Out-of-School Time Program Test Score Impact for Black Children of Single-Parents

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Dedication

This dissertation is dedicated to my grandmother, Rose Danze, mother, Patricia Nagle, and sister, Kimberly Honath. My grandmother's humility has always been and will always be a shining example on how to guide my life. She is greatly missed and always remembered. The sacrifices my mother made for my sister and I can never be acknowledged enough. This dedication is one small way to express my appreciation. I hope one day that I can contribute as much to this world as my sister. Her enthusiasm in helping others is something I will always strive to live up to.

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Abstract of Dissertation

Out-of-School Time Program Test Score Impact for Black Children of Single-Parents

Out-of-School Time programs and their impact on standardized college entrance exam scores for black or African-American children of single parents who have applied for a competitive college scholarship program is the study focus. Study importance is supported by the large percentage of black children raised by single parents, the large percentage of Institutions of Higher Education that require standardized test scores, and the standardized test achievement gap. Three questions guided the study. Question one: To what extent is there a statistically significant difference in mean standardized test scores among black or African-American children of single parents who have applied for a competitive college scholarship program given their participation in Out-of-School Time (OST) programs? An unmatched pairs t-test was applied for this research question. Question two: To what extent is there a statistically significant relationship between OST participation variable and standardized test scores among black or African-American children of single parents who have applied for a competitive college scholarship program? Two sub-questions included gender. A correlation and simple linear regressions were utilized. Question three: To what extent does OST participation contribute by gender to standardized test performance of black or African-American children from single-parent families when controlling for high school GPA and parent education level among a sample of black or African-American children of single parents who have applied for a competitive college scholarship program? level? A multiple regression analysis was utilized for this question.

The study produced six findings. Finding one is OST participation does impact standardized test scores. Finding two is OST participation level is associated with higher standardized test scores. Finding three is OST participation contributes more to standardized test scores when compared to males. Finding for is parent education level is not an important standardized test score predictor for this population. Finding five is OST participation accounts for similar or greater test score variance than GPA depending on gender. Finding six is that there is an opportunity to improve the opportunity students have to gain admittance to more selective institutions through increased standardized test scores by investing in OST programs.

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Chapter One

Overview

"Education in Lockport will change as we know it… There will be grief. There will be sadness. There will be a change in traditions. But we will survive" (Murray, 2010). Superintendent Terry Ann Carbone made this dramatic statement to the Lockport City School Board located in Lockport, N.Y., in March, 2010. Carbone's statement referred, in part, to ending after-school and summer programs. The recommended budget included ending all after-school and academic intervention programs for students in kindergarten through eighth grade. It also included ending summer school programs for all grade levels (Murray, 2010). Whether budget savings associated with eliminating after-school programs has any student educational progress impacts is an important area to explore for school districts facing budget constraints similar to Lockport City Schools.

Extracurricular program impact is the analysis focus. Several terms are synonymous with extracurricular programs including Out-of-School Time (OST) programs, After-School Programs, and extracurricular activities. This analysis will apply the same definition to all of these terms, which is programs, activities, and opportunities that occur during non-school hours (National Institute on Out-of-School Time [NIOST], n.d.). OST is the term most utilized throughout the analysis. Standardized test scores are the specific impact analysis area. Though the subject of criticism, standardized test scores are utilized by a large segment of Institutes for Higher Education (IHE) as an admission consideration. Approximately 70% of four-year IHEs require a standardized test score as part of the student application (Zwick, 2007).

While OST programs may have a broad impact, the study sample focus population is black or African American children of single parents. The study sample is drawn from applicants to a nationwide competitive college scholarship program. This sample differs from overall black or African American children of single parents characteristics in multiple areas. Personal characteristic differences are evident. Forty-two percent of the applicant population has single parents. The national rates are estimated to be 66% (Anne E. Casey Foundation, 2012). This national average difference supports the study focus population (Anne E. Casey Foundation, 2012). Parent Adjusted Gross Income (AGI) was compared to 2009 national AGI percentages by income band. When $40K or less AGI is considered, the sample proportion (79.3%) is 22.7% greater than the nation (56.6%). For AGI greater than $40K, the sample proportion (20.7%) is 22.7% less than the nation (43.4%).

Academic characteristic differences are also evident. The sample has parents with lower educational attainment rates when compared to national rates. Just under 43% of sample students have parents that have attended some college or beyond. Just over half (50.9%) of the African American population aged 25 or over has attended some college or beyond (U. S. Census Bureau, 2011). Student academic performance, however, is higher than national rates. The sample GPA average is 3.7 on a 4.0 scale compared to 2.69 on a 4.0 scale nationwide for black or African American students (Nord, Roey, Perkins, Lyons, Lemanski, Brown, & Schuknecht, 2011). Standardized test score differences are also evident. The sample mean SAT® score is 84 points higher than the national black student SAT mean but 125 points lower than the white student mean (College Board, 2011). Sample males scored 70 points higher than national rates and

females scored 91 points higher than black student national rates. Sample gender differences are similar to national differences. National black female SAT scores (1278) are 13 points higher than black males (1265) (College Board, 2011). There is a similar 21 point sample gender difference.

OST participation is a study focus. Nearly 90% of the sample (88.3%) indicated participation in OST activities. This is 53.3% higher than black or African American children national rates identified by the U. S. Census Bureau (2007) and 64.3% higher than the Afterschool Alliance (2009) identified black or African American children rate. This represents the largest difference between the sample and national rates.

These sample academic characteristics create a study limitation to high achieving black or African American children of single parents. High achieving refers to the sample higher mean GPAs and SAT scores. While the sample population has mean SAT scores higher than the national black student mean SAT scores, there is an achievement gap when sample children are compared to white children. The sample has mean SAT scores 125 points lower than white children SAT means. Although it is not segmented out by family type, the College Board (2010), for example, notes standardized test achievement gaps between white children and black children. The achievement gap is one of the factors that suggests that black children are an at-risk population for college admittance or admittance to their college of choice. Approximately 70% of IHEs require a standardized test score (Zwick, 2007). The high percentage of IHEs that require standardized test scores is the reason for the at-risk designation.

The impact of a college education supports study importance. A college degree has multiple benefits. The College Board's Education Pays 2010 report notes that

individuals with a bachelor's degree have a median annual income $33,800 higher than individuals that have earned only a high school diploma. Students who attended college but did not earn a degree, have an income 17% higher than high school graduates (College Board, 2010). There are other indicators that support the positive impact of a college education. One percent of bachelor's degree earners depend on the food stamp program compared to 8% of high school graduates (Baum, Ma & Payea, 2010). Health benefits are also associated with a college education. The Centers for Disease Control (CDC) found that the obesity rate lowers by increasing levels of education and is evident across age groupings (CDC, 2000). Adults ages 25 and older who have a college degree have obesity rates lower than individuals that only completed a high school education (CDC, 2000). Children in households of parents with a college education also have lower obesity rates (CDC, 2000). This is a sample of the positive benefits associated with a college education.

The economic benefits of a college education, however, have recently been questioned. The rate of return for students attending non-competitive, private, not-for-profit institutions is not good when future earnings and loans are considered (Klor de Alva & Schneider, 2011). Students that earn a degree from non-competitive admittance institutions derive an education rate of return lower than their cost of attendance (Klor de Alva & Schneider, 2011). Conversely, the return on investment for students attending public, selective institutions is positive (Klor de Alva & Schneider, 2011). Zwick (2007) noted that 40% of IHEs require a minimum standardized test score to be considered for admission. It can, therefore, be inferred that higher standardized test scores can help students gain admittance into more selective IHEs. Attending selective institutions

increases the likelihood that students will have a positive rate of return on their college education investment. Helping students become more competitive for admittance to selective IHEs supports the importance of identifying factors that influence standardized test scores. OST programs are the factor investigated here.

Problem Statement

This study examines whether OST programs have a positive impact on the standardized test scores of high achieving black and African-American children of single parents that apply for competitive college scholarship programs. It also examines whether there are OST program impact gender differences. Approximately 60% of black or African-American children are being raised in single-parent families (Annie E. Casey Foundation; 2012; U.S. Census Bureau, 2009). In work supported by the Russell Sage Foundation, Elwood and Jencks (2002) identified several problems associated with the spread of single-parent families in the U.S., including both economic and non-economic problems. From an economic perspective, single-parent families subsist on lower incomes than dual parent families. Using U.S. Census Bureau data, a Child Trends research brief confirmed that 50.2% of black children from single-parent families are being raised below the poverty level compared to 11% of black children in married-couple families (Anderson Moore et al., 2009).

Non-economic problems include child development. Elwood and Jencks (2002) cite research that children raised by both of their biological parents performed better on standardized tests, had fewer children in their teenage years, and had higher incomes in early adulthood. Children raised by both of their biological parents performed better in these areas when compared to alternative arrangements (McLanahan & Sandefur, 1994).

The prevalence of single-parent families in the African-American community and the potential economic and non-economic problems associated with this dynamic establishes the importance of the focus population for this analysis.

Standardized test performance by black or African-American students is the study outcome variable. Specific benefits are associated with high standardized test scores. Degree attainment is a college education outcome. Students with a 3.5 GPA and a 1200 or higher SAT score have an 89% six-year graduation rate when they attend highly selective IHEs (Bowen, Chingos & McPherson, 2009). Highly selective IHEs have 1200 or more average SATs (Bowen, et al., 2009). Conversely, students with lower SAT scores have lower college graduation rates. Students with SAT scores below 1000 that attend highly selective IHEs have a 71% six-year graduation rate (Bowen, et al., 2009). This pattern is repeated in the least selective IHEs which have average SAT scores lower than 1000. Students with a 3.5 GPA and a 1200 or higher SAT score have a 59% six-year graduation rate when they attend the least selective IHEs (Bowen, et al., 2009). Students with SAT scores below 1000 that attend the least selective IHEs have a 48% six-year graduation rate (Bowen, et al., 2009).

Black or African-American students perform at lower levels on the SAT when compared to white students. It was noted that the sample average is 125 points lower than white children in critical reading and mathematics. The overall black or African-American student mean score is 100 points lower in critical reading, 108 points lower in mathematics, and 99 points lower in writing (College Board, 2011). Black males have a combined score of 1265, which is 325 points lower than white males and 248 points lower than all male test takers (College Board, 2011). Black females have a combined

score of 1278, which is 292 points lower than white females and 213 points lower than all female test takers (College Board, 2011). The test score gap is evident overall and by gender. This sample demonstrates a similar though smaller achievement gap.

The study also examines gender differences. While the difference between black male and black female standardized test scores is only 13 points nationally and 21 points for the sample, there are other substantial academic differences. Black males have lower high school graduation rates (Education Week, n.d.), lower college graduation rates (Snyder & Dillow, 2012), higher dropout rates (Snyder & Dillow, 2012), and higher discipline rates (Losen & Skiba, 2010). These factors may affect the proportion of black males that attempt a college entrance exam. This may, in part, account for the low standardized test score difference between black males and black females.

The lower test score performance is important as college entrance exam results serve as an admittance gateway (Zwick, 2007). Approximately 70% of four-year IHEs require standardized test results with 40% requiring a minimum score (Zwick, 2007). A variety of research studies have established that college admittance standardized test results in conjunction with high school GPA are the best predictors of initial college success (Atkinson & Geiser, 2009, Korbin & Milewski, 2002). The emphasis IHEs place on standardized test results supports its importance as an outcome variable for this analysis.

The research gap discussed in the literature review section investigates whether OST programs, which are in danger of being eliminated due to budget constraints, have an impact on the standardized test scores of high achieving black or African-American children of single parents. The problem is that, nationally, black or African-American

children are performing at a lower level than white children on college admittance standardized tests. Test scores are an admittance decision factor at a high number of IHEs. Few studies exist to determine whether OST programs have a positive impact on college admittance standardized test scores. No identified studies consider the OST gender difference impact. This study addresses the gaps by informing on whether OST programs are an effective intervention for increasing the academic credentials for black or African-American children from single-parent families thereby increasing college admittance and by examining if OST programs impact males and females differently. Evidence that higher test scores increases the likelihood students will be admitted to more selective institutions is presented. Attending more selective institutions provides students with a higher college education return on investment (Klor de Alva & Schneider, 2011).

Purpose Statement

The purpose of this quantitative secondary data analysis study is to identify whether OST programs are associated with an increase in standardized test scores for high achieving black or African-American children from single-parent families overall and by gender. The study will be accomplished through a secondary analysis of standardized test score data and participation in OST activities. The results will give evidence on the impact of OST programs on standardized test scores for the focus population. A positive impact, if identified, will give stakeholders evidence that can inform their policies and budget decisions related to OST programs as an intervention to increase college admittance overall and to more selective institutions.

Research Questions

Three primary research questions associated with this study. The first research question considers the impact of any participation in OST programs. The second research question considers the level of participation in OST programs, and contains two secondary questions that consider gender. The third research question considers the contribution OST participation makes to standardized test score performance.

1. To what extent is there a statistically significant difference in mean standardized test scores among black or African-American children of single parents who have applied for a competitive college scholarship program given their participation in Out-of-School Time (OST) programs?
2. To what extent is there a statistically significant relationship between OST participation variable and standardized test scores among black or African-American children of single parents who have applied for a competitive college scholarship program?
    a. To what extent is there a statistically significant relationship between OST participation variable and standardized test scores among male black or African-American children of single parents who have applied for a competitive college scholarship program?
    b. To what extent is there a statistically significant relationship between OST participation variable and standardized test scores among female black or African-American children of single parents who have applied for a competitive college scholarship program?

3. To what extent does OST participation contribute by gender to standardized test performance of black or African-American children from single-parent families when controlling for high school GPA and parent education level among a sample of black or African-American children of single parents who have applied for a competitive college scholarship program?

Study Significance

Study significance is based on five areas. Characteristics of black or African American children of single parents characteristics is the first area explored. Study target population importance is established through examination of these characteristics. The status of OST program support is the second area explored. Standardized test relevance is the third area explored. Standardized test achievement gaps are the fourth area explored. The impact of extracurricular activities on standardized test performance is the fifth area explored. Study significance based on these five areas is discussed in this section.

