A Path Analysis Model Examining the Relationships Among Race, Gender, Poverty Concentration, Mathematics Achievement and Educational Values of Students and their Peers

Angelica T. James

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To the University Council:

The Dissertation Committee for Angelica T. James certifies that this is the approved version of the following electronic dissertation: “A Path Analysis Model Examining the Relationship among Race, Gender, Poverty Concentration, Mathematics Achievement and Educational Values of Students and their Peers.”

____________________________________
Karen D. Weddle-West, Ph.D.
Major Professor

____________________________________
Ernest A. Rakow, Ph.D.

____________________________________
Susan Magun-Jackson, Ph.D.

____________________________________
Steven M. Ross, Ph.D.

Accepted for the Graduate Council:

____________________________________
Karen D. Weddle-West, Ph.D.
Vice Provost for Graduate Programs
A PATH ANALYSIS MODEL EXAMINING THE RELATIONSHIPS AMONG RACE, GENDER, POVERTY CONCENTRATION, MATHEMATICS ACHIEVEMENT AND EDUCATIONAL VALUES OF STUDENTS AND THEIR PEERS

by

Angelica T. James

A Dissertation

Submitted in Partial Fulfillment of the Requirements for the Degree of

Doctor of Philosophy

Educational Psychology

The University of Memphis

August 2010
To my remarkable son, Jordan Isaiah James, who encourages me to be my best

and

To my parents, John and Christella Thompson, who taught me to strive for excellence

and never give up
ACKNOWLEDGEMENT

I would like to thank Dr. Karen D. Weddle-West, who agreed to be my advisor in the midst of the dissertation process and provided me with invaluable guidance. I would also like to thank my committee members, Dr. Ernest A. Rakow, Dr. Susan Magun-Jackson, and Dr. Steven M. Ross for their guidance and feedback. Lastly, I want to express how much I appreciate my family and friends who provided me with the support and encouragement I needed to accomplish this long awaited goal.
ABSTRACT

James, Angelica Timika. Ph.D., The University of Memphis. August 2010. A path analysis model examining the relationships among poverty concentration, gender, age, educational values and mathematics achievement. Major Professor: Karen D. Weddle-West, Ph.D.

The purpose of the current study was to explore the effects of race, gender, school poverty concentration and students’ and peers’ educational values on mathematics achievement, controlling for prior mathematics achievement and highest level of mathematics taken. Data were selected from the Educational Longitudinal Study (ELS:2002). The sample for this analysis consisted of 1,200 native English-speaking students from urban and suburban public schools. Ordinary least squares regression analyses were used to determine the effects in the model. Results revealed that African American students, females and students who attended schools with a higher concentration of poverty had higher educational values, but lower prior mathematics achievement scores than did their counterparts. Additionally, African American students and females felt that their peers had higher educational values than did Caucasian and male students. Finally, students who attended schools with higher concentrations of poverty took lower levels of mathematics courses. Students with higher educational values, those with higher prior mathematics achievement and those who took higher levels of mathematics courses had higher mathematics achievement.

The overall findings of the path analysis revealed that African American students, females and those who attended schools with higher concentrations of poverty performed more poorly in mathematics than did their counterparts. African American students had higher self-reported educational values and these values were associated with higher mathematics achievement. However, as a whole, African Americans performed worse in
mathematics than did Caucasian students. This was possibly because African American students had lower prior mathematics achievement, which had a much larger influence on mathematics achievement than did their educational values. Although African American students may have understood the value of education, their preparation in mathematics may not have allowed this valuing to translate into higher mathematics achievement scores.

Similarly, students who attended schools with higher concentrations of poverty had higher educational values, which was associated with higher mathematics achievement. However, these students had lower prior mathematics achievement and took lower levels of mathematics courses throughout high school, which resulted in lower mathematics achievement.
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CHAPTER 1

INTRODUCTION

Equality and discrimination have been issues of central concern in our society for decades, but nowhere are these issues of greater concern than in the education of our youth. The Brown v. Board of Education lawsuit of 1954 sought to equalize educational resources and quality for African American children. However, despite the fact that the federal government declared unconstitutional the practice of “separate but equal,” school boards found loopholes and implemented practices that continued to prevent African American students from enrolling in Caucasian schools, and allowed Caucasian students to withdraw from schools that had been forced to integrate. Examples of these practices included: a new pupil assignment plan that minimized integration; legislation that cut off funding to districts that attempted integration; closing integrated schools; grants to Caucasian students that provided them with the means to attend private schools; and an amendment to the compulsory attendance law that allowed Caucasian students to withdraw from integrated schools (Doyle, 1990). When it became obvious that most school districts would not voluntarily facilitate integration with due diligence, the Supreme Court intervened and implemented mandatory busing (Bankston & Caldas, 1996).

Busing resulted in both African American and Caucasian students being transported to schools outside of their neighborhoods to decrease the racial imbalance; however, the practice was met with a great deal of dissonance. According to Armor (1989), survey reports suggested that some parents of both races opposed mandatory busing for the following reasons: unfamiliarity with their children’s new school, busing
time detracted from homework and extracurricular activities, travel to unsafe areas, and loss of community cohesiveness and morale because of the loss of neighborhood schools. However, survey reports also revealed that most African American parents supported mandatory busing because they believed their children would receive a better education at a Caucasian school (Armor, 1989). Caucasian parents who did not want their children bused to schools outside of their neighborhoods, or who did not want their children to attend schools that allowed African Americans to enroll, had two choices: they could move to neighborhoods not yet zoned for school integration (commonly referred to as “White flight”); or find alternative forms of education for their children (e.g., private schools) (Armor, 1989; Kiel, 2008). Whatever the choice of resistance, the exodus of Caucasians from most public schools that were forced to integrate almost guaranteed the failure of desegregation.

The end of Federal supervision of desegregation began in the mid-1980s, which facilitated the end of busing in most areas (Orfield, 2001). At this time schools primarily served children in the surrounding neighborhoods, which were both racially and economically segregated. The term “neighborhood school” then can be conceptualized as a high concentration of children in poorer, urban, predominantly African American neighborhoods attending school together, and a high concentration of children in more affluent, suburban, predominantly Caucasian neighborhoods attending school together (Weinstein, 2002).

The National Center for Education Statistics (NCES) found significant race differences in the minority and poverty concentration enrollment of public elementary and secondary school students. In 2006-07, approximately 64% of Caucasian students
attended schools with a low concentration of minority students (less than 25%), whereas only 9% of African American students were enrolled in these schools. Conversely, approximately 52% of African American students were enrolled in schools with a high minority concentration (75% or more), and only 3% of Caucasian students were enrolled in these schools. The NCES also reported that African Americans were more likely to be enrolled in schools with a higher percentage of students who were eligible for Free or Reduced-Price Lunch (FRPL) than were Caucasian students. Approximately 19% of Caucasian students were enrolled in schools with low poverty concentration (10% or less FRPL enrollment) compared to 4% of African American students. Alternately, approximately 4% of Caucasian students were enrolled in schools with a high concentration of poverty (75% or more FRPL enrollment), compared to 33% of African American students (Planty et al., 2009). Academic outcomes typically differed vastly for students in high minority and high poverty schools, which put African American students (who are more likely to attend these schools than Caucasian students) at a distinct disadvantage (Orfield, 2001).

On average, African American students had lower standardized achievement test scores, graduated high school and attended college at lower rates than did Caucasian students (Banks & Banks, 2001; Planty et al., 2009; Thompson & Parker, 2007). The National Center for Education Statistics (NCES) produced several reports that detailed these gaps. Although NCES did not include significance levels in their reports, the differences between the two groups appeared to be substantial. In 2007, African American fourth and eighth grade students scored 27 points lower than Caucasian students on the National Assessment of Educational Progress (NAEP) Reading
Assessment (Planty et al., 2009). Of greater concern was that there was no measurable change in the reading achievement gap between eighth grade African American and Caucasian students between 1992 and 2007 (Planty et al., 2009). NCES also found gender differences in reading achievement. Males consistently scored lower than did females on the fourth and eighth grade NAEP Reading Assessment between 1992 and 2007. In fourth grade, males scored 8 points lower in 1992 and 6 points lower in both 2005 and 2007. In eighth grade, males scored 13 points lower in 1992 and 10 points lower in both 2005 and 2007. Finally, in 12th grade, males scored 10 points lower in 1992, 16 points lower in 2002 and 13 points lower in 2005 than their female counterparts.

Although NCES and NAEP typically focus on both reading and mathematics in assessing academic achievement, mathematics achievement was the focus of the current study. Reading achievement was not included because the current study was part of a larger study (ELS:2002) that did not administer a follow-up reading assessment in the 12th grade.

African American students’ performance in mathematics was just as low as it was for reading. In 2007, African American fourth graders scored 26 points below Caucasian students on the NAEP Mathematics Assessment. The gap only declined by 6 points between 1990 and 2007, and there was no measurable change in the gap between 2005 and 2007 (Planty et al., 2009). In eighth grade, the gap was even larger in 2007: 32 points (Planty et al., 2009). There was no notable gender difference (no more than 2 points) in fourth and eighth grade Caucasian and African American students’ scale scores on the NAEP Mathematics Assessment between 1990 and 2007.
The percent of African American students who were retained in a grade increased from 14% in 1996 to 16% in 2007. This number was double the percent of Caucasian students who were retained the same year (Planty et al., 2009). Additionally, both African American and Caucasian males were more likely to be retained than were their female counterparts. In 2007, 12% of males in grades K-8 had been retained versus 8% of females.

The plight of poor students deserves mentioning as well, especially since schools that served a high proportion of minority students also had a high proportion of students on Free or Reduced-Price Lunch. In 2007, 23% of poor students were retained, compared to 11% of near-poor, and 5% of non-poor students. Additionally, a greater percent of poor students were retained in 2007 than in 1996 (23% vs. 17%, respectively), while slightly fewer non-poor students were retained in 2007 than in 1996 (5% vs. 7%, respectively) (Planty et al., 2009).

The status dropout rate for African Americans and males mirrored the retention trend. Status dropout rate represents, “the percentage of 16- through 24-year-olds who are not enrolled in school and have not earned a high school credential” (Planty, 2009, p. 50). Twelve percent of African American students dropped out of high school in 2007, while only 6% of Caucasian students dropped out (Planty et al., 2009). Additionally, a higher percentage of males dropped out of school than females (11% versus 8%, respectively). Fourteen percent of African American males dropped out of high school, compared to 7% of Caucasian males, while 9% of African American females and only 5% of Caucasian females dropped out (Planty et al., 2009).
A substantial gap also exists in graduation rates. According to Education Week (2010), in 2007 approximately 54% of African American students graduated high school compared to 78% of Caucasian students. Additionally, the NCES reported that the percentage of 25- to 29-year-old African Americans who obtained a high school diploma or equivalent increased significantly between 1971 and 2008 (59% to 88%, respectively). However, the percentage was still well below the 94% of Caucasian students who earned a high school diploma or equivalent (Planty et al., 2009).

