Racial Differences in the Formation of Postsecondary Educational Expectations: A Structural Model

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Background: *Educational attainment is associated with a plethora of positive economic and social implications for individuals, institutions, and the broader society. One factor that has been identified as an important predictor of students' educational attainment is their educational expectations. Thus, understanding how educational expectations are shaped is important to comprehending how success can be fostered among students from diverse racial backgrounds.*

Purpose of the Study: *This quantitative study is aimed at understanding the process by which students from various racial backgrounds cultivate and reformulate their educational expectations during the high school years. Three research questions were explored in this study: (1) How do various academic and interpersonal factors directly affect students' educational expectations? (2) How do academic and interpersonal factors indirectly affect students' educational expectations via their self-perceptions? and (3) How do those effects vary across different racial groups?*

Populations and Participants: *The National Education Longitudinal Study (NELS) survey was first administered to students in the spring of eighth grade, and the first two follow-up surveys were administered in the spring of those students' 10th- and 12th-grade years. Students who participated in the NELS surveys from the base year to the second follow-up (88:92) were included in the omnibus analysis, resulting in an overall sample size of 12,144. That sample was divided into Asian (n = 764), Black (n =1,041), Latina/o (n*

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=1,444), Native American (n= 399), and White (n = 7,626) subsamples, and a parallel analysis was conducted to allow for the comparison of effects across various racial subpopulations.

Research Design: *Using a pretest-posttest design and structural equation modeling techniques, we created a structural model and examined how academic and interpersonal factors directly and indirectly, via self-efficacy and locus of control, influence students' educational expectations. Particular attention is given to how those effects vary across racial subpopulations.*

Conclusions and Recommendations: *Relationships between the results of this inquiry and earlier studies are complex, with some of our findings confirming and some contradicting those of other researchers. The results of this analysis indicate that the process by which students formulate and reformulate their educational expectations during the high school years varies across racial groups. Recommendations for future research involve considering racial, gender, socioeconomic, and other differences in examining students' educational expectations and outcomes. We also recommend that future research focus on understanding the reasons why such racial differences exist.*

Most high school graduates need some level of postsecondary education to achieve economic self-sufficiency and acquire the skills necessary to navigate the increasingly complex cultural, political, and social terrain that characterizes our national and international societies (Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006; McCabe, 2000). For individual students, participation and degree completion in higher education may translate into returns on investment and opportunities to enjoy the many benefits that accompany the completion of a postsecondary degree (Baum & Payea, 2005; Choy & Li, 2005; Swail, 2004). For example, in 2003, bachelor's degree recipients earned, on average, 62% more than high school graduates who chose not to enroll in college (Baum & Payea). The individual rewards of educational attainment also result in cumulative social and economic benefits for the broader society, including lower total incarceration rates, lower rates of unemployment, higher academic preparation among future generations, and higher levels of civic participation (Baum & Payea; Kezar, Chambers, & Burkhardt, 2005; Swail). Given the vast individual and societal benefits accrued via educational attainment, maximizing such attainment is more important now than it has ever been (Kuh et al.), particularly among racial minority groups for whom access to powerful social networks remains limited (Harper, 2008; Perna & Titus, 2005).

One factor that has been identified an important predictor of students' educational attainment is their educational expectations (Allen, 1992; Astin, 1977; Carter, 1999; Epps, 1995; Pascarella & Terenzini, 1991, 2005). Thus, understanding how educational expectations are shaped is

critically important to comprehending how success can be fostered among students. Although previous research has provided insights into the various factors that influence educational expectations, much remains to be learned about *how* those factors affect expectations, the relative impact of those influences on students' educational expectations, and differences in the effects of various factors across racial populations. Furthering our understanding of how and why various phenomena function to shape expectations as particular students formulate their postsecondary educational plans is an important step in clarifying how educators can create conditions that foster equitable long-term achievement patterns among diverse populations of students. Toward this end, the current study is aimed at understanding how academic, interpersonal, and psychological factors shape the college expectations of high school students across different racial backgrounds.

LITERATURE REVIEW

Literature focused on educational expectations is reviewed in this section. The review provides a foundation for the conceptual framework that guided the study and the structural equation model (SEM) that was employed in the analysis. First, the distinction between educational aspirations and expectations is discussed. Then, the many factors that evidence suggests are predictors of educational expectations are grouped into four categories—demographic, academic, interpersonal, and psychological factors—and discussed in the four following corresponding sections. Accordingly, it is these four categories that constitute the conceptual framework for the current study.

DISTINGUISHING BETWEEN EDUCATIONAL ASPIRATIONS AND EXPECTATIONS

Educational aspirations and expectations are among the least understood concepts in education (Carter, 1999, 2001). One factor complicating this understanding is the conflation of, and lack of consistent differentiation between, these two concepts (Carter, 2001; Museus & Hendel, 2005; Trusty, 2002). Whereas aspirations have been operationalized as desired outcomes absent of limitations on constraints or resources (Hauser & Anderson, 1991), expectations can be viewed as outcomes foreseen in the presence of various environmental constraints (Hanson, 1994; Museus & Hendel). This is an important distinction, given the discrepancies illuminated in existing research regarding students' educational aspirations and expectations.

Hanson (1994), for example, highlighted the critical distinction between aspirations and expectations. She examined a nationally representative sample of high school students and found that 16% of seniors who aspired to attain a college degree did not expect to attain one. Moreover, those students experienced decreases in expectations as they adjusted them to institutional and environmental constraints. Hanson described this gap between aspirations and expectations and the decrease in educational expectations over time as "lost talent" because individuals who aspire to a level of education but do not expect that they can attain it because of perceived social constraints are unlikely to realize their full educational potential.

Recognition of the importance of external constraints in the formulation of expectations is particularly important when discussing the expectations of students from historically underserved populations (e.g., low socioeconomic status [SES] and racial minority) because existing levels of social stratification may enhance the salience of perceived structural limitations for those students and consequently constitute major barriers to their academic achievement and educational attainment (Bourdieu, 1973; Ogbu, 1978). Although the current study is focused on the examination of students' educational expectations, we reviewed literature discussing the various factors that influence both aspirations *and* expectations concurrently because aspirations to attain a particular level of education and the social constraints on such aspirations are both considered fundamental components of students' educational expectations. A plethora of influences shape students' educational aspirations and expectations. Most of the literature on the educational aspirations and expectations of students prior to college focuses on three different types of predictors—demographic, academic, and social—which are discussed in the following sections. Those sections are followed by a discussion of the role of psychological mediators in the formation of educational expectations.

DEMOGRAPHIC INFLUENCES

Evidence suggests that demographic factors, including SES, race, gender, and family influences, are salient predictors of educational expectations (Carter, 2001; Hanson, 1994; Kao & Tienda, 1998; Perna, 2000; Perna & Titus, 2005; Solórzano, 1992; Trusty, 1998, 2002). Researchers have recognized that SES is an instrumental factor in the development of educational expectations (Hanson; Kao & Tienda; Solórzano; Trusty, 1998, 2002). In fact, studies using nationally representative data suggest that SES may be the most powerful predictor of educational expectations

(Hanson; Trusty, 1998). Furthermore, Hurtado, Inkelas, Briggs, and Rhee (1997) found SES to be important in explaining racial differences regarding which students apply to college, where they apply, at what stage in high school they apply (i.e., before, during, or after 12th grade), and to how many colleges they submit applications for admission.

