SOCIO-ENVIRONMENTAL IMPACTS ON ACADEMIC ACHIEVEMENT: EFFECTS ACROSS GENDER AND RACE

By

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I dedicate this research to my little sister, Laraine Nicole,

who inspires me to be the person she saw me as through her eyes.

I love and miss you dearly.

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ABSTRACT

Using elements of Bandura's (1986) Social Cognitive Theory and Bowen's (2009) Eco Interactional Developmental Model of School Success, the impact of socio-environmental factors on academic achievement were compared across race (Black and White students) and gender (male and female). Specifically, the constructs of parental involvement and teacher relationships were examined in relation to both educational aspirations and academic achievement, as measured by GPA, advanced course taking, and high school graduation/failure rates. Data for this study came from the public use Add Health data set (Harris, 2013). Results of the SEM analysis in Stata showed that the hypothesized measurement model was inappropriate for the Black student samples and thus, comparisons across race were not possible. The analysis continued by examining the best fitting model for White male and White female students. A comparison of the direct and indirect effects revealed gender differences regarding the relationship between SES, parental involvement, and academic achievement. Implications, limitations, and future directions are discussed.

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INTRODUCTION

Academic achievement during adolescence is a particularly influential predictor of a variety of adult outcomes and as such has become an ever-growing area of concern. Academic achievement is a predictor of positive socioeconomic, health, and mental health outcomes (Liem, Lustig, & Dillon, 2009). The alternative, dropping out of school, is associated with poverty, chronic illness, substance abuse, and incarceration (Richman, Bowen, & Woolley, 1997).

For decades, researchers have sought to explain why some students display higher levels of academic achievement than others and the factors that influence these disparities across race and gender. Research has consistently shown that both individual level and school structural variables exert influence over the academic achievement of students (Bronfenbrenner, 1979; Battistich et al., 1995; Pong, 1997; Parcel, Dufur, & Cornell-Zito, 2010). The process through which these effects occur is complex and still not fully understood (Feuerstein, 2000).

Disparate levels of academic achievement have been observed across gender for decades (Voyer & Voyer, 2014). Females outperform males in school grades across all subjects and on standardized tests of reading comprehension. Males, however, outperform females on standardized math and science achievement tests. Males also have higher dropout rates than females, while females make up 60% of students enrolled in college (Aud et al., 2010).

Biological differences, such as females' lower activity levels and, thus, greater ability to sustain attention, are offered as one explanation for these observed discrepancies (Kenny-Benson, Pomerantz, Ryan, & Patrick, 2006). These biological gender differences influence social factors at school in the form of classroom behavior may affect students' grades (Bennett, Gottesman, Rock, & Cerullo, 1993) and result in gender-biased treatment from teachers (Chalabaev, Sarrazin, Trouilloud, & Jussim, 2009) and self-fulfilling prophecies (Jussim, Robustelli, & Cain, 2009). Finally, motivations to achieve academically are affected by an adolescent male culture that views school success as feminine (Rumberger & Palardy, 2005).

Of additional concern is the vexing persistence of disparate patterns of achievement between Black and White students across the United States, commonly referred to as the Black-White "Achievement Gap." Numerous studies have provided substantial evidence for the existence of this achievement gap throughout the years, and the most recent reports show that African American students continue to underperform with lower grade point averages and standardized test scores (Bali & Alvarez, 2003; Caldas & Bankston, 1997; Corra, Carter, & Carter, 2011). African American students also exhibit higher dropout rates from high school than Caucasian students, and those that do graduate from high school are less likely to enroll in, and graduate from, college (Aud et al., 2010; Osborne & Walker, 2006).

This achievement gap results in the perpetuation of racial inequality throughout society (Whaley & Noel, 2012). Academic achievement is highly correlated with one's socioeconomic status and acts as a vehicle for upward mobility in social class (Pallas,

2000; Whaley & Noel, 2012). Thus, the existence of unequal academic achievement results in further racial segregation across social status (Whaley & Noel, 2012).

Although both race and gender have been looked at individually to assess gaps in achievement across groups, the interaction between race and gender on educational attainment has received less attention (Corra, Carter, & Carter, 2011). Research that has reviewed the impacts of both race and gender has generally found that Black females outperform Black males. Black females, however, underperform when compared to White females, who themselves underperform when compared to White males (Roderick, 2003; Rollock, 2007). These findings use various measures of academic achievement as their criterion, the most common being GPA and standardized test scores.

The current review includes an examination of relevant theories related to disparate patterns of academic achievement across White and minority students. Variables of particular interest to the current study include student teacher relationships, academic outcome expectations, and parental involvement. Additionally, the differing effects of these factors in the context of the gender-race interaction are considered.

The Eco-Interactional Developmental Model of School Success (EID; Bowen, 2009)

Rumberger and Lim (2008) describe two categories of explanations for the Black-White achievement gap. The first explanation takes a resource disparity perspective that posits that higher school failure and dropout rates for minorities are due to a discrepancy of personal, school, and community resources. The second, a socio-cultural perspective, suggests that differences in values, attitudes, and beliefs regarding education as well as levels of family academic support, explain the gap in academic achievement. The Eco-Interactional Developmental Model of School Success (Bowen, 2009) incorporates both explanations presented by Rumberger and Lim (2008) while also borrowing elements from Bronfenbrenner's Ecological Systems Theory (1979) and principals of social capital (Coleman, 1988; Putnam, 2001) resulting in a multidimensional model focused on reciprocal relationships between the student and their social environments over time.

Primary social environments (the family, the school, the community, and the peer group) overlap in a nested fashion. All of these environments are contained within, and guided by, the larger structural social context of culture and society (Bronfenbrenner, 1979). Consistent connections both between and within each of these environments leads to a greater probability of positive outcomes (Bowen, 2009). For example, close, supportive relationships with parents or teachers within the family or school environment, respectively, facilitate academic achievement (Parcel & Dufur, 2001). Parental involvement in school activities, and parental monitoring of their child's peer relationships are ways of linking primary social environments and act as positive predictors of achievement (Coleman, 1988; Parcel & Dufur, 2001).

The interaction between the students and their social environments is continuously evolving over time based on level of student fit with the environment (Bowen, 2009). Conceptually, environmental fit describes both the fit between the ability of the environment/social context to provide for the needs of the student, as well as the student's ability to successfully meet the demands of the environment (Bowen, 2009). In the academic environment, examples of the former include the individual instructional needs of the child and the ability level of the teacher to meet these individual needs of the child. An example of the latter would be the student's ability to learn the required content and successfully pass any exams. Thus, students are continuously influenced by, and influencing in return, their social environments. These influences can come from people via interpersonal relationships and social support, as well as from places through feelings of safety, opportunities available, and resources supplied.

Research on student achievement supports the notion that the development of academic skill is a multi-faceted phenomenon that requires an interdisciplinary approach (Maccoby, 2006; O'Connor & McCartney, 2007; Zand & Thompson, 2005). Social-emotional classroom factors such as the social interactions that occur between individual students, their teachers, and peers have been linked to student motivation (Cornelius-White, 2007), engagement (Decker, Dona, & Christenson, 2007), and self-regulation (Gregory & Weinstein, 2008). Students with poor social-emotional adjustment display low levels of self-efficacy, poor grades, and are more likely to have behavior problems and become high school dropouts than those with successful social-emotional adjustment (Gregory & Weinstein, 2008; Hickman, Bartholomew, Mathwig, & Heinrich, 2008; Maccoby, 2006). Given these findings, researchers have shifted beyond the examination

of within-child factors towards an emphasis on the processes and interactions occurring within a child's environment (Maccoby, 2006). The current study focuses on social-environmental factors within the family (parental involvement) and school (student teacher relationships) context, individual student factors (educational outcome expectations), and the impact of each on various forms of academic achievement.

Socio-Environmental Factors

Parental involvement. Parental involvement acts as one of the most influential predictors of student academic success with significant effects found at all age levels (Jeynes, 2012; Wilder, 2014). Studies show that the effects of parental involvement remain significant even after controlling for IQ, socioeconomic status, and prior achievement (Zellman & Waterman, 1998). Parental involvement has also been found to positively impact levels of academic engagement, students' academic self-efficacy (Jeynes, 2003; Topor, Keane, Shelton, & Calkins, 2010), student teacher relationships, and teacher expectations of students.

Most generally, parental involvement is defined as parental participation in, and awareness of, the academic endeavors, experiences, and educational environment of their children (Jeynes, 2012; Wilder, 2014). Parental involvement has been operationalized with measures falling into one of three categories, attitudinal components (e.g., aspirations or expectations for the child educational success), behavioral aspects (e.g., assistance with homework or attending PTA meetings), or stylistic components, which

include style of discipline, and monitoring of the child's schoolwork and general activities (Shute, Hansen, Underwood, & Razzouk, 2011).