Focus Population Characteristics. The sample focus population characteristics were discussed. Although lower than national black children rates, 42.8% of the applicant population is being raised in single parent families. This is higher than rates for the nation and for white children and supports study importance. When gender is considered, black females represent 7.2% of the SAT test-taker population while black males represent 5.9% (College Board, 2012). This represents a black female proportion 22% greater than black males. The sample is 68.8% female and 31.2% male. This proportion difference is greater than all black SAT test takers. Sample OST participation rates are higher than national averages. The literature review delves more in depth in these areas to create an OST impact context.

Program Support. Participation opportunities are the second study significance area. As noted, Duffett and Johnson (2004) found that minority parents have more difficulty in identifying high quality or affordable OST programs. School districts are a source of OST programming. A review of the 20 largest U.S. school districts reveals that budget cuts are occurring for extracurricular programming. The average reduction in OST program appropriations from 2009 to 2010 was 9.4%. There are other funding options for schools districts and other organizations to offer after-school programs. 21st Century Community Learning Centers is a federal program that enables school districts and other entities to compete for OST program funding (Department of Education [ED], 2003). Alternative funding problems have been identified. Competition for funding outside core operational school district budgets means that programs become dependent on time-limited or "soft" funding and have difficulty in finding sustainability funding when grants expire (Wright & Deich, 2002). Expiring programs or programs that must be modified to meet a funder's programming requirements may potentially limit the impact that consistent OST programming can have. If it were found that OST programs positively affect standardized test scores, this would constitute a data-driven reason for school districts and other entities to fund OST programs.

Standardized Testing. Standardized test relevance is the third study significance area. This is reflected in multiple ways. The prevalent use of standardized tests as a college entrance requirement is the first way. How test scores impact students' acceptance into selective IHEs is the second way. The predictive validity of standardized test scores in addition to high school GPA of first-year college performance is the third way.

Prevalence. The SAT and ACT® are the primary college entrance exams. Over 1.5 million students take each test per year (ACT, 2010; College Board, n.d.). A review of 2010 data from the Integrated Postsecondary Education Data System (IPEDS) system by the researcher reveals that of the 1,690 U.S. institutions that offer baccalaureate degrees, 79.5% require or recommend a standardized test for admittance. Zwick (2007) cited a National Association for College Admission Counseling (NACAC) Admission Trends Survey which found that 70% of four-year institutions consider standardized test scores, with 40% requiring a minimum score. The widespread usage of standardized test scores for college admission supports the importance of identifying factors such as OST programs that may increase scores.

Selectivity. IHE selectivity is related to the college entrance exam score a prospective student receives. A review of the 2010 IPEDS data by the researcher shows that 25th percentile scores for the three SAT test categories are between 174 and 189.5 points higher for institutions that admit 1% to 20% of applicants when compared to institutions that admit 81% to 100% of applicants. The 2010 IPEDS data also shows that the ACT Composite scores are 7.9 points higher for the most selective group of institutions when compared to the least selective group of institutions.

Validity. The SAT and ACT are considered to be valid predictors of first-year college performance. High school grades combined with standardized test scores are the best predictor of college success (Atkinson & Geiser, 2009, Korbin & Milewski, 2002). There is a high correlation (r=.62) between the combination of SAT Critical Reading, Mathematics, and Writing tests and high school GPA variables with the student's first-year college grades (Korbin et al., 2008). Two meta-analyses (Burton & Ramist, 2001,

Wilson, 1983) also identified positive correlations with standardized test results, GPA, and first-year college grades. Burton and Ramist (2001) considered 14 studies conducted between 1985 and 1995 and identified a moderate correlation (r=.47). Their study was a follow up to Wilson's 1983 study that identified a moderate correlation (r=.42). These correlations represent a positive relationship between standardized test score performance, high school GPA, and first year college grades. As a note, correlation significance levels were not provided in these sources.

Standardize Test Achievement Gap. Standardized test achievement gap is the fourth study relevance area. Results reported by the College Board and ACT give evidence of a large achievement gap for black or African-American students. On the SAT, black children score 232 points less than the national average, and 273 points less than the average for white children, when the average scores from Critical Reading, Mathematics, and Writing are combined (College Board, 2010). While the sample is high achieving, the standardized test score achievement gap is still evident. The sample SAT scores are 125 points lower than white children. On the ACT, black children score 4.1 points less than the national average (College Board, 2010). In addition, only 4% of black children meet the college readiness benchmark for all four ACT content tests (ACT, 2010).

OST Impact on Standardized Test Performance. The impact of extracurricular activities on standardized test performance is the fourth study significance area. As noted, the sample OST participation rate is greater than national averages. Thirty OST impact studies were reviewed. The studies were primarily identified using the Harvard Family Research Project (HFRP) database, and search engines including ERIC, Google, and

Google Scholar. HFRP maintains a database that indexes OST evaluations. The search engine literature review process is described in Chapter Two. Twenty-three studies are from the original source. Five studies were from a secondary source. Meta-analyses are the remaining two.

Multiple insights were revealed through the review. The first is that the OST impact on college entrance standardized test performance evidence is sparse. Two 2012 studies related to this area were identified. Both studies identified positive OST standardized test score impacts (Anderson & Muzak, 2012, Craft, 2012). The second finding is that positive results are more consistently identified with mathematics test scores. Twenty studies focused on mathematics test scores. Sixteen (80%) identified positive OST impacts on mathematics test scores. Three (15%) identified positive results on a study population segment rather than the full population. Overall, 19 of 20 studies (95%) found some evidence that OST programs positively impact mathematics test scores.

The third finding is that positive results are also associated with language arts related test scores. Language arts is a broad term that encompasses all tests related to English, reading, writing, and similar areas. Thirteen of 21 (61.9%) studies identified positive OST impacts on language arts test scores. Three (14.3%) identified positive results on a study population segment rather than the full population. Overall, 16 of 21 studies (76.2%). Found OST programs positively impact language arts related test scores.

The lack of studies that specifically focused on single-parent families is the fifth insight. Lauver (2002) did include single-parent families as an independent variable. This study, however, did not identify impacts on standardized test results, so no in-depth

analysis was provided on differences between children from single-parent families and two-parent families. Regnerus (2000) also included intact biological families as an independent variable but did not define what this represented.

In summary, the five primary factors that contribute to the study's significance are: 1) the characteristics of the target population, namely black or African-American children from single-parent families, 2) support for after-school programming, 3) standardized test importance to IHEs, 4) Achievement gaps by the target population, and 5) the impact of OST activities on standardized test performance. Collectively, these areas demonstrate study significance. One research gap previously noted was the scarcity of studies that examine the impact of OST programming on standardized test performance. Chapter Two will delve more deeply into the associated research gaps.

Theoretical Framework

Cultural capital theory undergirds this study. Bourdieu and Passeron developed the cultural capital concept to analyze how culture and education are instrumental in social reproduction (Lamont & Lareau, 1988). They were driven to develop the theory because of the belief that economic status is not a sufficient explanation for educational attainment (Bourdieu & Passeron, 1979). The cultural capital definition is that the societal structure provides positive reinforcement to individuals that have greater cultural opportunity. Societal status maintains this structure (Bourdieu & Passeron, 1990). Family and community networks can build this cultural capital (Bourdieu & Passeron, 1990). The resources that are provided through the culture can include verbal facility, cultural awareness, educational credentials and other elements that are associated with cultural opportunity (Swartz, 1997). Bourdieu's theory maintains that cultural habits and

temperaments are resources that are profit generating (Lareau & Weiniger, 2003). Similar to economic resources, cultural capital can be monopolized by individuals and groups and are generationally transmitted (Lareau & Weiniger, 2003).

The cultural capital concept has been applied to serve as the theoretical basis for multiple areas. There are broad societal impacts such as political attitudes, marital selection, and the societal stratification system (Lamont & Lareau, 1988). The literature also notes educational areas such as the reproduction of educational inequality and the influence of family background on school experience and educational attainment (Lamont & Lareau, 1988). Bourdieu's cultural capital framework can be characterized as "an informal academic standard, a class attribute, a basis for social selection, and a resource for power as an indicator/basis of class position" (Lamont & Lareau, p. 156)

Educational achievement is the cultural capital conception that most directly applies to this analysis. Swartz (1997) posits that Bourdieu directly links school success to cultural capital from the family network rather than talent and achievement. Swartz (1997) further notes that Bourdieu's cultural capital theory states that children from lower socioeconomic groups are at a disadvantage because of the lack of cultural opportunity. In essence, education serves as an institutionalized form of cultural capital that is directly linked to social inequality (Bourdieu & Passeron, 1990). Lamont and Lareau (1988) note that the cultural capital argument is that the "schools are not socially neutral institutions but reflect the experiences of the dominant class… working class and lower class students must acquire the knowledge and skills to negotiate their educational experience after they enter school." (Lamont & Lareau, 1988, p. 155). The essence of cultural capital as it relates to education is that it legitimizes inequality because home and school impacts

are ignored. Differences in educational achievement are attributed to aptitude and effort rather than any school or home impacts (Bourdieu & Passerson, 1979). Not accounting for the cultural capital that home and school transmit legitimizes inequality by ignoring research that shows that middle-class parents talk more to their children as infants and toddlers, which translates into larger vocabularies, and, subsequently, higher educational achievement (Hart & Risley, 1999, Lareau, 2003). As noted, verbal facility is a cultural capital resource.

In addition to the cultural opportunities, there is the knowledge that parents have of the positive educational experiences their children should have (Bordieu & Passeron, 1990; St. John, Hu, Simmons, Carter & Weber, 2004). Knowledge is associated with wealth in the sense that parents with more economic capital have greater opportunities to provide their children with experiences that build cultural capital (LaCombe, 2007). Parents from lower economic groups have fewer opportunities to experience different environments, which limit the opportunity for cultural capital (LaCombe, 2007).

The external environment is one cultural capital component. The habitus concept is also part of the cultural capital theory (Bourdieu & Passeron, 1990). The habitus conception posits that individuals in a society have a subjective outlook on how they operate in the external field or environment. This subjective outlook is based on the feedback from the external environment (Bourdieu & Passeron, 1990). The internalized perceptions impact expectations and choices individuals make in their future (Bourdieu & Passeron, 1990). Unequal social structures from the external field influence the skills and outlook of individuals (Scott & Marshall, 2007). The cultural capital a person has is the

result of the degree of symmetry or conflict between the environment and the habitus (Scott & Marshall, 2007).

The congruence between the external field and habitus is analogous to self-efficacy. Bandura (1994) defines self-efficacy as "beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives. Self-efficacy beliefs determine how people feel, think, motivate themselves and behave" (p.71). Self-efficacy has been linked to academic achievement (Caprara, Fida, Vecchione, Del Bove, Vecchio, Barbaranelli, & Bandura, 2008; Moller, Pohlmann, Koller, & Marsch, 2009). To specifically link this to cultural capital theory, Bourdieu and Passeron (1990) believe that family, community, and school experiences create a subjective perception, habitus, of an ability to succeed in these environments or fields.

This theory suggests that family, community, and school networks can build the cultural capital of an individual. Parents with cultural capital and resources create an environment that provides experiences to their children. Children develop subjective expectations on how they operate in this external environment based on the feedback they get from the external environment. These subjective expectations or habitus impact choices made and future achievements in their external environment. It can be inferred that a young person with high cultural capital will have greater opportunities to continue to develop cultural capital. This will positively impact self-efficacy and academic achievement. This analysis suggests that OST programs represent a way for black or African-American children of single parents to develop the cultural capital that will provide the resources to increase academic achievement.

Conceptual Framework

This study examines whether participation in OST programs will have a positive impact on standardized test scores. The conceptual framework operationalizes the theoretical framework. The framework suggests that OST participation creates an external field or environment for the students to develop a more positive habitus and self-efficacy. The conceptual framework displayed in Figure 1 suggests that OST participation has three outcomes. These are academic performance, social skills, and self-efficacy. This analysis researches whether these outcomes lead to higher standardized test scores.

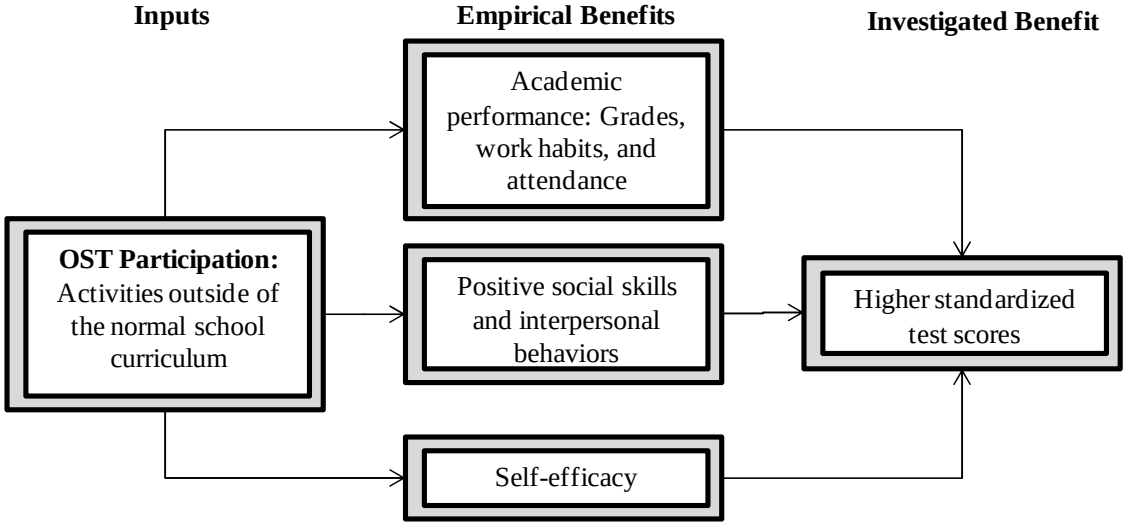

Figure 1. Conceptual framework linking OST participation with higher standardized test scores.

A 2007 Policy Studies Associates, Inc. study provides evidence that OST participation is associated with these outcomes (Reisner, Lowe Vandell, Pechman, Pierce, Brown & Bold, 2007). OST participants demonstrated improved conduct and work habits. Based on teacher reports, program participants performed better in multiple ways when compared to non-program participants, including work habits, persistence,

academics, social skills, and being less aggressive with their peers. Parent reports of youth relationships with adults were more positive for students in the OST programs when compared with students supervised at home. The disadvantages of student self-care after-school were consistent across age groups when compared with OST participants (Reisner et al., 2007). This national study of high quality programs with at-risk youth does, however, support the conceptual framework that OST participation increases academic performance, social skills and self-efficacy. The intent of this analysis is to test whether these outcomes would be associated with improved standardized test scores.