ACADEMIC INFLUENCES

Existing literature also indicates that several high school factors, including academic preparation, high school academic rank, test scores, and college preparatory curricula, affect the formation of students' educational aspirations and expectations (Dai, 1996; Farrell, Sapp, Johnson, & Pollard, 1994; Hauser & Anderson, 1991; Hearn, 1991; Hossler & Stage, 1992; Kandel & Lesser, 1979; J. I. Nelson, 1972; Perna, 2005; Trusty, 2000, 2002). Trusty (2002), for example, developed a structural equation model of African American students' educational expectations using a nationally representative sample and found that early academic variables were the strongest predictor of the students' expectations 2 years after high school, leading him to conclude that educational expectations and implied attainment were largely a function of academic preparation and efforts.

INTERPERSONAL INFLUENCES

Previous researchers have generally identified three groups of significant others with important roles in the construction of students' educational aspirations: teachers, parents, and peers (e.g., Alexander, Eckland, & Griffin, 1975; Qian & Blair, 1999; Sewell & Hauser, 1993). Evidence regarding the impact of teachers' expectations on students' expectations is mixed. For example, whereas Flowers, Milner, and Moore (2003) concluded that teachers' expectations significantly influence African American students' aspirations, Cheng and Starks (2002) contended that teacher expectations are only significant for Hispanic and White students. Given that the authors included very different statistical controls in their studies, this discrepancy could also be a function of variation in the methodological procedures and data used in the analyses.

Existing evidence, by and large, buttresses hypotheses affirming the significance of parental influence. Researchers examining heterogeneous samples (Marjoribanks, 1986; Smith, 1989, 1991; Wilson & Wilson, 1992) have consistently found parental influences to shape educational expectations. And studies that have specifically focused on minority students' expectations have also generally found that parental encouragement,

expectations, involvement, and support have a positive influence on students' educational expectations, achievement, and attainment (Connell, Spencer, & Aber, 1994; Mahoney & Merritt, 1993; Qian & Blair, 1999; Singh, Bickley, Trivette, Keith, & Anderson, 1995; Smith-Maddox, 1999; Trusty, 1998, 2002). For example, Adams and Singh (1995) analyzed a nationally representative sample of high school students and found parents' expectations and involvement to exhibit relatively strong effects on the expectations of African American students.

Additionally, researchers have found that the SES of peers and the academic norms of one's high school peers can have complex psychological implications. Those peer factors may result in a *frogpond effect* (Alwin & Otto, 1977; Meyer, 1970), in which higher SES and academic standards may increase students' educational aspirations or, conversely, have a negative impact on aspirations as students compare themselves with peers with higher academic ability. Researchers have noted that these effects may work to cancel each other out, rendering the influence of high school context minimal or insignificant (Alwin & Otto, 1977; Meyer, 1970; J. I. Nelson, 1972). With regard to peers' aspirations, scholars have argued that Black and Latina/o students have lower aspirations for their same-race peers than White students do (Kao & Tienda, 1998; Ogbu, 1978, 1991) and that Asian students' aspirations for their peers are relatively high (Cheng & Starks, 2002; Goyette & Xie, 1999).

PSYCHOLOGICAL INFLUENCES: ATTRIBUTION AND SELF-EFFICACY

The majority of studies in the area of educational expectations focus on examining the aforementioned demographic, academic, and interpersonal influences on expectations, but a few researchers have also relied on attribution and self-efficacy theories to understand the process by which students form expectations for particular levels of educational attainment (e.g., Flowers et al., 2003; Hanson, 1994; Museus & Hendel, 2005; E. S. Nelson & Mathia, 1995; Nowicki & Strickland, 1973; Wang, Kick, Fraser, & Burns, 1999). Locus of control involves a student's attribution of internal and external factors to outcomes and performance (Rotter, 1966; Weiner, 1979). Rotter classified individual beliefs about what influences various outcomes on a continuum, ranging from internal to external loci of control. A student with an internal locus of control realizes that personal characteristics, skills, and behaviors are responsible for outcomes. Conversely, a student with an external locus believes that he or she has no control over life situations and that outcomes are by-products of fate, luck, misfortune, and institutionalized conspiracies (Weiner, 1985, 1986). There is some support for the notion that locus of

control is positively associated with motivation, educational aspirations, academic performance, and educational attainment (Flowers et al.; Hanson; E. S. Nelson & Mathia; Nowicki & Strickland; Wang et al.).

Students who possess internal loci of control are likely to be successful in the academic domain (Floyd, 1996; Luthar, 1991). According to Volkmer and Feather (1991), because individuals with internal loci attribute success and failures to factors within themselves, they tend to perform better and have higher expectations. Alternatively, Bean and Eaton (2000) offered the following: "A student with an external locus is less likely to be motivated to produce the effort to perform well academically, since he [or she] perceives that the situation is not within his [or her] control" (p. 54). Although the literature on attribution focuses more on academic performance than the formation of educational expectations, it can be hypothesized that one's locus of control may be a salient factor in shaping her or his expectations and subsequent attainment.

Bandura (1977, 1986, 1997, 2001), as well as Rottinghaus, Lindley, Green, and Borgen (2002), characterized self-efficacy as an individual's perception of his or her abilities and competencies in performing various tasks. These perceptions are typically informed by previous experiences and positive reinforcement provided by the individuals' environments—that is, what they have done, how others have responded, and what they have seen others do. The theory also states that recognition of competence leads to greater academic performance, increased motivation to persist, and development of higher goals and subsequent aspirations.

Bandura (2001) asserted that positive beliefs about one's ability in a specific domain compel an individual to formulate and pursue goals associated with that domain, even when faced with institutional constraints. Alternatively, negative beliefs about ability may decrease aspirations or curb one's desire to persevere through challenging situations in order to attain educational goals. Reportedly, strong perceptions of self-efficacy are associated with higher degree aspirations, lofty educational plans, and academic achievement (Bandura, 1991, 2001; Bandura, Barbaranelli, Caprara, & Pastorelli, 1996; Carter, 1999; Museus & Hendel, 2005; Schabo Grabowski, Call, & Mortimer, 2001). Moreover, self-efficacy has been used to explain the gap between students' aspirations and expectations (Trusty, 2000).

There is a growing body of evidence suggesting that self-efficacy mediates the impact of other salient environmental variables. For example, Gándara and Lopez (1998) discovered that self-efficacy could play an important mediating role in the relationship between academic factors and the formation of students' educational expectations. They con-

cluded that students internalized standardized college entrance examination scores, and those who received lower scores reported lower levels of academic ability, even when controlling for high school grades. A study by Museus and Hendel (2005) supports this claim. Museus and Hendel found that test scores exhibited indirect effects on educational plans via their impact on intellectual self-confidence. Whether these findings are generalizable and how they vary among different types of educational student populations (e.g., various racial groups), however, is unknown.