The recent literature has begun to parse apart the components of parental involvement as they relate to academic achievement. While studies agree that parental involvement in general plays a positive role in student academic outcomes, in-depth examinations of the literature have revealed differences in relation to the type of parental involvement measured and the form of academic achievement used as an outcome measure (Wilder, 2014). Jeyne's (2007), for example, found that parents attendance and participation in school activities impacted GPA and teachers perceptions of students, but not graduation from high school.

Recently, Wilder (2014) conducted a meta-synthesis of six meta-analyses exploring the topic of parental involvement from the past two decades. The most common forms of parental involvement observed in the literature included parent-child communication regarding school, helping with homework, parental aspirations and expectations, and attendance and participation in school activities. Definitions of academic achievement were broken down into two categories, standardized tests and non-standardized assessments.

The majority of meta-analyses found support for the relationship between parental involvement in academic achievement, regardless of definitions used for parental involvement or measures of academic achievement. Additionally, parental involvement showed stronger influences over more global definitions of achievement, such as GPA, as opposed to specific teacher ratings or class grades (Englund, Luckner, Whaley, &

Egeland, 2004). Importantly, these findings were also consistent across subject area (Erion, 2006).

Parental expectations were shown to have the largest and most consistent effect on student outcome expectations and adolescent academic outcomes, whereas parents assisting children with homework showed no effect, or even a small negative impact (Hill & Tyson, 2009; Jeynes, 2005). Results regarding general levels of parental supervision and monitoring at home were inconclusive, with some studies finding a moderate impact (Hill, & Tyson 2009; Patall, Cooper, & Robinson, 2008) and others reporting no significant effects (Jeynes, 2005, 2007). Additionally, Wilder (2014) looked for, but found no mention of gender-race interactions in any of the meta-analyses reviewed. The current study aims to expand upon this literature by examining both race and gender simultaneously.

Levels of parental involvement have been shown to vary by race, with predominately-White schools exhibiting higher levels of parental involvement than schools made up of primarily minority students (Marschall & Shah, 2014). Examining levels of parental involvement using national data, Noel, Stark, Redford, and Zuckerberg (2013) observed that minority students are less likely to have parents that attend school meetings (85%), attend school events (68%), and volunteer their time (31%) than their White peers, 89%, 82%, and 50%, respectively.

Studies that have examined the impact of parental involvement in terms of gender and race have found inconsistent findings. Jeynes (2005), for example, found no differences in the relationship between parent involvement and academic achievement across race and gender in a sample of urban adolescence. The strongest impact on

academic achievement came from parental expectations and parental monitoring of the child's activities. Hill and Tyson (2009), on the other hand, found the impact of parental involvement on academic achievement to be significant regardless of race but observed significantly stronger effects for White students than for African American students. Likewise, Jeynes (2003) also reported differing levels of impact for certain ethnic groups, which varied by type of parental involvement. Using college enrollment after completing high school as a measures of academic achievement, Perna and Titus (2005) found that the impact of parental contact with school influenced the likelihood of attending college for African American students more so than it did Caucasian students. On the other hand, child discussions with parents about academia had less of an impact on African American student college enrollment than it did for Caucasian students.

In sum, several forms of parental involvement consistently exhibit a positive influence on the academic achievement of children. The nature of this influence as it pertains to gender and racial differences remains unclear due to limited research on the matter. Findings from studies that do address the issue suggest differing effect sizes across ethnic groups.

Teacher relationships and expectations. The quality of student teacher relationships consistently predicts a variety of positive academic outcomes (Brookover, Schweitzer, Schneider, Beady, & Flood, 1978; Cohen, McCabe, Michelli, & Pickeral, 2009). Positive student teacher relationships have been shown to foster better work habits and engagement (Green, Rhodes, Hirsch, Suarez-Orozco, & Camic, 2008), academic aspirations (Eccles & Wigfield, 2002; McCollum & Yoder, 2011), and academic achievement (Stewart, 2007). Positive student teacher relationships are associated with

higher grades (Goodenow, 1993), while negative relationships have been identified as a predictor of dropping out of high school (Wentzel, 2002).

Students who rate their teachers as caring display higher levels of academic engagement (Green, Rhodes, Hirsch, Suarez-Orozco, & Camic, 2008; O'Connor & McCartney, 2007; Wentzel, 2002) and feelings of academic competence (Hughes, Gleason, & Zhang, 2005; Paulson, Marchant, & Rothlisberg, 1998; Stewart, 2007), both of which are linked to academic achievement (Eccles & Wigfield, 2002; McCollum & Yoder, 2011). Variables measuring perceived fairness and respect from teachers have also been consistently associated with student levels of motivation (Murdock & Miller, 2003), classroom engagement (Goodenow, 1993), and academic outcomes (McCollum & Yoder, 2011; Wentzel, 2002).

Studies on teacher perceptions of students have shown significant differences based on both gender and race. Teachers generally rate their relationships with female students as more positive regardless of race (Hughes, Luo, Kwok, & Loyd, 2008) while consistently rating their relationships with African American students more negatively than those with White students (Hale, 2001; Jerome, Hamre, & Pianta, 2009; Milner, 2006). Additionally, race has been shown to be a significant predictor of teacher-student conflict (Saft & Pianta, 2001).

African American males are more likely to be viewed by teachers as less capable academically when compared to African American females and Caucasian students (Mickelson & Greene, 2006; Ross & Jackson, 1991). Likewise, African American males tend to rate their school environments as more racially discriminatory and tend to disengage from academia earlier than African American female students (Chavous,

Rivas-Drake, Smalls, Griffin, & Cogburn, 2008). On the other hand, positive student teacher relationships and teacher support have been shown to moderate the impact of low parental expectations and other risk factors for low income, racially diverse students (Wood, Kaplan, & McLoyd, 2007).

The quality of student teacher relationships influences teacher expectations, which in turn influence student expectations (McCollum & Yoder, 2011). Teachers who report having poor relationships with students view the students as less academically competent (Hughes, Gleason, & Zhang, 2005), less likely to do well (Chavous et al., 2008; Wentzel, Battle, Russell, & Looney, 2010), and less motivated (Hughes & Kwok, 2007; Hughes et al., 2008; Seifert, 2004). The reciprocal nature of this relationship has also been shown in studies with students who experience negative relationships with teachers reporting lower levels of self-worth (Juvonen, 2006), less perceived support and respect (Roesner, Eccles, & Sameroff, 2000), and feeling less academically competent (Juvonen, 2006; Paulson et al., 1998).

Teachers tend to report lower expectations of academic achievement for African American students as compared to Caucasian students (Jussim & Harber, 2005; Kenyatta, 2011; Wood, Kaplan, & McLoyd, 2007). This is likely due to the significant influence that student teacher relationships have on teacher expectations of student achievement (Hughes, Gleason, & Zhang, 2005). Although teachers expect less academically of African American students as a whole, studies show that teachers hold higher expectations for African American female students than for African American males. In general teachers report more positive relationships with females compared to males, regardless of ethnicity (Murray, Murray, & Waas, 2008; Sirin & Rogers-Sirin, 2005).

Thus, teacher expectations of individual students influence the student teacher relationship and vice versa. Of most importance are the consistent findings that show that student teacher relationships and teacher expectations influence students' levels of self-efficacy and expectations of future academic success, which affect academic achievement.

Student Academic Outcome Expectations

Social cognitive theory (SCT) suggests that outcome expectation and self-efficacy work together to influence academic achievement (Bandura, 1986; Lent, Brown, & Hackett, 1994). Outcome expectations refer to the expectation of realistically obtaining a future goal (i.e., graduating from college) through one's actions (i.e., working hard and studying), while self-efficacy refers to one's belief in his or her own abilities to carry out the actions necessary to succeed (Bandura 1977, 1986). Self-efficacy has been shown to predict higher GPA even when socioeconomic status (Robbins et al. 2004), past performance (Elias & MacDonald 2007), and ability levels (Kitsantas & Zimmerman, 2008) are controlled for.

Outcome expectations influence GPA (Hackett, Betz, Casas, & Rocha-Singh, 1992) and act as a unique predictor of academic performance when controlling the contribution of self-efficacy (Siegel, Galassi, & Ware, 1985). Outcome expectations are thought to play a larger role in situations where the outcome of one's behavior is decided more by external rather than internal factors, as is the case in environments perceived as discriminatory and thus may be a more influential predictor of academic achievement in minorities (Bandura, 1977, 1986).

Literature regarding the influence of outcome expectations is limited; the impact of race on this relationship is even harder to come by. The literature that is available suggests the presence of racial differences in academic expectations, which then contribute to differences in academic achievement (Aldous, 2006; DeFreitas, 2011).

