the present study of having remained in school and having completed NELS:88 surveys in both 1988 and 1990. Data from these 1,766 students, who were eighth graders in 1988 and high school sophomores in 1990, comprised the study sample. Unless otherwise specified, data were extracted from first follow-up (1990) student files.

Variables Included in the Model

It was hypothesized that the variability in achievement among African American 10th graders could be explained by explicating the interrelationships among 10 composite variables. Of primary interest, however, was the interrelationships among 8 endogenous variables: prior achievement, students' perceptions of the school environment, their perceptions of teachers and teaching (i.e., quality of instruction), parental aspirations for students, parental involvement, student aspirations, student motivation, and achievement (see Figure I). Of secondary interest was the interrelationship between these 8 endogenous variables and the 2 exogenous variables: gender and SES.

The following operational definitions describe the variables examined in this study:

(1) *Gender*: a dichotomous variable scored 0 for male and 1 for female;
(2) *SES*: a composite developed by NCES from data extracted from parent files which included responses indicating father's and mother's education, father's and mother's occupation, and family income;
(3) *Prior Achievement*: the average of students' IRT (item response theory) scores on standardized tests of reading, mathematics, science, and social studies (from eighth-grade data obtained in 1988) (Cronbach's alpha: .85);
(4) *School Environment*: a composite created from students' responses to two Likert-type items (each with four anchor points from "strongly agree" to "strongly disagree") on the NELS:88 student survey ("Discipline is fair at school"; "Students are friendly with other racial groups") (Cronbach's alpha: .73);
(5) *Teachers/Teaching*: a composite created from students' responses to four Likert-type items (each with four anchor points from "strongly agree" to "strongly disagree"; the negatively worded item was recoded) on the NELS:88 student survey ("Students get along well with teachers"; "The teaching is good at this school"; "When respondent works hard, teachers praise effort"; "In class I often feel put down by teachers") (Cronbach's alpha: .86);

[1]Hispanic and Asian Americans were oversampled in NELS:88 to permit valid analyses within these populations.

(6) *Parental Aspirations*: a composite created from students' responses to two Likert-type items (each with seven anchor points from "less than high school" to "postgraduate education") on the NELS:88 student survey ("How far in school father wants respondent to go"; "How far in school mother wants respondent to go") (Cronbach's alpha: .87);
(7) *Parental Involvement*: a composite created from students' responses to two Likert-type items (each with three anchor points from "never" to "often") on the NELS:88 student survey ("How often respondent discussed preparing for the ACT/SAT with parents in college planning"; "How often respondent discussed going to college with parents") (Cronbach's alpha: .97);
(8) *Student Aspirations and Expectations*: a composite created from students' responses to two Likert-type items (with seven and four anchor points, respectively, from "less than high school graduation" to "postgraduate education," and from "no, don't plan college" to "yes, right after high school") on the NELS:88 student survey ("How far in school respondents think they will get"; "Does respondent plan to go to college after high school?") (Cronbach's alpha: .87);
(9) *Homework and Course Work*: a composite created from students' responses to three Likert-type items (the first two with eight and the third with three anchor points, respectively, from "none" to "more than 15 hours a week" and from "none" to "one year or more," respectively) on the NELS:88 student survey ("How much time spent on homework in school"; "How much time spent on homework out of school"; and "How much coursework in the following subjects: general mathematics, algebra I, geometry, general science, physical science, biology, English, foreign language") (Cronbach's alpha: .47); and
(10) *Academic Achievement*: the average of students' scores on standardized tests of reading, mathematics, science, and history (the cognitive test battery consisted of multiple choice tests of reading comprehension [21 questions, 21 minutes], mathematics [40 questions, 30 minutes], science [25 questions, 20 minutes], and history [30 questions, 14 minutes]) (Cronbach's alpha: .94).

Data Analysis

The present study used a non-experimental, multi-equation design recommended by Pedhazur and Schmelkin (1991) that permitted the examination of the impact of the independent variables on the final outcome variable (academic achievement), while simultaneously estimating the relationships between the independent variables. For example, composites were formed and regressed in succession from the outermost endogenous variable (i.e., academic achievement in 10th grade) to the innermost endogenous variable (i.e., prior academic achievement). The two exogenous variables, gender and SES, were included in all equations. Thus, a series of regression equations were estimated.