Delimitations

This study focuses on the extracurricular activity impact on SAT and ACT scores. The target population was delimited to black or African-American children of single parents. The sample characteristics further delimited the study to high achieving students in terms of GPA and standardized test scores. This is a secondary data analysis of program application data for a nationwide competitive scholarship program designed for minority students that are seeking college attendance funding. While the program is open to all minority students, students that select African-American on the program application are the only students included in this analysis. Students that indicate that they were raised by a single, never-married parent are the only students included in this analysis. The interest for this study is on extracurricular activity impact on standardized test scores for this select population.

Limitations

A global limitation was already noted. The sample has high achievement levels when compared national averages. Sample mean GPA scores are a full point higher than

black children national averages. Sample mean SAT scores are 84 points higher than black student national averages. This limits study findings to high achieving black or African American children from single parent families.

There are several other limitations that are important to consider. The limitations mainly relate to instrumentation. OST activity participation self-reporting is a limitation. The program application asks the students to list the specific activities they participated in and the number of hours spent on that activity for the traditional school year of September through June and the summer months of July through August. Applicants can enter information on activities for three school years and two summers prior to graduation. As the applicants enter specific hours, there is the likelihood that students may over or underestimate the actual time spent on OST activities.

The self-reporting of test scores on the program application is a limitation. Four scores are requested: 1) SAT Critical Reading, 2) SAT Mathematics, 3) SAT Writing, and 4) ACT Composite. Respondents may not remember or overestimate or underestimate their scores when providing the response. Respondents may also provide an approximation rather than actual scores and may make errors. There is evidence, however, on the validity of self-reported scores (Cole & Gonyea, 2010). The validity is supported through a rigorous correlation study that utilized 2007 Beginning College Survey of Student Engagement data and institution-reported scores. The study of 8565 students that completed the SAT and 16643 that completed the ACT identified high correlations between self-reported and actual scores. The correlation for self-reported ACT scores was .95 and .86 or more for each of the SAT section scores. Although there

is evidence that the validity of self-reported test-scores is high, these factors may impact analysis precision.

The self-reporting of race and ethnicity is a limitation. The program application asks students to select their primary race/ethnicity from the following categories: African American, American Indian/Alaska Native, Asian Pacific Islander American, and Hispanic American. Individuals that select African American are the target audience for this analysis. The limitation is that there is no verification for the primary ethnicity selections.

The analysis of the study sample characteristics revealed a limitation. The sample has a higher mean high school GPA and higher SAT mean scores than the overall black or African American population. The difference in GPA may be due to the communication of program eligibility requirements during the application period. Students are required to have a cumulative 3.3 on a 4.0 scale GPA by their graduation date. Students below this GPA level, according to program data, do apply for the program but the program documentation likely limits applications from students with lower GPAs lower than 3.3. The other areas noted are not program eligibility requirements. The sample and the overall population dichotomy limits the generalizability of the findings. The higher SAT scores when compared to the overall black or African American population is consistent, however, with research showing that scholarship applicants perform higher on standardized tests than non-applicants (Wolf, Gutmann, Eissa, Puma, & Silverberg, 2005). The higher GPA and SAT scores is why the sample focus is high achieving black or African American children of single parents.

High OST participation rates also represent a study limitation. The sample OST participation rate was much higher than national rates. The sample OST participation rate was 88.3%. The highest national black or African American children OST participation rate was 35% (U.S. Census Bureau, 2007). The sample high participation rates may be represent a specific population characteristic for high achieving black or African American children of single parents when compared to national population characteristics. If this high OST participation characteristic is common for high achieving black or African American children of single parents, it limits the value of any recommendations focused on increasing OST participation to impact standardized test scores.

An initial analysis intent was to review sample poverty status and national rates by race and by single parent status. AGI was the only sample income data available. No literature was identified that associated AGI levels with poverty status. AGI data is also not available by race. Specific AGI comparisons between the sample by race are not possible. This summarizes the limitations associated with this study.

Key Terms

There are several key terms that will facilitate understanding of this analysis. As a note, this analysis uses After-school Programs, Extracurricular Activities, and OST interchangeably. The similarity between all three terms is that they represent programs and activities that occur during non-school hours.

After-school Programs: Programs that begin when the regular school day ends that occur in a school or community organization (Concept to Classroom, n.d.).

Black or African-American: According to the United States Census Bureau (n.d.), this is a person having origins in any of the black racial groups of Africa.

Extracurricular Activities: Activities that are not part of the standard academic curriculum that are sponsored by and usually held at the school outside of the normal school day (U.S. Legal, n.d.). Activities provide students with opportunities to practice social skills and experiment with activities that may represent a career interest (U.S. Legal, n.d.).

Out-of-School Time (OST): Programs, activities, and opportunities that occur during non-school hours (NIOST, n.d.).

Race: The United States Census Bureau (n.d.) defines race as how an individual self-identifies the race or races with which they most closely identify. The definition further states that the race categories are socio-political constructs and are not scientific or anthropological in nature (United States Census Bureau, n.d.).

SAT: Scholastic Aptitude Test. According to the College Board, the SAT is an indicator of how a student will perform in college (College Board, n.d.). It is a reliable and valid scale for measuring student college readiness (College Board, n.d.).

Standardized Test: An examination that is administered and scored with a predetermined and standard manner (Popham, 1999). Standardized aptitude tests such as the SAT and ACT are designed to predict how well high school students will perform in college (Popham, 1999).

Summary

Chapter One outlined the problem investigated in this study, which is to identify the impact OST participation has on the standardized test scores of high achieving black

or African-American children from single-parent families. The chapter presented evidence on why this is a significant study topic, why the focus population is important, and the characteristics of the focus population. Approximately 43% of black or African-American children scholarship program applicants are being raised in single-parent families. There is also an achievement gap in standardized test results between black and white children. Although their utility is sometimes questioned, there is evidence that standardized tests in conjunction with high school grades are a valid predictor of college success. This validity is coupled with estimates that standardized tests are required by approximately 70% of four-year IHEs. These factors support the significance of the study.

The literature review, Chapter Two, discusses the prevalence of black or African-American children living in single-parent families and the characteristics of single-parent families. It also discusses extracurricular activity participation levels. This information establishes the target population's importance. A discussion of extracurricular program status provides an overview of how opportunities are generated for students. An examination of standardized test relevance establishes its importance as the outcome variable. A discussion of the standardized test achievement gap further demonstrates the importance of the focus on black or African-American children. The review closes with a review of the impact extracurricular programs have on standardized test scores.

Chapter Three outlines the study methodology for the three research questions. The first research question examines if there is a mean standardized test score difference for black or African-American children from single-parent families. The second research question examines the relationship between OST program and standardized test scores

overall and by gender. The third research question examines whether OST participation contributes to the prediction of standardized test scores for black or African-American children from single-parent families. The methodology is described more in depth in Chapter Three.

Chapter Four presents the study results by research question. A mean difference in standardized test scores, research question one, was identified between students that do and do not participate in OST programs. Research question two investigated the OST participation and standardized test score relationship and identified a positive, moderate relationship. The contribution OST participation makes to standardized test scores was defined with a simple linear regression by gender in research question two and a multiple regression analysis by gender for research question. Chapter Five discusses the importance of the results and closes by relating the OST participation findings to the theoretical framework first introduced in Chapter One.

Chapter Two

The study focus is black or African-American children of single parents and how participation in OST activities impact standardized test scores. The literature review establishes study relevance through five areas: 1) Prevalence and Characteristics of Black Children from Single-parent Families, 2) School Extracurricular Activity Status, 3) Standardized Test Relevance, 4) Standardized Test Achievement Gaps, and 5) OST Program Impacts. The review is designed to first establish that focusing on the target population is relevant. Second, the review establishes the status of school district extracurricular activities from a participation and support level. Third, the review discusses why standardized tests are important. Fourth, the review discusses the achievement gap in standardized testing to demonstrate why a focus on black or African-American children is important. Fifth, the analysis reviews evidence on the impact of extracurricular activities on standardized test results. The literature review closes with a summary of the research gap to which this study will respond.

Multiple keyword groupings facilitated the literature review. The OST program and their impacts group keywords were: afterschool programs, after school programs, before school, budgets, benefits, evaluation, evaluation studies, expenditures, experimental design, extracurricular programs, extracurricular activities, foundations, funding, government, grants, out-of-school time programs, non-experimental design, non-profits, OST programs, participation rates, program evaluation, quasi-experimental design, reliability, school districts, and validity. The Standardized testing group keywords were: ACT, achievement gap, contribution, equivalence, GPA, PSAT, prediction, predictors, race, reliability, statistics, SAT, standardized tests, test scores, validity. The

Family type group keywords were: African American, Asian, black, demographics, ethnicity, family type, Hispanic, Latino, never married parents, population, prevalence, race, single parents, US, United States, white.

Six primary search engines were utilized. These were Academic Search Complete, ERIC, ProQuest, Google, Google Scholar, and WorldCat. Searches were limited to post-2002 publications. Current research findings were better ensured by the date limitation. Black or African-American of single parents characteristics are discussed first. Study relevance is established through the prevalence and characteristics of this focus population.

Prevalence of Black or African-American Children of Single Parents

Descriptive statistics on the prevalence of black or African-American children of single parents establishes that the focus population is appropriate. The U.S Census Bureau Current Population Survey, 2008 Annual Social and Economic Supplement identifies the percentage of children from one-parent or no-parent families. A child in a no-parent family lives with a grandparent, other relative, or non-relative (U.S. Census Bureau, 2009). The most recent data available indicates that 30.1% of families are in the one-parent or no-parent categories (U.S. Census Bureau, 2009).

Additional data sources define the extent to which underrepresented children live in single-parent families. The Annie E. Casey Foundation publishes a Kids Count Data Book on an annual basis. This publication presents a variety of statistics on key indicators, including the focus of this analysis which is the percent of children in single-parent families nationally and by race. The data sources used to derive the statistics are the Population Reference Bureau, U.S. Census Bureau, Census 2000 Supplementary

Survey, 2001 Supplementary Survey, and the 2003 through 2008 U. S. Census American Community Surveys (ACS). The 2010 Kids Count Data Book (The Annie E. Casey Foundation, 2011) noted that 34% of children in the U.S. and Puerto Rico are being raised in single-parent families. Approximately 66% of black children and 24% of white children are being raised in single-parent families. Table 1 presents the statistics from the 2006-2011 Kids Count Data Books on the percentage of children from single-parent families in race/ethnicity categories noted.

Table 1

Percentage of Black or African-American children and Non-Hispanic white children being raised in single-parent families by race and ethnicity

	National	Non-Hispanic White	Black/African-American
2010 Percentages	34%	24%	66%
2009 Percentages	34%	24%	67%
2008 Percentages	32%	23%	65%
2007 Percentages	32%	23%	65%
2006 Percentages	32%	23%	65%
2005 Percentages	32%	23%	65%
2004 Percentages	31%	23%	64%

Table 1 displays that little change was identified over the seven-year period in the percentage of children by raised in single-parent families nationally, for non-Hispanic white children, and black or African-American children.

The Annie E. Casey Foundation (2009) stated that the census figures consistently undercount the population in low-income urban communities and states these figures may be low. To support this statement, the foundation noted that a U.S. Census Bureau

analysis concluded that the 2000 census undercounted minorities and young children (Annie E. Casey Foundation, 2009).

The U.S. Census Bureau American FactFinder Internet site enables users to view ACS results. The raw data available on the site enables the derivation of the percentages of children that live in single-parent families by family type. The raw data analysis from the ACS estimates that approximately 63% of black children live in single-parent families (U.S. Census Bureau, 2008a). This is 2% less than the figures cited by the Annie E. Casey Foundation's data book. Of the 10.8 million black children, 6.0 million (55.8%) are in female householder, no husband present, family households and .8 million (7.0 %) are male householder, no wife present, family households (U.S. Census Bureau, 2008a).

Results from the U.S Census Bureau Current Population Survey, 2008 Annual Social and Economic Supplement identified the percentage of children living in one-parent or no-parent families. The no-parent family category includes grandparents only, other relatives only, nonrelatives only, and other arrangement. The U.S. Census Bureau summary enabled the derivation of the percentages of children in one-parent or no- parent families and shows that 62.5% of black children live in one-parent (54.4%) or no- parent (8.1%) families (U.S. Census Bureau, 2009). For white children, 22.2% live in one-parent (19.6%) or no-parent (2.6%) families (U.S. Census Bureau, 2009).

Summary. Approximately 62.5% to 66% of black or African-American children in the U. S. live in single-parent families. The specific reasons for the discrepancies cannot be identified. A potential discrepancies reason is that The Annie E. Casey Foundation statistics were derived from multiple data sources while the U.S. Census Bureau utilizes its own sources. Despite the inconsistencies between data sources, the

descriptive statistics provide evidence that the percentage of children being raised in single-parent families is high. The percentage of black or African-American children being raised in single-parent families is between 40.3% to 42% higher than white children. Prevalence of black or African American children in single parent families is established. Presenting characteristics of these families deepens the understanding of the focus population.

Characteristics of Single-parent Families

A variety of areas provide a more in-depth understanding of underrepresented children in single-parent families. The most detailed statistics are from the 2006 Current Population Survey (CPS) (U.S. Census Bureau, 2007). These areas, presented here, include living arrangements, and family size.

Living Arrangements. Aud, Fox, and KewalRamani (2010) summarized 2006 CPS descriptive statistics. Their examination identified the percentage of children by race/ethnicity and living arrangements. The percentage of black or African-American children being raised in female parent, no spouse households is 56% while the percentage being raised in male parent, no spouse present households is 7.6%. Combining these categories indicates that 63.6% of black or African-American children are being raised in single parent households. This is 31.4% higher than national rates and 40.7% higher than rates for white children. Table 2 presents this information nationally and for white and black or African-American children.