In sum, outcome expectations may be more instrumental in explaining racial differences in academic achievement than the often-studied construct of self-efficacy. When individuals perceive their efforts toward a goal as futile, they are less likely to exert effort to obtain said goal even if they believe they possess the ability to do so in the absence of external influences (Bandura, 1977, 1986; Lent, Brown, & Hackett, 1994). In terms of academic achievement, students who do not believe that their hard work will result in good grades, high school graduation, or college acceptance are less likely to put forth the effort necessary to succeed academically. The existence of perceived external barriers (i.e., discrimination) to desired educational outcomes is more relevant to minority students. Thus, minority students' belief that they will realistically be able to succeed academically is more likely to be a predictor of academic success than measures of self-efficacy.

Measures of Academic Achievement

The social-environmental factors discussed above are consistently identified as significant predictors of academic achievement. The measure chosen to define the construct of academic achievement, however, varies by study and may contribute to inconsistent findings when they occur. Several measures of academic achievement exist; the most common include GPA, successful High School completion, teacher reports,

student self-reports, and enrollment in college (Roderick, Nagaoka, & Coca, 2009). Additionally, enrollment in advanced courses in high school acts as a measure of achievement and college readiness (Corra, Carter, & Carter, 2011). Achievement measures can be viewed as either global (e.g., overall GPA) or subject specific (Roderick, Nagaoka, & Coca, 2009; Wilder, 2014). The current study uses high school GPA and high school completion as global measures of achievement; enrollment in advanced math and science courses act as subject specific measures of achievement.

High school grade point average (GPA). Educational aspirations of students of all races have increased over the decades (Domina, Conley & Farkas, 2011). Levels of college readiness, success, and access however still display the gap between African American and White students (Roderick, Nagaoka, & Coca, 2009). College readiness represents the ability to succeed in institutions of higher education (Roderick, Nagaoka, & Coca, 2009). GPA acts as a measure of college readiness in that it is a measure of mastery of core academic skills as well as work ethic and study skills necessary for further educational advancement (Roderick, 2003).

Geiser and Santelices (2007) analyzed college performance using high school GPA, SAT scores, class rank, and family background as predictors of college GPA and likelihood of graduating from college. High school GPA was the strongest predictor of college GPA and college graduation. Specifically, a one standard deviation increase in high school GPA resulted in a standard deviation increase of 0.34 in college GPA.

Similarly, Roderick (2003) found that a one standard deviation increase in GPA was associated with a 15-percentage point increase in the likelihood of graduating from a four-year college, while controlling for standardized test scores and advanced course

work completion. Using a GPA cutoff of 3.0 or better as an indicator of adequate college readiness resulted in a 50% or greater chance of obtaining a four-year college degree within six years of high school graduation. Thus, the use of high school GPA as an indicator of the mastery of academic content, related academic study skills, and ultimately educational outcomes has strong support in the literature.

Overall, the average GPA of students across the nation has been steadily increasing. However, the racial gap in the GPA of graduating seniors is growing (Roderick, 2003). National data shows that from 1990 to 2005, students of all races saw an increase in average GPA by the time of high school graduation (Aud et al., 2012). The GPAs of African American students, however, are increasing at a lower rate than those of Caucasian students (Aud et al., 2010, 2012).

High school completion. The most recent NCES report on high school completion rates (school year 2011-2012) across the United States shows an overall graduation rate of 80%. White students fall above the national average at 86% while only 69% of Black students successfully graduate from high school (Stetser & Stillwell, 2014). The rate of graduation for Black students is even lower than that of economically disadvantaged students who display a 72% graduation rate. Discrepancies in graduation rates by gender also exist with 78% of males and 85% of females, successfully completing high school (Aud et al., 2012).

While high school graduation rates are steadily increasing, dropout rates are dwindling (Aud et al., 2012; Rumberger & Lim, 2008). Dropout rates are determined by calculating the percentage of young adults, ages 16 to 24, who are not currently enrolled in school, and do not have a high school diploma or GED certificate. Overall dropout

rates declined from 11% in 1992 to 7% in 2011 (Aud et al., 2012). White students, however, continue to show lower dropout rates (5%) than Black students (8%). The reduction in dropout rates from 1992 to 2011 was similar for White males and females with differences of 2.6% and 2.8%, respectively. The dropout rate for Black males, however, decreased by only half that of Black female students, with decreases of 4.2% and 8.4%, respectively. Thus, the factors that influence academic achievement as measured by high school graduation may have different effects by gender and race (Dalton, Glennie, Ingels, & Wirt, 2009).

Advanced course enrollment. Advanced course taking is particularly important because these classes are designed to prepare students for college and are carefully considered in college admission criteria (Corra, Carter, & Carter, 2011; Klopfenstein, 2004). Additionally, students who successfully earn credits in AP and honors courses are more likely to graduate from college (Burdman, 2000). Yet current data shows that both females and Black students continue to be underrepresented in these courses (Aud et al., 2012; Corra, Carter, & Carter, 2011). For example in 2009, 18% of White high school graduates had taken calculus, compared to only 6% of African American high school graduates.

Corra, Carter, & Carter (2011) found that White students, regardless of gender, were more likely to enroll in advanced courses. The expected student enrollment for five advanced placement courses was calculated using student SAT scores. Those who scored above the SAT mean (based on districts data) were deemed likely candidates for advanced course enrollment. The residuals from the observed and expected frequencies for advanced course enrollment were discordant across the four groups (White males,

White females, Black males, and Black females). Across all advanced courses, Black male and Black female students enrollment was lower than expected based on SAT performance.

The results showed a large discrepancy between White and Black students enrolled in advanced courses. Levels of participation in advanced math, science, and English courses were 86.4%, 84.6%, and 82.5% for White students and 13.6%, 15.3%, and 17.4%, respectively, for Black students. White females had higher enrollment levels in advanced math (44.1%), science (44.5%), and English (47.5%) courses than White males (42.3%, 40%, and 35%, respectively). Additionally, Black females exhibited higher enrollment rates across all advanced courses (math 8.2%, science 9.7%, and English 12.3%) than Black males (math 5.4%, science 5.6%, and English 5.1%). These results support the need to examine the distinct patterns associated with race and gender interactions. The lower levels of enrollment for females in the math and science courses and the lower enrollment of Black students across all courses supports the notion that social and environmental factors may be influencing academic achievement via disproportionate levels of advanced course taking enrollment.

The Current Study

The goal of the study is to examine the interaction between student characteristics (i.e., gender and race) and the influences of relationships with parents and teachers, specifically, parental involvement and student teacher relationships. The impacts of these constructs were examined in the context of two criterion; academic outcome expectancies

and indices of academic achievement (GPA, high school completion, and advanced course taking).

The following hypotheses related to the model are presented:

Hypothesis 1: *Student teacher relationships positively influence educational outcome expectancies, GPA, advanced course taking, and high school completion.*

Hypothesis 2: *Parental involvement positively influences educational outcome expectancies, overall GPA, advanced course taking, and high school completion.*

Hypothesis 3: *Educational aspirations/outcome expectancies influence advanced course enrollment, GPA, and high school completion.*

Hypothesis 4: *The influence of parental involvement and student teacher relationships on educational outcome expectancies, GPA, and high school completion differs by race and gender.*

The first hypothesis proposes a direct relationship between student teacher relationships and all three levels of academic achievement, as well as an indirect relationship via educational outcome expectancies. Similarly, the second hypothesis describes an expected direct influence of parental involvement on academic achievement, as well as an expected indirect influence through educational outcome expectancies. The third hypothesis suggests that educational outcome expectancies will directly influence all academic achievement variables. Finally, the fourth hypothesis suggests that the relationships described in the first three hypotheses will be influenced by a gender-race

interaction. The nature of the interaction will be examined by comparing model fit across four subgroups, Black males, Black females, White males, and White females. As the current literature is limited in the examination of gender-race interactions, the exact nature by which the influences of parental involvement and student teacher relationships will differ across race and gender, in regards to educational expectations and academic achievement, are not specified. See Figure 1.