Given the trend in achievement, grade retention, dropping out, and graduation rates, the gap in postsecondary degree attainment was not surprising. Looking at first time students attending 4-year institutions in 2000-01, Planty and colleagues (2009) reported that a lower percentage of African American students (42%) earned a bachelor’s degree or its equivalent within six years of enrolling than Caucasian students (60%). Gender differences were present for this variable as well. Approximately 51% of males earned a bachelor’s degree from a public institution within six years of enrolling compared to 58% of females. Additionally, African American males had the lowest college completion rate (34%), while Caucasian females had the highest (60%). Fifty-four percent of Caucasian males and 45% of African American females completed college within six years of enrolling.

The source of the achievement and educational attainment gap between African Americans and Caucasians has been investigated extensively (Ainsworth, 2002; Armor, 1997; Barton, 2003; Beer, 2005; Coleman, 1990; Garibaldi, 1997; Trent, 1997). Some researchers have attributed the gap to the discriminatory treatment and allocation of resources based on race and/or poverty concentration in schools (Bankston & Caldas,
Darling-Hammond (1998) asserted that educational outcomes for minority children were much more a result of their unequal access to key educational resources, such as skilled teachers and quality curriculum, than they were a result of race. Furthermore, Darling-Hammond (1998) asserted that the U.S. educational system was one of the most unequal in the industrialized world, and that social status routinely determined the learning opportunities students received. Other studies have found that having a high concentration of impoverished students in a school was negatively related to the academic achievement of not only poor, but also middle-class African American and Caucasian students (Cohen & Little, 2005).

Other researchers have attributed the gap to race, gender or economic differences in valuing education or academic engagement (Fordham & Ogbug, 1986; Graham, Taylor, & Hudley, 1998; Honora, 2002; Kuriloff & Reichert, 2003; Osborne, 1997; Rodkin, Farmer, Pearl, & Van Acker, 2000; Schmader, Major, & Gramzow, 2001). Wilson (1987) explained that one reason poorer students might not have performed as well as their more economically advantaged counterparts was because poorer students might not have valued education as a means for economic success. Impoverished students may have lacked “mainstream role models that help keep alive the perception that education is meaningful, that steady employment is a viable alternative to welfare, and that family stability is the norm, not the exception” (Wilson, 1987, p. 56).

Although there has been little consensus on which variables influence academic achievement most, it is evident that a significant gap continues to exist between the academic achievement and educational attainment of African American and Caucasian
students in elementary, secondary and postsecondary education. Understanding more clearly the variables that affect academic achievement would assist the administrators of high-poverty, high-minority schools in closing the achievement gap, and improve opportunities and outcomes for African American students.

**Purpose of the Study**

Previous achievement studies attributed the gap between African American and Caucasian students’ educational outcomes to the negative effects of individual race and/or poverty, the concentration of minority race and/or poverty within schools, and the lack of engagement or educational valuing in school. However, few have combined these variables and utilized a path analysis to investigate the relative effect of each of these variables on achievement. Therefore, the purpose of the current study was twofold: 1) to determine the role that race, gender, and poverty concentration in schools had on mathematics achievement; and 2) to determine if the educational values that students and/or their peers possessed differed based on the aforementioned variables and mediated the effects these variables had on mathematics achievement.

**Definition of Variables and Hypothesized Path Analysis Model**

For the purposes of this study, the variables of interest are defined in Table 1 and the path analysis to be investigated is depicted in Figure 1.
### Table 1

**Variable Definitions**

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<tr>
<td><strong>Exogenous Variables</strong></td>
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</tr>
<tr>
<td>School Poverty Concentration</td>
<td>Percent of students in that school who qualify for Free and Reduced Price Lunch</td>
</tr>
<tr>
<td>Race</td>
<td>Race in this study is limited to Caucasians and African Americans. Race is coded 1 = Caucasian; 2 = African American</td>
</tr>
<tr>
<td>Gender</td>
<td>Gender is coded 1 = Male; 2 = Female</td>
</tr>
<tr>
<td><strong>Endogenous Variables</strong></td>
<td></td>
</tr>
<tr>
<td>Students’ Educational Values</td>
<td>A subscale of the Educational Longitudinal Study:2002 (ELS:2002) Student Questionnaire. Represented students’ self-reported valuing of education for the sake of learning or as a means for achieving goals.</td>
</tr>
<tr>
<td>Peers’ Educational Values</td>
<td>A composite score represented how much students believed their peers valued education for the sake of learning or as a means for achieving goals as reported on a subscale of the ELS:2002 Student Questionnaire.</td>
</tr>
<tr>
<td>Prior Mathematics Achievement</td>
<td>Standardized score on ELS:2002 base-year mathematics assessment for tenth grade students.</td>
</tr>
<tr>
<td>Highest Level of Mathematics Taken</td>
<td>A variable from the ELS:2002 Student Questionnaire representing the highest level of math completed. Courses ranged from General Math to Calculus.</td>
</tr>
<tr>
<td><strong>Dependent Variable</strong></td>
<td></td>
</tr>
<tr>
<td>Mathematics Achievement</td>
<td>Standardized score on first follow up mathematics assessment for 12th grade students.</td>
</tr>
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</table>
Figure 1. Hypothesized Path Analysis Model of Mathematics Achievement

Assumptions

1. A path analysis “is an extension of the regression model, used to test the fit of the correlation matrix against two or more causal models which are being compared by the researcher.” (Garson, 2008, p. 1). However, path analyses ultimately deal with correlation of variables, not causation. The paths demonstrated elucidate which of the hypothesized models is “most consistent with the pattern of correlations found in the data” and compares the “relative importance of different paths within the diagram” (Garson, 2008, p. 10). Therefore, the assumption undergirding this research is that there is no direct cause and effect between any variables being investigated.
2. Both race and gender are proxy variables. Demographic variables are often used as proxies for unmeasured risk variables. There are a number of contributing factors that affect the relationships between race and mathematics achievement and between gender and mathematics achievement, not all of which are being measured in this study. For example, the proxy variables of race and school poverty concentration included the relationships among socioeconomic status, individual-level poverty, availability of resources, accessibility to high-quality education, teacher expectations and lack of early preparation for school. The proxy variable of gender includes the relationships among teacher and parent expectations of lower mathematics achievement for girls and competency beliefs. Therefore, no correlations between the proxy variables and the dependent variable should be interpreted as directly attributable to the proxy variables.
CHAPTER 2
LITERATURE REVIEW

The following review of the literature summarizes findings from previous studies on the academic achievement of African American students, which will be presented in chronological order. This chapter focuses on the research on the effects that race, poverty concentration and gender have been shown to have on academic achievement and the educational valuing of students and their peers.

Race and Academic Achievement

Although the previously cited research statistics focused on the achievement gap between Caucasians and African Americans, it is equally important to report the substantial gains in academic achievement among African Americans after desegregation granted them access to the quality education received by their Caucasian counterparts. Between 1970 and 1990, the gap between minority and Caucasian students’ test scores narrowed, and the greatest gains were reported for middle school students (Darling-Hammond, 1998). The SAT test scores of African American students climbed 54 points between 1976 and 1994, while the SAT scores of Caucasian students during the same period remained stable. Although Darling-Hammond (1998) did not report the statistical significance for this research, the increase in absolute numbers is impressive and different from past research that showed declines or no improvements. Between 1971 and 2008, African American students showed substantially larger gains in their average NAEP reading scores than did Caucasian students (Planty et al., 2009). The scores of 9-year-old African American students rose 34 points compared to the 14-point gain for 9-year-old Caucasian students. Thirteen-year-old African American students demonstrated a 25-
point gain, while Caucasian students’ scores increased 7 points. Finally, 17-year-old African American students showed a gain of 28 points compared to the 4-point gain of Caucasian students (Planty et al., 2009). The outcome for mathematics achievement showed a similar trend. From 1973 to 2008, the NAEP mathematics scores for 9- and 13-year-old African American students improved 34 points, and improved 17 points for 17-year-olds. Mathematics gains for 9- and 13-year-old Caucasian students were large (25 and 17 points, respectively), however, 17-year-olds only showed a 4-point increase (Planty et al., 2009). As with Darling-Hammond, Planty et al. (2009) did not report significance levels for these data. However, the gains for African American students in reading and mathematics achievement appeared substantively significant. Yet, despite these gains, considerable gaps still existed between African American and Caucasian students’ academic achievement, retention, high school graduation, and college completion rates.

Several researchers have explored the relationship between race and achievement. Using a stepwise regression model, Bankston and Caldas (1996) examined the effects of minority concentration in schools and other individual variables on academic achievement, controlling for race. Individual variables included race, gender, English proficiency, economic status (eligibility for Free or Reduced Price Lunch), parent socioeconomic status (a composite of parents’ educational and occupational levels), and time spent on homework, reading, watching television, organized activities and working. Bankston and Caldas (1996) used the Louisiana Graduation Exit Examination (GEE) to measure academic achievement. They found that the academic performance of African American students was significantly lower than the academic performance of Caucasian
students. Some of the variables that differentially affected the academic performance of African American students were lower income and higher concentration of minority students. However, individual race had the strongest influence on academic achievement.

Bankston and Caldas (1996) also compared the effects of race, individual and peer socioeconomic status, and minority and poverty concentration in schools on the GEE achievement of Caucasian and African American students separately. They found that attending schools with peers from a high socioeconomic background significantly increased academic achievement for many African American students, and helped to explain the negative effects of poverty concentration within the school. The researchers reported that poverty concentration negatively affected student achievement because impoverished students were more likely to come from families who were educationally and occupationally disadvantaged (Bankston & Caldas, 1996). However, of all the significant factors in the equation, high minority concentration in schools had the strongest, negative influence on African American achievement.

For Caucasian students, the most important influence on achievement was parental socioeconomic status (Bankston & Caldas, 1996). Attending a high minority school negatively affected academic achievement for Caucasian students, but the effect was not as strong as it was for African American students. Poverty concentration had essentially no effect on achievement for Caucasian students. Attending schools with peers from a high socioeconomic status significantly increased achievement for Caucasian students, but individual socioeconomic status still had the greatest influence. The results of Bankston and Caldas’ (1996) study suggested that there was something unique about African American students that negatively affected these students’ academic
achievement. Additionally, the presence of a high concentration of minority students in a school adversely affected the academic achievement African American students to a greater degree than for Caucasian students.