Path analysis, a method for studying causal patterns among a set of variables (Pedhazur, 1982), was used to estimate the effects of school, parental, and student variables on students' academic achievement. By the simultaneous analysis of multiple variables, the path-analytic technique separates correlations among variables into direct and indirect effects. Version 7 of the Linear Structural Relations (LISREL 7) program developed by Joreskog and Sorbom (1989) was used to (a) estimate path coefficients to determine which factors exert significant, unique influence on academic achievement both directly and indirectly and (b) assess the overall goodness-of-fit of the proposed model of relationships to the sample data.

Results

As the first step, the full model with all paths was estimated by a series of regression equations. Table I presents the means, standard deviations, and intercorrelations among the variables used in that model (see Figure I). Next, the path coefficients in the full model were examined, and the nonsignificant paths were deleted one by one starting with the one with smallest *t*-value. This iterative process resulted in a reduced model that delineated only those paths registering significant interactions (see Figure II).

The Chi-square likelihood ratio and other measures of fit as well as R^2 values for the final model are presented in Table II; while Table III presents the direct, indirect, and total effects of the significant independent variables. Direct effects, or path coefficients, are the standardized regression coefficients that can be interpreted as the standardized effect of one independent variable on a dependent variable in units of standard deviations. Because these are standardized coefficients, the path coefficients in the model can be compared to determine the relative magnitude of effects of independent variables. Indirect effects are those effects that take into account the mediational effects of other variables in between. For example, the effect of SES on achievement is mediated by other variables; thus, SES exerts an indirect effect on achievement through other variables. The total effect of a variable is the sum of its direct and indirect effects.

Given that the reduced model had reasonably good fit and explained 76% of the variance for the criterion variable (academic achievement), the path coefficients were interpreted as indices of effects. A rule of thumb provided by Pedhazur (1982) for the interpretation of effects is to consider all paths whose coefficients are less than .05 as substantively not meaningful. Keith and Cool (1992) offer an additional qualitative aid to the interpretation of these coefficients. They suggest that paths greater than .05 may be interpreted as exerting small but meaningful effects, those between .10 to .15 as exerting moderate effects, and those above .25 as exerting strong effects.

Discussion

The results of this study indicate that prior achievement, perceptions about teaching and teachers, and SES had a significant effect on the academic achievement of this nation-

TABLE I

Composite Variable Correlations, Means, and Standard Deviations

VARIABLES	1	2	3	4	5	6	7	8	9	10
1. Gender	1.000									
2. SES	−.069	1.000								
3. Prior Achievement	.065	.315	1.000							
4. School Environment	.033	.101	.061	1.000						
5. Teachers	.049	−.007	.117	.364	1.000					
6. Parental Aspirations	.106	.290	.234	.053	.036	1.000				
7. Parental Involvement	.036	.172	.095	.170	.191	.251	1.000			
8. Student Aspirations	.097	.180	.170	.106	.115	.367	.276	1.000		
9. Student Motivation	.109	.231	.310	.118	.088	.071	.214	.104	1.000	
10. Achievement	.039	.373	.864	.106	.157	.198	.132	.207	.295	1.000
M	.508	−.404	−.058	.042	.048	−.031	.015	.058	−.023	−.042
SD	.500	.756	.855	.722	.662	.942	.857	.772	.396	.879