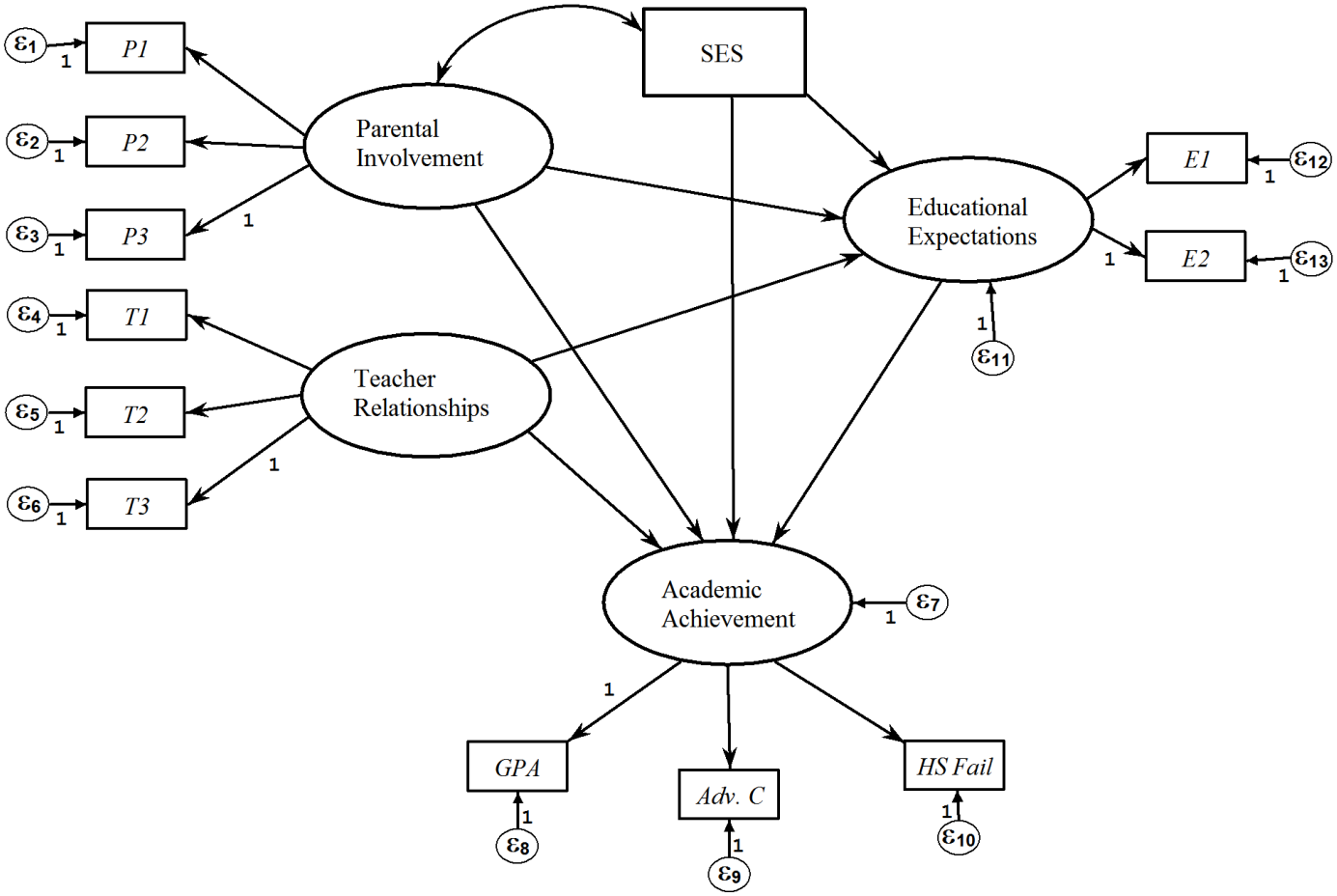

Figure 1. Hypothesized Model

METHODS

Participants

Data used for analyses in the current study were taken from the first and third waves of the National Longitudinal Study of Adolescent Health (Add Health) public-use dataset (Harris, 2009). The Add Health data set is unique in its inclusion of family context, school context, and peer networks that is not solely based on individual self-report responses. Since multiple individuals that make up each adolescent's environment participated (school administrators, parents, friends, and the students themselves) reports from multiple perspectives are available for a number of items.

The full data set includes four waves, the first of which covers the 1994 – 1995 school year. For the first wave, a random sample of 7th to 12th graders were selected from schools across the U.S. Roughly 90,000 participants from N = 145 schools filled out a brief in-school questionnaire. Of these participants, researchers conducted more in-depth at-home interviews with N = 20,745 of them, N = 14,838 of which were currently in high school. Parents of these students also completed questionnaires, as did administrators from participating schools (Harris, 2009, 2012). Wave III participants signed high school transcript release forms from which data regarding GPA, course sequences, and graduation were obtained.

The public use data set consists of N = 6,504 participants, ages ranging from 12 to 18 years of age with a mean age of M = 15.41, SD = 1.69. First, participants who were missing sample weights were removed from the dataset leaving a sample size of N = 4,020. Only participants enrolled in 9th grade or higher during the first wave of data

collection and who identified themselves as either African American or Caucasian were included in the subsample for analysis. This left a total subsample of n = 1,872. The subsample used for analysis was comprised of 48% males, 52% females, 77% White students, and 23% Black students. The interaction subsamples were broken down into White males (n = 721), White females (n = 719), Black males (n = 183), and Black females (n = 249).

Measures

The constructs of student teacher relationships, educational future aspirations/expectation, and parental involvement are each comprised of items from the first wave of the Add Health data set. Teacher relationships and academic expectations use student reported items while parental involvement contains items from the parental questionnaire. Descriptive statistics are presented in Table 1, and reliability statistics are reported in Table 2.

Teacher relationships. Teacher relationship items have responses ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). One of the three items, "I have trouble with teachers", was reverse coded so as to have higher scores on all three items indicative of better relationships. These items have a reliability of $\alpha = .61$, ranging from $\alpha = .55$ to $\alpha = .68$ across subsamples.

Table 1

Subsample Mean (Standard Deviation) For Measurement Items by Gender and Race

				Caucasian		African American	
Latent Trait / Item	*Label*	*Min*	*Max*	*Male*	*Female*	*Male*	*Female*
Parental Involvement							
Peer monitoring[1]	P1	0	3	2.80 (.02)	2.81 (.02)	2.67 (.08)	2.54 (.10)
Parent-child school communication[2]	P2	0	2	1.63 (.02)	1.68 (.02)	1.87 (.03)	1.92 (.03)
Parent involvement in school orgs[3]	P3	0	2	0.68 (.03)	0.59 (.04)	0.67 (.14)	0.59 (.05)
Teacher Relationships[4]							
Teachers treat students fairly	T1	1	5	4.07 (.04)	4.32 (.03)	3.81 (.10)	4.15 (.08)
Teachers care about me	T2	1	5	3.57 (.04)	3.39 (.06)	3.24 (.11)	3.26 (.10)
Trouble getting along with teachers*	T3	1	5	3.54 (.05)	3.57 (.04)	3.34 (.12)	3.60 (.07)
Education Aspirations/Expectations[5]							
Want to go to college	E1	1	5	4.40 (.06)	4.57 (.04)	4.51 (.09)	4.49 (.07)
Likelihood of going to college	E2	1	5	4.16 (.06)	4.47 (.04)	4.15 (.13)	4.24 (.10)
Academic Achievement							
Grade Point Average 1994-1995[6]	GPA	0	4	2.52 (.05)	2.92 (.05)	1.97 (.15)	2.37 (.10)
Advanced course credits[7]	Adv C	0	15	10.34 (.26)	10.89 (.18)	9.06 (.49)	10.03 (.36)
Failure/H.S. completion[8]	HS Fail	1	3	1.41 (.04)	1.59 (.03)	1.20 (.14)	1.37 .08)

* Item reverse coded

Note. [1] Sum of dichotomous responses to "knows who best friend is", "met best friend in person", and "met parents of best friend". [2] Sum of dichotomous responses to "talk about school with child" and "talk about grades with child". [3] Sum of dichotomous responses to "member of parent-teacher organization", and "participates in fundraising". [4] The scale for teacher relationship items is 1 = strongly disagree to 5 = strongly agree. [5] The scale for educational expectations items is 1 = low to 5 = high. [6] The scale for GPA is 0 = fail to 4 = A. [7] The scale for advanced courses is 0 = most remedial courses to 15 = most advanced courses. [8] The scale responses include 0 = dropped out of high school, 1 = graduated with failed classes on transcript, and 2 = graduated with no failed classes.

Table 2

Internal Consistency Reliability Estimates (Cronbach's α) for Construct Measures by Gender and Race

	Caucasian		African American	
Construct	*Male*	*Female*	*Male*	*Female*
Parental Involvement	.54	.56	.48	.39
Educational Expectations	.82	.84	.82	.82
Teacher Relationships	.68	.63	.63	.55
Academic Achievement	.85	.87	.84	.85

Educational aspirations/future extpectations. The proposed construct of educational future aspirations was measured using three variables from the student questionnaire asking students to report their level of desire to attend college as well as the likelihood that they will be able to attend college. Answer responses range from 1 (*low*) to 5 (*high*) and had an overall reliability of $\alpha = .83$. Internal consistency of these items is stable across samples, ranging from $\alpha = .82$ to $\alpha = .84$.