Banks and Banks (2001) described equality of educational opportunity as “equity, parity, and comparability of instructional treatment based on diagnosed needs of diverse individuals and groups” (p. 197). Even when African American and Caucasian students received similar educational resources, the effects the resources had on these two groups may have differed. Resources that may have benefited Caucasians may have had no effect or even been detrimental to African Americans because of differences in personal, social, cultural, historical and family traits between the two groups (Banks & Banks, 2001). Another factor that contributed to the achievement gap was that even when the student body population of the school was diverse, the various classroom populations were not. African American students were much less likely than Caucasian students to enroll in advanced or high-level, college preparatory courses (Banks & Banks, 2001; Diamond, 2006). Was this because African American students lacked the grades to qualify for enrollment in these courses? Or was it because early on, differences in instructional patterns based on erroneous assumptions about African American students’ capabilities led to these students being targeted and placed on lower academic tracks? Several researchers have reported on the underrepresentation of African Americans in college and upper-level academic tracks (Diamond, 2006; Riegle-Crumb, 2006). In his review of the literature, Ansalone (2009) reported that there were race and class biases in track placement. Tracking limited opportunities to learn, which affected academic achievement.
Diamond (2006) asserted that discrimination was still prevalent in integrated schools, but it was done much more subtly. African Americans could be disadvantaged in three ways:

(a) structurally by having limited access to valued resources outside of schools,
(b) institutionally by being positioned systematically in the least advantaged locations for learning inside schools, or (c) ideologically by having their intellectual capacity questioned and their cultural styles devalued both within schools and in the broader social discourse. (p. 496)

Diamond (2006) studied the course-taking patterns and academic achievement of African American students in one racially integrated school in an affluent, suburban neighborhood. He found that although African American and Caucasian students took the same types of classes in early grades, by upper elementary and middle school years, differentiated course-taking patterns emerged (Diamond, 2006). At this particular school, teachers routinely tested fourth graders in mathematics and recommended them for different academic tracks. By the fifth grade, the “vast majority” of students placed in higher-level mathematics courses were Caucasian (Diamond, 2006, p. 500). Additionally, by the eighth grade, almost all of these Caucasian students had taken Algebra I, which was “an important milestone that enables students to take high-level mathematics before high school graduation” (Diamond, 2006, p. 500). If course-taking was supposed to prepare students for standardized achievement tests, then students enrolled in lower-level courses were at a disadvantage. In tenth grade, African American students scored approximately 7 points lower on the PLAN test than did Caucasian students. In 2001, a disproportionately large percent of Caucasian students took Advanced Placement (AP)
calculus compared to African American students. Although 40% of the student body population was African American, only 9% took AP calculus. Alternately, 50% of the population was Caucasian and 82% of them took the course. Furthermore, African Americans were concentrated in the lower instructional levels in all subjects, and made up only 10% of students who took AP courses (Diamond, 2006).

**The effects of race on student and peers’ educational values.** To help explain differences in achievement, some researchers (Ainsworth, 2002; Steele, 1997) have suggested that African American students had the ability to perform well in school, but may not have put forth a significant effort because they were not engaged in school and did not value education. This devaluing may have occurred because some African Americans did not see academic achievement as a means for success, or because they felt that they were unable to succeed even if they worked hard (Ogbu, 1990b). In discussing his 1966 report, Coleman (1990) provided some insight into the relationship between African American students’ academic achievement and perceptions of the benefits of hard work. Coleman’s 1966 report found that both African American and Caucasian students expressed high self-concept, as well as high interest in school and learning; however, African Americans and other minorities expressed “a much lower sense of control of the environment than whites” (Coleman, 1990, p. 107). Researchers have referred to this notion of possessing control over one’s outcomes as locus of control. Internal locus of control “refers to an individual’s belief that an event or outcome is contingent on his or her own behavior or on relatively permanent characteristics such as ability” (Stipek & Weisz, 1981, p. 102). If students felt that no matter how hard they worked they would not be successful in school due to factors beyond their control, then
lack of effort might be a natural reaction. Research has shown that students with an internal locus of control had higher academic achievement than those with an external locus of control.

Tashakkori and Thompson (1991) used the High School and Beyond database to select 19,918 sophomores and seniors from public and private high schools to determine whether there were race differences in self perception and locus of control. The authors used six items from the Rosenberg scale to measure general self-esteem, which they defined as general self-perception. The authors also used measures of social attractiveness and locus of control scales from the larger study. Regarding locus of control, Tashakkori and Thompson (1991) found that African Americans had significantly lower perceptions of internal control than Caucasians.

Marshall (2003) also attempted to determine whether locus of control orientation affected the academic achievement of African American middle school students. Participants were 477 eighth grade African American males from four middle schools. Marshall (2003) used students’ math and reading scores on the Metropolitan Achievement Test (MAT 7), as well as their GPA in the two subjects to determine achievement. The author used the Academic Achievement Questionnaire (AAA) to measure locus of control. Marshall (2003) found that internally oriented students had significantly higher MAT 7 math and reading scores than did externally oriented students. This also held true for their mean grades in both reading and math.

Cunningham (2004) also explored the effects of locus of control on academic achievement, but included race, gender and living status (1-parent versus 2-parent home) in the equation. Participants in the study were 596 ninth grade South Carolina students.
Cunningham (2004) also used the Academic Achievement Questionnaire (AAA) to assess locus of control, and the Palmetto Achievement Challenge Test (PACT) to assess reading and math achievement. As in the previous study, Cunningham (2004) reported that overall, internally oriented students scored significantly higher in reading and math than externally oriented students. Specifically, internally oriented African American students scored significantly higher in reading than did externally oriented African American students. However, both internally and externally oriented Caucasian students scored significantly higher in reading and math than their African American counterparts.

Similar outcomes were also found in Savannah-Chatham County, Georgia. Howard (2004) explored the relationships between locus of control orientation, family structure, race, gender, socioeconomic status (SES) and academic achievement. Participants were 626 seventh and eighth grade students. The Iowa Test of Basic Skills (ITBS) in mathematics and reading was used to measure academic achievement, and the Academic Achievement Questionnaire (AAA) to assess locus of control. Socioeconomic status was classified as students’ eligibility for free and reduced price lunch. Howard’s (2004) findings mirrored the previous studies. Internally oriented students had significantly higher reading and mathematics scores than externally oriented students. Caucasian students, no matter the orientation, outperformed both internally and externally oriented African American students in reading and math. Internally oriented African American students scored significantly higher in reading and math than externally oriented African American students.

These studies suggested that African American students felt less in control of their academic outcomes than did Caucasian students. Additionally, the feeling of control was
significantly related to students’ actual achievement. The history of unfair treatment and discrimination, especially in the field of education and employment could make African American students more susceptible to feeling that forces outside of their control were responsible for their outcomes.

Finn and Rock (1997) explored the concept of educational valuing from an academic engagement perspective and found that engagement played a role in the academic achievement of minority, low-income students. The authors measured engagement with student and teacher questionnaires to ascertain students’ basic compliance or noncompliance with school and classroom requirements, as well as students’ in-school and out-of-school initiative taking. Achievement was measured by the National Educational Longitudinal Statistics of 1988 (NELS:88) tests in reading comprehension, mathematics, science and history/citizenship/geography. The authors classified eighth and 12th grade students as resilient (successfully completing school), non-resilient completers (school completers with lower academic achievement), and dropouts (non-completers). They found that minority students who successfully completed school had significantly higher self-esteem and greater locus of control than did non-resilient students. Teachers viewed resilient students as significantly harder working and more engaged than non-resilient students. Additionally, teachers judged non-resilient students as harder working and more engaged than were dropouts. Significant differences in engagement remained even after controlling for home background (socioeconomic status and family makeup) and psychological characteristics (self-esteem and locus of control).
Sbrocco (2009) also attempted to determine the relationship between various types of engagement and their relationship to race and academic achievement. Behavioral engagement described overall positive student conduct, such as following classroom rules, and a lack of disruptive behaviors. It “implies a student’s involvement in learning and academic behaviors in the classroom, such as effort, persistence, asking questions, and concentration” (p. 15). Emotional engagement referred to students’ actions and emotions related to school and their classroom. Disengagement was defined as emotional and mental disengagement from school as evidenced by such behaviors as boredom, distraction and lack of values. Sbrocco (2009) used questions from several surveys to develop an engagement scale, including The National Education Longitudinal Study of 1988 (NELS:88), Educational Longitudinal Study of 2002 (ELS:02) and the High School Survey on Student Engagement 2005 (HSSSE). He also used surveys to assess school climate and culture. Teacher support represented teachers’ positive interpersonal relationship with their students and was measured by student surveys. The Developmentally Appropriate School Model (DASM) was also used to develop a comprehensive approach to educating young sixth to eighth grade students. Sbrocco used Newmann, Secada, and Wehlage’s (1995) authentic pedagogy instructional approach to develop a survey that measured authentic instruction. Authentic pedagogy was a type of instructional planning and assessment teachers used to connect students’ work with real-world application.

Sbrocco (2009) found that behavioral engagement had the strongest association with all measures of academic achievement. Students who were emotionally engaged performed significantly better academically than those who were not, and disengaged
students were more likely to have lower achievement scores. Caucasian students had significantly higher achievement and engagement scores than African Americans. Behavioral and emotional engagement and academic achievement also correlated higher for Caucasian students than for African American students. Conversely, there was a stronger relationship between disengagement and academic achievement for African American students. The authors suggested that African American students were more likely to become disengaged than were Caucasian students. Additionally, when disengagement did occur, it was more likely to have a detrimental effect on African American students’ achievement than Caucasians’ achievement.

Lleras (2008) explored whether differences in the learning processes within low and high minority schools could explain the racial gap in academic achievement. He used data from the NELS:88 and NELS:90 to explore the effects of race on mathematics achievement, academic engagement, and mathematics course-taking patterns, controlling for family background. Additionally, he sought to estimate whether or not this process of learning differed based on the school’s racial composition. He measured mathematics achievement using multiple-choice mathematics tests administered at the end of eighth and tenth grade. Lleras (2008) used teacher questionnaires to measure academic engagement, which the author defined as students’ attentiveness, disruptiveness and homework habits. Teachers rated eighth graders in high-minority schools as less engaged than those in low-minority schools, especially in urban areas. Additionally, teachers rated African American students in high-minority schools as less engaged than their Caucasian counterparts in the same school, especially if these schools were in urban and rural areas versus suburban areas. Not surprisingly, teachers viewed eighth grade African American
students in urban, high-minority schools as significantly less engaged than were African American students in urban, low-minority schools. Lleras (2008), found no differences in the academic engagement of eighth grade African American and Caucasian students attending low-minority schools, no matter the location. However, as African American students progressed through these low-minority schools, teachers reported that they had an increasingly lower level of engagement when compared to Caucasian students.

The results of this study had two important implications. First, it suggested that African American and Caucasian students were equally engaged when they began eighth grade in low-minority schools. However, something happened to reduce the engagement of African American students as they progressed through school. Second, there was something unique about high-minority schools that contributed to the low academic engagement of all students, but especially of African American students enrolled in urban areas (Lleras, 2008). Because high-minority, urban schools are more likely to serve economically disadvantaged students, it is important to explore the relationship between poverty concentration and academic achievement.

**Poverty Concentration and Academic Achievement**

One of Coleman’s (1990) assumptions regarding educational equality was that “the existence of free schools eliminates economic sources of inequality of opportunity” (1990, p. 20). This section will explore this assumption and detail how both neighborhood and school poverty concentration can influence the complex mental processes that affect academic achievement.

The Gastreaux housing desegregation lawsuit of 1976 provided Kaufman and Rosenbaum (1992) the unique opportunity to explore the effects of a program that not
only provided school desegregation but also residential desegregation. The lawsuit was filed as a result of the racially discriminatory policies of the Chicago Housing Authority and the Department of Housing and Urban Development (HUD). The lawsuit led to the development of a federally funded housing program that provided public housing residents with Section 8 subsidies that allowed them to move to private apartments either in the city or in mostly Caucasian suburban neighborhoods (Kaufman & Rosenbaum, 1992).