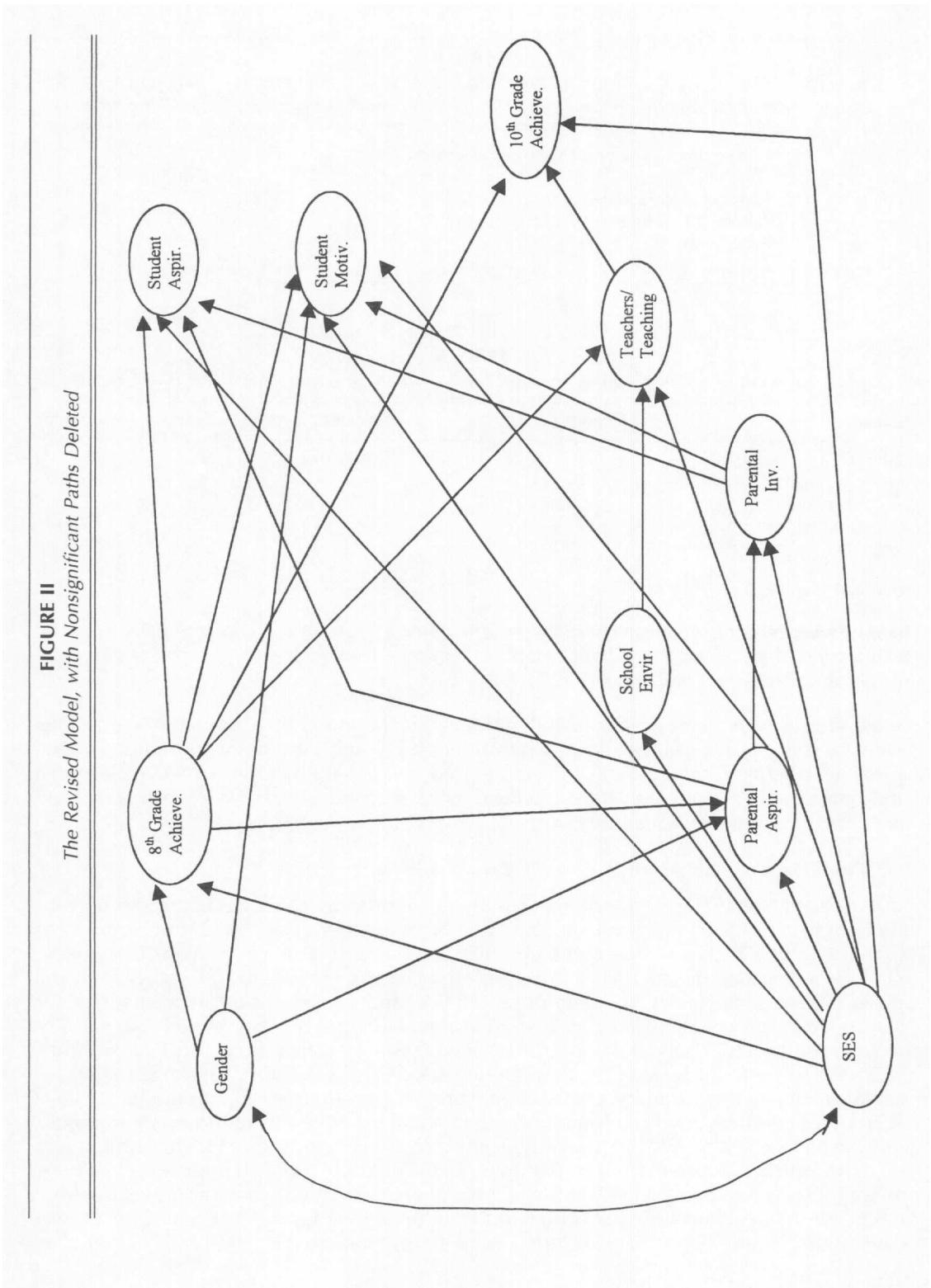

FIGURE II

The Revised Model, with Nonsignificant Paths Deleted

TABLE II

Measures of Overall Fit and R^2 for the Proposed Model to Test the Direct and Indirect Effects of School Learning Variables on the Academic Achievement of African American 10th Graders

Chi Square (χ^2) with 29 Degrees of Freedom	57.48 ($p = .000$)
Goodness-of-Fit Index	.987
Adjusted Goodness-of-Fit Index	.965
Root Mean Square Residual	.023
R^2	.761

TABLE III

Direct and Indirect Effects on the Academic Achievement of African American 10th Graders

VARIABLES	DIRECT EFFECT	INDIRECT EFFECT	TOTAL EFFECT
Gender	—	.072	.072
SES	.134	.305	.439
Prior Achievement	.844	.007	.851
School Environment	—	.027	.027
Teachers	.082	.000	.082
Parental Aspirations	—	—	—
Parental Involvement	—	—	—
Student Aspirations	—	—	—
Student Motivation	—	—	—

wide sample of African American 10th graders. Furthermore, these students' aspirations were causally influenced by prior achievement, SES, and parental aspirations. Finally, prior achievement, gender, and SES influenced student motivation. However, because this was a non-experimental study and the data were correlational, it is important to draw only tentative and cautious inferences.