Parental involvement. The parental involvement items consist of three index items created from a list of dichotomous yes/no responses taken from the Wave I parent questionnaire. Principal components analysis was implemented using the tetrachoric correlation matrix of the items to determine the most valid combination for item reduction, see Table 3. The first of these items, friendship monitoring, is a general indicator of parental involvement and monitoring of the child's social relationships with peers. This item was created by summing the responses "knows who best friend is", "met best friend in person", and "met parents of best friend". The second composite variable, parent-child school communication, is the result of summing the responses, "talk about

school with child" and "talk about grades with child". Finally, parent school participation is comprised of the remaining two items, "member of parent-teacher organization", and "participates in fundraising". The overall reliability of the three parental involvement index items was the lowest at $\alpha = .54$. The internal consistency estimates range from $\alpha = .39$ for Black females to $\alpha = .56$ for White females. The low reliability of these items for the Black subsamples in particular are worrisome. Caution will be taken when interpreting results based on these items.

Table 3

Principal Components Analysis of Parental Involvement Items

		Component			
Item		P1	P2	P3	h^2
1	Knows child's best friend in school	.884			.64
2	Met best friend in person	.766			.63
3	Met parents of best friend	.722			.49
4	Talk about grades		.807		.57
5	Talk about other school activity		.802		.76
6	Member of parent teacher organization			.671	.58
7	Participate in school fundraising			.665	.48
	Eigenvalue	2.197	1.65	1.167	
	% Variance explained	24.41	18.33	12.97	

Socio-economic status (SES). SES was included in the analysis as an observed control variable. Scores for this item were created by summing the normalized items indicating household income, highest education level of both parent, and highest occupation prestige score of either parent.

The measure of household income came from the parent questionnaire with answers ranging from $0 to $999,000 in total household income after taxes. Outliers in this variable were addressed by winsorizing the tails at .01. This had no effect on the lower end of the distribution ($0) but the maximum income became truncated at $200,000.

The highest level of education reported by a parent is used as the third component of SES. Item responses ranged from 1 (did not graduate from high school) to 5 (obtained M.A. or Ph.D.).

Parent occupation consisted of 10 ordinal categories of occupational prestige, with 0 indicating unemployed and 10 indicating the highest level of prestige. The highest prestige score from responses regarding mother and father occupations was used for the SES score calculation.

The SES index used in the model was created by summing the normalized values of occupation, education, and household income. Descriptive statistics for the generated SES index and its original components are presented in Table 4.

Table 4

SES Descriptive Statistics for Subsample (n = 1872)

	Min	*Max*	*Median*	*M*	*SD*
Income[1]	0	200	43	49.06	34.50
Education[2]	1	5	3	3.26	1.18
Occupation[3]	0	9	7	5.80	2.45
SES Index[4]	0.03	3	1.47	1.46	0.60

Note. [1] The scale for income is 0 = no annual income to 200 = $200,000 or more. [2] The scale for education scores is 1 = did not graduate from high school to 5 = obtained M.A. or Ph.D. [3] The scale for occupation scores 0 = unemployed to 10 = highest level of prestige. [4] The scale for the SES index is 0 = low SES to 3 = high SES.

Academic achievement. The academic items used for the latent trait of academic achievement include the students GPA the year of the survey (1994-95), the highest level advanced course credit received by graduation, high school completion, and the cumulative failure index created by the Add Health investigators.

Grade Point Average (GPA). Yearly GPA variables represent the average semester grade across one school year while the cumulative indicators represent the average course grade across all years of high school course taking. The outcome measure of GPA for the current study used yearly indicators of GPA that correspond to the year in which the student completed Wave I of the Add Health survey.

Advanced course taking. Advanced course enrollment data is only available for math and science subjects. The high school math and science courses are represented in a hierarchical, sequential fashion with certain courses requiring more prerequisites and considered more advanced than others. Add Health researchers using Classification of

Secondary School Courses (CSSC) codes listed on student transcripts developed ordinal indicators of course sequences ranging from remedial to more advanced (Harris, 2013).

The resulting categories for the level of math courses are as follows: 1, Basic/Remedial Math; 2, General/Applied Math; 3, Pre-algebra; 4, Algebra I; 5, Geometry; 6, Algebra II; 7, Advanced Math (Algebra III, Finite Math, Statistics); 8, Pre-calculus (includes Trigonometry); and 9, Calculus. The science course subject categories include: 1, Basic/Remedial Science; 2, General/Earth Science; 3, Biology I; 4, Chemistry; 5, Advanced Science (Biology II, Chemistry II); and 6, Physics (Harris, 2014).

Cumulative measures of advanced course taking used for the current analysis capture the highest level course for each subject that the student received credit for by the end of high school. These sequence variables allow for an overall measure of high school academic achievement at the end of high school regardless of the actual school year during which the course credit was earned (1994-1995; Harris, 2013).

Failure index & high school graduation. High school completion was analyzed using the Add Health exit status variable dichotomized into graduate (1) and non-graduate (0). The failure index from the data set represents the proportion of failed classes divided by the total number of courses attempted. Since this variable was highly skewed, as was the variable indicating high school graduation, a new ordinal variable was created with “0” indicating dropping out, “1” representing graduates who had failed classes, and “2” representing high school graduates with no failed courses. This new variable was normally distributed and was thus able to be used as a criterion in the model. Reliability of these items is high with an alpha of .86 overall and stable estimates across subsamples.

Data Cleaning

After the measures were constructed, they were tested for outliers and normality. Multivariate outliers were removed by examining the significance of Mahalanobis distance measures. All of the items displayed adequate levels of skewness and kurtosis, within -2 to 2, except for those related to future aspirations for which Box-Cox transformations were attempted. The resulting transformations were too extreme and resulted in dichotomous responses. As an alternative, categories with less than 5% of the responses were binned to reduce skew. After transformations these variables had acceptable univariate levels of skewness and kurtosis, falling between -2 and 2. Mardia's skewness and kurtosis statistics showed that the multivariate distribution had a normal level of kurtosis ($p = .154$) but was still significantly skewed ($p < .001$). Despite the multivariate skew in the data they were deemed adequate for analysis since they met univariate requirements and because the analyses used are considered robust to these violations of assumptions (McDonald & Ho, 2002; Muthén & Kaplan, 1985; Muthén & Sattora, 1995).

Analysis Design

Survey design effects. Design effects were taken into account to produce unbiased estimates and reduce the risk of Type I error. Within-school clustering was controlled for by including the school ID as the primary sampling unit. Not taking the within-school clustering into account can result in underestimated standard errors.

Sample weights provided by the Wave III transcript data were also used in the analysis to ensure a nationally representative sample with robust parameter estimates.

The data were analyzed using Stata 13 in order to take advantage of the survey techniques available that handle observations that lack independence and identical distributions (i.e., cluster samples with unequal probability). It is strongly recommended by the Add Health investigators to perform design –based analyses as opposed to model-based analyses (Chen & Chantala, 2014) despite the inability to obtain various widely used post estimation statistics such as chi-square.

Analyses. Preliminary analyses included PCA to reduce a set of dichotomous indicators into index variables, data cleaning, and item transformations described above. The study hypotheses were tested using maximum likelihood estimation in SEM with robust linearized variance estimation to fit the hypothesized model for each individual subgroup, see Figure 1.

Fit statistics used to determine goodness of fit included the standardized root mean square residual (SRMR) and the coefficient of determination (CD). The SRMR is an absolute measure of fit representing the standardized difference between the observed and predicted correlations. Values closer to zero indicate good fit with an SRMR of less than .08 being indicative of good fit. The CD is analogous to R^2 in regression. It indicates the amount of variance within the endogenous constructs that is accounted for by the exogenous constructs in the model. High values closer to a value of 1 indicate that the observed variables in the model are able to explain a large portion of the variance in the endogenous latent traits. Additionally, Wald's *F* tests were examined in order to determine whether each parameter in the model was significant.

RESULTS

Black Males and Black Females

Attempts to fit the model for the Black male and Black female samples were unable to successfully converge. As a result, the model was reduced by eliminating the structural elements and CFA was performed on the measurement model. Results for each indicated that the items chosen for the model were not performing as expected. In fact, for Black females only two items in the model had significant loadings while the Black male sample had only three, see Table 5.

These results clearly indicate the items chosen to represent each factor were not in fact representative of the latent construct as hypothesized. As a result, it was impossible to continue with further analyses on these subsamples. The lack of measurement fit to this degree was unexpected; however, these results do show that measurement of these constructs lack invariance across racial categories.