Table 2

Percentage of children being raised in single-parent families by parent-type

	National	White	Black/African American
Female parent, no spouse present	25.2%	16.8%	56.0%
Male parent, no spouse present	7.0%	6.1%	7.6%
Combined	32.2%	22.9%	63.6%

Family Size. The 2006 CPS results detailed the family size of one-parent families. The sizes included the parent. Overall, 44.9% of children from one-parent families lived only with the parent. The remaining 55.1% had two or more children in the household. Results noted that 41.6% of black children from one-parent families lived only with the parent. The remaining 58.4% lived with a single-parent with two or more children. For white children from one-parent families, 46.4% of children lived with only one parent. The remaining 53.6% lived with a single parent with two or more children (U.S. Census Bureau, 2007). This information gives evidence that black or African-American children from single-parent families are slightly more likely to have more than one child in the household with the single parent. This may contribute to the higher percentages of black or African-American children that are being raised by a single parent.

Summary. Nearly two-thirds of black or African-American children are being raised in single-parent families. Over half are being raised in a female only, one-spouse household (56%). These characteristics support the study focus on black or African-American children of single-parents. A higher percentage live in single-parent families and live in homes with more than one child of the single parent when compared to the

overall population and white families. Family characteristics are one important area. OST participation is the next important characteristic that establishes that black or African American children are an important focus population.

OST Participation

OST participation trends further establish the analysis context. This information is first presented by the race categories. This is followed by participation trends by marital status, parental educational attainment, and parental income status. This information displays national trends. Chapter one noted that sample OST participation rates are higher than national rates. This information presented here enables an understanding of how the sample differs from national trends.

Participation by Race. The most detailed OST participation statistics are available in the U.S. Census Bureau Survey of Income and Program Participation, 2001 Panel, Wave 7 (U.S. Census Bureau, 2007). This survey requested information on children participating in sports, clubs and lessons for the age range of 12 to 17. Sports participation included school sponsored or other organized league athletic activities sponsored by schools or by organized leagues (U.S. Census Bureau, 2007). Club participation included Boy Scouts and Girl Scouts, religious groups, Girls and Boys Clubs, or 4-H activities (U.S. Census Bureau, 2007). Lessons included after-school or weekend work on subjects such as music, dance, language, computers, or religion (U.S. Census Bureau, 2007).

Table 3

Percentage of children aged 12 to 17 participating in extracurricular activities by race

	National	White	Black/African American
Sports	41.8%	43.5%	35.0%
Clubs	33.7%	35.2%	29.5%
Lessons	28.6%	29.4%	25.0%
All Three Activities	9.7%	10.6%	6.5%

Table 3 lists that black or African-American children participated less in all extracurricular activity types when compared to the national participation rates (U.S. Census Bureau, 2007). Black children also participated less in each extracurricular activity type than white children (U.S. Census Bureau, 2007). Finally, Table 3 shows that black children participated less in all three types of activities combined when compared to the national participation rates and the rates for white children (U.S. Census Bureau, 2007).

Duffett and Johnson (2004) conducted two national random sample surveys with 609 middle and high school children and 1,003 parents of school-age children. Nine focus groups were conducted to support questionnaire design. After questionnaire development, data were collected through telephone interviews and respondents were identified through a random digit-dialing technology. The authors state that every household in the 48 contiguous states had an equal opportunity for being contacted. Their results are not reported by race category, but state that minority parents find it more difficult to locate quality, affordable activities for their children. The study reported that 71% of minority parents find it difficult to identify conveniently located out of school activities as opposed to 44% of the white parents. Similarly, 73% of minority parents

report that it is difficult to identify programs conducted by trustworthy adults as opposed to 45% of the white parents. Two issues should be considered with these results related to the sampling procedure. The first is that the random digit-dialing technology may not incorporate families that only have cell phones and does not incorporate families that do not have any phones. This contradicts the authors' claim that every household had an equal opportunity to be contacted. The second issue is that the sample may over or under represent the population by race. The large sample, however, may minimize any sampling bias, suggesting that the study provides a good descriptive picture of access to OST activities.

A HFRP (Wimer, Bouffard, Caronongan, Dearing, Simpkins, Little, & Weiss, 2006) study provides more depth associated with this area. This study accessed two nationally representative data sets on OST participation. The first data set was the Panel Study of Income Dynamics (PSID), which is a longitudinal study that began in 1968 with 7,000 families and began including a Child Development Supplement in 1997. The report cited references data collected in 2002 from 3,000 children aged 5-19. The second data set was the National Survey of American Families (NSAF) which collects data on the well-being of families using a nationally representative sample. This study collected data from between 30,000 to 40,000 families in 1997, 1999, and 2002. The HFRP analysis confirmed the U.S. Census Bureau (2007) and the Duffett and Johnson (2004) results in finding that black youth (58%) participate less in OST activities when compared to white children (65%). The study also looked specifically at before and after-school programs and school extracurricular activities. The PSID found that for all school extracurricular activities, 49% of white children participate and 42% of black children participate

(Wimer et al., 2006). There was one exception to these statistics as the NSAF survey found that 26% of black youth were more likely to participate in after-school tutoring programs when compared to white children (13%) (Wimer et al., 2006).

There is a general consistency when participation in OST lessons by race was considered. The U.S. Census stated that 25% of black youth participate in lessons as an extracurricular activity compared to 29.4% of white children. The HFRP study did not identify a difference and found that 34% of black and white youths participated OST lessons (Wimer et al., 2006). The variation in results cannot be specifically identified but may be due to the reporting ages. The U. S. Census Bureau figures refer to children aged 12-17. The HFRP study cites the NSAF data that has age groupings of 6-11 and 12-17. An interesting difference was identified in the HFRP study, however, when tutoring programs were considered. Thirty-three percent of black youths compared to 13% of white youths participate in any before or after school OST programs (Wimer et al., 2006). This is the only area identified where black children participate at a higher percentage than white children. Black youth academic deficits, it is speculated, may limit their ability to participate in other types of activities and programs (Wimer et al., 2006).

Participation variation in sports is also noted. The U.S. Census Bureau (2007) states that 43.8% of white children and 35% of black children participate in sports. The NSAF data reports that 58% of white children and 43% of black children participate in sports (Wimer et al., 2006). While the raw percentages are different, both studies consistently note that white children participate more in sports than black children.

The NSAF study collected data in 1997, 1999, and 2002. When examining trends in OST club participation for 6-11 year olds, the data showed that participation for white

children dropped from 58% in 1997 to 56% in 2002. For black children, participation dropped from 51% in 1997 to 41% in 2002 (Wimer et al., 2006).

The Afterschool Alliance (2009) found results inconsistent with the cited studies. In 2009, the organization conducted a national household survey of 30,000 families. Data were collected via U.S. mail, and the study states that the random sample included parents with school-age children from all 50 U.S. states. Additional telephone screening was completed in states with low mail survey completion rates. The margin of error for the results is +/-.56%. Findings demonstrate that, overall, 15% of children participate in afterschool programs. When race is considered, 24% of African-American and 21% of Hispanic children participate in afterschool programs. The participation difference compared to other studies appears to be based on the definition of afterschool activities: a program that children regularly attend, that provides supervised activities after the school day ends, and that is usually offered in schools or centers (Afterschool Alliance, 2009). The survey definition excludes individual activities including sports, special lessons or hobby clubs (Afterschool Alliance, 2009).

A study strength was the random sampling procedure which appears to give an equal opportunity for all parents of school-age children to participate. A first weakness of the study relates to the limited definition of afterschool activities. The definition provided on the survey excludes activities that may occur in a supervised environment which would meet the definition of an afterschool program. A second weakness is that the definition may not be interpreted the same by all survey respondents at varying educational levels, which raises concerns on the validity of the study. The study would be strengthened by a less ambiguous definition. Because of these weaknesses, the

participation statistics are questionable. Although it is not a focus of this analysis, the study strength relates more to its attitudinal findings because of its well-documented sampling procedure.

Participation by Marital Status. The U.S. Census Bureau Survey of Income and Program Participation, 2001 Panel, Wave 7 also details the participation in OST activities by the parental marital status (U.S. Census Bureau, 2007). Table 4 presents the participation rates in sports, clubs and lessons for children aged 12 to 17 by marital status type.

Table 4

Percentage of children aged 12 to 17 participating in extracurricular activities by parental marital status

	Married	Separated, Divorced, Widowed	Never Married
Sports	45.4%	34.5%	30.6%
Clubs	36.8%	26.7%	26.0%
Lessons	31.4%	23.6%	17.8%
All Three Activities	11.4%	6.2%	4.7%

Table 4 shows that children in separated, divorced, or widowed families participate less in all extracurricular activity types than children that live in married families (U.S. Census Bureau, 2007). This is also true for children that live in families with a parent that has never married (U.S. Census Bureau, 2007).

Participation by Educational Attainment. The U.S. Census Bureau Survey of Income and Program Participation, 2001 Panel, Wave 7 also details the participation in extracurricular activities by parental educational attainment (U.S. Census Bureau, 2007). Figure 2 presents the participation rates in sports, clubs and lessons for children aged 12

to 17 by parental educational attainment. The figure was derived by the researcher utilizing the data from the survey results.

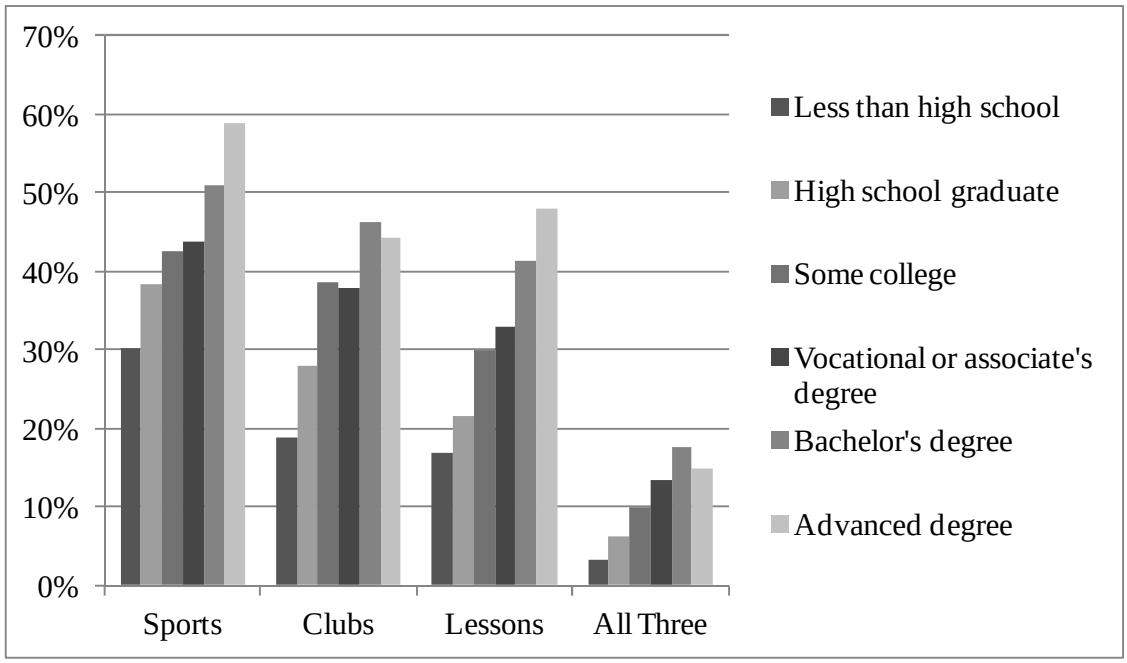

Figure 2. Comparison of participation in extracurricular activities for children age 12-17 by parental educational attainment.

Figure 2 displays that children with parents that have less than a high school degree and children with parents that are high school graduates participate less in extracurricular activities when compared to all other levels of parental educational attainment (U.S. Census Bureau, 2007). For sports and lessons, participation in extracurricular activities increases sequentially by parental educational attainment level (U.S. Census Bureau, 2007).

Participation by Parental Income Status. There is descriptive evidence that children from low income families participate less in extracurricular activities than children from other income levels. Theokas and Block (2006) utilized data from the National Survey on Children's Health, 2003 and noted that one-third of children in low

income families do not participate in organized activities outside of school. Ten percent of children from middle class or above families do not participate in activities outside of school (Theokas & Block, 2006). The authors did not detail, however, how their results were derived other than stating the data source. The NSAF survey collected data on participation in before and after-school programs by family income. The five income categories were high income, moderate/high income, moderate income, low/moderate income, and low income. The three data collection periods were 1997, 1999, and 2002. Participation rate increases of approximately 5% were observed for children from low income and moderate income families with the remaining income categories observing slight increases (Wimer et al., 2006). For the 2002 NSAF data collection, the participation rates by income category are as follows: high income, 21%; moderate/high income, 16%; moderate income, 14%; low/moderate income, 11%; low income, 13% (Wimer et al., 2006).

Inferential statistical evidence that income is associated with participation in extracurricular activities is available. The PSID, Child Development Supplement data was utilized to examine the relationship between neighborhood, home contexts and participation in OST activities. Dearing, Wimer, Simpkins, Lund, Bouffard, Caronongan, Kreider, and Weiss (2009) provide an in-depth explanation of their procedures, including imputation methods for missing data. The seven activities considered were after-school, athletics, community center, community program, lessons, church activities, summer camp, and activities outside of church. The authors calculated odds ratios with their associated 95% confidence intervals and concluded that children from low-income families are unlikely to participate in activities outside of school. Income was noted as

being strongly related to OST participation rates for low income children but was more weakly associated with participation rates of more wealthy children. The nonlinear relationship implies, according to the authors, that very poor children are most in need of interventions to increase their participation in OST activities (Dearing et al., 2009). This study further identified that children in less affluent neighborhoods were more likely to participate in church activities (Dearing et al., 2009). The authors cited three study limitations with the first being that neighborhood affluence may be a weak indicator of community context. The second limitation was potential variable bias and the third limitation was the inability to examine participation frequency and duration. While the limitations are important to consider, this is a well-designed study that found an association between low income levels and participation in OST activities.

Summary. Black children participate at lower rates than white children in all extracurricular activities (U. S. Census Bureau, 2007, Wimer et al., 2006). The only exception was tutoring programs with black children participating at higher rates than white children (Wimer et al., 2006). This was identified in census results. In a study of OST experiences by Duffett and Johnson (2004), parents of minority children state it is more difficult to identify extracurricular activities that are high quality or affordable. Children from families with married parents participate more in extracurricular activities than children from other family types. Children from families with parents that have attended some college or higher levels of educational attainment participate more in extracurricular activities than children whose parents are high school graduates or drop-outs. This leads the discussion to school district OST status. School districts are an

important OST activity provider. OST status is the second area that establishes study relevance.