Participants in the housing program were typically under the age of 35, single, African American, female, and very low income. In principle, participants could move wherever they wanted, but in practice, they could only move where there were housing openings. As a result, this program resembled a natural experiment because selections for neighborhoods were, in effect, random (Kaufman & Rosenbaum, 1992). Kaufman and Rosenbaum (1992) studied two groups. The first group moved to 96% Caucasian suburban communities, while the second group moved to 99% African American urban neighborhoods. At the time of the study, the differences in the academic outcomes of students in these areas were vast. For example, in 1990, students who attended suburban schools in Chicago had significantly higher achievement (average reading scores = 259/500 suburban, 198/500 urban; p < .0001; ACT 21.5 suburban, 16.1 urban; p < .0001), and graduation rates (85.7% suburban, 33.5% urban; p < .0001) than did students who attended city schools (Kaufman & Rosenbaum, 1992). Kaufman and Rosenbaum (1992) sought to determine whether economically disadvantaged students moving to the suburbs would fare worse than those who moved to urban areas due to the differences in academic standards and rigor.
Results showed that youth who moved to suburban neighborhoods fared better than youth who moved to urban neighborhoods (Kaufman & Rosenbaum, 1992). Specifically, 20% of youth in the program who moved to urban areas dropped out of high school, compared to less than 5% (p < .10) of suburban youth. A significantly higher percentage of suburban movers than city movers were in high school college tracks (40.3% suburbs vs. 23.5% city; p < .05). The difference in educational tracks could explain why there was no significant difference in grades earned between the two groups. Additionally, youth who moved to the suburbs enrolled in college at a higher rate than did urban students (54% vs. 21%; p < .025) (Kaufman & Rosenbaum, 1992).

Interviews revealed that all the youth in the program felt that had they not moved from their original neighborhood, safety issues, especially drug use and/or gang involvement, would have negatively affected their lives (Kaufman & Rosenbaum, 1992). After safety issues, urban and suburban youth provided different explanations for how their lives improved as a result of the program. Urban movers mentioned improved housing quality while suburban youth noted that their new school environment improved their motivation (Kaufman & Rosenbaum, 1992). Students reported that suburban schools had the following: higher expectations for student achievement; a more intense curriculum; teachers who provided more assistance; access to college; and positive role models and peer pressure to achieve (Kaufman & Rosenbaum, 1992). This finding suggested that economically disadvantaged students could do well when placed in the right environment. Therefore, it was not only micro-level poverty (individually-based in the home), but also macro-level poverty (concentration in the neighborhood and school) that affected academic achievement.
In a more recent study, Ainsworth (2002) explored the advantage of having positive role models. Ainsworth (2002) drew upon Julius Wilson’s work to describe how economic segregation could affect academic achievement through a process called collective socialization. Ainsworth (2002) reasoned that collective socialization played a large role in the way a person’s neighborhood influenced his/her thinking and behavior by shaping the type of role models to whom children were exposed. When children grew up in areas where most adults were educated and gainfully employed, the children were socialized to believe that education and hard work would in turn help them to become successful. Conversely, when children grew up in neighborhoods that were impoverished due to the adults’ unemployment and/or limited upward mobility, the children may have started to devalue the very educational arena that they felt failed their parents and other adults in their environment. While youth may have seen the disadvantages of a lack of education, they may have lacked the cultural capital needed to understand how to navigate the educational system in order to secure a career path that would help them become successful (Ainsworth, 2002).

To examine this theory, Ainsworth (2002) measured the influence of several neighborhood characteristics on math and reading achievement, as measured by composite scores on Educational Testing Service tests. He found that neighborhood economic deprivation was a significant, strong predictor of math and reading achievement. Additionally, the prevalence of high-status residents in a neighborhood strongly predicted the time students spent on homework as well as students’ math and reading achievement. Ainsworth (2002) concluded that more than half of the detrimental effects of living in an economically deprived neighborhood could be attributed to the lack
of high-status residents in those neighborhoods who modeled the importance of hard work.

Ainsworth (2002) also demonstrated that relative to individual, familial, and school factors, neighborhood characteristics were still significant. Family socioeconomic status (a composite of parental education, occupational status and family income) was the strongest predictor of the amount of time students spent on homework and of academic achievement. However, the prevalence of high-status residents was the second strongest predictor of academic achievement, even above attending a private school, teacher quality, number of siblings in the household, and a student’s gender.

Finally, Ainsworth (2002) wanted to determine which variables mediated the effects of the prevalence of high-status residents in the neighborhood. Mediating variables (i.e., educational expectation (defined as how far a student thinks he/she will progress in school), number of friends who dropped out, time spent on homework) did explain some of the impact of neighborhood effects; however, the presence of high-status residents was still a significant predictor of time spent on homework and of math and reading achievement. Specifically, time spent on homework and educational expectations held by students accounted for the greatest effect that the prevalence of high-status residents had on achievement, while number of friends who dropped out and occupational expectations explained a small, but significant amount.

Ainsworth (2002) demonstrated that neighborhood poverty concentration could have a negative impact on academic achievement because of lack of exposure to high status residents who could have provided visual representation of the benefits of performing well in school. Ainsworth’s (2002) study suggested that students did not
value education when they did not see the benefits of it. The following studies will further explore attitudes towards learning and educational valuing for economically disadvantaged students.

**The effects of poverty concentration on student and peers’ educational values.** Bankston and Caldas (1996) reasoned that students were social resources for one another and “schools are social environments that are, to some extent, independent of the families that supply the students” (p. 536). Because students brought “behavioral and attitudinal ‘capital’ from the family to the school,” they ultimately “establish a peer society that makes their forms of behavior and attitudes a part of the common holdings” (Bankston & Caldas, 1996, p. 536). This interpretation suggested that the culture of learning within the school that a student attended could have influenced the way he or she viewed achievement and could have superseded the influence of the student’s own family or residential neighborhood. The authors reasoned that if levels of preparation, standards for performance, and attitudes towards learning were associated with family socioeconomic status, then students who attended schools that served a large population of impoverished students might have been at a distinct educational disadvantage (Caldas & Bankston, 1999).

In examining student achievement and poverty in Montgomery County, Maryland, Schulte and Keating (2001) found that although low-income students of all races performed at their worst when attending high poverty concentration schools, they scored at or above the county’s average when they attended schools that were more affluent. However, middle-class students continued to score well when they attended high poverty concentration schools. This suggested that poverty concentration negatively
affected the academic achievement of poor students, but not of middle-class students. Attending schools with students who were more affluent compensated for the detrimental effects of individual-level poverty; however, the benefits associated with high-level individual economic status superseded the detrimental effects of high-poverty schools.

In a different study, Cohen and Little (2005) found slightly different results than the previous authors for middle-class students in Chicago, Illinois. In this environment, middle-class students performed just as poorly as low-income students did when middle-class students attended high-poverty schools (Cohen & Little, 2005). In higher-poverty elementary schools, approximately 40% of middle-class African American students passed the previous year's state reading test, compared to the 62% who passed in lower-poverty elementary schools. While significance levels were not reported, the difference between the percent of middle-class students who passed in these two environments appeared substantively large. Parents reported that their children tried to fit in with “lesser students” and that being “surrounded by high-achieving students with few disciplinary problems” helped their children succeed (Cohen & Little, 2005, p. 3). Cohen and Little (2005) explained that because there were few middle-class neighborhoods large enough to support having their own schools, most middle-class students in Chicago attended schools with a high concentration of poverty. If middle-class African American families lived in close proximity to high-poverty communities as well as attended high-poverty schools, then it is not surprising that their outcomes were similar to students from impoverished backgrounds.

Some of the above literature suggested that poverty concentration within a school negatively affected the values students and peers placed on academic achievement. This
was possible through a process called collective socialization, which shaped the type of role models youth were exposed to. Therefore, poverty concentration in schools as well as in neighborhoods could have affected students’ views of the importance of education as a means for achieving financial success and stability. Individuals valued, and consequently engaged, in tasks that they felt would help them reach immediate and future goals (Eccles & Wigfield, 2002). The role models to whom impoverished children were exposed, as well as the lack of visual representation of the benefits of working hard in school could have led to academic disengagement (Ogbu, 1991, 1995a).

The literature has revealed that the relationships among race, poverty and achievement is complex; however, gender adds another dimension to the equation that deserves exploration. Therefore, following section explores gender differences in academic achievement.

**Gender and Academic Achievement**

Research findings on gender differences and academic achievement have been mixed. Several researchers have investigated gender differences in academic achievement and have reported that males outperformed females in subjects like mathematics and science, while girls performed better overall in reading, social studies and other linguistic-based subjects (Coley, 2001; Mullis, Martin, Fierros, Goldberg, & Stemler, 2000). However, other researchers have reported no gender differences in academic achievement (Freeman, 2004; Planty et al., 2009), and some found that girls performed better in school than boys in both reading and mathematics (Lloyd, Walsh, & Yailagh, 2005). The Third International Mathematics and Science Study (TIMSS) tested students across five different grades from elementary/primary, middle, and high/secondary school
on both mathematics and science (Mullis et al., 2000). The sample included more than half a million students from 15,000 schools in 41 countries. In the United States, TIMSS found no significant difference in the fourth or eighth grade mathematics achievement of males or females; however, there was a difference in 12th grade students’ scores. For 12th graders, TIMSS used two measures of mathematics achievement: the mathematics literacy test and the advanced mathematics test. The mathematics literacy test was “designed to measure the mathematics achievement of all final-year students, regardless of their mathematics curriculum” (Mullis et al., 2000, p. 13). The advanced mathematics test was designed to measure knowledge of advanced mathematics concepts among students who had studied advanced mathematics. The mean achievement score for males was 31 points higher (p < .05) in advanced mathematics achievement (Mullis et al., 2000).

The Educational Testing Services (ETS) Policy Information Center compiled a report that compared gender differences in academic achievement within ethnic groups and found mixed results (Coley, 2001). In all three assessment years (1992, 1994, and 1998), ETS found that fourth, eighth and 12th grade African American and Caucasian females scored significantly higher than males of the same race on the NAEP reading assessment. ETS examined scores on the NAEP mathematics assessment in 1990, 1992 and 1996. 12th grade African American males scored significantly higher than African American females in 1996. No significant differences were found in other years or in other grades. Caucasian fourth grade males scored significantly higher in 1992 and 1996, and Caucasian 12th graders scored significantly higher in 1990 and 1992 on the NAEP mathematics assessment. There were no significant differences in eighth graders’ scores
in any year. On the SAT I Verbal Test, African American female college-bound seniors scored higher than males, however, males from all ethnic groups scored higher than females on the SAT I Mathematics Test. Additionally, males in all ethnic groups scored higher than females on the GRE Verbal, Quantitative, and Analytic Tests as well as on the GMAT (Coley, 2001). Significance levels were not reported for these tests.

Between 1990 and 2007, NCES reported no significant differences in the fourth, eighth or 12th grade NAEP mathematics scale scores of males and females (Freeman, 2004; Planty et al., 2009). Lloyd et al. (2005) reported that the mean report card grade for girls was 80%, while boys earned a 73%. In the specific subject of math, the authors found that on average, girls scored 14 points higher than did boys on the Numeracy subtest (which referred to a combination of mathematics knowledge, problem solving and communication skills) of the 2001 Foundation Skills Assessment (FSA), however, the author did not report whether this difference was statistically significant. Else-Quest, Linn, and Hyde (2010) conducted a meta-analysis of cross-national patterns in gender differences in math achievement. They analyzed the 2003 Trends in International Mathematics and Science Study (TIMSS) and the Programme for International Student Assessment (PISA) and found mixed results. Girls outperformed boys on the TIMSS Algebra assessment, while boys outperformed girls in PISA-Math. While the differences were statistically significant, the effect sizes were too small to be considered meaningful (Else-Quest et al., 2010).