The Effect of Background Variables on Achievement

The path from SES to achievement (.134) was significant, as would be expected given that students with higher levels of SES often enjoy greater access to learning resources that aid in their higher achievement. Yet, this finding raises another, perhaps more pertinent issue because the coefficient from SES to achievement is both (a) higher than the path coefficient calculated in some other studies; and (b) significant, whereas in other studies, it is not. For example, Fehrmann, Keith, and Reimers (1987) examined an ethnically mixed sample of high school seniors and derived a path coefficient for family background/SES of .008. Their study suggests that family background has little if any direct effect on achievement, as measured by grades. Donovan (1984), estimating a path model for low-SES African American youth, found the direct effect from parents' education and family income to be .037 and .033, respectively. Her study also suggests that SES has little if any direct effect on achievement. (For Donovan's study, grades were the outcome measure as well.) Keith and Benson (1992) also examined effects on high school grades across five ethnic groups and concluded that the path from family background to achievement was constrained to zero because it was found to be nonsignificant. It is possible, however, that

different range of SES variables in these different study samples affected the magnitude of coefficient of SES derived in each.

Although the above-noted studies represent a mere smattering of the literature on student achievement, they raise the question of whether SES has differential effects for minority students when the outcome measure is grades as opposed to scores on standardized tests. It appears that when grades are the outcome measure, parents' income and education are found to have modest effect on student achievement; yet when standardized test scores are used as the outcome variable, SES seems to have a stronger effect. In other words, SES and standardized test scores are more strongly related. This observation is at least given tangential support by the research of Fehrmann et al. (1987) as well as that of Keith, Keith, Bickley, and Singh (1992), which suggests that grades and standardized test scores may have different antecedent influences. The inconsistency in findings regarding the effect of SES underscores the need for more research using different measures of academic achievement in addition to standardized tests.

The Effect of Prior Achievement on Achievement

The path from prior achievement to later achievement noted in the present study was very large (.844). This overwhelmingly suggests that African American students who do well in school prior to their 10th-grade year will do well beyond that year, when gender and SES are statistically controlled. That the path obtained indicates a very strong effect of prior achievement on current achievement comes as no surprise. It stands to reason that nothing predicts success better than previous success. However, by comparison to other effects, this coefficient was extremely large. Studies finding a significant path from a prior measure of achievement to a later measure of achievement typically report a coefficient between .3 and .6 (Cool & Keith, 1991; Keith & Benson, 1992; Keith & Cool, 1988, 1992; Keith et al., 1992; Singh et al., 1995). Thus, the magnitude of the coefficient in the present study raises questions about reasons for such a large effect of prior achievement. This again could be due to the fact that in prior studies, researchers controlled for previous achievement as measured by grades; while in the present study, previous achievement was measured by standardized test scores in four areas. Earlier and later test scores were found to be very strongly correlated.

The large effect of prior achievement suggests that prior standardized test achievement may play a greater determining role in the later achievement of African American high school students than it does for high school students in the general population. If the role of previous academic achievement is much stronger among African American youth, then it seems that patterns of high achievement (and conversely, of low achievement) are determined much earlier for them. If the determinants of early school achievement prior to 10th grade are early school experiences, early instructional quality, early parental aspirations, early parental involvement, and early instructional quality, then studies on minority students' academic achievement should focus on their earlier rather than later years to determine what interventions would be appropriate. The question that such a speculation raises is whether greater stratification of achievers and nonachievers occurs at an earlier age for minority youth such that later school factors have little effect.