School District OST Status

To investigate the status of OST programs, the school district budgets in the twenty largest school districts in the United States were examined by the researcher. The school districts were identified using the Digest of Education Statistics 2008 (Snyder, Dillow, & Hoffman, 2009). Focusing on the 20 largest school districts was an analytical decision to represent investment trends in extracurricular activities. The 20 school districts are located in 12 different U. S. states, including Florida (five school districts), California (two), Maryland (two), North Carolina (two), Texas (two), Georgia (one), Hawaii (one), Illinois (one), Nevada (one), New York (one), Pennsylvania (one), and Virginia (one) (Snyder, Dillow, & Hoffman, 2009). When rank order is considered, the largest school district is the New York City Public Schools and the smallest is the Wake County Public School System in North Carolina (Snyder et al., 2009).

Black or African-American children of single parents are the study focus population. While the percentage from single parent families in these school districts is not possible to identify the overall population figures are available. For the 20 school districts, the mean black or African-American student percentage is 30.5% with a median of 28.4%. The School District of Philadelphia has the largest black student population with 65.2% (Snyder et al., 2009). The Hawaii Department of Education has the smallest black student population with 2.3% (Snyder et al., 2009). For the U. S., the mean percent of black children is 24.1% in school districts with more than 15,000 students (Snyder et al., 2009). Of the 20 largest school districts, 13 (65%) have more than 24.1% of black or

African-American children. The prevalence of black children in these 20 school districts supports an examination of their budgets. The OST budget cuts in these school districts are an indicator of the impact OST budget cuts have on black or African American children.

OST Budgets. The researcher summarized the 2010 and 2009 budget appropriations for the top 20 U.S. school districts in terms of student population to determine if there is a trend in school district investment in extracurricular activities. Table 6 displays the 2009-2010 extracurricular activity appropriations change. It is important to note that this analysis is a snapshot of extracurricular activity appropriations. The definitions vary across school districts. The percentage difference listed may not represent the full investment in extracurricular activities as some school districts give the individual schools the responsibility to allocate their budgets to their needs.

Table 5

Investment in OST for the 20 Largest U.S. School Districts

School District	2009/2010 Change
New York City Public Schools (Raab, 2009)	-33.2%
Los Angeles Unified School District (2009)	-8.9%
Chicago Public Schools (2009)	-11.8%
Miami Dade County Public Schools (2009; 2008)	0.0%
Clark County School District (Simpson & Franklin, 2009)	-23.0%
Broward County Public Schools (2009)	-12.2%
Houston Independent School District (2009)	-10.5%
Hillsborough County Public Schools	N/A
Hawaii Department of Education (2009)	-55.6%
School District of Philadelphia (2008)	-32.4%
Orange County Public Schools (Collins & Kelly, 2009)	-1.3%

School District	2009/2010 Change
School District of Palm Beach County (Knox, 2009)	-5.1%
Fairfax County Public Schools (2009)	-1.1%
Dallas Independent School District (2009; 2008)	39.8%
Gwinnett County Public Schools (2009)	-1.4%
Montgomery County Schools (2008)	-2.8%
Prince George's County Public Schools (2009)	-46.5%
San Diego City Schools (Kowba Leighton, Rayburn, & Kroemer, 2008)	8.4%
Charlotte-Mecklenburg Schools (2009)	2.0%
Total	-9.4%

Nineteen of the twenty school districts had budgets itemized to identify the investment in OST activities. Hillsborough County Public Schools has an executive summary budget available on its Internet site but did not respond to requests for an itemized budget. Their information, therefore, is not included in the budget analysis. Table 6 displays that 14 school districts (77.8%) are reducing their investments, 4 (21.1%) are increasing their investments, and 1 (5.3%) is not changing its investment. One school district that has a planned increase may have a decrease when the final 2010 budget is passed; this relates to the investment in interscholastic athletics for San Diego City Schools. They have an 8.4% appropriation increase planned but the district states that the elimination of interscholastic athletics is under consideration because of the California budget crisis (Kowba et al., 2008).

The Hawaii Department of Education (2009) has the largest planned decrease in their investment in Other Instructional Services with a decrease of 55.6%. The Dallas Independent School District has the largest planned increase in Co-curricular/

Extracurricular activities of 39.8% (Dallas Independent School District, 2009; Dallas Independent School District, 2008). When all school districts are combined, the investment in extracurricular activities from 2009 to 2010 is decreasing 9.4%.

Federal Support Method. The 21st Century Community Learning Centers is a U.S. Department of Education Office of Elementary and Secondary Education program for State Education Agencies (SEAs). The purpose of the program is to provide funding to states to manage competitions to award grants for the creation of centers that provide academic enrichment opportunities during non-school hours for children who attend high-poverty and low-performing schools (U.S. Department of Education [ED], n.d.). Its intent is to help students meet state and local student standards in core academic subjects and to provide enrichment activities to complement academic programs (ED, n.d.). As a federal program, funding is based on appropriations. The funding level in FY10 was $1.166 billion, enabling states to serve 1,166,66 million children (Afterschool Alliance, 2011).

In a policy paper, the Afterschool Alliance warns that proposed FY11 cuts of $85 million would result in 85,000 fewer children receiving after-school services (Afterschool Alliance, 2011). FY12 cuts of $185 million would result in an additional 185,000 children losing after-school services (Afterschool Alliance, 2011). To derive these figures, the Afterschool Alliance assumes a cost of $1,000 per child. Although the dollar amounts are accurate, the accuracy of the number of children served cannot be verified. The reduction in the number of children served by the community learning centers is, therefore, speculative. It is necessary to point out that the article is from an advocacy

group which may have influenced the presentation of the data and the derivation of the statistics.

Alternative Methods to Support OST Activities. There is evidence of school districts using alternative methods to fund OST activities. Foundation grants are a primary alternative method. A sample of a grant is a $225,000 grant by the New York Life Foundation in 2006. The purpose of the grant was to fund the expansion of the Middle Ground after-school program starting with one New York City Public School and 40 children in the first year of the grant and expanding to 120 children in three schools the last year of the grant (New York Life Foundation, n.d.).

The Wallace Foundation funds programs nationwide and expected to provide approximately $82 million in grants across the U.S. by the end of 2010 (The Wallace Foundation, n.d.). The Chicago Out-Of-School Time Project, for example, was developed from Wallace Foundation Funding. Including the Chicago Public Schools, the partners in this initiative are The Department of Family and Support Services Office of Children and Youth Services, After-school Matters, The Chicago Park District, and the Chicago Public Library (The Chicago Out-of-School Time Project, n.d.). Similar initiatives were funded by the foundation in Providence, RI, New York, NY, Boston, MA, and Washington, DC. In Minnesota, the McKnight Foundation provides funding to support programming for school-age children and youth with a focus on children with limited access to enrichment activities (McKnight Foundation, 2011). The foundation intends to develop a new nonprofit to support OST programs in the Twin City area of Minnesota (McKnight Foundation, 2011).

There are other resources available for organizations to identify OST funding. The Afterschool Alliance hosts a searchable database that allows for the identification of funding sources by agency and the level of difficulty on gaining funding. In addition, this organization has an online funding forum where individuals can submit questions to funding experts (Afterschool Alliance, n.d.). The U.S. Department of Health and Human Services (n.d.) Administration for Children and Families hosts afterschool.gov which provides a searchable database for organizations to identify funding for afterschool programming. The Finance Project (n.d.) also hosts an information resource center to identify OST funding. Rather than a searchable database, The Finance Project provides guides to gain funding.

These are examples of alternative funding or methods to identify funding for after-school programs. They are not meant to be inclusive of all efforts occurring outside of operational school district budgets or federal funding; rather, it is included to infer that there may be a void in developing and funding after-school programming for students that other entities are attempting to fulfill.

Summary. A review of the 20 largest U.S. school districts reveals that budget cuts are occurring for extracurricular programming. The average reduction in appropriations was 9.4%. The federal government created the 21st Century Community Learning Centers so that school districts and other entities can compete for funding for OST programming. Other foundations such as The Wallace Foundation are also dedicating funding for the development of OST programming. A potential problem with funding OST efforts outside the core operational school district budgets is that programs are dependent on time-limited funding and have difficulty in finding sustainability

funding when grants expire (Wright & Deich, 2002). Expiring programs or programs that consistently have to adjust to the funder programming requirements may potentially limit the impact OST programming can have.

Black or African American children of single parents are the focus population. The literature review established the prevalence of this population and their participation rates. OST status was reviewed by examining school district budgets and other funding sources. Standardized test relevance is the next discussion focus area. This is the third area that supports study relevance.

Standardized Test Relevance

The objective of this study is to determine if extracurricular activity participation is associated with an increase in standardized test scores for black or African-American children from single-parent families. It is, therefore, important to establish standardized test relevance. The literature suggests relevance in two ways. The first is that standardized test scores when combined with high school GPA are a college success predictor. The second is that standardized test scores are a gateway to college admittance.

College Success Predictor. High school GPA is noted as the best predictor of college success with standardized tests serving as a supplement to high school performance (Atkinson & Geiser, 2009, Korbin & Milewski, 2002). The purpose of these standardized tests is to measure a student's potential college academic success (Korbin et al., 2008). This section will discuss evidence related to standardized test validity. The preponderance of the evidence supports the use of standardized testing as a college success predictor. This supports the study purpose.

Standardized Test Validity Support. The College Board, which administers the SAT, conducted a validity study to determine the effectiveness of predicting first-year college grade point average. This was done as the SAT was revised in 2005 to better align the test content with high school curricula and the skills required for college success (Korbin et al., 2008). The sample for this study included 110 institutions and 151,316 students across the United States. The sample was representative of the overall population in terms of institution size. Institutions in the South were underrepresented by 14%. Private institutions were overrepresented by 14%. Regarding selectivity, institutions that admit 50% to 75% of the applicants were overrepresented by 10% while institutions that admit over 75% of the applicants were underrepresented by 13%. A criticism of the institution sample examination is that the authors failed to address minority-serving institutions. Regarding the students, white students were overrepresented by 13%. Students that noted that English was their best language were overrepresented by 10%. The 2006 College-Bound Senior Cohort was the database utilized in the analysis. This database is composed of students that participated in the SAT program and reported plans to graduate from high school in 2006. The independent variables were the three sections of the SAT including Critical Reading (SAT-CR), Mathematics (SAT-M), and Writing (SAT-W) and the student High School GPA (HSGPA) found in SAT Questionnaire response provided during test registration. The dependent variable was first-year college GPA (FYGPA). Correlation between the independent variables and the FYGPA was the primary analytic method. When the SAT tests are considered, the correlations between the tests and FYGPA are as follows: SAT-CR (r=.48), SAT-M (r=.47), and SAT-W (r=.51). When all three tests are combined, the correlation with FYGPA is .53. When all

three SAT tests are combined with HSGPA, the correlation is .62. The authors conclude that these results are consistent with other studies, supporting the validity of the SAT as a predictor of FYGPA. Overall, this is a solid analysis that provides a comprehensive description of the sample and the statistical adjustments that were made to adjust for the range restrictions in the data.

Two longitudinal studies support the validity of standardized test scores as predictors of college success. Burton and Ramist (2001) completed a meta-analysis of studies that predict college success for students graduating between 1980 and the mid 1990s. This research study represents a follow-up of a study by Wilson (1983) that considered 12,000 students graduating from 40 institutions between 1930 and 1980. Burton and Ramist (2001) state that their review tended to confirm Wilson's study. Burton and Ramist's meta-analysis considered 14 studies published between 1985 and 1995. Burton and Ramist (2001) found a .42 correlation (.47 when combined with high school record) between SAT verbal and math scores and cumulative GPA. Wilson (1983) found a .36 correlation (.52 when combined with high school record). Burton and Ramist (2001) speculate that the differences may derive from the SAT-M scores. Wilson (1983) found a .3 correlation between SAT-M and cumulative GPA. The studies considered by Burton and Ramist (2001) found a .4correlation. This may be because of the increased mathematics preparation required by high school students to successfully complete college curricula (Burton & Ramist, 2001). Table 6 presents the average weighted correlations in the two studies. The correlations are weighted by the number of students in each study.

Table 6

Correlations between predictors and cumulative undergraduate GPA

	Burton & Ramist (2001)		Wilson (1983)	
Predictor	Weighted Average Correlations (Range)	Studies	Weighted Average Correlations (Range)	Studies
SAT-Verbal	.40 (.17-.50)	9	.43 (.18-.50)	8
SAT-Math	.41 (.28-.49)	9	.31 (.16-.46)	8
SAT Verbal/Math	.36 (.20-.56)	10	.42 (.22-.52)	5
HS Record	.42 (.30-.59)	12	.49 (.34-.57)	9
SAT Verbal/Math/ HS Record	.52 (.49-.62)	5	.47 (.41-.67)	3

Table 6 demonstrates that Burton and Ramist (2001) found the SAT and the High School Record to be most correlated with cumulative undergraduate GPA.

An additional method to investigate the validity of standardized testing is to consider students whose high school grades and test scores are discrepant. In a presentation to the American Educational Research Society, Mattern, Shaw, and Korbin (2010) presented findings on students with discrepant scores. This College Board study collected data on approximately 200,000 first-time, first-year students from 110 institutions for the 2006 academic year. The final sample of 150,377 students included those with SAT scores, self-reported high school GPA (HSGPA) and a valid first-year GPA. Student SAT scores and HSGPA were standardized. The HSGPA was subtracted from the standardized SAT score. Students with a difference score of -1.00 were categorized as higher HSGPA. Students with scores between -1.00 and 1.00 were

classified as non-discrepant. Students with a difference score of 1.00 were classified as higher SAT. Approximately 17.5% of the sample was in the high and low groups. The remaining 65% of the students were in the non-discrepant group. The study found that using only HSGPA for admission under-predicted college performance for students that performed higher on the SAT as compared to HSGPA. The study concludes that it is important to utilize standardized test scores and HSGPA for admission decisions. This was a conference presentation that did not have an in-depth methodology description. The information provided does support the credibility of the study as far as the inclusion rules for the sample and the standardization of the SAT and HSGPA. A potential criticism of the study would be the failure to employ a missing value replacement procedure for incomplete records rather than discarding them from the sample.