RACIAL DIFFERENCES IN THE FORMATION OF EDUCATIONAL ASPIRATIONS AND EXPECTATIONS

A growing body of evidence suggests that the process by which students formulate their educational aspirations and expectations varies by race (Carter, 1999; Farrell et al., 1994; Hanson, 1994; Rigsby, Stull, & Morse-Kelley, 1997). For example, Farrell et al. found that academic performance was a more powerful predictor of expectations for White students than for their Black and Latina/o peers, whereas Hanson concluded that academic performance was salient for racial minorities but not White students. One source of the discrepancy in these findings may be the analytical methods employed. Whereas Farrell et al. examined students' expectations after high school, Hanson's study was focused on identifying predictors of lost talent.

There is also evidence that parents' aspirations and teachers' expectations for their children also vary by race (Cheng & Starks, 2002; Goyette & Xie, 1999). Cheng and Starks found that parents' expectations were higher for minority students than for their White peers in the 10th grade but that parental aspirations exhibited a greater impact on White students' educational expectations than their racially different peers. It has also been noted that teachers hold significantly higher expectations for Asian and White students than for their Black peers (Alexander, Entwisle, & Bedinger, 1994; Alexander, Entwisle, & Thompson, 1987; Farkas, Grobe, Sheehan, & Shuan, 1990; Ferguson, 1998; Wong, 1980) and that teachers' perceptions may be more negative for Hispanic students than for their non-Hispanic counterparts (Arnold, Griffith, Ortiz, & Stowe, 1998). Nonetheless, much remains to be learned about racial differences in the formation of postsecondary educational expectations.

SIGNIFICANCE OF THE STUDY

This study will contribute to existing literature in two primary ways. First, although the salience of self-efficacy and locus of control has been

established in previous literature, the ways in which these psychological variables may mediate the impact of various factors is largely unknown. Therefore, one contribution of the current study is the illumination of *how* and *to what extent* the effects of various academic and interpersonal factors on educational expectations may be mediated by variables measuring self-perceptions (e.g., self-efficacy and locus of control).

Despite the gradual increase of literature on educational expectations, understandings of racial differences in the ways by which students formulate their educational plans during the high school years are limited. Although researchers have expanded our knowledge of the various factors that influence racial minority student expectations (Cheng & Starks, 2002; Flowers et al., 2003; Qian & Blair, 1999; Trusty, 2002), to the best of our knowledge, none of these examinations has analyzed Asian, Black, Latina/o, Native American, and White students' expectations using the same sample and methodological procedures. This is a major limitation of existing literature because when racial differences are identified by juxtaposing multiple studies, there is no way to ensure that those differences are a function of race and not a product of the sample, data, or statistical procedures used. Thus, a second contribution of this study will be the provision of a model for comparing the process by which various high school factors influence educational expectations across five major racial groups.

OBJECTIVES

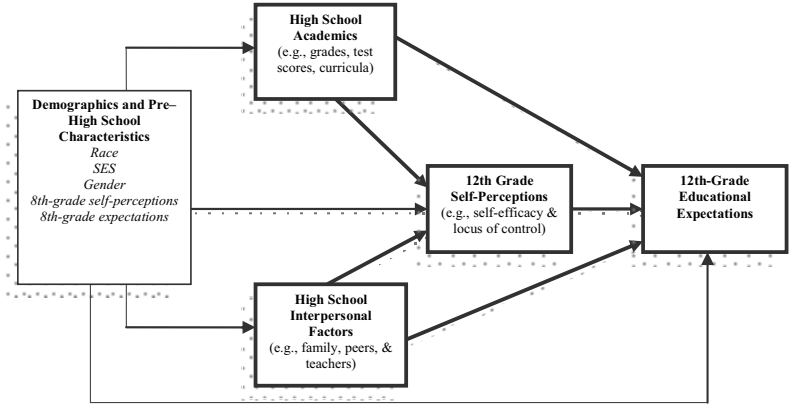
Three research questions were explored in this study: (1) How do various academic and interpersonal factors directly affect students' educational expectations? (2) How do academic and interpersonal factors indirectly affect students' educational expectations via their self-perceptions? and (3) How do those effects vary across different racial groups? The aim here is to examine the impact of various academic and interpersonal factors on the educational expectations of high school seniors—while paying particular attention to conditional effects and mediating psychological factors—to provide educators with a better understanding of how they can positively shape particular students' aspirations and expectations regarding educational attainment beyond high school.

CONCEPTUAL FRAMEWORK

The conceptual framework that guided the design and execution of this study is displayed in Figure 1. The model posits that various demographic and pre–high school factors (e.g., race and eighth-grade educational

expectations) and academic (e.g., high school curriculum and standardized tests), interpersonal (e.g., social involvement and teacher interaction), and psychological (e.g., locus of control and self-efficacy) factors directly influence students' educational expectations. Moreover, the framework hypothesizes that academic and interpersonal factors indirectly affect expectations via those aforementioned psychological mediators. The academic, interpersonal, self-perceptions, and expectations constructs, as well as the relationships among them, represent the focal point of the model and are the focus of the following analysis.

Figure 1. Conceptual Model of Influences on Postsecondary Educational Expectations in the 12th Grade



METHODS

THE SAMPLE AND WEIGHTS

The National Education Longitudinal Study (NELS) survey was first administered to students in the spring of eighth grade, and the first two follow-up surveys were administered in the spring of those students' 10th- and 12th grade-years. The NELS data were particularly ideal for this study for two primary reasons. First, they contain a sufficient number of participants in each of the five racial groups that we sought to include in our analysis. This is critical because the adequately large sample sizes within each racial group permitted the disaggregation of the omnibus sample by race and allowed us to compute a separate set of calculations for each racial subgroup. Second, the sample selected for the NELS survey is nationally representative, which permits the generalization of results to

the broader national population of high school students.

Students who participated in the NELS surveys from the base year to the second follow-up (88:92) were included in the omnibus analysis, resulting in an overall sample size of 12,144. The sample was then divided into Asian (n = 764), Black (n =1,041), Latina/o (n =1,444), Native American (n= 399), and White (n = 7,626) subsamples, and a subsequent parallel analysis was conducted to allow for the comparison of effects across various racial subpopulations. Because the AMOS structural equation modeling software package does not allow the application of panel weights, means were imputed to replace missing values and the appropriate panel weight was used to calculate a composite covariance matrix and separate covariance matrices for each racial group, which were then loaded into AMOS for the final analyses. It should be kept in mind that imputation of means may decrease variation within variables and contribute to attenuation of the individual effects. In other words, the path coefficients that result from our analysis may be modest estimates of the actual magnitude of the respective relationships that they represent.

THE MEASUREMENT AND STRUCTURAL MODELS

Key variables and their corresponding indicators and alpha codes are displayed in Table 1. The measurement model was constructed using a combination of exploratory and confirmatory factor analysis procedures. First, exploratory principal components factor analysis with varimax rotation was used to identify the most reliable and valid indicators for creating each latent construct. Indicators with factor scores below 0.4 were excluded from the remainder of the analysis. Then, confirmatory factor analysis and indicators with scores above 0.4 were used to construct a measurement model in AMOS.