The Effect of School Influences on Achievement

A significant path was found to exist between students' perceptions of teachers and teaching and their achievement. Although the magnitude of the effect was small (.082), it is important to consider that it represents a net effect over and above the contribution of other variables in the equation. The teacher effect was measured by the items that

solicited students' perceptions regarding rapport with teachers, instructional quality, positive feedback from teachers for student effort, and teachers showing respect for students. A significant teacher effect means that when students perceive teachers as caring about them and as giving them praise for their effort, and when they perceive the quality of instruction as good, students are likely to be higher achievers (Clark, 1991; Cool & Keith, 1991; Keith & Benson, 1992; Keith & Cool, 1992).

This significant teacher effect is an important finding, particularly because it suggests that teachers have a unique positive impact on students above and beyond the impact of the school environment, students' prior levels of achievement, SES, and gender. In other words, regardless of whether a student is rich or poor, male or female, academically gifted or challenged, teachers can make a difference in their later academic achievement. This finding also suggests that regardless of whether students view discipline at their schools as fair, or regardless of what types of relations exist between students of various races, the relationship between teachers and students may be an important link to academic achievement.

The Effect of Parental Influences on Achievement

A surprise finding from this analysis was that neither parental aspirations nor parental involvement had a significant effect on student achievement. The studies of Keith et al. (1992) and Singh et al. (1995) used the NELS:88 dataset and operationalized parental aspirations in the same way as was done in the present study. Those studies, however, looked at the entire NELS:88 student population, and their results were different: they found a significant effect for parental variables. Notwithstanding, the present findings should not be interpreted to mean that parents have no influence on the academic achievement of their children. However, they do suggest that when other variables such as SES, prior achievement, school and teacher influences are controlled for, parental involvement and aspirations during 10th grade do not affect academic achievement as measured by standardized test scores.

There are several tentative explanations for the nonsignificant or marginal effects of parental variables noted in the present study. First, the very large effect of prior achievement may account for this finding. For instance, it could be argued that having controlled for the variable prior achievement, which clearly explains most of the variability in future achievement, any path to future achievement above .05 from any other variable in the model represents a meaningful effect of substantive importance. It could also be argued that after controlling for prior achievement, other factors in the model were likely not to show much effect on achievement. Thus, the nonsignificance of the effect from parental to student variables could be an artifact of statistical control in regression. It is endemic to path models for which temporal sequencing of variables is required that the effects of a downstream variable may be attenuated merely by its position in the path diagram (Loehlin, 1987). Thus, it is only logical that a prior measure of achievement taken in the 8th grade be posited before measures taken at subsequent points in time (i.e., 10th grade). However, once the effect of previous achievement is taken into account, other factors have only a small amount of variance left to explain. Additionally, items used to measure parental aspirations, student motivation, and other constructs could be improved in reliability and validity. Items with better psychometric characteristics would be able to assess the effect of the constructs better.

Finally, it is important to note that the present study provides a snapshot of effects operating between the 9th and 10th grades. It does not take into account, for example, prior levels of parental aspirations nor prior levels of parental involvement. At best, then,

it can only be said that between the 8th and 10th grades, a time when students typically begin establishing their independence from family, that parental variables had little or no effect on the sampled students' standardized achievement. This finding is interesting given that other similar studies (Keith et al., 1992; Singh et al., 1995) have shown that high parental aspirations are related to higher academic achievement.

Several other factors may help explain the current findings beyond the tentative explanations suggested above. Thus, in addition to path analysis, frequency analyses were conducted for certain demographic variables. The descriptive statistics revealed that nearly 16% of students' parents never completed high school, 23% completed high school only, and nearly 45% graduated from high school but had less than a four-year college degree. These data also revealed that approximately 82% of the sampled students' mothers and fathers aspired for their children to attend a four-year college, graduate from college, or complete postgraduate education. This suggests that most of these African American parents, on average, wanted their children to obtain more education than they themselves did. Apparently, they valued higher education whether or not they had personally benefitted from it. Further, many may have had expectations for their children that were above their children's abilities, as based on the latter's scores on the achievement tests. Thus, even when African American children have relatively low scores on standardized achievement tests, their parents still hold high aspirations for them. This pattern remained consistent among the sampled African American parents who held college degrees at various levels as well as among those who had less than a college education. This suggests the possible existence of a gap between these parents' high aspirations and their lack of knowledge about the role of high school achievement in pursuing college education.