Table 5
CFA Measurement Model Results for African American Student Samples

	Females			*Males*		
	B	*SE*	B_{std}	*B*	*SE*	B_{std}
Parental Involvement → P1	1		.11	1		.48
Parental Involvement → P2	-1.83	3.83	-.58	0.11	.18	.10
Parental Involvement → P3	1.96	2.43	.31	1.07	.57	.50
Teacher Relationship → T1	0.96	.58	.62	0.91	.18	.52**
Teacher Relationship → T2	1		.56	1		.63
Teacher Relationship → T3	0.79	.22	.47**	1.11	.41	.70*
Educ. Expectations → E1	0.73	.27	.78*	0.89	.16	.82**
Educ. Expectations → E2	1		.96	1		.82

* $p < .01$ ** $p < .001$

White Females

The initial results from the White female sample showed that the parental involvement factor was not a significant predictor of educational expectations (B = .05, p = .703). SES did not have a significant effect on academic achievement (B = .17, p = .245). The overall fit statistics indicate good model fit, SRMR = .049, and prediction of endogenous constructs, CD = .86. Due to insignificant Wald tests, the path from parental involvement to educational aspirations was removed, and the model was run again. SES remained an insignificant predictor of academic achievement and was also removed from the final model. The results from the final model are shown in Figure 2 and Table 6.

The model fit statistics for the final model show a slight improvement over the original with SRMR = .039, and CD = .86. This indicates that the removal of the paths linking parental involvement to educational expectations and SES to academic achievement results in less measurement error, as indicated by SRMR, without reducing the amount of variance explained. An examination of the Wald test statistics indicated all parameters were appropriate to retain.

Table 6

Final Structural Model Unstandardized and Standardized Estimates for White Females

	B	*SE*	B_{std}
Structural Model			
Educ. Expectations → Academic Achievement	0.23	.05	.43**
SES → Academic Achievement	(n.s)		
Parental Involvement → Academic Achievement	1.12	.20	.44**
Teacher Relationships → Academic Achievement	0.31	.09	.24**
SES → Educ. Expectations	0.7	.08	.42**
Teacher Relationships → Educ. Expectations	0.39	.08	.25**
Parental Involvement → Educ. Expectations	(n.s.)		
Error Variance			
Academic Achievement	0.25	.05	
Educ. Expectations	0.51	.07	
Parental Involvement	0.09	.02	
Teacher Relationships	0.34	.08	

** $p < .001$

Table 6 (Continued)

Measurement Model Unstandardized and Standardized Estimates for White Females

	B	*SE*	B_{std}
Measurement Model			
Parental Involvement → P1	0.49	.14	.28**
Parental Involvement → P2	0.12	.09	.11†
Parental Involvement → P3	1		.45
Teacher Relationships → T1	0.68	.14	.53**
Teacher Relationships → T2	1.15	.21	.64**
Teacher Relationships → T3	1		.62
Educ. Expectations → E1	0.81	.05	.73**
Educ. Expectations → E2	1		.91
Academic Achievement → Adv Courses	2.99	.21	.79**
Academic Achievement → Fail Index	0.18	.01	.74**
Academic Achievement → GPA	1		.85
Parental Involvement ↔ SES	0.08	.10	.61**
Measurement Error			
P1	0.24	.03	
P2	0.23	.02	
P3	0.35	.02	
T1	0.47	.04	
T2	0.70	.08	
T3	0.47	.07	
E1	0.28	.03	
E2	0.11	.04	
GPA	0.13	.02	
Adv C	3.15	.30	
HS Fail	0.01	.001	

† $p < .05$ * $p < .01$ ** $p < .001$

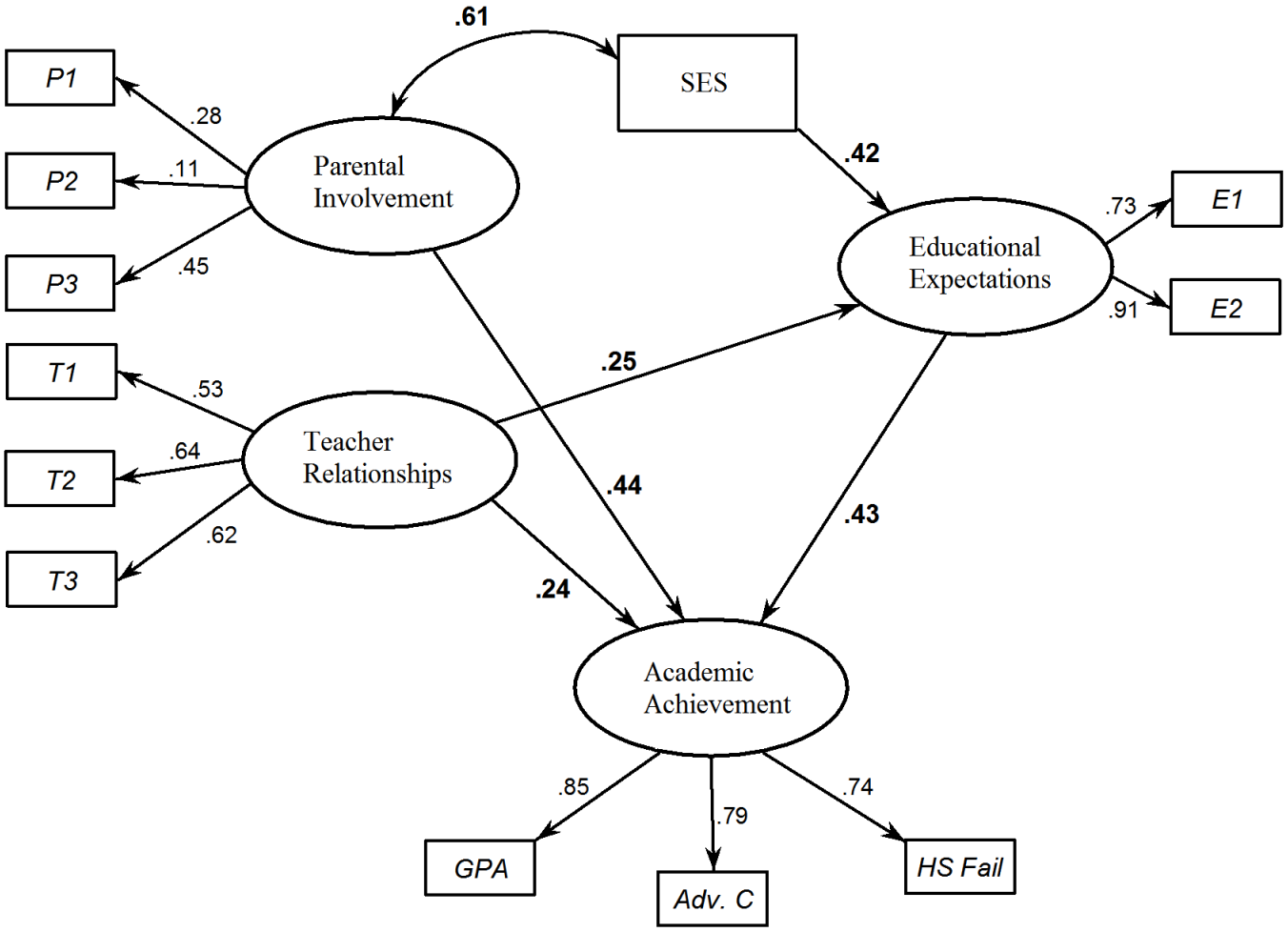

Figure 2. White Female Final Model Standardized Estimates

The final model for White females indicates that parental involvement does not predict educational expectations as hypothesized. It does, however, have a direct effect on academic achievement. Alternatively, SES has a significant impact on educational expectations but not a direct effect on academic achievement. Teacher relationships also significantly predicted educational aspirations, $B = .39$, $p < .001$. All latent variables had a significant direct effect on academic achievement: academic expectations ($B = .38$, $p < .001$), parental involvement ($B = .19$, $p < .001$), and teacher relationships ($B = .25$, $p < 001$).

White Males

The hypothesized model was then run on the White male sample. Results indicated that similar to the female sample, parental involvement did not predict educational aspirations, $B = .16$, $p = .07$, and the path was removed from the model. Unlike the female sample however, SES did have a significant direct effect on academic achievement ($B = .24$, $p < .001$), and no further modifications were made to the model. Model fit statistics indicated that the data fit the model well, SRMR = .046, and that a large amount of variation in academic achievement was able to be explained by the exogenous constructs, CD = .92. Additionally, Wald tests indicated that all parameters were statistically significant, see Table 7.