After the measurement model was created, a structural model was constructed using a longitudinal pretest-posttest design. Demographic characteristics such as gender and SES were also entered into the model as control variables. Additionally, pre–high school self-perceptions and educational expectations were included as pre–high school benchmarks to allow for the estimation of the effects of various predictors on students' educational expectations *during the high school years*. The focal point of the model, therefore, posited that academic (e.g., remediation, advanced placement (AP) coursework, high school grades, standardized test scores) and interpersonal (e.g., integration; teacher interaction; teacher care and expectations) factors in high school directly, and indirectly via psychological mediators (i.e., self-efficacy and locus of control), influence educational expectations during the high school years.

Table 1. Key Variable Definitions and Alpha Codes

Variable	*Description and Codes*
12th-Grade Educational Expectations	A single-item construct that measures the highest level of education that the student expects to attain. Coded: 0 = *less than HS diploma,* 1 = *high school diploma,* 2 = *some college,* 3 = *bachelor's degree,* 4 = *master's degree or equivalent,* 5 = *Ph.D., MD, or equivalent.*
Psychological Mediating Factors	
12th-Grade Locus of Control	A continuous standardized scale that was developed using three measures: the extent to which students felt that luck is more important than hard work; that they cannot get ahead because of external forces; and that plans hardly ever work out.
12th-Grade General Self-Efficacy	A continuous standardized scale that was developed using four measures: the extent to which students felt good about themselves; that they are a person of worth; that they can do things as well as most other people; and that they are satisfied with themselves.
Academic Factors	
Advanced Placement	A single-item construct that measures whether the student had been in an AP program in 9th- or 10th-grade. Dummy-coded: 0 = no, 1 = yes.
Remedial English	An observed factor measuring whether the student had participated in remedial English in 9th- or 10th-grade. Dummy-coded: 0 = no, 1 = yes.
Remedial Math	An observed factor measuring whether the student had participated in remedial math in 9th- or 10th-grade. Dummy-coded: 0 = no, 1 = yes.
Grades (alpha = .93)	A latent factor constructed from continuous measures of composite average high school grades in the areas of English, math, science and social studies.
Test Scores (alpha = .90)	A latent factor constructed from continuous measures of scores on three sections of the mini-SAT administered by the Department of Education: (1) math; (2) reading; and (3) science.
Interpersonal Factors	
Teacher Interaction	An observed factor measuring the extent to which the student interacts with teachers per week outside of class in 10th-grade. Coded: continuously from 0 to 40 or more hours.
Teacher Expectation	An observed factor measuring extent to which the students agreed with a statement that their teacher cares about them and expects them to succeed in school in 10th-grade. Coded 0 = *strongly disagree,* 1 = *disagree,* 2 = *agree,* 3 = *strongly agree.*
Father's Aspirations	An observed factor measuring how far in school students' fathers expect them to go in 10th grade. Coded ordinal: 0 = *less than high school diploma,* 1 = *high school diploma,* 2 = *some college,* 3 = *bachelor's degree,* 4 = *master's degree,* 5 = *Ph.D. or professional degree.*
Mother's Aspirations	An observed factor measuring how far in school students' mothers expect them to go in 10th grade. Coded ordinal: 0 = *less than high school diploma,* 1 = *high school diploma,* 2 = *some college,* 3 = *bachelor's degree,* 4 = *master's degree,* 5 = *Ph.D. or professional degree.*
Parent Communication (alpha = .85)	A latent factor constructed using eight measures of the frequency of discussions students had with parents about: (1) courses; (2) school activities; (3) things studied; (4) grades; (5) ACT/SAT prep; (6) going to college; (7) job possibilities; (8) current events. All indicators from 12th grade survey and coded ordinal: 0 = *never,* 1 = *sometimes,* 2 = *often.*
Parental Involvement (alpha = .67)	A latent factor constructed from four 10th-grade measures of parental involvement, including the extent to which parents: (1) attended school meetings; (2) talked to teacher/counselor; (3) visited classes; and (4) volunteered at the school. All indicators coded ordinal: 0 = *never,* 1 = *sometimes,* 2 = *often.*
Social Involvement (alpha = .56)	A latent factor constructed from five 12th-grade measures of involvement, including the extent to which students participated in: (1) academic clubs; (2) honors society; (3) service clubs; (4) student government; and (5) yearbook. All indicators coded ordinal: 0 = *did not participate or not offered,* 1 = *participated,* 2 = *participated as officer.*
Peer Attitudes (alpha = .78)	A latent factor constructed from measures of peer attitudes in 10th-grade using four indicators, including how important it is to: (1) attend class regularly; (2) study; (3) get good grades; and (4) graduate. All indicators coded ordinal: 0 = *not important,* 1 = *somewhat important,* 2 = *very important.*

SEM allows for the simultaneous regression of observed and latent variables, using maximum likelihood estimation (MLE). Thus, educational expectations and the psychological mediators were each concurrently regressed on the 13 academic and interpersonal predictors in the model. Educational expectations were also regressed on self-efficacy and locus of control. The results reveal the direct effect of each of the eight predictors and the mediating variables on the educational expectations variable, and the indirect effect of each of those predictors on the expectations variable via the mediating psychological variables.

The measurement and structural models included categorical outcome variables, which can be cause for the suspicion that the assumption of multivariate normality may have been violated (Kline, 1998). Violations of this assumption can bias parameter estimates. For example, nonnormality can result in attenuated estimates of standard errors and lead to increased likelihood of Type II errors or to inaccurately concluding that a path is statistically significant. Several strategies have been offered for dealing with nonnormal data in structural equation modeling. Those methods include using adjusted asymptotic distribution-free estimators, the calculation of polychoric, tetrachoric, and polyserial correlations, and resampling techniques such as bootstrapping (Kupek, 2005). To address this issue, we estimated the structural model using bootstrapping. When such techniques are used, random samples with replacement are drawn from the observed data (Bollen & Stine, 1993). The bootstrapped estimates are then averaged and their standard errors computed, which together provide a method of evaluating the stability of normal MLE estimates. When bootstrapping is used, AMOS provides both the normal MLE and bootstrapped parameter estimates. In addition, AMOS computes a bias statistic, which can be used to measure the degree of difference between the normal MLE estimates and the bootstrapped estimates. If that bias statistic is low, it can be concluded that the standard errors between the normal MLE and bootstrapped estimates are similar, and the parameter estimates can be interpreted with accuracy. For all racial groups, each path in the model exhibited a bias statistic of zero, indicating that our estimates are unbiased.

KEY VARIABLES

EXOGENOUS PREDICTOR VARIABLES

Table 1 displays all the key variables, alpha values for latent factors, and descriptions of each variable's numerical codes. The academic and interpersonal predictors displayed in the conceptual model were

disaggregated to identify the individual direct and indirect effects of each independent predictor. Five academic factors were included in the model. Three dichotomous observed academic variables were included: whether the student had participated in AP, remedial English, or remedial math coursework. Academic performance (alpha = .93) was a latent variable constructed using students' grade point averages in four different areas of study: English, math, science, and social studies. The grade point average in each area was on a continuous scale of 1–13. Finally, the latent standardized test scores factor (alpha = .90) was constructed using continuous measures of students' scores on a mini-SAT administered by the Department of Education in three areas: reading, math, and science.