Although the results for mathematics achievement have been mixed, data has consistently shown that males completed high school at a lower rate than did females (Coley, 2001; Planty et al., 2009). In 2003, 65% of male students graduated while 72% of
female students did (Greene & Winters, 2006). In 2007, 11% of 16- to 24-year-old males dropped out of high school compared to 8% of females (Child Trends Database, 2010, Planty et al., 2009). Specifically, 14% of African American males dropped out of high school, compared to 7% of Caucasian males, while 9% of African American females and only 5% of Caucasian females dropped out (Planty et al., 2009). According to the Child Trends Databank, in 2008 86% of 25-29 year old males and 90% of females completed high school (Child Trends Database, 2010). The statistical significance of these findings were not reported, however, the consistent gender gap provided evidence of the obvious disconnect between ability to achieve and successful completion of school for male students. The inconsistency may have been rooted in gender differences in educational valuing.

The effects of gender on student and peers’ educational values. Some evidence exists that has suggested that females may value education more than do males. Solorzano (1992) found that African American and Caucasian female students aspired to attend college at a higher rate than do males. Graham et al. (1998) conducted two studies on the achievement values of African American middle school students. Graham et al. created an achievement values index using nominations of peers whom students admired, respected and wanted to be like. Additionally, students nominated peers who they felt fit into six behavioral categories, including: academic achievement, effort, following rules, clothing choice and sports. The researchers divided students into three achievement levels (low, average and high) based on teachers’ subjective ratings of students’ achievement level on a 9-point scale. In their first study, Graham et al. (1998) selected 304 African American middle school students from predominantly African American, high-poverty
schools and found gender differences in student values. Overall, girls valued other girls who were high-achieving (p < .001). These high-achieving girls tended to follow the rules, worked hard, and wore nice clothes. Girls identified low achieving boys as those who exerted less effort and did not follow the rules, but were good at sports. Conversely, it was these low-achieving boys that male classmates valued and wanted to be like (p < .001). The boys also felt that the students who tried hard and followed the rules were high-achieving girls. These findings indicated that for African American boys to fit in with their male peers, sports should have been their focus, not academic achievement or staying out of trouble, while for girls, the opposite was true (Graham et al., 1998). In their next study, the authors explored whether a student’s race had any effect on what they valued.

Using the same procedures as their first study, Graham et al. (1998) looked at 401 African American, Latino and Caucasian students from ethnically diverse, high-poverty middle schools to determine whether ethnic differences existed. African American girls admired, respected and wanted to be like other African American girls who were average to high-achieving. When African American girls did nominate females from another race, they chose high-achieving Caucasian females. Latino girls also nominated average to high-achieving Latino girls, but when they chose females from other ethnicities, Latino girls selected high-achieving Caucasian females first, followed by high-achieving African American females. Finally, Caucasian females chose high-achieving Caucasian girls, followed by high and average achieving Latino girls. Girls across all ethnicities felt that high-achieving girls tended to work hard on their schoolwork and followed the school rules. For males, both African American and Latino boys preferred low achieving boys of
their same ethnicity only. Conversely, Caucasian males valued high-achieving Caucasian males (Graham et al., 1998). All males felt that high-achieving male and female classmates followed the school rules and worked hard on their schoolwork. Additionally, African American, Latino and Caucasian students preferred their same-ethnicity males who were good in sports, regardless of their level of academic achievement (Graham et al., 1998). This indicated that for females of all ethnicities and for Caucasian males to fit in with their peers, they needed to do well in schools. Conversely, African American and Latino boys could have fit in while being low achieving and disobedient. Additionally, being athletic helped boys of all races fit in with their peers (Graham et al., 1998). If African American boys received the message from their peers that athleticism rather than academic achievement was the key to popularity, it was likely that sports would have been African American boys’ focus instead of education.

Honora (2002) took a slightly different approach to exploring the educational values, goals and beliefs of African American students and also found that boys were less focused on academic achievement than were girls. Honora’s sample consisted of high- and low-achieving African American ninth graders from a “socioeconomically homogeneous group of low-income students” (p. 304). Socioeconomic status was determined by the educational and occupational level of parents, as well as students’ eligibility for Free or Reduced Price Lunch. Honora used students’ overall grade point average (GPA) to determine achievement level. Additionally, school officials provided feedback on whether students’ GPA was reflective of their overall academic potential. The study revealed that girls listed a greater percentage of goals related to education and employment, whereas boys’ goals tended to be related to sports and leisure. While high-
achieving boys showed an obvious focus on academic goals and expectations, they expressed fear regarding their ability to attend college due to financial constraints and saw sports as a means for financing college. Lower-achieving boys tended to view sports and other occupations that would not require college as their possible career options. These findings indicated that girls were more hopeful about their academic futures than were boys. Boys may have become disengaged and devalued education because they were fearful about their ability to attend college, or they did not see academics as a means for success (Honora, 2002).

However, Kuriloff and Reichert (2003) provided evidence that boys, even those from lower socioeconomic statuses, could perform well and were able to see the value of education if they were placed in the right environment. Their study explored how boys from diverse backgrounds faired in an elite preparatory school. The study was part of a larger, quantitative study. The authors conducted one-hour interviews with 16 boys in grades junior-kindergarten through 12th grade, as well as 11 graduates who were enrolled in college. Students were selected based on race, socioeconomic status and achievement level. Kuriloff and Reichert did not specify how they determined socioeconomic status or what measure of academic achievement they used. They found that boys of all races and all socioeconomic backgrounds (middle class, working class, and poor) valued education because of the culture of learning promoted at the school. The school culture’s definition of masculinity included “honor, courage, teamwork, sacrifice, a strong inquiring intellect, and a genuine appreciation for the life of the mind” (p. 766). No matter what the values or behaviors of those in their household or neighborhood, boys
from lower socioeconomic background internalized the values they gained in school and continued to exhibit them at home by carving out time to study despite distractions.

Wood, Kaplan, and McLoyd (2007) conducted a study of gender differences in student, teacher and parental educational expectations for low-income African American students. The authors used data from the Child and Family Study (CFS) of the New Hope Project. This project was conducted in two low-income (below 150% of the federally defined poverty level) neighborhoods in Milwaukee, WI during the mid- to late-1990s. CFS selected residents of these neighborhoods who were at least 18 years old and willing to work at least 30 hours per week. Participants were randomly assigned to the control or experimental group, which provided participants with “job search assistance, a monthly earnings supplement, and subsidized health insurance and child care” (p. 420). Wood et al. (2007) selected 301 African American caregivers who reported on 466 6-16 year olds while teachers reported on 281 students from the same age group. The authors obtained self-reported data from three hundred and seven 9-16 year olds. The questions asked students and teachers whether they expected the student to attend and finish college, and asked parents how far they thought their child or children would go in school. The authors assessed academic achievement with four scales from the Woodcock-Johnson Psycho-educational Battery-Revised. Among their findings were that even after controlling for academic achievement, not only did male students have significantly lower educational expectations for themselves than did females, but teachers and parents also had significantly lower expectations for male students. These low expectations for the academic completion or attainment of male students could be a plausible explanation for their higher dropout rate relative to females.
Another explanation of male students’ lack of academic achievement and educational attainment relative to females could have been related to attitudes towards school. Sullivan, Riccio, and Reynolds (2008) explored differences in gender, ethnicity and age on students’ self-reported attitudes towards school and teachers. They used data from the Behavior Assessment System for Children Self-Report of Personality (BASC SRP) to select 10,140 children and adolescents from 26 states. The Self-Report of Personality (SRP) component of the BASC was a self-report instrument designed to measure child and adolescent emotional functioning. Sullivan et al. (2008) used both a child and adolescent versions of the Attitudes to School and Attitudes to Teachers scales. Attitudes to Teachers measured “feelings of alienation, hostility, and dissatisfaction regarding school” while the Attitude to Teachers scale measured “feelings of resentment and dislike of teachers; beliefs that teachers are unfair, uncaring, or overly demanding” (p. 298). Among the authors’ findings were that both child and adolescent males reported significantly more negative attitudes towards teachers and school than did females. Perhaps these feelings of alienation in school and lack of connection with teachers contributed to male students’ lack of educational valuing as evidence by their poor academic outcomes compared to females.

**Summary of Literature Review**

The history of segregation in the United States has been long and complex. Although the government ruled that *de jure* segregation was unconstitutional in 1954, *de facto* segregation is still prevalent today. Neighborhoods are naturally segregated by the economic status of the residents who can afford to purchase homes in particular areas; however, economic segregation most often leads to racial segregation. After eliminating
busing, students once again attended schools that served their local neighborhoods. Consequently, the demographic makeup of schools mirrored that of the local, segregated neighborhoods. This factor resulted in many schools with a high concentration of poverty and minority students who were disadvantaged because of the limited economic and social capital of local adults. Macro-level factors, such as poverty and minority concentration of schools, as well as micro-level factors, such as a student’s race and gender all affect students’ academic achievement. Not only do these individual factors affect academic achievement, but the complex interaction of these factors also has an impact.

Prior research has attempted to determine the relationships among gender, race and school poverty concentration on academic achievement. Researchers have explored the interaction among these variables to determine whether achievement differed by gender within a student’s race. Other studies have attempted to determine the mediating effects of locus of control, engagement and motivation on academic achievement. Most research on these mediating variables has assessed students’ engagement and motivation from the teachers’ perspective. The current study was an extension of the previous research and attempted to determine whether students’ self-reported educational values and students’ self-reported perceptions of their peers’ educational values could explain any differences in mathematics achievement based on race, gender or school poverty concentration.

**Hypothesized Path Analysis Model**

As previously stated, the purpose of this study was to explore the effects of race, school poverty concentration and gender on current mathematics achievement,
controlling for prior mathematics achievement and highest level of mathematics taken. Additionally, this study explored whether or not students’ and peers’ educational values mediated the effects of the aforementioned variables (see Figure 1 in Chapter 1 for a depiction of the Hypothesized Path Analysis Model. The arrows shown indicate the hypothesized paths of influence).

There were two sets of variables in the proposed path analysis model. The first set of variables in the model included the exogenous variables of race, school poverty concentration and gender. It was hypothesized that African American students would have lower self-reported educational values and lower perceptions of their peers’ educational values, controlling for prior mathematics achievement and highest level of math taken. The second hypothesis was that females would have higher self-reported educational values, as well as higher perceptions of their peers’ educational values, controlling for prior mathematics achievement and highest level of mathematics taken. The third hypothesis was that students who attended schools with higher levels of school poverty concentration would have lower self-reported educational values and lower perceptions of their peers’ educational values, controlling for prior mathematics achievement and highest level of math taken.