Table 7

Final Structural Model Unstandardized and Standardized Estimates for White Males

	B	*SE*	B_{std}
Structural Model			
Educ. Expectations → Academic Achievement	0.25	.07	.44**
SES → Academic Achievement	0.09	.02	.23**
Parental Involvement → Academic Achievement	1.23	.29	.15**
Teacher Relationships → Academic Achievement	0.31	.10	.26*
SES → Educ. Expectations	2.48	.21	.40**
Teacher Relationships → Educ. Expectations	6.64	1.40	.27**
Parental Involvement → Educ. Expectations	(n.s.)		
Error Variance			
Academic Achievement	0.3	.04	
Educ. Expectations	0.81	.11	
Parental Involvement	0.1	.03	
Teacher Relationships	0.31	.07	

† $p < .05$ * $p < .01$ ** $p < .001$

Table 7 (Continued)

Measurement Model Unstandardized and Standardized Estimates for White Males

	B	*SE*	B_{std}
Measurement Model			
Parental Involvement → P1	0.53	.15	.17**
Parental Involvement → P2	0.32	.07	.32**
Parental Involvement → P3	1		.78
Teacher Relationships → T1	1.17	.18	.64**
Teacher Relationships → T2	1.20	.16	.65**
Teacher Relationships → T3	1		.63
Educ. Expectations → E1	0.61	.05	.66**
Educ. Expectations → E2	1		.95
Academic Achievement → Adv Courses	3.23	.22	.79**
Academic Achievement → Fail Index	-0.24	.01	.75**
Academic Achievement → GPA	1		.85
Parental Involvement ↔ SES	0.09	.013	.44**
Measurement Error			
P1	0.27	.04	
P2	0.24	.01	
P3	0.38	.03	
T1	0.47	.05	
T2	0.59	.06	
T3	0.57	.06	
E1	0.49	.05	
E2	0.02	.08	
GPA	0.20	.02	
Adv Courses	4.60	.57	
Fail Index	0.01	.001	

† $p < .05$ * $p < .01$ ** $p < .001$

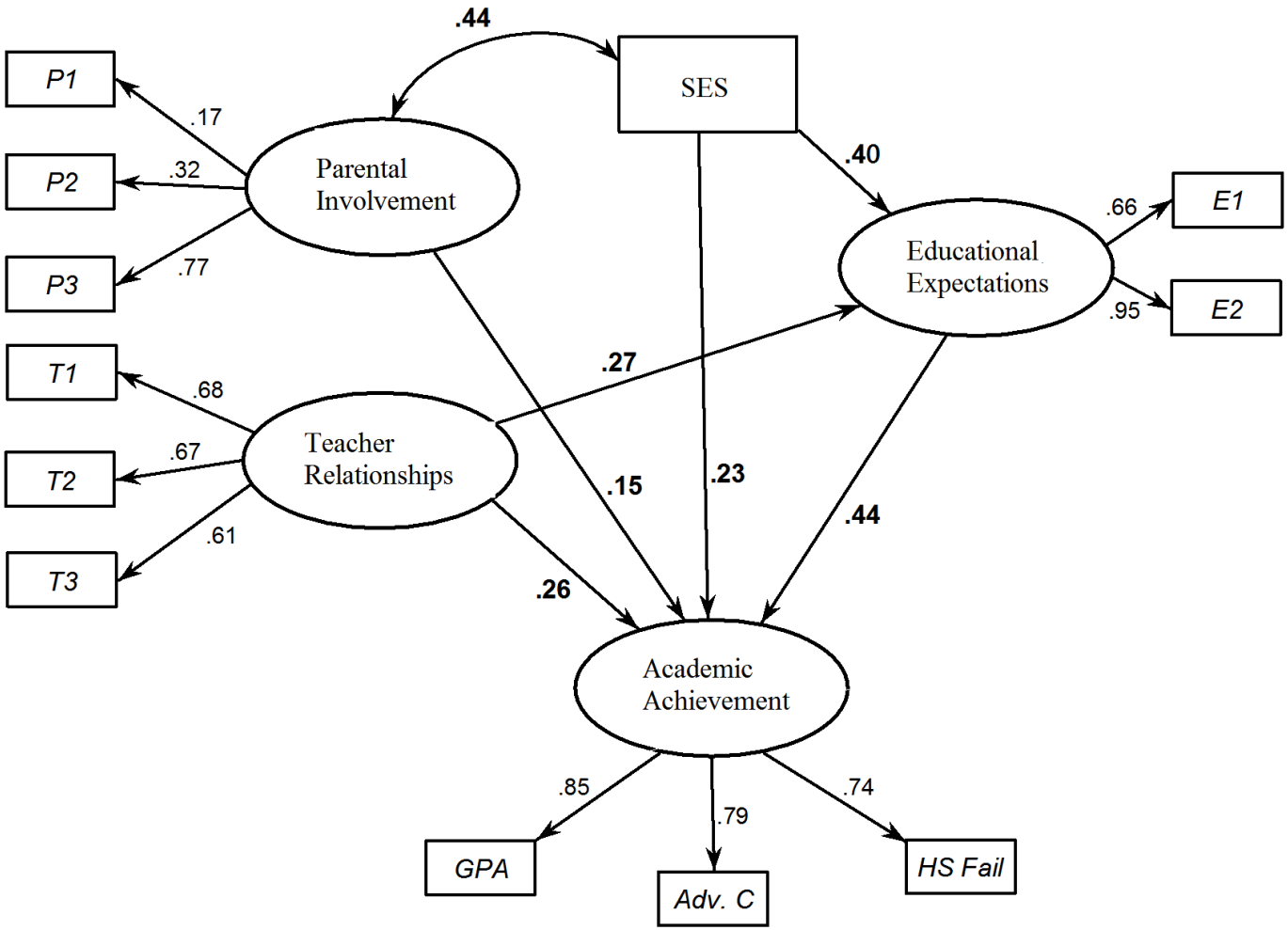

Figure 3. White Male Final Model Standardized Estimates

Total Effects

The total effects of each factor in the model are presented in Table 8. Teacher relationships and SES had similar total effects on educational aspirations for both males and females indicating that these influences operate in a similar manner across gender. Teacher relationships had less of a direct effect on educational expectations for males (.27) and females (.25) than SES, .40 for males and .42 for females. This indicates that the environmental circumstances created by SES influence educational expectations more so than relationships formed with teachers.

Teacher relationships and educational expectations also shared a similar pattern regarding their influence on academic achievement across males and females. Educational expectations has a slightly higher total effect for males (.44) and females (.43) than did teacher relationships, .38 for males and .35 for females.

The total effects of parental involvement and SES on academic achievement, however, were reversed in size across males and females. The male sample demonstrated a higher total effect of SES (.41) compared to females (.18). This is likely due to the fact that the direct path of SES to academic achievement was not significant in the female model. Instead, the highest total effect on academic achievement for females came from parental involvement (.44) which was the factor that exerted the smallest impact on academic achievement for males (.15). High levels of multicollinearity between parental involvement and SES may be the cause for this with SES acting as a suppressor variable in the male model. The exclusion of SES from the male model provides further evidence of this resulting in much higher coefficient on the path from parental involvement to

academic achievement $B = .44$, $p < .001$, compared to $B = .15$, $p < .001$ when SES is included. The true relationship that exists among SES, parental involvement, and academic achievement is further clouded by the fact that the reliability of the parental involvement measurement was low for all samples. Thus, conclusions regarding the exact nature of this relationship cannot be made.

Of importance, however, is the fact that the impact of parental involvement remained significant even with the inclusion of SES, providing support for the importance of family support and involvement in their child's education.

Table 8
Decomposition of Standardized Effects on Academic Achievement

	Females			Males		
	direct	*indirect*	*total*	*direct*	*indirect*	*total*
Teacher Relationships	.24	.11	.35	.26	.12	.38
Educational Expectations	.43		.43	.44		.44
Parental Involvement	.44		.44	.15		.15
SES		.18	.18	.23	.17	.41

Note: All effects are significant at $p < .001$

In summation, the analyses of the White male and White female samples indicated a similar structure across groups. All measurement loadings were found to be significant, although the parental involvement items had low loading on the factor. This was not entirely unexpected due to the low reliability estimates presented in Table 1. Additionally, parental involvement was not found to be a significant indicator of

educational expectations for either of the samples while SES was. Parental involvement was, however, a significant predictor of academic achievement for both samples while SES was only a significant predictor for the male sample. Teacher relationships had a similar significant effect across both samples but the total effects were somewhat smaller than those of SES and educational expectations.

DISCUSSION

The goal of the current study was to compare socio-environmental influences of academic achievement across gender and race. The lack of invariance of measurement items across race indicate that items that represent constructs of parental involvement, teacher relationships, and educational aspirations/expectations, function differently for Black students than they do for White students. The comparison of gender for the White student sample suggested that SES has only an indirect effect on females' levels of academic achievement whereas SES had both direct and indirect effects for males. Additionally, parental involvement was not a significant predictor of educational expectations as hypothesized for either the male or female sample. In general, the study confirms the results from a number of previous studies linking academic achievement to parental involvement (Hill & Tyson, 2009; Jeynes, 2003, 2005, 2007, 2012; Wilder, 2014), teacher relationships (Goodenow, 1993; McCollum & Yoder, 2011; Stewart, 2007; Wentzel, 2002), and outcome expectations (Bandura, 1977, 1986; Hackett et al., 1992; Lent, Brown, & Hackett, 1994).