Finally, there were eight interpersonal variables included in the model. Teacher care and expectations was included as an observed ordinal Likert-scaled variable, which measured the extent to which students' teachers expected them to succeed in school. Teacher interaction was an observed single continuous scaled item, ranging from 0 to 40 hours per week and indicating the number of hours per week students spent interacting with teachers outside of regular school hours. Both father's and mother's aspirations were observed ordinal variables measuring how far in school students' parents wanted them to go. Parental communication (alpha = .85) was a latent variable measuring how often students discussed eight different things, such as school coursework or standardized test preparation, with their parents. Alternatively, parental involvement (alpha = .67) was a latent factor measuring how often students' parents took part in various activities, including attending school meetings, talking to teachers/counselors, visiting classes, and volunteering at the students' high school. Social involvement (alpha = .56) was constructed using students' levels of involvement in five different types activities: student government, honors society, academic clubs, service clubs, and the yearbook. Finally, peer attitudes (.78) is a latent variable measuring peers attitudes toward attending class, studying, getting good grades, and graduating from high school.

ENDOGENOUS MEDIATING VARIABLES

The key mediating variables included in the model were students' self-efficacy and locus of control. Self-efficacy was a continuous standardized scale created by the Department of Education using four indicators of how students felt about themselves. The four indicators were items measuring the extent to which students felt good about themselves, felt they were a person of worth, felt they could do things as well as other people,

and were satisfied with themselves. Locus of control was measured on a continuous standardized scale created by the Department of Education using three items measuring the extent to which students felt in control of their lives. The items were measurements of the extent to which students felt that luck was more important than hard work, believed they cannot get ahead because of external constraints, and perceived that their plans work out.

ENDOGENOUS OUTCOME VARIABLE

The observed outcome variable, educational expectations, measured the highest level of education that the student expected to attain during his or her senior year. To eliminate categories with very few responses, the indicator was collapsed into six categories (see Table 1). The modified ordinal scale ranged from *less than high school diploma* to *Ph.D. or professional degree.*

LIMITATIONS

There are at least three major limitations of the study that should be considered when interpreting the results of the preceding analysis. First, the initial wave of data in the NELS was collected in 1988, and the students included in this study graduated in 1992. In the past 15 years, there have been many changes in society (e.g., trends in academic achievement and attainment within racial subpopulations), which could pose difficulties when attempting to generalize the results of investigations using the NELS data to more recent cohorts. Nevertheless, the database is still ideal for many investigations that require nationally representative and longitudinal data, and it continues to be used by educational researchers (Adelman, 2005; Wenfan & Qiuyun, 2005). Second, the standardized test scores used for this analysis were students' scores on an examination that was administered by the U.S. Department of Education and were assumed to be adequate measures of students' general performance on college entrance examinations. However, transfer of the effects of these standardized tests to other types of standardized exams, such as the ACT or SAT, should be made with caution. A final limitation is with regard to the NELS data. The data used in the analysis were limited to those collected using the NELS survey. As mentioned, one major problem posed by this limitation is the reliance on imperfect measures (e.g., general self-efficacy) of the phenomena that we sought to study.

RESULTS

For both the measurement model and the structural model, initial results indicated that the models were not a good fit for the data. The researchers' knowledge of relevant theory, prior literature, and modification indices were used to employ model building (Kline, 1998) and significantly improve the fit of the model. The results of the final measurement and structural models are contained in Table 2. L. T. Hu and Bentler (1999) suggested the following cutoff values for testing model-fit: comparative fit index (CFI) and Tucker-Lewis index (TLI) values greater than .95 and a root mean square error of approximation (RMSEA) value less than .06. Additionally, the PCLOSE is a test of the null hypothesis that the RMSEA is no greater than .05. All four tests indicated that both the measurement and structural models were a good fit for the data and therefore retained. The final structural model produced a CFI of .97, a TLI of .96, a RMSEA of .03, and a PCLOSE of 1.0. For the omnibus sample, the model explained 27% of the variation in 12th-grade educational expectations. When the samples were disaggregated, the model explained 33%, 24%, 26%, 23%, and 31% of the variation in educational expectations for Asian, Black, Latina/o, Native American, and White students, respectively.

Table 2. Model Fit Results

Model Fit Indices	CFI	TLI	RMSEA	PCLOSE
Measurement model	.99	.98	.03	1.00
Structural model	.97	.96	.03	1.00

Note: Strong model fit is reflected by (a) CFI and TLI values greater than .95; (b) RMSEA less than .06; and (c) PCLOSE greater than .05.
CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation.

DESCRIPTIVE STATISTICS

Table 3 displays the means for each variable, disaggregated by race. Juxtaposition of the means reveals a number of noteworthy findings. First, Asian students in the sample exhibited the highest educational expectations of all racial groups, with Latina/o and Native American students having the lowest levels of educational expectations in the 12th grade. Surprisingly, levels of teacher expectations were lowest among Native American and White students and highest among Black students. With regard to teacher interaction, Black and White students exhibited the highest levels of informal interaction, whereas Native American students displayed the lowest levels. Both fathers' and mothers' aspirations

Table 3. Variable Means by Race

Predictor Variable	*Race*				
	Asian	Black	Latina/o	Native American	White
Expectations	3.64	3.22	3.06	2.77	3.13
Self-Efficacy	-.04	.26	-.02	-.09	-.03
Locus of Control	.08	-.10	.01	-.05	.09
Test Scores					
Math	54.19	45.40	47.29	47.56	53.03
Reading	56.71	46.15	47.96	48.42	52.71
Science	54.17	44.34	46.81	48.29	53.01
Grades					
English	5.41	8.09	7.65	7.81	6.53
Math	6.08	8.62	8.29	8.24	7.13
Science	5.78	8.52	8.02	8.13	6.93
Social studies	5.28	8.05	7.60	7.72	6.45
Advanced Placement	.42	.30	.26	.17	.28
Remedial English	.11	.15	.20	.28	.17
Remedial Math	.12	.21	.23	.29	.17
Teacher Expectation	1.87	1.98	1.88	1.78	1.82
Teacher Interaction	1.46	1.71	1.29	1.49	1.51
Father Aspirations	3.28	2.90	2.83	2.65	2.89
Mother Aspirations	3.24	2.93	2.87	2.69	2.88
Parent Involvement					
School meeting	.59	.75	.57	.57	.72
Spoke to T/C	.50	.81	.62	.69	.65
Attend event	.72	.86	.71	.80	1.05
Volunteered	.23	.32	.23	.34	.37
Parent Communication					
Courses	.80	.92	.80	.83	.92
Test prep	.88	1.03	.81	.78	.86
College	1.31	1.33	1.20	1.11	1.31
Activities	.90	.98	.94	.93	1.05
Things studied	.82	.95	.94	.93	1.03
Grades	1.18	1.38	1.36	1.29	1.34
Jobs	.75	.99	1.00	.87	.94
Current Events	.79	.84	.79	.81	.91
Social Involvement					
Student govt.	.25	.25	.17	.16	.24
Honors	.45	.19	.16	.13	.27
Yearbook	.31	.20	.20	.24	.28
Service	.30	.18	.18	.18	.22
Academic	.47	.29	.27	.26	.34
Peer Influence					
Attend class	1.63	1.60	1.52	1.50	1.54
Study	1.43	1.37	1.27	1.22	1.27
Get good grade	1.59	1.59	1.48	1.42	1.41
Graduate	1.84	1.82	1.76	1.78	1.79

were highest among Asian students and lowest among their Native American counterparts. White parents exhibited the highest levels of involvement, and their Asian parent counterparts were involved the least. Black and White students appear to communicate with their parents the most, with their Asian and Native American peers exhibiting the lowest levels of parental communication. Black, Latina/o, and Native American students exhibited the lowest levels of social involvement. It has been noted in the higher education literature (Rendón, Jalomo, & Nora, 2000), however, that customary measures of social involvement have typically been based on common modes of involvement among traditional (e.g., White, middle-class students) students and have excluded modes of social involvement common among racial minority students. Thus, this disparity could be just as much a product of the survey questions focusing on particular types of social involvement as it is a function of the actual involvement of students from various racial subgroups. Finally, peer influence appeared to be highest among Asian and Black students, and much lower among their Latina/o, Native American, and White counterparts.