Another possibility, given that 33% of students reported household incomes of less than $10,000 a year, is that these parents did not have within their means the avenues to help bolster their children's scores on standardized tests despite their high aspirations. It is unlikely that students from families having incomes under $10,000 would be enrolled, for example, in courses that help prepare students to take popular standardized examinations like the Scholastic Achievement Test (SAT). The absence of a substantive path coefficient from parental aspirations and involvement to achievement, as shown in Table III, may also reflect the existence of a different opportunity structure for minority students compared to non-minority students, as suggested by Johnson (1992), Kozol (1991), and Ogbu (1990). These findings also suggest the presence of another paradox, with African American parents holding high aspirations for their children's postsecondary plans, yet seemingly lacking the information and perhaps the skills needed to get involved in meaningful ways to further the current achievement of their children.

The Effect of Student Influences on Achievement

Another anomaly noted among the findings was that neither these students' educational aspirations nor their motivation had significant effect on their academic achievement after controlling for other variables such as SES, previous achievement, perceptions of teaching quality, and so forth. Again, this does not suggest that achievement is not affected by whether or not a student aspires to higher levels of learning; does his or her homework; or takes courses in mathematics, science, English, and foreign languages. Rather, because of the temporal sequencing of these variables, it may be that the variability in educational aspirations and achievement motivation does not contribute significantly to the explanation of variance in academic achievement after controlling for other factors. This finding is supported by the work of Keith and Cool (1992), who examined the impact of motivation and other factors on the achievement of a national sample of high school students. They

found motivation to have a nonsignificant direct effect on achievement, although the indirect effect was significant when other variables were already in the model. Similar findings were reported by Uguroglu and Walberg (1986) in a cross-sectional study of less-affluent students of different races and ethnicities. These latter researchers concluded that although motivation was highly correlated with achievement measures, it inconsistently predicted achievement when analyzed simultaneously with other factors.

It should be noted that the independent contributions of aspiration and motivation may be difficult to detect because motivation, as a construct, is complex and multidimensional. Moreover, the usual measures may only represent certain aspects or a single dimension of motivation. These findings suggest that the effects of motivation, as measured in the present study, and student aspiration are inconsistent and should be studied further in future research, using multiple measures of these constructs.

The Effect of Background Influences on Student Motivation

Both gender ($\beta = .084$) and SES ($\beta = .079$) were found to influence student motivation in the present study. The path coefficient from gender to motivation indicated that girls are more motivated to achieve academically than were boys. This suggests that the girls in the sample spent more time on homework and took more courses in mathematics, science, English, and foreign language than did the boys. Similarly, the significant path from SES to motivation suggests that higher levels of SES are related to higher levels of motivation among this set of African American 10th graders.

The Effect of School Influences on Student Motivation

Interestingly enough, despite the significant influence of students' perceptions of teaching and teachers on their achievement, the effect of students' perceptions of teachers did not influence their aspirations or their motivation when other variables in the model were statistically controlled. This gives rise to two thoughts. First, it might be that African American high school students have developed a type of resilience factor, and, as a result, teachers seemingly have no impact on affective characteristics of students such as thoughts, feelings, and aspirations (Lee, Winfield, & Wilson, 1991; Ogbu, 1979, 1990, 1991; Wilson–Sadberry, Winfield, & Royster, 1991; Winfield, 1991). Related to this is yet another possibility: The process of education for African American students have neither permitted nor facilitated a relationship between African American students and teachers to flourish outside of the classroom. As such, the sampled students' perceptions that their teachers are friendly and supportive may be more akin to perceptions of their teachers not being outwardly unfriendly. It may also be that students perceived their teachers as being helpful when they sought help as opposed to being proactive in offering help and support, and thereby influencing the motivational aspects of student behavior. Again, these ideas are based on speculation, and thus they need to be examined further empirically.