The second block of the model included the endogenous variables of students’ self-reported educational values, perceptions of their peers’ educational values, prior mathematics achievement and highest level of mathematics taken. The fourth hypothesis was that these variables would have a direct, positive effect on mathematics achievement. Students with higher self-reported educational values and higher perceptions of their peers’ educational values would have higher mathematics achievement. Additionally,
students who took higher levels of mathematics courses and those with higher prior mathematics achievement would have higher mathematics achievement.

The final hypothesis was that the endogenous variables in the model would mediate the effects of the exogenous variables on mathematics achievement. In other words, students’ self-reported educational values and students’ perceptions of their peers’ educational values would help explain the relationships among race, school poverty concentration, and gender on mathematics achievement, controlling for prior math achievement and highest level of math taken.
CHAPTER 3
METHODOLOGY

Participants

Data for this study were extracted from the Educational Longitudinal Study (ELS:2002), which was designed to monitor the transition of a national sample of youth progressing from 10th through 12th grade, and then on to postsecondary education and/or the workforce (Ingles et al., 2004). ELS:2002 was sponsored by the U.S. Department of Education Institute of Education Sciences (IES) National Center for Educational Statistics (NCES). The base year for the ELS:2002 study was in the spring term of 2002. Tenth grade students were administered cognitive tests in reading and mathematics. Additionally, questionnaires were administered to the students, parents, math and English teachers, principals, and heads of the school library media center (Ingles et al., 2004). The final sample size for the larger study included 752 schools, 15,362 students, their parents, and each student’s mathematics and English teacher. First, schools were selected, and then 10th grade students were randomly selected within each school. Non-public schools (specifically Catholic and other private schools) were sampled at a higher rate to ensure a large enough sample size to accurately compare to public schools. Subsequently, students were selected. To ensure sample sizes large enough for accurate comparison, Asian students were sampled at a higher rate than Caucasian, African American, and Hispanic students (Ingles et al., 2004). The first follow-up survey occurred in spring 2004. Base year students who remained at their base-year schools were re-surveyed and re-administered the mathematics cognitive test. Most of the base-year sample members were in the 12th grade; however, some students had been retained, some dropped out, and others graduated early. These students were also surveyed. Additionally, in order to
obtain a fully representative sample of 2004 high school seniors, seniors who were not sophomores at the base-year schools were also included in the survey. The second follow-up occurred in 2006, when many sample members were in their second year of college. Subsequent follow-ups are projected to take place in 2010 (Ingles et al., 2004).

The populations of interest in the present study were native English speaking African American and Caucasian students attending urban and suburban public schools. Selection was based on participation in both the 2002 base and 2004 follow-up years of the larger study. The final sample for the present study included 600 African American and 600 Caucasian students from 318 schools. Participants responded to all items included in this study.

**Instruments**

The *ELS:2002 School Administrator Questionnaire* was used to determine poverty concentration within the selected schools based on the percentage of students who qualified for Free and Reduced Price Lunch. Students’ tenth grade standardized scores on the *ELS: 2002 Cognitive Mathematics Test* were used as the measure of prior achievement, while 12th grade standardized scores on the *ELS: 2002: First Follow-Up Cognitive Mathematics Test* served as the measure of mathematics achievement. The *ELS:2002 First Follow-Up Student Questionnaire* was used to determine the highest level of mathematics course taken. Examples of mathematics courses students could have taken included General Math, Algebra, Geometry, Trigonometry and Calculus.

A subscale of the *ELS:2002 Student Questionnaire* was used to assess the educational value students held (Students’ Educational Values Scale), as well as students’ perceptions of the educational value their peers possessed (Peers’ Educational Values
Questions in the Students’ Educational Values Scale asked students to rate their level of agreement or disagreement, the importance, and the applicability of some of the following statements: I go to school because I think the subjects I am taking are interesting and challenging; I go to school because education is important for getting a job later on; When studying, I try to work as hard as possible; I study to ensure that my family will be financially secure; When studying, I try to do my best to acquire the knowledge and skills taught (see Appendix A for the full list of questions included in the Students’ Educational Values Scale). Some of the questions in the Peers’ Educational Values Scale included: How important is getting good grades to your first, second and third friend; Among your close friends, how important is it to them that they attend classes regularly; Among your close friends, how important is it to them that they finish high school; Among your close friends, how important is it to them that they continue their education past high school; Altogether, how many of your close friends have dropped out of school before graduation (see Appendix B for a full list of questions included in the Peers’ Educational Values Scale).

Procedure

First, students with complete profiles (those with gender, race, language, standardized math scores and math courses taken variables) who participated in both the base and follow-up years of the larger study were chosen. Next, students who answered the minimum number of questions on both the Students’ and Peers’ Educational Values Scales were selected. This resulted in 8,207 students (1,322 African American and 6,885 Caucasian). Finally, students attending urban and suburban public schools with complete profiles (information on school type, enrollment and percent free and reduced price
lunch) were selected. This resulted in 3,238 students (692 African American and 2,546 Caucasian). As in the national dataset, a disproportionate number of Caucasian students remained in this sample. Consequently, to prevent errors due to extreme sample size differences, a random sample of 600 students was drawn from each ethnic group. This sample size was selected to allow adequate power for statistical tests.

**Analyses**

Prior to testing the variables in the model, reliability testing was conducted to gauge the internal consistency of the Students’ Educational Values Scale and the Peers’ Educational Values Scale. Reliability is the correlation of an item, scale or instrument with a hypothetical one that truly measures what it is supposed to measure. However, since the true instrument was not available, reliability was estimated using Cronbach’s alpha to test the correlation among the variables that made up each of the two scales. Cronbach’s alpha can be interpreted as the correlation of the observed scale with all possible other scales measuring the same construct and using the same number of items. A cut-off of .70 was used to determine the accuracy of each of the constructed scales. Items were dropped from each of the scales if the *Alpha if Deleted* was higher than the overall alpha for the particular item or items. Some items were retained in each scale that would have slightly increased reliability if dropped because the items added validity to the scales. Validity refers to the degree to which an item or scale accurately reflects or assesses the specific construct the researcher is attempting to measure. For example, the reliability of the Students’ Educational Values Scale was .871. Reliability would have been highest (.874) if some items were removed (i.e., How important are good grades to you?; How important is getting a good education to you in your life?). However, these
items were included in the scale because they were reflective of the concept the scale measured and reliability remained high with their inclusion. Similarly, the reliability of the Peers’ Educational Values Scale was .755. Reliability would have been highest (.837) if the questions pertaining to the importance of getting good grades to friends were removed. However, these questions were included in the scale because they were reflective of the concept the scale measured and reliability remained high with their inclusion.

This study utilized a path analysis to examine the relationships among the variables listed above. A regression equation was estimated for each variable in the model. Since the direct effects in the model were estimated with ordinary least squares regression procedures, the assumptions of regression had to be met. Thus, each regression equation defining the model was tested for linearity, normality, homoscedasticity and multicollinearity. Additionally, Gemini was used to test the indirect and total effects amongst the variables to determine which of the hypothesized paths significantly predicted mathematics achievement.
CHAPTER 4

RESULTS

Ordinary least squares multiple regression was used to determine the effects of the set of independent variables on mathematics achievement, and whether or not the endogenous variables mediated the effects of the exogenous variables on mathematics achievement. The exogenous variables were race, gender and school poverty concentration. The endogenous variables were students’ educational values, peers’ educational values, prior mathematics achievement and highest level of mathematics taken. Students’ educational values represented students’ self-reported valuing of education for the sake of learning or as a means for achieving goals. The Cronbach’s alpha reliability for this scale was .871. Peers’ educational values represented students’ self-reported perceptions of how much their peers valued education for the sake of learning or as a means for achieving goals, which had a Cronbach’s alpha reliability of .755. The sample for this analysis consisted of 1,200 native English-speaking students (600 African American and 600 Caucasian) from urban and suburban public schools.

The means, standard deviations and inter-correlations of all the variables used in the model are listed in Table 2. Twenty-one of the correlations were significant; the top five will be discussed here. Prior mathematics achievement and mathematics achievement had the largest correlation (r = .903). This very high correlation indicated that students who had higher prior mathematics achievement also had higher mathematics achievement. The variables that had the second highest relationship were race and prior mathematics achievement (r = -.460). The negative correlation suggested that being African American was related to lower prior mathematics achievement. The third largest
Table 2
Correlations, Means, and Standard Deviations of Variables in Model of Math Achievement

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Race</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Gender</td>
<td>.018</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. School Poverty Concentration</td>
<td>.380</td>
<td>-.028</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Prior Achievement</td>
<td>-.460</td>
<td>-.067</td>
<td>-.320</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Student Values</td>
<td>.196</td>
<td>.098</td>
<td>.130</td>
<td>.026</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Peer Values</td>
<td>.095</td>
<td>.237</td>
<td>.015</td>
<td>-.007</td>
<td>.350</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Highest Level of Mathematics Taken</td>
<td>-.112</td>
<td>.003</td>
<td>-.230</td>
<td>.376</td>
<td>.091</td>
<td>.077</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>8. Math Achievement</td>
<td>-.425</td>
<td>-.075</td>
<td>-.324</td>
<td>.903</td>
<td>.062</td>
<td>.016</td>
<td>.423</td>
<td>1.000</td>
</tr>
<tr>
<td>Mean</td>
<td>1.500</td>
<td>1.510</td>
<td>3.880</td>
<td>49.115</td>
<td>2.980</td>
<td>2.485</td>
<td>5.451</td>
<td>48.150</td>
</tr>
<tr>
<td>Standard Dev</td>
<td>.500</td>
<td>.500</td>
<td>1.775</td>
<td>9.867</td>
<td>.490</td>
<td>.404</td>
<td>2.394</td>
<td>9.813</td>
</tr>
</tbody>
</table>

Race was coded as 1 = Caucasian and 2 = African American
Gender was coded as 1 = Male and 2 = Female
correlation was between race and mathematics achievement \((r = -.425)\). As with prior mathematics achievement, the negative correlation suggested that African American students had lower mathematics achievement. The fourth largest correlation was between highest level of mathematics courses taken and mathematics achievement \((r = .423)\). Students who took higher levels of mathematics courses had higher mathematics achievement. Finally, the positive correlation between race and school poverty concentration \((r = .380)\) indicated that African American students were more likely to attend schools with higher concentrations of poverty. Surprisingly, there was no significant relationship between gender and highest level of mathematics course taken. This suggested that females took similar levels of mathematics courses as their male counterparts. Another remarkable finding in the correlation table was the lack of relationship between school poverty concentration and students’ perceptions of their peers’ educational values. This indicated that students who attended schools with higher levels of poverty concentration reported that their peers’ educational values were similar to the reported peer educational values of students who attended schools with lower levels of poverty concentration.

Preliminary exploratory analyses indicated that the largest variance inflation factor among the variables in the model was 1.451, which indicated that there were no multicollinearity problems in the data. The assumptions of independence, normality and homoscedasticity were also met. The regression results indicated that the entire set of independent variables explained 82.7% of the variance in mathematics achievement with four of the seven variables having
a significant unique influence on mathematics achievement. In order of importance, they were prior mathematics achievement ($\beta = .874$), highest level of mathematics taken ($\beta = .091$), students’ self-reported educational values ($\beta = .039$) and school poverty concentration ($\beta = -.028$). As indicated in Table 2 by the almost perfect correlation between prior mathematics achievement and mathematics achievement (.903), prior mathematics achievement alone would have accounted for 81.5% of the variance in mathematics achievement, but when controlling for the other independent variables prior mathematics achievement was reduced to explaining 47.5% of the variance uniquely. The remaining variables in the model, three of which were statistically significant, uniquely accounted for only an additional 1.2% of variance in the model beyond that of prior mathematics achievement. Therefore, although their effect on mathematics achievement was statistically significant, the magnitude of effect was substantively small. Of particular interest in this research is the additional explanation of the complex inter-relationships among these variables resulting from use of this model.