DIRECT EFFECTS OF PSYCHOLOGICAL MEDIATORS

Although most of the direct relationships hypothesized in the model were statistically significant at the .001 level for all groups, many of the path coefficients were too small for interpretation. Thus, rather than centering this discussion on the statistical significance of coefficients, we give less attention to weak direct effects (e.g., standardized path coefficients under +/- .05) and focus on highlighting the relatively moderate (i.e., path coefficients between +/- .06 – .10) and strong (i.e., path coefficients over +/- .10) direct effects found within the model. Our intention is not to discount the importance of statistically significant direct effects under .05; researchers have given substantial attention to effects of such magnitude (e.g., S. Hu & St. John, 2001; St. John, Kirshtein, & Noell, 2004). Because of the complexity of our model and multitude of statistically significant relationships, however, we focus on relatively moderate and strong direct effects for purposes of parsimony and to underscore those most salient.

Table 4 displays the direct standardized path coefficients from each predictor on expectations for each racial subgroup. The standardized path coefficients are equivalent to beta weights in multivariate regression models and represent the standard-unit change in educational expectations that accompanies a one-standard-deviation change in the predictor variable. For example, the standardized path coefficient of .01 for Asian

students' general self-efficacy on expectations indicates that every one-standard-deviation change in general self-efficacy is associated with .01 of a standard deviation change—almost no change—in educational expectations for Asians students. Contrary to our initial expectations, the direct effect of general self-efficacy on expectations was moderate and negative for Latina/o and Native American students, moderate and positive for their White peers, and negligible for the Asian and Black groups. Again, it should be kept in mind that the indicators used to construct the self-efficacy measure were not specific to the academic arena. Therefore, validity of the effects of self-efficacy on expectations is uncertain, but the negative effect among Latina/o and Native American students could indicate that among those groups, students who do not intend to pursue higher levels of education exhibit higher levels of domain-specific self-efficacy in other respective vocational or occupational fields. The effect of locus of control on expectations was positive and relatively large for Black students, and moderate and positive for their Asian and Native American counterparts. This could indicate that consideration of social constraints in formulating educational plans is particularly salient for these students.

Table 4. Direct Standardized Path Coefficients for Each Predictor on Expectations

Predictor	*Race/Ethnicity*				
Variable	Asian	Black	Latina/o	Native American	White
Self-efficacy	.01***	-.03***	-.06***	-.11***	.05***
Locus of Control	.07***	.16***	.01***	.09***	-.02***
Test scores	.13***	-.04***	.05***	-.03***	.14***
Grades	.08***	.04***	.06***	.13***	.10***
AP coursework	-.02***	.07***	.08***	-.00	.02***
Remedial English	.11***	-.09***	-.04***	-.02***	.01***
Remedial math	-.02***	-.04***	.07***	-.11***	-.01***
Social involvement	.19***	.11***	.18***	.16***	.23***
Peer attitudes	.14***	.00	.05***	-.03***	.03***
Parent involvement	.06***	.05***	.09***	.09***	.00
Parent comm.	-.05***	.10***	.08***	.15***	.12***
Father aspirations	.01	.06***	.13***	.14***	.16***
Mother aspirations	.14***	-.02***	.09***	.01	.02***
Teach. expectation	.05***	-.04***	-.06***	.01	-.01***
Teach. interaction	-.02***	.08***	.02***	.06***	-.00

*** Statistical significance at the .001 level.

DIRECT EFFECTS OF ACADEMIC FACTORS

With regard to academic factors, test scores exhibited a large positive effect on Asian and White students' expectations. Higher grades were

associated with higher expectations for all groups, with the effect being largest among Native American and White students. The effect of AP coursework was moderate and positive for Black and Latina/o students. Interestingly, remedial English exhibited a relatively large and positive effect on Asian students' expectations and a moderate and negative effect on Black students' expectations. This discrepancy could be due to first-generation Asian American students benefiting greatly from some level of remediation in English, if it is not their first language. Alternatively, remediation or lower levels of curricular rigor could send signals of inadequacy to Black and Latina/o students.

DIRECT EFFECTS OF INTERPERSONAL FACTORS

The direct effect of social involvement was significant and positive for all groups. Moreover, it exhibited the strongest direct effect on expectations in the model for all groups, except Black students. Peer attitudes exhibited a large positive effect on Asian student expectations but were negligible for all other groups. The effect of parental involvement was moderate and positive for Asian, Latina/o, and Native American students, slightly lower for their Black counterparts, and insignificant for White students. This could be support for the notion that family engagement and cultural validation are particularly salient for racial minority students. Parental communication exhibited a moderate positive effect for Black and Latina/o students, while exerting a large positive effect for Native American and White students. Father's aspirations exhibited a moderate and positive effect on Black students' expectations and a large positive effect on Latina/o, Native American, and White students' expectations. Although fathers' aspirations were negligible for Asian students, mother's aspirations exhibited a large positive effect on Asian students' expectations and a moderate positive effect on expectations for Latina/o students. Surprisingly, the effect of teacher care and expectations on students' expectations was moderate and negative for Latina/o students and negligible for all other groups. Because that evidence (e.g., Arnold et al., 1998; Cheng & Starks, 2002; Flowers et al., 2003) indicates that teachers' perceptions and expectations of students influence those students' expectations, the insignificance of the direct effect of teacher care and expectations on students' expectations in four of the five racial groups here may seem counterintuitive. The following section, however, reveals that much of the positive influence of teachers' expectations on students' expectations may be explained by their indirect effects on expectations

via psychological variables.

Tables 5 and 6 include the standardized path coefficients from each predictor on the mediating self-efficacy and locus-of-control variables. Tables 7 and 8 display the standardized path coefficients emerging from the analysis. The coefficients convey the magnitude and direction of the indirect path of each predictor on expectations via self-perceptions. The indirect standardized coefficients are calculated for an A (e.g., grades) → B (e.g., self-efficacy) → C (e.g., expectations) path by multiplying the direct standardized path coefficients of the A → B and B → C paths. Tables 7 and 8 indicate that the indirect path coefficients are all relatively weak. Nevertheless, some of those paths were statistically significant and, given the focus of our study on conditional and indirect effects, are worthy of discussion. Moreover, although the focus of our analysis was on *educational* expectations, our self-perceptions variables were general and encompassed but are not specific to education. One might suspect that the inclusion of a more academic-specific self-efficacy measure might yield a different and more powerful result. It should be kept in mind, however, that all indirect effects in our model were weak and none of them were larger than +/-.03.