An earlier study on discrepant HSGPA and SAT scores was more definitive in its SAT validity conclusions. The study concluded that the SAT may be a more accurate predictor of FYGPA for students in the high HSGPA discrepant group, which is the group that has a standardized HSGPA one standard deviation higher than the standardized SAT score (Korbin & Milewski, 2002). The sample included 48,410 students that entered as college freshmen at 23 institutions. Approximately 16% of the students were in the HSGPA or SAT discrepant groups. The authors performed regression analyses of SAT and HSGPA on FYGPA individually and combined. When SAT was combined with HSGPA, the amount of variance accounted for increased as follows for the three study groups: Non-discrepant group: 1.9%, HS discrepant group: 1.5%, SAT discrepant group: 1%. The authors state that the R-square values are underestimated due to a restriction in range. A Pearson-Lawley procedure that would

correct for this could not be performed because of a failure to meet all assumptions required for the procedure. The study is credible in that the sample is fully described and the procedures are fully documented. For students in all groups, there is an observed increase in the variance accounted for when SAT is included with HSGPA. For the HSGPA discrepant group, the variance accounted by the SAT is 14.4%, by the HSGPA is 12.7%, and for the SAT and HSGPA combined is 15%. This is the basis for the authors' claim that the SAT may be a better predictor of FYGPA for students in the high school discrepant group. The critical finding, however, is that for all groups the FYGPA variance accounted for is highest when the SAT is combined with the HSGPA.

Standardized test validity questioned. Although there is evidence regarding SAT validity, there are critics. Atkinson and Geiser (2009) raise questions regarding the validity of standardized testing in predicting college success even when combined with high school GPA. In their critique, the authors state that the studies supporting standardized test validity utilize simple correlations between SAT scores and college grades. The correlation studies do not take into consideration other factors such as family income and parent education. Atkinson and Geiser (2009) support the use of curriculum-based achievement tests as more valid predictors of college readiness. The authors cite evidence to support their position, primarily a study by Rothstein (2004) that will be separately reviewed. Other studies are cited to support curriculum-based assessment tests which are compelling but are not a focus of this analysis.

Rothstein (2004) conducted a study on SAT validity and found that its predictive power derives from its correlation with high school demographic characteristics. The author claims that SAT validity studies do not typically include other predictive

variables. Instead, the studies select variables that correlate with demographic and socioeconomic characteristics, which, therefore, overstate SAT importance. This study considered the prediction of freshmen GPA at the University of California. The author completed an Ordinary Least Squares (OLS) regression with data on all 1,993 freshmen enrolled at the eight University of California campuses. This was a total of 22,526 students. Rothstein found that high school GPA and student background characteristics explain 45% of the variance of freshmen GPA. This is similar to the variance predicted by high school GPA and the SAT. The author demonstrates that other background characteristics, when combined with high school GPA, are effective predictors of freshmen GPA. The fact, however, that the background characteristics predict approximately at the same level as the SAT indicates that using the SAT may create a more parsimonious model and is, therefore, preferable to models that include the background characteristics. The author's findings contradict the claim that the predictive ability of the SAT is overstated by 150%.

In Crossing the Finish Line: Completing College at America's Public Universities, Bowen, Chingos and McPherson (2009), performed a secondary analysis on graduation for 150,000 students entering 21 public flagship universities in 1999. Part of the analysis focused on the predictive value of standardized tests and college graduation. As graduation is the goal of a college education, the authors note that test validity should be based on this criteria rather than FYGPA. While concluding that the standardized testing has limited impact on predicting college graduation, the authors point out that "neither the SAT nor the ACT was designed to predict graduation rates" (p. 113). The study did not reject the use of standardized testing. The authors, in fact, stated that

SAT/ACT scores may adjust for differences in high school quality as the regression coefficients are negative. The study questions more the importance placed on predicting FYGPA rather than focusing on the graduation rate outcome variable. An overall potential criticism of the study is that minority institutions are not well represented in the flagship institutions. The authors note the lack of Historically Black Colleges and Universities (HBCUs) in the study but do state that the overall study population is "similar in key characteristics to the rest of American higher education" (p. 14).

There are standardized test differential validity and differential prediction questions related to minority populations. Young (2004) noted that correlation between standardized test scores and FYGPA are lower for black and Hispanic students when compared to white students. In an analysis of eleven studies, Young (2004) identified that when SAT scores and HSGPA are combined, FYGPA is over predicted by .11 for African-American students (Young, 2004). Young's findings were first noted in an analysis of 49 published studies between 1994 and 1999 (Young, 2001). Sixteen of the studies addressed black students. Young did not report an examination of all of the studies included in the analysis. The criteria to select studies to be included were those that originated as journal articles, book chapters, conference papers, or research/technical reports. While the author appears to be relying on the editorial standards of the source documents, the organization of the analysis is clear.

Noble (2004) contradicted the over prediction phenomena identified by Young and other earlier studies for African-American students in a study using ACT results. The study included 94,786 enrolled students and 325,821 non-enrolled students at 71 institutions. The enrolled and non-enrolled students represent the applicant pool. Each

institution had a minimum of 40 enrolled white and 40 enrolled African-American students. The institutions were primarily from southern, south central, and Midwestern U.S. states. The author specifically states that the institution sample does not nationally represent postsecondary institutions. A logistic regression was performed, with success defined as having a GPA of 2.5 or higher. Noble (2004) found that ACT composite scores or HSGPA were more accurate predictors of the probability of obtaining a FYGPA of 2.5 or higher. The author explains the differences in these results by stating that previous studies (e.g. ACT, 1997) restricted the sample to enrolled students. While the regression statistics in Noble's study are based on enrolled students, the validity statistics consider the expected outcomes for students in the applicant pool. For the full applicant pool, probabilities of obtaining a GPA of 2.5 or higher were estimated by ethnic group and institution using three logistic regression models. The first considered the ACT composite as the only predictor, the second considered HSGPA as the only predictor, and the third used both variables. Expanding the sample to non-enrolled students rather than restricting it to enrolled students represents a method to include students that did not enroll due to non-academic factors and increases the credibility of Noble's analysis and may be explanatory when differential validity issues due to race are considered.

Gateway to College Admittance. There is evidence that standardized tests serve as a gateway to college admission in two ways. The first is that standardized tests are an admissions requirement. The second is that it is a factor in the level of institution into which a student is accepted.

Admission Factor. The Integrated Postsecondary Education Data System (IPEDS) was accessed by the researcher to determine the number and percentage of

institutions that require a standardized test score for admission consideration. IPEDS is offered by the U.S. Department of Education's Institute of Education Sciences (IES). According to the IES Internet site, IPEDS presents data from every institution that participates in federal student aid programs. Every institution that participates in federal student aid is required to submit data to the system (Institute for Education Statistics, n.d.). IPEDS enables the users to select the data output by groups and variables. For this analysis, the groups selected in the IPEDS Data Center were all institutions that offer a Baccalaureate degree or above according to the Carnegie Classification. The variable selected was Admission Test Consideration. The year 2009 was selected as the time period. In 2009, the IPEDS database indicates that there are 1,690 institutions that offer baccalaureate degrees or above. Of these, 79.5% of the institutions require or recommend a standardized test score in order to be considered for admission. This high percentage gives evidence that standardized tests are an important admittance gateway. The interface to download the data is available at http://nces.ed.gov/ipeds/datacenter/.

Zwick (2007) summarized data indicating that standardized test scores are second only to HSGPA in undergraduate admission decisions. The National Association for College Admission Counseling (NACAC) Admission Trends Survey found that 70% of four-year institutions routinely considered standardized test scores with 40% having minimum test score requirements (Zwick, 2007). The summary included a joint 2000 survey conducted by ACT, Inc., The Association for Institutional Research, the College Board, the Educational Testing Service and the National Association for College Admission Counseling. The joint survey results also gave evidence that standardized test scores were the second most important factor in admission decisions (Zwick, 2007).

Annual NACAC survey results demonstrate an increase in the percentage of schools that state that standardized tests scores are given considerable importance in admission decisions. In 1993, 46% of the NACAC survey respondent institutions reported giving considerable importance to standardized test scores in admission decisions. This percentage rose to 60% in 2004 (Zwick, 2007).

Selectivity. There is evidence that higher standardized test scores are associated with the selectivity of the institutions. IPEDS requires institutions to enter the standardized test scores that represent the 25th and 75th percentile ranks. IPEDS also requires the institutions to enter the percent of applicants that are admitted. To determine if standardized test scores are higher for institutions that are more selective, institutions were grouped by the researcher by the percent of students admitted. The most selective group admits 1% to 20% of applicants. The second most selective group admits 21% to 40%. The third most selective group admits 41% to 60%. The fourth most selective group admits 61% to 80%. The fifth most selective group admits 81% to 100%. Table 7 presents the average 25th percentile score by institution group.

Table 7

25th Percentile scores of the specified standardized tests by percentage admitted groups for institutions that require or recommend test scores for admission

	Average 25th Percentile			
Admittance Rate	SAT Critical Reading Score	SAT Math Score	SAT Writing Score	ACT Composite
1%-20%	621.7	633.0	628.7	27.1
21%-40%	529.9	541.2	562.4	23.4
41%-60%	473.7	480.2	473.2	20.1
61%-80%	465.7	471.4	456.4	19.9
81%-100%	447.7	451.5	439.2	19.2

Table 7 displays that the more selective the institution in terms of student admissions, the higher the standardized test scores. The difference range between the average 25th percentile scores for the most selective and least selective institutions is between 174 and 189.5 which is a range of 15.5 for the SAT test categories and 7.9 for the ACT Composite. This indicates that standardized test performance is a factor in the level of institution to which students would be able to gain admittance.

Standardized test importance increases with the institutions' size (Zwick, 2007). The 2004 NACAC Admission Test survey found that 55% of the 661 responding institutions with less than 3,000 students give standardized testing considerable importance in admission decisions. For institutions with over 20,000 students, 92% of the institutions report that standardized testing is given considerable importance in admission decisions (Zwick, 2007).

Summary. Standardized tests are relevant for two main reasons. The first reason is that the SAT and ACT are valid predictors of first year success in college. The second reason is that the tests serve as a gateway to college admittance. Nearly 80% of baccalaureate and above degree granting institutions require or recommend the SAT or ACT for admission consideration. The score a prospective student receives is also a factor related to the selectivity of the institutions. The 25th percentile scores for the three SAT test categories are between 174 and 189.5 points higher for institutions that admit 1% to 20% of the applicants when compared to institutions that admit 81% to 100% of applicants. Similarly, the ACT Composite scores are 7.9 points higher for the most selective group of institutions than the least selective group of institutions. These factors support the importance of identifying methods that will increase standardized test scores.

Standardized tests, the third study relevance area, are important for college admission and selectivity. The achievement gap is the fourth area that establishes study relevance. The discussion reviews how black or African American children perform at lower rates than other test takers.

Standardized Test Achievement Gap

This analysis focuses on black or African-American children in single-parent families and standardized test scores. Providing evidence of an achievement gap in standardized test scores supports the study importance.

SAT Achievement Gap. The College Board (2010) released its college-bound senior's report that documents students in the class of 2010 who completed the SAT through March, 2010. A total of 1,597,329 college-bound seniors completed the test. The race/ethnicity distribution was 54% white, 13% Black or African American, and 11% Asian, Asian American, or Pacific Islander. No other group was represented by more than 10% of the test takers (College Board, 2010).

Critical reading, mathematics, and writing are the three test sections. Table 8 displays the mean scores for the three top race/ethnicity groups.

Table 8

Total Mean SAT scores by race

	Critical Reading	Mathematics	Writing	Total	Gap
Asian, Asian American, or Pacific Islander	519	591	526	1636	127
White	528	536	516	1580	79
Black/African American	429	428	420	1277	-232
Overall Average	501	516	492	1509	--

Table 8 demonstrates that in 2010, the mean combined SAT for black or African-American children was 232 points less than the national average, 303 less than white children and 359 less than Asian, Asian American, or Pacific Islander children (College Board, 2010).

The discrepancy is more pronounced when race and male test-takers is considered. A total of 720,793 college bound senior males completed the SAT. This represented 47% of the overall total. Of the total population, 26% were white males, 6% were Black or African-American males and 5% were Asian, Asian-American, or Pacific-Islander males. The combined SAT score for black or African-American males is 1270. This is 253 points less than the national average for males, 323 less than white males, and 375 less than Asian, Asian-American, or Pacific-Islander males (College Board, 2010).

A total of 827,197 college bound senior females completed the SAT. This represented 53% of the overall sample. Of the total population, 29% were white females, 7% were Black or African-American females and 5% were Asian, Asian-American, or Pacific-Islander females. The combined SAT score for Black or African-American females is 1282. This is 214 points less than the national average for females, 286 less than white females, and 346 less than Asian, Asian-American, or Pacific-Islander females (College Board, 2010).

ACT Achievement Gap. ACT (2010) released its annual college and career readiness report that documents test performance nationally and by state. Approximately 1.6 million high school graduates took the ACT. The race/ethnicity distribution was 62% white, 14% Black or African American, and 10% Hispanic. No other group was represented by more than 10% of the test takers (ACT, 2010).

Reading, Science, Mathematics, and English are the four areas that comprise the ACT test. These four test scores are averaged to form a composite. In 2010, the composite score average was 21.0. The composite average for African-American children was 16.9 which is 4.1 points below the national average, 1.8 points below the average for Hispanic test takers, and 5.4 points below the average for White test takers (ACT, 2010).

ACT also sets college readiness benchmarks by test content area and overall. Thirty-nine percent of the Asian-American/Pacific-Islander children met the benchmark scores in all four test areas. For the other race/ethnicity categories, 30% of white test takers, 11% of Hispanic test takers, and 4% of African-American test takers met the benchmark scores in each of the four test areas (ACT, 2010). As the population of interest for this analysis, the scores of African-American children will be reported by test content area. In English, 34% of the African-American test takers met the college readiness benchmark. In Reading, 21% of the African-American test takers met the college readiness benchmark. In Mathematics, 13% of the African-American test takers met the college readiness benchmark. In Science, 6% of the African-American test takers met the college readiness benchmark. For each individual test area and overall, the percentage of African-American test takers that met the college readiness benchmark was lower than all other race/ethnicity groups (ACT, 2010).