As shown in Table 3 by the regression coefficients for the equations estimated, race had a significant influence on three of the four endogenous variables. In order of importance, those variables were prior mathematics achievement ($\beta = -.395$), students’ self-reported educational values ($\beta = .171$) and perceptions of peers’ educational values ($\beta = .102$). The negative regression coefficient suggested that African American students had lower prior mathematics achievement than did Caucasian students. Conversely, the positive regression
Table 3
Regression coefficients for the equations estimated

<table>
<thead>
<tr>
<th></th>
<th>Students' Educational Values</th>
<th>Peers' Educational Values</th>
<th>Prior Mathematics Achievement</th>
<th>Highest Level of Mathematics Taken</th>
<th>Mathematics Achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race</td>
<td>.171*** (.167)</td>
<td>.102*** (.083)</td>
<td>-.395*** (-7.796)</td>
<td>-.029 (-.138)</td>
<td>.023 (-.446)</td>
</tr>
<tr>
<td>Gender</td>
<td>.093*** (.091)</td>
<td>.236*** (.191)</td>
<td>-.055* (-1.089)</td>
<td>.010 (.046)</td>
<td>.023 (-.459)</td>
</tr>
<tr>
<td>School Poverty Conspiracy</td>
<td>.063* (.017)</td>
<td>-.031 (.007)</td>
<td>-.168*** (-.936)</td>
<td>-.219*** (-.296)</td>
<td>-.028* (-.154)</td>
</tr>
</tbody>
</table>

Students' Educational Values                      | .039** (.776)                          |

Peers' Educational Values                        | .009 (.230)                           |

Prior Mathematics Achievement                    | .847*** (.842)                         |

Highest Level of Mathematics Taken               | .092*** (.375)                         |

Metric coefficients are presented in parentheses.
* p<.05.  **p<.01.  ***p<.001.
coefficients indicated that African American students had higher self-reported educational values and perceptions of their peers’ educational values than did Caucasian students.

Gender had a significant effect on three of the four endogenous variables. In order of importance, the variables were students’ self-reported perceptions of their peers’ educational values (\( \beta = .236 \)), students’ self-reported educational values (\( \beta = .093 \)) and prior mathematics achievement (\( \beta = -.055 \)). The direction of the signs indicated that females had higher self-reported perceptions of their peers’ educational values than did males. Additionally, females had higher self-reported educational values than did males. However, female students had lower prior mathematics achievement than did male students.

School poverty concentration exerted a significant influence on three of the four endogenous variables, as well as the dependent variable. In order of importance, the variables were highest level of mathematics taken (\( \beta = -219 \)), prior mathematics achievement (\( \beta = -.168 \)), students’ self-reported educational values (\( \beta = .063 \)) and mathematics achievement (\( \beta = -.031 \)). These results indicated that students who attended schools with higher concentrations of poverty took lower levels of mathematics courses than did students who attended schools with lower concentrations of poverty. Surprisingly, students who attended higher-poverty concentration schools had higher self-reported educational values than did students who attended lower-poverty concentration schools. Finally, students who attended schools with higher concentrations of poverty had lower
mathematics achievement than did students from lower-poverty concentration schools.

Three of the four endogenous variables were significant predictors of mathematics achievement. As previously stated, the greatest influence on mathematics achievement was prior mathematics achievement ($\beta = .847$). As expected, students with higher levels of prior mathematics achievement had higher levels of mathematics achievement. The remaining endogenous variables in the model had a statistically significant effect on mathematics achievement, but the impact was small. Highest level of mathematics taken ($\beta = .092$) and students’ self-reported educational values ($\beta = .039$) exerted significant influences on mathematics achievement. Students who took higher levels of mathematics courses had higher levels of mathematics achievement than did students who took lower levels of mathematics courses. Additionally, students with higher self-reported educational values had higher levels of mathematics achievement than did students with lower self-reported educational values. Students’ perceptions of their peers’ educational values failed to exert a significant influence on mathematics achievement as anticipated.

As shown in Figure 2, the estimated path analysis model failed to support fully the hypothesized path analysis model. Neither race nor gender had a significant effect on highest level of mathematics taken. School poverty concentration did not predict students’ perceptions of their peers’ educational values. Additionally, students’ perceptions of their peers’ educational values did not predict mathematics achievement. Finally, there was an additional variable
that influenced mathematics achievement, which was not previously predicted: the direct effect of school poverty concentration on mathematics achievement. The negative coefficient ($\beta = -0.028$) indicated that students who attended schools with higher concentrations of poverty had lower mathematics achievement.

The direct, indirect and total effects of the independent variables on mathematics achievement are provided in Table 4. Indirect effects were calculated using Gemini, a Fortran program developed by Wolfle and Ethington (1985). The two of the exogenous variables in the model that exerted indirect effects on mathematics achievement were race and school poverty concentration. Three of the endogenous variables mediated the effects of the two significant exogenous variables in the model. In order of importance, the endogenous variables were prior mathematics achievement, highest level of mathematics taken and students’ self-reported educational values. Students’ prior mathematics achievement ($\beta = 0.847$) and self-reported educational values ($\beta = 0.039$) served as mediating variables for race. The positive regression coefficients for race, students’ self-reported educational values and mathematics achievement suggested African American students in this study had higher mathematics achievement than did Caucasian students because African American students had higher self-reported educational values. The regression coefficient for race and prior mathematics achievement was negative, while the coefficient for prior mathematics achievement and mathematics achievement was the positive. This suggested that African American students had lower mathematics achievement than did
Figure 2. Comparison of Hypothesized and Estimated Path Analysis Model of Mathematics Achievement
Table 4  
*Direct, Indirect and Total Effects of Variables on Mathematics Achievement*

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Direct Effects</th>
<th>Indirect Effects</th>
<th>Total Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Race</td>
<td>-.023</td>
<td>-.330***</td>
<td>-.352***</td>
</tr>
<tr>
<td></td>
<td>(-.446)</td>
<td>(-6.468)</td>
<td>(-6.914)</td>
</tr>
<tr>
<td>2. Gender</td>
<td>-.023</td>
<td>-.040</td>
<td>-.063*</td>
</tr>
<tr>
<td></td>
<td>(-.459)</td>
<td>(-.785)</td>
<td>(-1.244)</td>
</tr>
<tr>
<td>3. School Poverty Concentration</td>
<td>-.028*</td>
<td>-.161***</td>
<td>-.188***</td>
</tr>
<tr>
<td></td>
<td>(-.154)</td>
<td>(-.887)</td>
<td>(-1.041)</td>
</tr>
<tr>
<td>4. Students’ Educational Values</td>
<td>.039**</td>
<td>.039**</td>
<td>.039**</td>
</tr>
<tr>
<td></td>
<td>(.776)</td>
<td>(.776)</td>
<td></td>
</tr>
<tr>
<td>5. Peers’ Educational Values</td>
<td>.009</td>
<td>.009</td>
<td>.009</td>
</tr>
<tr>
<td></td>
<td>(.230)</td>
<td>(.230)</td>
<td></td>
</tr>
<tr>
<td>6. Prior Mathematics Achievement</td>
<td>.847***</td>
<td>.847***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.842)</td>
<td>(.842)</td>
<td></td>
</tr>
<tr>
<td>7. Highest Level of Mathematics Taken</td>
<td>.092***</td>
<td>.092***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.375)</td>
<td>(.375)</td>
<td></td>
</tr>
</tbody>
</table>

Metric coefficients are presented in parentheses.  
* p<.05.  **p<.01.  ***p<.001.
Caucasian students because African American students had lower prior mathematics achievement. Overall, the indirect effect of race was negative ($\beta = -.330$) because prior mathematics achievement exerted a larger influence on mathematics achievement than did students’ self-reported educational values. Finally, the total effect of race on mathematics achievement was -.352. This negative effect suggested that African American students in this study performed lower in mathematics than did Caucasian students.

Students’ prior mathematics achievement ($\beta = .847$), highest level of mathematics taken ($\beta = .092$) and self-reported educational values ($\beta = .039$) mediated the effects of school poverty concentration on mathematics achievement. The effects of school poverty concentration on prior mathematics achievement and highest level of mathematics were negative. Prior mathematics achievement and highest level of mathematics taken exerted a positive influence on mathematics achievement. These results indicated that the reason students who attended schools with higher levels of poverty concentration had lower mathematics achievement was because they had lower prior mathematics achievement and took lower levels of mathematics courses. The regression coefficients among school poverty concentration, students’ self-reported educational values and mathematics achievement were positive. This suggested that students who attended higher-poverty concentration schools had higher mathematics achievement because they had higher self-reported educational values than did students in lower-poverty concentration schools. Overall, the indirect effect of school poverty concentration was negative because prior mathematics achievement and highest level of mathematics taken had a greater effect on mathematics achievement than did students’ self-reported educational values. The
negative total effect of school poverty concentration (-.188) suggested that students who
attended schools with higher concentrations of poverty had lower mathematics
achievement than did students who attended schools with lower concentrations of
poverty.

One final exogenous variable that had a significant total effect on mathematics
achievement was gender. The negative total effects of this variable (-.063) suggested that
female students had lower mathematics achievement than did male students. However, it
should be noted that this effect is the sum of the small non-statistically significant direct
and indirect effects of gender on mathematics achievement.
CHAPTER 5
DISCUSSION

The purpose of the current study was to determine whether students’ self-reported educational values and perceptions of their peers’ educational values could explain any differences in mathematics achievement based on race, gender or school poverty concentration. The sample consisted of 600 African American and 600 Caucasian English-speaking students from urban and suburban public schools. Ordinary least squares regression analyses were used to determine the effects in the model. Significance was established at the .05 probability level.

Race, Gender, School Poverty Concentration and Educational Values

The first hypothesis was that African American students would have lower self-reported educational values and lower perceptions of their peers’ educational values, controlling for prior mathematics achievement and highest level of mathematics taken. However, the opposite is true. African American students have higher self-reported educational values and feel that their peers have higher educational values than do Caucasian students. These findings are contrary to previous studies. One explanation for the differences in findings between current and previous research is that much of the previous research (Finn & Rock, 1997; Lleras, 2008; Sbrocco, 2009) explored how much students liked school or how well students behaved in class (engagement) rather than assessing how much they valued education. However, a student may not like school or may misbehave in school for various reasons unrelated to how important they believe school is to their future success. Additionally, there may be a difference between
students’ beliefs and actions. A student may believe that education is important, but may lack the motivation to behave in a way that is congruent with these beliefs.

Secondly, some studies used teacher ratings to determine students’ level of engagement (Finn & Rock, 1997; Lleras, 2008). However, the current study used students’ self-reported responses to a questionnaire. It is possible that teachers’ perceptions of student conduct do not accurately measure how students feel about education. It is also possible that teachers are more likely to view African American students’ behaviors as more defiant than that of students of other races (Gregory & Thompson, 2010).