Table 5. Direct Standardized Path Coefficients for Each Predictor on Locus of Control

Predictor	*Race/Ethnicity*				
Variable	Asian	Black	Latina/o	Native American	White
Self-efficacy	——	——	——	——	——
Locus of Control	——	——	——	——	——
Test scores	.16***	.06***	.07***	-.01***	.16***
Grades	.17***	.12***	.07***	.15***	.10***
AP coursework	.10***	-.05***	.00	-.06***	-.04***
Remedial English	.01	.14***	-.07***	-.04***	-.06***
Remedial math	-.03***	-.09***	-.01***	-.01	.00
Social involvement	-.13***	-.05***	.04***	.12***	.04***
Peer attitudes	-.02***	.02***	-.04***	.06***	.02***
Parent involvement	-.09***	.07***	-.01	.17***	.01***
Parent comm.	.17***	.07***	.20***	.05***	.12***
Father aspirations	.03***	.00	.04***	-.11***	.05***
Mother aspirations	-.14***	-.01***	-.05***	-.00	.00
Teach. expectation	.05***	-.05***	.10***	-.09***	.03***
Teach. interaction	.00	-.04***	.06***	-.09***	-.01***

*** Statistical significance at the .001 level.

Table 6. Direct Standardized Path Coefficients for Each Predictor on Self-Efficacy

Predictor	*Race/Ethnicity*				
Variable	Asian	Black	Latina/o	Native American	White
Self-efficacy	——	——	——	——	——
Locus of Control	——	——	——	——	——
Test scores	.02***	.06***	-.04***	.20***	.04***
Grades	.07***	.00	.07***	-.19***	.02***
AP coursework	.06***	.08***	.01***	.06***	.01***
Remedial English	.01***	-.07***	-.09***	.02***	.02***
Remedial math	-.07***	.06***	.03***	-.10***	-.01***
Social involvement	-.08***	-.07***	.12***	-.01***	.08***
Peer attitudes	.00	.08***	-.05***	.01***	.04***
Parent involvement	-.10***	.09***	.03***	-.05***	-.03***
Parent comm.	.13***	.14***	.19***	.13***	.14***
Father aspirations	.05***	-.01***	.14***	.08***	-.06***
Mother aspirations	-.04***	.08***	-.14***	-.26***	.03***
Teach. expectation	.07***	.01	.10***	.21***	.04***
Teach. interaction	.01	.04***	-.03***	-.05***	-.02***

*** Statistical significance at the .001 level.

Table 7. Standardized Coefficients of the Indirect Effect of Each Predictor on Expectations via Locus of Control.

Predictor	*Race/Ethnicity*				
Variable	Asian	Black	Latina/o	Native American	White
Test scores	.01***	.01***	.00	.00	.00
Grades	.01***	.02***	.00	.01***	.00
AP coursework	.01***	-.01***	.00	.00	.00
Remedial English	.01	.02***	.00	-.01***	.00
Remedial math	.00***	-.01***	.00	.00	.00
Social involvement	-.01***	-.01***	.00	.01***	.00
Peer attitudes	.00	.00	.00	.01***	.00
Parent involvement	-.01***	.01***	.00	.02***	.00
Parent comm.	.01***	.01***	.00	.01***	.00
Father aspirations	.00	.00	.00	-.01***	.00
Mother aspirations	-.01***	-.02	.00	-.00	.00
Teach. expectation	.00	-.01***	.00	-.01	.00
Teach. interaction	.00	-.01***	.00	-.01***	.00

Note: AMOS does not calculate *p* values for indirect paths. Thus, the symbol *** indicates that both paths (i.e., the path from the independent variable to the mediating variable, and the path from the mediating variable to the outcome variable) are statistically significant at the .001 level.

Table 8. Standardized Coefficients of the Indirect Effect of Each Predictor on Expectations via Self-Efficacy

Predictor	*Race/Ethnicity*				
Variable	Asian	Black	Latina/o	Native American	White
Test scores	.00	.00	.00	-.02***	.00
Grades	.00	.00	.00	.02***	.00
AP coursework	.00	.00	.00	-.01***	.00
Remedial English	.00	.00	.01***	.00	.00
Remedial math	.00	.00	.00	.01***	.00
Social involvement	.00	.00	-.01***	.00	.00
Peer attitudes	.00	.00	.00	.00	.00
Parent involvement	.00	.00	.00	.01***	.00
Parent comm.	.00	.00	-.01***	-.01	.01***
Father aspirations	.00	.00	-.01***	-.01***	.00
Mother aspirations	.00	.00	.01***	.03***	.00
Teach. expectation	.00	.00	-.01	-.02***	.00
Teach. interaction	.00	.00	.00	.01***	.00

Note: AMOS does not calculate *p* values for indirect paths. Thus, the symbol *** indicates that both paths (i.e., the path from the independent variable to the mediating variable, and the path from the mediating variable to the outcome variable) are statistically significant at the .001 level.

INDIRECT EFFECTS VIA LOCUS OF CONTROL

Test scores, grades, AP coursework, remedial English, and parental communication were all associated with higher levels of locus of control and, in turn, more desirable educational expectations among Asian students. Social involvement, parental involvement, and mother's aspirations exhibited a negative indirect effect via locus of control for those students. Among Black students, higher test scores, better grades, remedial English, parental involvement, parental communication, teacher interaction, and teacher care and expectations were associated with higher levels of internal locus of control and higher educational expectations. AP, remedial math, social involvement, mother's aspirations, teacher care and expectations, and teacher interaction all exhibited a negative indirect influence via locus of control. For Native American students, several factors, including grades, social involvement, peer attitudes, and parental involvement and communication exhibited positive indirect effects on expectations. Remedial English, parental aspirations, teacher care and expectations, and teacher interaction were all negatively associated with internal locus of control and, therefore, lower levels of educational expectations. All indirect effects via locus of control were insignificant for Latina/o and White students.

INDIRECT EFFECTS VIA GENERAL SELF-EFFICACY

Among Asian and Black students, all indirect effects via self-efficacy were insignificant. For Latina/o students, remedial English and mother's aspirations were associated with higher levels of self-efficacy and higher educational expectations, whereas social involvement, father's aspirations, and teacher care and expectations exhibited negative indirect effects on expectations for that group. AP coursework, parental communication, father's aspirations, and teacher's expectations were also negatively and indirectly associated with Native American students' expectations. Better grades, remedial math, parental involvement, mother's aspirations, and teacher interaction exhibited positive indirect effects on expectations via self-efficacy. For Native American students, higher test scores were associated with higher levels of general self-efficacy and subsequently lower educational expectations. Again, the extent to which students' self-assessments are academic domain-specific could play a role in the counterintuitive nature of this relationship, especially if test scores are deemed irrelevant by students who do not intend to pursue a bachelor's or graduate degree. Finally, among White students, parental communication was associated with greater self-efficacy and, in turn, loftier educational expectations.