Male-female differences. There is a slight difference between black male and female SAT scores. Black female SAT scores (1278) are 13 points higher than black males (1265) (College Board, 2011). ACT scores by race and gender are unavailable. The near identical black male and female SAT performance is not consistent with other achievement and school behavior areas. Education Week (n.d) provides an online

database that derives high school graduation rates utilizing the NCES Common Core of Data. The table is available here: http://www.edcounts.org/createtable/step1.php. Table 9 presents graduation rates for black males and females.

Table 9

Black female and male high school graduation rates

	Black Females	Black Males	Difference
2009	65.3%	51.9%	13.4%
2008	62.2%	50.0%	12.2%
2007	59.4%	46.7%	12.7%
2006	57.5%	44.0%	13.5%

Table 9 displays that black female high school graduation rates are 12% to 13% higher than black males. This graduation rate difference extends to college graduation rates. The six-year graduation rate for the 2004 cohort is 43.1% for black females and 34.2% for black males (Snyder & Dillow, 2012).

The Digest of Education Statistics (Snyder & Dillow, 2012) notes that black student high school dropout rates have been declining from 2009 to 2011. In 2011, the black male dropout rate was 8.3% compared to 6.4% for black females. The black male rate has declined from 10.6% in 2009. The black female rate has declined from 8.1% in 2009 (Snyder & Dillow, 2009).

Discipline differences are also noted. The Southern Poverty Law Center completed a study of 9,000 U.S. middle schools. Black males were suspended at least once 10.3% more than black females (Losen & Skiba, 2010). The black male rate was 28.3% while the black female rate was 18% (Losen & Skiba, 2010). The authors speculate that there could be a bias related to black males and females and the rates are

higher than suspensions of white students (Losen & Skiba, 2010). The graduation rate, dropout rate, and discipline differences may result in a lower black male proportion attempting college admittance standardized tests. If a larger proportion of black males completed college entrance exams, it is possible there would be a more pronounced standardized test score difference given the differences in other areas.

Summary. The SAT and ACT are the primary college entrance exams. Over 1.5 million students take each test per year. Results reported by the College Board and ACT give evidence of a large achievement gap for black or African-American students. On the SAT, black children score 232 points less than the national average. On the ACT, black children score 4.1 points less than the national average. In addition, only 4% of black children meet the college readiness benchmark for all four ACT content tests. These results support the importance of identifying activities that are associated with increasing standardized test scores. There are interesting differences when considering black males and females. Although the SAT scores are nearly identical for black males and females, there are other noteworthy differences. Black females when compared to black males have higher high school and college graduation rates. Black females when compared to black males have lower dropout rates and discipline rates.

Study relevance has been established in four areas. Black or African American children of single parents prevalence, OST status, standardized test relevance, and standardized test achievement gaps are the four areas. OST impact is the last area that establishes study relevance.

OST Impact

The conceptual framework stresses that there are multiple positive benefits associated with OST program participation. These include academic performance, social skills, and self-efficacy. The study examines whether these benefits are linked to higher standardized test scores. This section briefly explores OST participation benefits and then delves more deeply into the OST participation standardized test score impact.

OST participation is associated with multiple benefits as a 2007 Policy Studies demonstrated. OST participants demonstrated improved conduct and work habits. Based on teacher reports, program participants performed better in multiple ways when compared to non-program participants, including work habits, persistence, academics, social skills, and being less aggressive with their peers. Parent reports of youth relationships with adults were more positive for students in the OST programs when compared with students supervised at home. The disadvantages of student self-care after-school were consistent across age groups when compared with OST participants (Reisner et al., 2007).

Benefits extend to standardized test score impacts. Thirty afterschool programs test score focused studies and evaluations were reviewed. Research study inclusion criteria are a peer-review publication or dissertations and a 1997 or later publication date. The inclusion criteria for program evaluations are a consideration of standardized test results and included comparison groups, and a 1997 or later publication date. This criterion ensured information currency. Studies, in this section, refers to research studies and program evaluations. Twenty-three were Original Source Studies meaning the full study or evaluation was available for review. Five were Secondary Source Studies

meaning study summaries were available for review. Two were meta-analyses. These studies and their findings are reviewed. Twenty-five of the 30 studies (83.3%) identified positive OST standardized test score impacts. Two studies were specific to college entrance examinations. Both found positive impacts though the findings were mixed in one study. The term impact does not denote any specific statistical methodology. Impact, instead, is used as a descriptive term.

Original Source Studies. Twenty-three original source studies were available. Studies were identified through the HFRP database and independent literature searches. The following search terms were utilized for the literature searches: program evaluation, evaluation, studies, evaluation studies, extracurricular programs, extracurricular activities, afterschool programs, out-of-school time programs, OST programs, standardized tests, and test scores. Six primary search engines were utilized. These were Academic Search Premier, ArticlesPlus, the ERIC collection, Google, and Google Scholar. Although Google and Google Scholar are not traditional academic resources, these were utilized to identify evaluations that may not be published in journals or other peer reviewed publication types. All identified studies were reviewed.

Bringing Up Girls in Science (BUGS). BUGS was a three-year National Science Foundation (NSF) funded afterschool program for fourth and fifth grade girls. Program goals were making science interesting, contributing to a conceptual understanding of the world, developing scientific-reasoning and problem-solving, and fostering the positive scientific attitudes (Tyler-Wood, Ellison, Lim & Periathiruvadi, 2012). BUGS provided students with authentic experiences such as outdoor environmental lab activities. A hands-on science project demonstration to parents and University of North Texas faculty

concluded each program year. ITBS-Science standardized test results were, in part, a study focus. Career perceptions of program participants that entered college were the second study focus area. This review focuses on standardized test results and will, therefore, discuss this area.

The study included 2001 program year female students. BUGS participants were 32 female students from a large north Texas school district. Each student was matched with a student from another north Texas school district. Each BUGS program participant was matched with a female student that scored within three ITBS-Science pretest percentile points. Students in the treatment and control groups completed pre and post ITBS-Science administrations. The authors state that a repeated measures ANOVA demonstrated that BUGS program participants made statistically significantly higher gains on the ITBS-Science from the pre and post-test administrations ($F=14.985$, $p<.001$). The authors did not report degrees of freedom. The authors also completed t-tests that compared the pre and post test administration ITBS-Science scores by group. The BUGS participants observed a statistically significant mean 6.0 score increase ($t(31)=6.29$, $p<.001$). The control group observed a non-statistically significant mean score increase of 0.98 ($t(33)$, $p=.28$). The authors concluded that the results related to test scores reinforce the benefits of authentic student learning experiences.

The repeated measures ANOVA method selection is a study strength. ITBS-Science results, the dependent variable, are collected on the pre and post administrations supporting this method. More information would strengthen the study. This information includes when the pre and post test administrations occurred, whether each test administration utilized the same test form, and how the three percentile point matching

criteria was established. A test effect validity threat is a study challenge area. A test effect indicates that dependent variable inflation or deflation may be associated with prior testing rather than the treatment (Campbell & Stanley, 1963). As stated, the time between test administrations and whether the same test forms are repeated is unknown. The test effect may have contributed to observed test score changes.

Overall, this is a well-described study that demonstrated participant improvement in post-test science ITBS-Science scores. The BUGS participants also demonstrated greater improvements than the control group. The study credibility would be improved by attending to the issues noted regarding test administration time periods and the utilized test forms.

Chicago Debate League. Anderson and Muzak (2012) investigated debate participation and ACT performance relationship. The Chicago Debate League (CDL) tournament ran from 1997 to 2007. This post-hoc study utilized CDL tournament records and school attendance and demographic records. The sample included 12,179 Chicago Public School (CPS) high school students. Of these, 2,449 participated in at least one debate. The authors state that the population was representative of the CPS student body in terms of gender and race. ACT scores by test subject area were a study focus area.

Debate participants were classified by the number of debates and competitive success. Competitive success was classified by win-loss ratio and the number of top eight finishes. The authors further developed a risk-index related to high-school completion. Five factors indicated risk status: free lunch status, special education status, neighborhood poverty, 8th grade standardized reading test scores, and 8th grade standardized math scores. Risk scores were completed based on four areas as the test

scores were combined into one risk factor. Students that received free lunch or special education status received one risk factor point respectively. Neighborhood poverty was determined by census blocks and the number of families above the poverty level. If a student lived in a high poverty census block, one risk factor point was assigned. Students with test scores 0.5 standard deviations below the standardized and combined reading and math scores received one risk factor point. The combination of these areas provided a risk factor score.

T-tests were completed to compare ACT scores on each subject test. Debate participants scored significantly higher on the English (1.42 points higher, $p<.001$), Reading (1.57 points higher, $p<.001$), Mathematics (0.55 points higher, $p<.001$), and Science (0.98 points higher, $p<.001$) ACT sections. A multiple logistic regression was used to assess ACT college readiness benchmarks. Debate participants were more likely to attain at or above the readiness benchmark in English (1.63 odds ratio, 95% CI: 1.43-1.86), Reading, (1.54 odds ratio, 95% CI: 1.32-1.69), and Science (1.41 odds ratio, 95% CI: 1.21-1.65). CDL participants were not more likely than non-debate participants to meet the Mathematics benchmark (1.14 odds ratio, 95% CI: 0.96-1.26).

Multiple linear regressions were completed to consider debate intensity with the ACT test section as the dependent variable. The independent variables were age, sex, race, and risk score. Only CDL participants were included in this analysis. For each additional debate participation round, English ACT scores are predicted to increase 0.58 ($p<.001$). Mathematics ACT scores are predicted to increase .41 ($p<.001$). Reading ACT scores are predicted to increase .88 ($p<.001$). Science ACT scores are predicted to increase .53 ($p<.001$).

Additionally, multiple linear regressions were completed to consider the wins ratio with the ACT test section as the dependent variable. The independent variables were age, sex, race, and risk score. Only CDL participants were included in this analysis. For each one unit increase in the wins ratio, English ACT scores are predicted to increase 1.29 ($p<.001$). Mathematics ACT scores are predicted to increase 0.93 ($p<.001$). Reading ACT scores are predicted to increase 1.45 ($p<.001$). Science ACT scores are predicted to increase 0.91 ($p<.001$).

The authors concluded that CDL participants had statistically significantly higher ACT test scores on all sections. CDL participants were also more likely to achieve ACT college readiness benchmarks in English, Reading, and Science. Finally, as debate quantity and competitive success increased, ACT performance increased. This is a rigorous study that fully describes the methodology and results. One improvement area is noted. This is information on how students were selected to participate in the debates. A perspective on selection bias could be formed with this information. Overall, however, this is a quality study.

Church Activities. Regnerus (2000) proposed and tested a model to examine, in part, the relationship between church activity participation and academic performance. Involvement in church activities will be directly related to higher educational expectations and better achievement scores in public school youth were the standardized testing hypotheses tested. The data source was the 1990 first wave restricted use edition of the High School Effectiveness Study. The author described this as a panel study of high school students in urban and suburban schools in the 30 largest metropolitan school districts. This data was linked to U.S. Census Bureau Common Core Data that provided

district and neighborhood information. One-hundred sixty-six public high schools and 4,434 tenth-grade students were included in the sample. Student-level SES missing values were replaced using the series means.

Continuous math and reading composite cognitive test scores administered for the High School Effectiveness Study is the test related dependent variable. Student self-expectations were the second dependent variable. Church involvement, Catholic affiliation, liking school, extracurricular activities, academic/college curriculum track, gender, race/ethnicity, intact biological family, and family SES were the independent variables.

Hierarchial linear modeling methods were applied. Extracurricular activities and race are of interest in this analysis. The first model included the noted independent variables reported but did not extracurricular activities and intact family. Church activities (β=2.32, $p<.001$) and being black (β=-4.801, $p<.001$) were both statistically significant. The first model accounted for 21.5% of test score variance. The second model added the excluded independent variables. In this model, church activities (β=2.221, $p<.001$), being black (β=-4.672, $p<.001$), and extracurricular activities (β=1.445, $p<.001$) were statistically significant. The intact family (β=.343, $p>.05$) variable was not statistically significant. The second model accounted for 25.2% of the test score variance.

The author notes that participation in church activities had a slightly stronger effect on math/reading scores than participation in extracurricular activities. The difference was 1.4 points. Intact families were not significantly related to test scores. Single parents are an interest in this study. Regnerus' study defined an intact family as a biological family so it is unknown if non-intact families represented single parents.

The overall conclusion is that higher church activity involvement likely signifies a higher level of social control and educational motivation that leads to better math and reading skills. This is a detailed analysis. The methodology and results are fully presented. One area may have added study value. It appears that educational expectations could have been included as an independent variable in the models that had the test scores as the dependent variable. Variance accounted for may have increased with the inclusion of this variable and enriched the results discussion.

Citizen Schools. Arcaira, Vile, and Reisner (2010) completed an evaluation of the Citizen Schools in Boston, MA. This is a program for low-income youth in sixth through seventh grades with the purpose of achieving long-term academic, social, career and civic success. The program extends the student learning day through hands-on learning opportunities.

The academic outcomes of school participants and matched non-participants were compared through a quasi-experimental design in the fifth-year evaluation. The treatment group included 448 students that attended Citizen Schools 8th Grade Academy Class. The control group was a matched comparison group of similar Boston Public School students not enrolled in the program. High school exit exams in English/Language Arts and Mathematics were the tests utilized to identify longitudinal program impact. Results identified no statistically significant differences in exam passage rates. The percentage of students that earned proficient or advanced on the tests were compared. In the mathematics area, 53% of the participants earned proficient or advanced compared to 44% of the matched comparison group. In the English/Language Arts area, 50% of the participants earned proficient or advanced scores compared to 41% of the non-

participants. Both of these results were significant at the .05 level. The effect size for the mathematics exam was .23 and .22 for the English/Language Arts exam.

This is an in-depth longitudinal study. The study concluded that while high school exam passage rates were not impacted by the 8th Grade Academy, performance on the exams was impacted. Students that attended the academy performed at higher levels than students that did not. The evaluation methodology is fully explained and the conclusions are aligned with the data results. A possible criticism is that the evaluation does not account for any intervening events after the students leave the program and the high school exam. Another potential criticism is the sampling procedure for the control group is not described. The authors do state, however, that it is a matched comparison group. The methodology description and the data linkage to the results contributes to the study credibility.