The Effect of Parental Influences on Student Motivation

The effect of parental aspiration ($\beta = -.038$) on student motivation was also perplexing. The results of the present study suggest that higher levels of parental aspirations for their children was related to lower levels of students' motivation, and vice-versa. Although the effect noted was very small and negligible, the negative sign of the coefficient was the opposite of what one might expect. This negative coefficient is an artifact of regression and statistical control; however, controlling for other variables parental variables apparently had no effect on the students' motivation. Though the parents held high aspirations

for their children, they seemed unable to translate these aspirations into a motivation and achievement orientation among the sampled 10th graders. Kozol (1991), Ogbu (1990), Pine and Hilliard (1990) have each documented possible reasons for this. On the one hand, they suggest that the schooling of African American children should not be viewed in isolation from the larger society in which they live. Furthermore, they maintain that the collective history of poverty endured by the majority of African Americans during the first 350 years of their experience in the Western Hemisphere may have adversely affected the schooling and motivation of African American children of recent generations. Thus it seems that many poor families in the United States, among whom African Americans are disproportionately represented, may operate with a decreased ability to foster motivation and achievement in their children, even when these families hold high aspirations for their children's future education. Holding higher aspirations in the absence of motivation and achievement orientation does not necessary pave the way for future achievement. In any case, the relationship between parental aspiration and students' academic motivation demands further investigation. A dearth of empirical research remains to be addressed in this area.

Finally, parental involvement was shown to have a small but significant effect on student motivation. Apparently, when parents and children talk about school-related matters and communicate about college attendance, it creates a home environment where learning and achievement are valued. Such communication positively affects motivation. The finding that the effect of parental involvement on student motivation was small ($\beta = .084$) may also be explained by a qualitative assessment. That is, students are probably less likely to talk to parents about taking college placement examinations such as the SAT or ACT (the American College Testing Assessment Test) if parents have not taken these tests themselves. Students may, therefore, be more inclined to talk to parents about going to college in general and not at the level of detail of taking the tests. As Kozol (1991) suggests, parents of poor children may find the process of planning for college intimidating if they have not been exposed to it themselves. Table IV presents data on the direct, indirect, and total effects of parental involvement on motivation.

The Effect of Parental Influences on Student Aspirations

The variable with the largest significant effect on students' aspirations was parents' aspirations ($\beta = .250$), followed by parental involvement ($\beta = .225$). These effects far outweighed those of socioeconomic status ($\beta = .089$) and prior achievement ($\beta = .071$). This suggests that although the parents of this sample of African American 10th graders may

TABLE IV

Direct and Indirect Effects on Student Motivation of African American 10th Graders

VARIABLES	DIRECT EFFECT	INDIRECT EFFECT	TOTAL EFFECT
Gender	.084	.012	.096
SES	.079	.046	.125
Prior Achievement	.120	−.003	.117
School Environment	—	.000	.000
Teachers	—	.000	.000
Parental Aspirations	−.038	.017	−.051
Parental Involvement	.084	.000	.084
Student Aspirations	—	.000	.000

not have been able to affect increased study time or motivate their children to enroll in college-preparatory academic courses, parental involvement and aspirations were nonetheless significant insofar as their children's academic aspirations were concerned (see Table V). It further suggests that students' aspirations in part reflect parental aspirations and communications. Research has confirmed the incidence and prevalence of high aspirations among the parents of African American children (Clark, 1991; Keith et al., 1992; Pollard, 1989; Singh et al., 1995). It may be that parents of African American children view education as the only path available for their children to escape from poverty, inequality, and racism; thus, they hold high educational aspirations for their children.

Conclusion

The purpose of this study was to test the direct and indirect effects of school learning variables on the academic achievement of African American 10th graders. Chief among its findings were the following:

(1) prior achievement overwhelmingly influences later achievement;
(2) SES produces a moderate effect on achievement;
(3) students' perceptions of teachers and teaching exerts a small but statistically significant effect;
(4) prior achievement, SES, and parental aspirations causally influence student aspirations;
(5) student motivation is affected by prior levels of achievement, gender, and SES; and
(6) despite high educational aspirations of both African American children and their parents, these aspirations often affect neither student achievement as measured by scores on standardized tests nor student motivation.