DISCUSSION

Relationships between results of this inquiry and earlier studies are complex, with some of the current findings confirming and some contradicting those of other researchers. Because of the multitude of findings emerging from the analysis and for the purposes of parsimony, this discussion focuses on two of the most salient results of the study—those pertaining to racial differences, and the role of psychological factors in mediating the impact of other variables in our model. The findings of this analysis confirm earlier assertions that the process by which students formulate and reformulate their educational expectations during the high school years differs across racial groups (Carter, 1999; Farrell et al., 1994; Hanson, 1994; Rigsby et al., 1997). In addition to racial differences in the magnitude of various effects in our model, relationships between variables also differ in direction across racial groups, thereby underscoring the importance of understanding the processes by which students from different racial backgrounds formulate and reformulate their educational expectations.

Other important results emerging from this analysis are related to the role of locus of control and self-efficacy in the development of educa-

tional expectations. The findings of the current study provide partial support for earlier studies suggesting that locus of control is a significant predictor of educational aspirations, expectations, and attainment (Flowers et al., 2003; Hanson, 1994; E. S. Nelson & Mathia, 1995; Nowicki & Strickland, 1973; Wang et al., 1999). Whereas locus of control exhibited a statistically significant effect on expectations for all groups, the magnitude of the effect was trivial for Latina/o and White students. This may suggest that the effects of perceptions of external constraints on educational expectations may be more salient for Asian, Black, and Native American students.

One of the major contributions of this study is the increased levels of understanding regarding whether and how psychological factors mediate the effects of other predictors of educational expectations. Specifically, we sought to examine whether academic and interpersonal factors indirectly affect expectations via locus of control and self-efficacy. Of particular interest were the indirect effects of standardized test scores on educational expectations, because standardized testing has continued to be a controversial issue in both K–12 and higher education. Indeed, evidence of the cultural and gender bias of standardized testing has raised questions about how such bias should be addressed (see, for example, Freedle, 2003). In fact, some colleges have eliminated the use or made optional the inclusion of standardized test scores in the college admissions process (Hoover, 2003, 2004; Primost, 2003). By and large, the findings of this study support earlier assertions (Gándara & Lopez, 1998; Museus & Hendel, 2005) that standardized test scores may differentially pose negative psychological consequences for particular groups of students.

When controlling for high school grades, standardized test scores exhibited a relatively strong and positive statistically significant effect on Asian and White students' educational expectations. Moreover, it appears that higher standardized test scores are associated with higher levels of internal loci of control and, in turn, more desirable expectations for Asian, Black, and Native American students. Therefore, regardless of high school academic performance, as measured by grades, receiving lower standardized tests scores could send a signal to students that they are in less control of their educational success, and that relationship might disproportionately disadvantage particular groups that do not perform as well as others on those examinations.

Contrary to earlier studies (Carter, 1999; Museus & Hendel, 2005), the self-efficacy construct was inversely related to educational expectations. This finding prompted us to conduct a post-hoc correlation analysis to determine whether the effects with regard to the self-efficacy variable could be interpreted with confidence. To shed some light on why the

counterintuitive relationship between self-efficacy and educational expectations emerged, we calculated the bivariate correlations among those mediating and outcome variables. The bivariate correlation between self-efficacy and expectations was statistically significant and positive. However, when the other variables were added into the equation, the direction of the relationship between the self-efficacy construct and an educational expectations variable—which represents the variation in expectations explained solely by the self-efficacy predictor after all other predictor variables are taken into account—was reversed and became negative.

Thus, this inverse relationship between students' self-efficacy and their educational expectations could be a function of several factors, such as the exclusion of a confounding variable from our model; a substantial portion of the positive bivariate relationship between self-efficacy and expectations being explained by other variables (e.g., locus of control) in the model; or a lack of construct validity in the measurement of the self-efficacy variable. Given earlier assertions about the domain specificity of self-efficacy measurements (Bandura, 1986; Pajares & Miller, 1995), inadequate validity in the measurement of self-efficacy is one likely cause of the negative relationship. Museus and Hendel (2005) provided some support for this conclusion. Museus and Hendel found, in contrast to the results here, a positive relationship between self-efficacy and the educational plans of first-year college students, but they used a domain-specific indicator of self-efficacy that measured students' *intellectual* self-confidence. Therefore, the results found here—particularly those regarding the effects of self-efficacy—should be interpreted with caution. In the context of measuring educational expectations, a more valid indicator of self-efficacy, such as students' intellectual self-efficacy or self-confidence, may be necessary.

IMPLICATIONS FOR FUTURE RESEARCH AND PRACTICE

The results of this study have important implications for future educational research and practice. With regard to research, these findings indicate that our understanding of the processes by which students succeed in the educational pipeline is only as valid and reliable as the extent to which we are aware of the conditional effects of various factors on students' educational expectations, achievement, and outcomes. Future research, therefore, should take into consideration racial, gender, socioeconomic, and other differences in examining students' educational expectations and outcomes.

Future research should test the effects of *academic-specific* self-efficacy

on expectations and its role in mediating the impact of various factors on educational expectations and attainment for different demographic groups. Given that other researchers (Carter, 1999; Museus & Hendel, 2005; Schabo Grabowski et al., 2001; Trusty, 2000) have found self-efficacy to be a salient positive predictor of educational outcomes, expanding our knowledge of how such efficacy interacts with other factors to shape the educational expectations, achievement, and attainment of students would yield great benefits to our understanding of how educators can maximize educational outcomes.

Most of the questions that emerge from our findings are qualitative in nature. Our study identifies and further clarifies racial differences in how various factors shape educational expectations. Questions regarding *why* many of those discrepancies exist, however, remain unclear. Why do test scores have a negative impact on expectations for some students but not others? Why are fathers' aspirations particularly salient for some groups and mothers' aspirations more critical for others? Qualitative insights into these types of questions would help provide educators with the tools necessary to maximize educational outcomes among their students.

With regard to practice, educators should assist racial minority students in understanding that standardized test scores are not a definitive indicator of their intellectual capacity or future academic success. Minimizing the constraints that such educational policies and structures place on students' levels of internal locus of control can be a major factor in introducing these students to new possibilities for future educational success. Given the potential cultural and gender bias inherent in standardized tests, this may be a particularly important consideration for female and racial minority students. It is critical that educators diminish the extent to which test scores might signal educational impossibilities to these students.

Educators should also be conscious of the differential impact that various educational policies and practices can have on students from different racial and cultural backgrounds. If a majority of students at a particular school or in a specific classroom are of a single race, it may be easy for teachers to overlook or dismiss the fact that the same experience may have a positive influence on the majority while having a negative impact on members within a minority group.

Finally, high school educators should be aware that students' academic self-efficacy and locus of control may exert important influences on students' educational expectations and outcomes. To the extent that educators can convey to students that they have control over their future educational success, those educators can help maximize positive educational outcomes among those students. An example of how teachers might

convey such messages involves building connections between students and people who share similar characteristics with those students and have achieved academic and occupational success. Such connections can expose those students to role models and opportunities to collaboratively build their perceptions that they have control over their decisions to pursue college and particular academic and professional interests.

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