Race and Measurement

The hypothesized model used for this study was unable to be examined beyond the measurement items for the Black student sample. Items regarding parental involvement displayed low levels of reliability and did not load significantly onto the factor for either gender. The Black female sample had the lowest levels of reliability for parental involvement items ($\alpha = .39$) and teacher relationship items ($\alpha = .55$). It is unclear

as to why this might be so, but it does suggest that the construct of parental involvement in particular requires careful attention as it lacked validity and reliability in the current anaylsis. The lack of reliability indicates lack of unidimensionality of the construct and provides evidence of perhaps the presence of a hierarchical factor structure. Future studies are needed to create a reliable measure of parental involvement with particular care given to thoroughly examining the differential functioning of measurements across gender and race.

Parental Involvement

The results from this study suggest that research utilizing single item indicators of parental involvement are potentially measuring different constructs. This would explain the varied findings in the literature in regards to the effects of parental involvement on academic achievement (Wilder, 2014). Chen and Gregory (2009) examined three types of parental involvement: direct participation, academic encouragement, and academic expectations. Their findings revealed that some types of parental involvement have a greater influence on adolescent academic achievement than others. Chen and Gregory (2009) also found that these dimensions were not necessarily related to one another and that parents practicing one form of involvement may not necessarily practice others. This would explain the low internal consistency of the composite measures used to represent involvement in the current study. The results of the analysis therefore support the notion that parental involvement consists of multiple dimensions that cannot be represented as a single factor. Additionally, the lack of overlap in different forms of parental involvement may be more pronounced for Black students than it is for White students.

In the White student sample, parental involvement had a significant impact on academic achievement as defined by multiple indicators. These findings are congruent with Wilder (2014) whose meta-analysis revealed that parental involvement is a consistently significant predictor of academic achievement across a variety of definitions of involvement. The present study's results add to the literature by showing that the effect of parental involvement on academic achievement exists across multiple indicators of achievement. Specifically, GPA, advanced course taking, and failure rates.

Parental involvement had the largest direct effect on academic achievement for White females while it had the smallest direct effect for White males. The incongruent effect sizes, however, are likely do to the significant direct effect of SES found in the White male model that was not significant in the White female model. Thus, SES has only indirect effects on the academic achievement of White females (via its influence on educational expectations) while it directly and indirectly influences the achievement of White males. Further studies are needed to parcel apart the nature of the parental involvement and SES relationship. The two measures were highly correlated with evidence of a suppressor effect on parental involvement when the direct effect of SES is included. The results therefore suggest that the impact of parental involvement is more generalizable across levels of SES for females than it is for males.

Teacher Relationships

Teacher relationships were a significant predictor of academic success and educational expectations for both White male and White female students. These findings are consistent with prior literature that has shown teacher relationships to be influential to

the academic outcomes of adolescents, (Eccles & Wigfield, 2002; Goodenow, 1993; McCollum & Yoder, 2011; Stewart, 2007; Wentzel, 2002). This effect was similar for both White males and White females and remained significant even whilst controlling for the effects of SES and parental involvement. Neither of these constructs had any statistically significant relationship with teacher relationships. This suggests that teacher relationships are truly a unique influence on student expectations and academic success regardless of socio-economic status and parental support.

Educational Aspirations

Educational expectations were significantly influenced by teacher relationships and SES for both White male and White female samples. Parental involvement, however, did not emerge as a significant influence over educational expectations. Chen and Gregory (2009) found that the greatest influence over students' academic expectations were parental expectations of their child's academic success. This facet of parental involvement was not measured in the current model which aimed to focus more so on parental participation in the school environment. This may explain why parental involvement was not indicative of student educational expectations as hypothesized. The greatest effect on educational expectations came from SES. Teacher relationships also had a significant impact on educational aspirations but to a lesser extent than SES. These results imply that being aware of one's financial capabilities to attend college influences both the desire to attend and the perceived likelihood. This finding is especially important as educational expectations had the largest impact on academic success for White male students and the second largest for White females.

Ozturk & Singh (2006) examined the effect of SES, educational aspirations, and parental involvement on mathematics course taking. Their findings displayed no direct effect of SES on advanced course taking but there was a significant indirect effect. In fact, they found the same size indirect effect of SES on advanced course taking (B = .14) as was found for White female students in the current study (B =.14). The indirect effect for White male students in the current study was B = .32. When the White male sample was run without SES directly impacting academic achievement the indirect effect of SES on advanced course taking was B = .14 for White males as well.

The current analysis found larger effects of SES on educational aspirations, .42 for White females and .40 for White males, while Ozturk and Singh (2006) found only a .35 total effect of SES on educational aspirations. Their conclusions were that SES did not play a role in advanced course taking whereas parental involvement did. Their findings are consistent with the findings for White females in the current study. The results found for White males are similar to those of Ozturk & Singh with the exception of the significant direct effect of SES on academic achievement. Unfortunately, the sample characteristics reported by Ozark & Singh do not include details about race or gender. The results from the current study corroborate these findings and uncover differences in gender that were not previously explored. Further examination into the relationship between SES and parental involvement is necessary for future research, especially for male students.

The results of the current analysis regarding educational aspirations lend support to social cognitive theory of outcome expectations presented by Bandura (1986). In terms of the current study, this implies that White students who do not see an academic future

for themselves put forth less effort in their current endeavors resulting in higher failure rates, less advanced course taking, and lower GPA. Outcome expectations are thought to play a larger role in situations where the outcome of one's behavior is decided more by external rather than internal factors (Bandura, 1977, 1986). It could be that students view their success in school as dependent on environmental factors (i.e., SES) and not dependent on their internal abilities. This study shows that educational expectations for the future plays one of the largest roles in predicting the academic success of White students, even more so than teacher relationships, SES, and parental involvement. These results are consistent with those of previous studies that have found that outcome expectations play a significant role in academic achievement even after controlling for SES (Robbins et al., 2004).

Limitations and Future Directions

There are a number of limitations in the current study that are important to keep in mind when drawing conclusions. The measurement model chosen for parental involvement was weak. The lack of unidimensionality of the parental involvement items supports the notion that parental involvement is a multifaceted construct. Future studies should focus on defining these dimensions and examine items for differential functioning across race.

The use of survey data introduced a number of limitations as far as the statistics that were able to be obtained. The general purpose of the analyses however was more exploratory in nature, successfully identifying issues with measurement across race and examining gender differences for White adolescents. Future studies have the opportunity

to build upon the current results in order to examine additional comparisons across gender and race.

The reduction in sample size was another limitation. A number of participants had to be eliminated due to lack of sampling weight data. The further requirements of the subsample likely skewed the results. The requirement that observations must have linked transcript data excluded certain portions of the population such as students who are home schooled. The sample weights used, however, were calculated with this in mind to help aid in the creation of unbiased estimates. Only Black and White students were examined in the analyses and thus the results lack generalizability to other racial categories. The results of the SEM analysis in particular is only applicable to White student populations. Additionally, a number of other variables not included in the current model, such as behavioral problems at school, were not examined but may provide insight into gender and racial differences in academic achievement, especially regarding teacher relationships.

The items chosen for measurement were done so based on an extensive review of the literature. This being said, a consensus on the exact definition of several of the latent traits examined, such as parental involvement and academic achievement, remains to be resolved (Wilder, 2014). The results of this study are thus, limited in their interpretation, especially when compared to research using different measures. The measures of academic achievement were of a more global nature and did not include teacher reports, specific class grades, or standardized test scores. Studies using these measures as the criterion have been shown to yield differing results (Englund et al., 2004; Jeynes, 2007). Additionally, the current study examined advanced course taking for math and science

classes only. Information regarding course trajectory in other subjects, such as English, History, and Foreign Language, were unavailable in the public data set. The literature shows that gender differences exist within these subjects regarding both grades and frequency of course credit in advanced courses (Aud et al., 2012; Corra, Carter, & Carter, 2011). Future studies may wish to compare the results of the current study to models incorporating a wider variety of advanced course subjects.

Despite the limitations, the study was unique in that measures of academic achievement were not self-reported and instead taken directly from high school transcript data. Additionally, parental involvement items were taken from the parent survey directly as opposed to reports from the student. Extreme caution was taken to control for the design effects of the data so the results produced would be as unbiased as possible. While measurement error inhibited the ability to fully explore the gender-race interaction, the study results addressed important issues regarding the measurement of parental involvement and the influence of several socio-environmental factors linked to academic achievement. Future studies may wish to build upon the current model and examine relationships in a longitudinal fashion using hierarchial linear modeling with data from multiple waves of the survey. This type of analysis may help uncover causal relationships that were unable to be unearthed with the cross-sectional design of the current study.

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