Another explanation is that the current study used a more recent cohort than did previous studies (Finn & Rock, 1997; Lleras, 2008; Ogbu, 1990b, 1991, 1995a). It is possible that with the recent focus on the educational achievement gap, students have begun to understand the importance of education for future success. Finally, because the larger study on which the current study is derived was longitudinal, and because the current study selected students who were a part of both the tenth and 12th grade cohort, differential sample attrition may have occurred. Differential sample attrition occurs when members from a particular population drop out during the course of a study more frequently than do others (Center for Technology in Learning, 2002). Therefore, the population of students who remained in the study may have differed significantly from those who did not. Consequently, the African American students and the students in high poverty concentration schools who remained in school through the 12th grade may have been those who valued education more or were more resilient than the students who were not included the present study because they dropped out or transferred.
The second hypothesis was that controlling for prior mathematics achievement and highest level of mathematics taken, females would have higher self-reported educational values and perceptions of their peers’ educational values than did males. This hypothesis is fully supported by the results. Female students value education more than their male counterparts.

The third hypothesis was that students who attended schools with higher levels of school poverty concentration would have lower self-reported educational values and perceptions of their peers’ educational values, controlling for prior mathematics achievement and highest level of math taken. Surprisingly, students who attend schools with higher concentrations of poverty have higher self-reported educational values than those in schools with lower concentrations of poverty. However, school poverty concentration did not influence students’ perceptions of their peers’ educational values. Similar to the effect of race on students’ self-reported educational values, these results are contrary to what was expected. As previously stated, African American students scored higher than Caucasian students in their self-reported educational values. Given the significant correlation between race and school poverty concentration (r = .380), it is likely that higher concentrations of African American students are enrolled in schools with higher concentrations of poverty. Therefore, the African American students with higher self-reported educational values probably contribute to the high educational values of students from high poverty concentration schools. Additionally, economically disadvantaged students may see the relationship between educational and economic attainment. Understanding this relationship may lead impoverished students to value
education. Conversely, students from more economically advantaged backgrounds may feel that they have more options (such as parental connections) to succeed.

**Race, Gender, School Poverty Concentration and Mathematics**

As predicted, African American students have lower prior mathematics achievement scores than do Caucasian students. However, there is no significant difference between race and highest level of mathematics course taken. Also as expected, female students have lower prior mathematics achievement scores than do males. However, there is no significant difference between gender and highest level of mathematics course taken. Thus, while African American and female students may take upper-level mathematics courses, they do not perform as well in these courses as their Caucasian and male counterparts. School poverty concentration has a negative effect on students’ prior mathematics achievement and the highest level of mathematics course students take. Furthermore, school poverty concentration is the only exogenous variable in the model that has a direct, adverse effect on students’ mathematics achievement. This suggests that lower levels of prior mathematics achievement and highest level of mathematics courses students take help explain some of the negative effects of school poverty concentration on mathematics achievement. However, there are other variables unique to high poverty concentration schools, which the current study does not measure, that significantly contribute to the lower mathematics achievement of these students. Additionally, the prevalence of African American students in high poverty concentration schools probably contributes to this population’s lower mathematics achievement scores relative to Caucasian students.
Educational Values, Prior Mathematics Achievement, Highest Level of Mathematics Taken and Mathematics Achievement

The fourth hypothesis was that students’ self-reported educational values, perceptions of their peers’ educational values, prior mathematics achievement and highest level of mathematics taken would have a direct, positive effect on mathematics achievement. As predicted, students with higher educational values perform better in mathematics than do students with lower educational values. Students with higher prior mathematics achievement and those who take higher levels of mathematics courses also have higher mathematics achievement than do their counterparts. However, students’ self-reported perceptions of their peers’ educational values do not affect students’ mathematics achievement. This suggests that the degree to which students feel that their peers value education is unrelated to students’ academic achievement.

Mediating Effects

The final hypothesis was that the endogenous variables in the model would mediate the effects of race, gender and school poverty concentration on mathematics achievement. Students’ self-reported educational values and prior mathematics achievement mediate the effects of race on mathematics achievement. African American students have higher mathematics achievement scores than do Caucasian students because African American students have higher self-reported educational values. Conversely, African American students perform more poorly in mathematics than do Caucasian students because African American students have lower prior mathematics achievement. Prior mathematics achievement has a greater effect on mathematics achievement than does students’ self-reported educational values. Therefore, these
findings suggest that although African American students may value education more than Caucasian students, African American students perform more poorly in mathematics due to lower prior mathematics achievement.

Students’ educational values, prior mathematics achievement and highest level of mathematics taken mediate the effects of school poverty concentration on mathematics achievement. Students who attend schools with higher levels of poverty concentration perform better in mathematics because they have higher self-reported educational values than do students who attend schools with lower concentrations of poverty. However, students who attend schools with higher levels of poverty concentration have lower mathematics achievement because they have lower levels of prior mathematics achievement and take lower levels of mathematics courses than do students who attend schools with lower levels of poverty concentration. Because taking higher levels of mathematics courses and prior mathematics achievement have a greater impact on mathematics achievement than does students’ self-reported educational values, students who attend schools with higher levels of poverty concentration tend to perform more poorly in mathematics.

The overall findings of the study suggest that African American students, females and those who attend schools with higher concentrations of poverty perform more poorly in mathematics than do their counterparts. African American students have higher self-reported educational values and these values are associated with higher mathematics achievement. However, as a whole, African Americans perform worse in mathematics than do Caucasian students. This is possibly because African American students have lower prior mathematics achievement, which has a much larger influence on mathematics
achievement than does their educational values. Although African American students may understand the value of education, their preparation in mathematics may not allow this valuing to translate into higher mathematics achievement scores.

Similarly, students who attend schools with higher concentrations of poverty have higher educational values, which is associated with higher mathematics achievement. However, these students have lower prior mathematics achievement and take lower levels of mathematics courses throughout high school, which results in lower mathematics achievement. Perhaps students who attend schools with higher concentrations of poverty are not as well prepared in mathematics as their counterparts who attend schools with lower concentrations of poverty, resulting in lower prior mathematics achievement scores. Additionally, students who attend high poverty concentration schools may lack the grades to take more advanced levels of mathematics. Another possibility is that high poverty concentration schools do not offer higher levels of mathematics courses (Handwerk, Tognatta, Coley, & Gitomer, 2008). Finally, African American students and those who attend schools with higher concentrations of poverty may understand the detrimental effects of a lack of education, and thus value education more than their counterparts. However, while these students value education as a whole, they may not specifically value mathematics. Partial evidence of this exists in the non-significant relationship between students’ self-reported educational values and prior mathematics achievement (r = 0.026) and the very low, although significant, relationship between students’ self-reported educational values and mathematics achievement (r = 0.062).

The use of a path analysis allows for the exploration of the relationships among the variables in the study, as well as the significant paths of influence from the exogenous
variables to the dependent variable. The salient finding of the current study is that prior mathematics achievement, not race or school poverty concentration, has the greatest influence on mathematics achievement. In fact, in the presence of the other variables in the model, race does not have a significant influence on mathematics achievement. Additionally, school poverty concentration has the lowest significant influence on mathematics achievement. In examining the paths of influence, the current study reveals that African American students and students who attend schools with higher concentrations of poverty have lower mathematics achievement than do their counterparts due to lower prior mathematics achievement. In the presence of the other variables in the model, highest level of mathematics taken and students’ self-reported educational values are the second and third strongest predictors of mathematics achievement. The highest level of mathematics taken by African American students does not differ significantly from that of Caucasian students. Additionally, African American students and students who attend schools with higher concentrations of poverty have higher self-reported educational values than do their counterparts. These findings suggest that there is something lacking in the mathematics preparation of African American and impoverished students. Research has shown that both high-minority and high-poverty schools are more likely to have teachers with less experience and lower levels of education. Additionally, these schools tend to have higher incidents of out of subject teaching (Darling-Hammond, 2007; Garibaldi, 1997). All of these variables could contribute to the lack of quality education and lack of mathematics preparation experienced by African American and high-poverty concentration students.
Limitation and Recommendations for Future Research

In the current study, race, school poverty concentration and gender are used as proxy variables that represent a composite of the effect of other related variables on academic achievement. Future research should disaggregate the data as much as possible to determine which variables related to these proxy variables, such as socioeconomic status, individual-level poverty, availability of resources, accessibility to high-quality education, teacher expectations and lack of early preparation for school, contribute to the differences in educational values and mathematics achievement.

The current study explored the effects of race, gender and school poverty concentration separately and did not explore any interactions between these exogenous variables. Future research should explore the interaction between race and school poverty concentration on educational values and on mathematics achievement. This would help determine the degree to which poverty adversely affects the educational values and academic achievement of students from different races. Interactions between race and gender would help determine whether all males perform better in mathematics than do females, or whether males and females from different races outperform others. Additionally, race and gender interactions could help determine whether females as a whole value education more than males, or whether this is unique to females of particular races. Interactions between gender and school poverty concentration could also help determine whether gender differences exist in the educational valuing and academic achievement of students who attend schools with different levels of poverty concentration.
The significant correlation between students’ self-reported educational values and perceptions of their peers’ education values (r = .350) indicates the need to explore an interaction between these variables as well. Perhaps students’ perceptions of their peers’ educational values has a significant effect on mathematics achievement through students’ self-reported educational values.

Only one method of assessment was used in this study; however, a mixed method model may be useful. Including qualitative data could help ensure that students’ expressed educational values are being assessed accurately. Additionally, qualitative assessments could help researchers determine what other values, beliefs and thoughts contribute to educational values and mathematics achievement.

A final limitation of the present study was the use of an existing data set. The conditions under which the questionnaires were administered were not discussed. Therefore, it is unknown whether questionnaires were administered by teachers or experienced researchers. Inconsistency of language or instructions, attitudes of test administrators and attitudes of students could have significantly affected the results.
REFERENCES


Cohen, J. S., & Little, D. (2005). Test scores, poverty are entwined; Middle-class African Americans fare better away from low-income schools. *Chicago Tribune, 1*.


Appendix A

Students’ Educational Values Scale

1. How much do you agree or disagree with the following statements about why you go to school?
   a. I go to school b/c I think the subjects I’m taking are interesting and challenging
   b. I go to school because I get a feeling of satisfaction from doing what I’m supposed to do in class.
   c. I go to school because education is important for getting a job later on.
   d. I go to school because I’m learning skills that I will need for a job.

2. How important are good grades to you?

3. How important is each of the following to you in your life?
   a. Getting a good education

4. How often do these things apply to you?
   a. I study to get a good job
   b. I study to increase my job opportunities
   c. When studying, I try to work as hard as possible
   d. I study to ensure that my family will be financially secure
   e. When studying, I try to do my best to acquire the knowledge and skills taught
Appendix B

Peers’ Educational Values Scale

1. How important is getting good grades to this …
   a. First friend?
   b. Second friend?
   c. Third friend?

2. Among your close friends, how important is it to them that they …
   a. attend classes regularly
   b. study
   c. get good grades
   d. finish high school
   e. continue their education past high school