The major factor determining the standardized achievement of this sample of African American 10th graders was their previous achievement. Although the large effect of previous achievement on later achievement is not a surprising finding and has been reported in similar studies, the magnitude of this effect was larger than in other studies of general populations. There may be some plausible reasons for such a large effect. It seems that patterns of achievement are crystallized during earlier schooling, and these same patterns continue during high school years. This apparent stratification of achievers and nonachievers, which may occur at a young age for African American children, may explain why later school factors seem to have little effect on their achievement.

Another important variable found to affect the academic achievement of this nationwide sample of African American students was the socioeconomic status of their families.

TABLE V

Direct and Indirect Effects on Student Aspirations of African American 10th Graders

VARIABLES	DIRECT EFFECT	INDIRECT EFFECT	TOTAL EFFECT
Gender	—	.081	.081
SES	.089	.163	.252
Prior Achievement	.071	.048	.119
School Environment	—	.000	.000
Teachers	—	.000	.000
Parental Aspirations	.250	.040	.295
Parental Involvement	.225	.000	.225

This suggests the possibility of students' economic impoverishment negatively influencing their achievement at the 10th-grade level as well as undermining their postsecondary plans. Furthermore, earlier studies have reported smaller or marginal effects of SES on achievement when grades are measures of achievement, yet the present study found a larger effect of SES on standardized test scores. It is possible that SES is more strongly related to standardized achievement, as measured by test scores, than to grades earned in subject areas because parents of higher SES may be more knowledgeable about standardized testing and the ways to prepare for these tests.

Further research should examine the differential effects of SES on different measures of achievement other than standardized tests. These findings should also be taken into consideration when designing educational programs and interventions for students whose parents have little more than a high school education and who, despite their having higher aspirations for their children, may not be familiar with the tests and practices necessary for their children to gain college admission.

Students' perceptions of teachers and teaching were found to significantly influence the academic achievement of students, although to a much lesser degree than prior achievement or SES. In other words, when students perceive teachers as caring about them and as giving them praise for their effort, and when they feel that the quality of instruction they receive is good, they are more likely to be higher achievers. This finding is important, particularly because it suggests that teachers can have a positive effect on students above and beyond the impact of the school environment, students' prior levels of achievement, and students' SES and gender. Moreover, it indicates that when teachers are perceived as fair, involved, and as good instructors, African American high school students are more likely to achieve higher. It also suggests that students' perceptions regarding school discipline and peer relations among students of different racial/ethnic groups are less important to school achievement than are their perceptions of teachers and teaching.

This study, like all research, raises as many questions as it answers and suggests directions for further research. Some critical areas for research and practice are suggested as a result. For example, additional empirical research is needed to investigate whether patterns of school achievement are determined at an earlier age for African American schoolchildren. Such research should examine the earlier influences on school learning in elementary grades. Additionally, in the present study, school achievement was found not to be affected by parental involvement; thus, the effects of parental involvement may be age-specific, as suggested by Singh et al. (1995). Earlier research has also reported that the effect of parental involvement is stronger in younger years than in adolescent years. That being the case, more empirical research on parental involvement and its effect on school achievement should be focused on younger African American children.

Another recommendation is to include measures of parental aspiration and involvement taken directly from parents in studies of school achievement. Furthermore, similar models may be developed and examined for other racial/ethnic groups to determine whether differences exist in factors that affect school achievement for different groups. Are there racial/ethnicity-specific differences in the magnitude of effects of family, school, and student factors on achievement? A point that should be emphasized is that factors that affect achievement such as aspiration and motivation are multidimensional and complex psychological constructs. Issues of validity and reliability in the measurement of such complex constructs are always paramount. Although the measures used in the present study had high reliabilities and face validity, new studies may conceptualize these constructs using more comprehensive, multiple measures. Finally, this study suggests the need for school personnel to help raise African American parents' knowledge, awareness,

and involvement in their children's education. Better information and knowledge would aid these parents in their efforts to help their children select more rigorous, academic course work during the high school years and better advise them with regard to planning for a college education.

It is crucial to identify the variables that influence the academic achievement of African American schoolchildren, and the study described in the present article marked an important step in that direction. By examining the sources of variation in these students' achievement and motivation, educators and policymakers will be in a better position to intervene and reverse the negative educational trends found among them and ultimately design instruction for the improved learning and development of all students.

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