Cooke Middle School after-school recreation program. Lauver (2002) completed an unpublished dissertation study on a School District of Philadelphia after-school program. The program was held at Cooke Middle School. One of the program goals was to offer after-school activities that, in part, encourage intellectual development. One of the outcome measures for the evaluation was the 2000 test administration Stanford Achievement Test (SAT-9) data provided by the School District of Philadelphia.

The program was in operation for three years prior to the research study. At the beginning of the 2000 school year, all 346 students in grades five through seven were invited to participate in the program. A total of 227 students elected to participate. Five students dropped out of the program, leaving 222 students with 124 in the treatment group and 98 in the control group. The control group consisted of students that applied to

the program but were not admitted due to program capacity. Approximately 83% of the sample was African American and 60% were male. Forty percent of the sample's households consisted of two-parent families. The students were in grades five to eight and ranged in ages from 10 to 15.

Of the 124 treatment group students, 67 completed the SAT-9 math and reading comprehension tests. Of the 98 control group students, 61 completed the SAT-9 math test and 62 completed the SAT-9 reading comprehension test. An OLS regression was developed for each test. The independent variables included family background characteristics, student background characteristics, and academic background. The study found that after-school participation had no statistically significant impact on seventh and eighth grade SAT-9 test results in reading comprehension or math. In reading comprehension, the average percentile scores were 33.9 for the treatment group and 31.7 for the control group. In math, the average percentile scores were 25.2 for the treatment group and 26.3 for the control group.

This is a rigorous analysis. The study utilized random assignment in a quasi-experimental design. A power analysis was completed and noted that the analysis would be sensitive enough to detect between eight and ten percentiles on the SAT-9 test. This study was an unpublished dissertation so the procedures may be documented to a greater extent than other studies. The full research procedure documentation contributes to the study credibility that found no impact on standardized test scores.

Georgia Extracurricular Activities Study: Craft (2012) completed a dissertation to determine whether extracurricular participation was related to GPA, SAT scores, and attendance. This review discusses the SAT focus. There was one SAT related research

question. The question asked whether there was a statistically significant SAT test score difference between students that participated in extracurricular activities and those that did not. A t-test was applied to examine the difference in SAT scores between extracurricular participants and non-participants.

The sample included 12 of 16 high schools in a Georgia school district. The school district, according the author, is one of the largest in the country. The independent variable was participation in extracurricular activities. SAT scores were a study dependent variable. Data was collected by survey from eleventh and twelfth grade school district students that completed a parent permission form. A $25 gift card survey completion incentive was provided to students. The survey collected data on gender, GPA, SAT scores, success on the Georgia High School Writing test, and attendance. The survey all asked students to check whether they participated in school sports and clubs. The sports were football, softball, cheerleading, cross country, volleyball, basketball, and wrestling. The music programs were marching band, chorus, and orchestra. The clubs were student government, Fellowship of Christian Athletes, Beta Club, National Honor Society, Key Club, foreign language club, and dance club.

The survey was distributed to 2400 students with 440 responses yielding an 18.3% response rate. Although the research question stated a general focus on extracurricular activities, the study reported on activity categories. There was no statistically significant difference for students that participated in sports ($t(362)=-1.023$, $p<.230$) and music ($t(362)=.987$, $p=.324$). Sports participants had mean SAT scores 35 points lower than non-sport participants. Music participants had SAT scores 34 points higher than non-music participants. A statistically significant difference was identified

for school club participants ($t(362)=6.668$, $p<.001$). School club participants had mean SAT scores of 1770 (SD=268.66) while non-participants had mean SAT scores of 1587 (SD=254.18).

The study did not have an in depth discussion on why this difference was identified. Overall, the study is well constructed. Due to the low survey response rate, the study would be strengthened by an examination of the respondents compared to the overall school population to identify the sample representativeness. The study would also be strengthened by effect size determination. This would help to identify how impactful the difference was for students that participate in school clubs and those that do not.

Gervitz Homework Project. Three public elementary schools in Santa Barbara, CA participated in the Gervitz Homework Project (GHP). The program goal was to build a strong academic foundation and student study skills. Students entered the program in fourth grade and participated through sixth grade. Forty-five minute sessions were held three to four times per week during the school year. A credentialed teacher and aide supervised the program. Cosden, Morrison, Albanese, and Macias (2001) conducted an evaluation of the program. The GHP relationship with SAT-9 scores was an evaluation focus.

The quasi-experimental design randomly assigned 146 students to treatment and control groups. The sample declined to 90 students due to attrition over the three year period. The sample was 48% male and 52% female. The sample was 65% Latino, 25% white, and 10% other. Thirty-one percent of the sample was categorized as having limited English proficiency.

The full evaluation report was not available. Two published studies describing the results were available. No SAT-9 statistically significant differences between the treatment and control groups were found (Cosden, Morrison, Gutierrez, & Brown, 2004; Cosden, et al., 2001). The method was not identified in either source. The within group impacts were also investigated. Using a 77% median attendance split, 18 students were high attendees and 17 were low attendees. The authors found that high attending students had higher reading ($F(1,33)=4.88$, $p<.05$), math ($F(1,33)=4.89$, $p<.05$), and language ($F(1,33)=4.07$) scores (Cosden, Morrison, Gutierrez, & Brown, 2004). Both sources reported the probability levels. Neither source report the methods applied to test statistical significance. The F-test results give evidence that an ANOVA was completed. This, however, is not specifically stated.

In depth study quality comments are not possible without the methodology and other detailed information. Results indicate there is no standardized test score difference for homework participants when compared to non-recipients. The results do indicate that the group with greater participation in the homework program achieved higher standardized test scores.

Learning disability student after-school tutoring programs: Hock, Pulvers, Deshler, and Schumaker (2001) conducted two learning disability (LD) student after-school program studies. Each study investigated tutoring method effectiveness. The study purposes were to extend the research on effective after-school programs and one-on-one tutoring. Textbook quizzes and chapter tests were the outcome variables.

Study One.

Study one was conducted in a junior high school serving grades seven through nine. The 650 student body school was located in a small Midwestern city with an 85,000 population. Approximately 20% of the school body was minority and qualified for free or reduced lunch. The after school program was available to all students. Daily attendance averaged 15 students a day approximately 40 students participated over the semester. Two teachers and eight college student tutors assisted the students. Study tutors received two-hours of strategic tutoring training. There was no specific curriculum. Students received help on homework assignments.

A multiple-baseline design was employed to examine strategic tutoring effectiveness. The study included three at-risk students. Tutors met with the students in the 1997-1998 school year for two or three afternoons a week and 45 minutes per session. School year teacher grade book math test scores were recorded. Student one, a female eighth grade student, raised test scores from 46% on tests and 45% on quizzes before tutoring to 70% on quizzes and 80% on tests while receiving tutoring. Student one maintained a 78% four-week quiz average after tutoring ended. Student two, a male seventh grade student, raised test scores from 54% on tests and 58% on quizzes before tutoring to 86% on quizzes and 84% on tests while receiving tutoring. The four-week quiz average after tutoring ended declined to 57%. Student three, a female seventh grade student, raised test scores from 59% on tests and 61% on quizzes before tutoring to 87% on quizzes and 91% on tests while receiving tutoring. Student three maintained a 78% four-week quiz average after tutoring ended. The mean effect size for all three students was 3.12.

The authors concluded that strategic tutoring was an effective method in improving quiz and test scores. Two students were able to independently maintain their performance improvement for four-weeks after tutoring ended. Study procedures and methods were fully described. Study conclusions are linked to the results.

Study Two.

Study two was conducted in the same school during the 1998-1999 school year. Study two and study one program characteristics were identical. This study included six students. Math scores were collected for five students and biology scores were recorded for one student. Authors reported summarized scores. The student baseline mean test and quiz score was 50.3% before tutoring. This rose to 80.3% after tutoring. Five of the students observed improved scores. Four students maintained performance four weeks after tutoring ended. One of the students that did not maintain performance did not complete any tests or quizzes. The mean effect size was 3.12.

Similar to study one, the authors concluded that strategic tutoring was effective method to improve quiz and test scores. The strengths noted in study one apply to study two. Small sample sizes are acceptable in a multiple-baseline design (McMillan, 2004). Single-subject designs, however, require reliable measurements (McMillan, 2004). Although textbook quizzes and tests were utilized, there was no report on test reliability. This would increase study credibility.

Lighthouse: Chicago Public Schools (CPS) implemented the Lighthouse program in response to declining test scores (Farmer-Hinton, Sass, & Schroeder, 2009). The Lighthouse is a school-based remediation program aligned with the regular school day objectives and the Iowa Test of Basic Skills (ITBS) (Farmer-Hinton, Sass, & Schroeder,

2009). The program was either extended-day where all students stayed in the classroom or were dismissed from school and attended the program. The program serves approximately 85,000 K-8 CPS students. Farmer-Hinton, Sass, and Schroeder (2009) conducted a study to examine the Lighthouse program effects.

Secondary data from a 2001 biennial survey completed by 46,777 sixth through eighth grade students was utilized. The student survey collected information on academic offerings and experiences, school culture, student-staff relations, parental support, and student demographic and background characteristics. Lighthouse specific questions included participation, teacher, and experience questions.

Study inclusion criteria included student attendance survey responses and one of four Lighthouse attendance patterns: 1) no Lighthouse attendance (n=26,944), 2) Lighthouse attendance three consecutive years (n=3,540), 3) Lighthouse attendance in 1998-1999 and 1999-2000 (1,754), or 4) Lighthouse attendance only in 2000-2001 (n=5,387). The sample included 37,625 students. Study independent variables were gender, mobility in terms of school change over the three program years, summer bridge program participation, Lighthouse attendance, ethnicity, and free or reduced lunch. The dependent variable was student Centered Grade Equivalency Scores from the Iowa Test of Basic Skills (ITBS) reading and mathematics sections. The authors converted student test scores into difference scores over the three year period. A seventh grade student that scored +.1 in 1998-1999 and .3 in 1999-2000 had a grade equivalency difference score of .2 units for the first interval. All students had two interval scores.

Three-level HLM models were developed for reading and mathematics. Student growth was level one, student-level variables (e.g. gender) was level two, and school

level variables (e.g. school performance) were level three. In model one, students had a statistically significant intercept indicating that grade equivalency scores increased .38 reading units from 1998-1999 to 1999-2000. Non-Lighthouse attendees served as the baseline in model two. Three year Lighthouse attendees did not have statistically significantly different grade equivalency scores from the baseline group. Two-year Lighthouse attendees had a slightly positive difference score (β=.057) when compared to the baseline group. Students that attended Lighthouse only in 2000-2001 had a slightly negative difference score (β=-.119). Model three added the bridge program and no significant changes were noted in the Lighthouse variables. Model four added student demographics and, generally, did not result in significant changes in the Lighthouse variables. The exception was for Hispanic students who demonstrated a decrease in reading results. In all models, mathematic results were similar except for the summer bridge variable. In reading, the intercept and slope are statistically significant with smaller effects in math. The authors note that math scores increased slightly between years one and two (β=.123) but dropped after the summer bridge program was implemented (β=-.057).

The authors concluded that the Lighthouse program effects were positive. For students that attended Lighthouse for two years but not the last year, there was a negative impact. For students that did not attend the program for two years but did the last year, there was a positive impact. Students that attended all three years maintained growth equal to non-Lighthouse participants. The authors state that results indicate that the afterschool program will result in achievement gains as long as participation is consistent.

This is a high quality study. The procedures are fully documented including, for example, missing data procedures. Study limitations are also noted. The authors noted that the study did not link Lighthouse program designs or instructional strategies to achievement gains. The study cannot, therefore, suggest the most productive implementation strategies. The evidence, the authors note, is that an afterschool program that leverages the resources of the regular school day can have a small to moderate positive impact in reading and mathematics.

New Jersey Abbott District. New Jersey Abbott Districts are school districts that have low socioeconomic status, evidence of substantive failure of thorough and efficient education, large percentage of disadvantaged students, and excessive taxes for municipal services (Rothman & Henderson, 2011). A school-based tutoring programs study was conducted by Rothman and Henderson (2011) with three urban central New Jersey School District schools. The schools were in an Abbott District. Examining the results of an in-district, eighth-grade after school tutoring program on standardized test scores was the study purpose.

A pre-post, nonequivalent control group design was employed to examine tutoring program impact on language arts (LA) or mathematics (MA) sections of the standardized test New Jersey Assessment of Skills and Knowledge (NJASK). The target population was 102 eighth grade students that were designated as borderline on the seventh grade NJASK. Students were assigned to the LA or MA groups based on their NJASK scores. All 102 students received invitations to participate in a tutoring program. The invitation noted that program participation would positively impact NJASK scores. The study focused on students that scored from180-199 which is the borderline score.

Students that scored lower than 180 were excluded. These students, according to the authors, may require interventions greater than what could be provided through a tutoring program.

Forty-three students responded to the invitation and were assigned to the treatment group (LA=23, MA=20). The control group included the 59 non-respondents. Treatment group students were placed in the appropriate tutoring program based on their NJASK scores. Students attended tutoring sessions two afternoons a week for 90 minutes each day. Tutoring lasted a total of 48 hours over 16 weeks. The post-test were the LA or MA Grade Eight Proficiency Assessment (GEPA) scores. ETS developed the standardized GEPA state exam.

Analysis compared LA and MA pre and post test scores. An ANCOVA was completed because the authors noted the treatment group consisted of volunteers. Students that received language arts tutoring significantly outperformed the LA control group ($F(1,57)=5.835$, $p=.02$). Students that received math tutoring outperformed the MA control group ($F(1,54)=4.55$, $p=.04$). The authors concluded that borderline students that receive language arts or mathematics tutoring outperform students that do not receive tutoring.

The study procedures are well documented. Statistical test assumptions are discussed and study results are presented within the context of the study. A limitations section is presented and acknowledges that selection bias is the most significant issue that may impact study validity. The authors state that replication with a larger sample with random selection would be positive. Within the sample context, the study demonstrated

that students that receive tutoring outperform students that do not receive tutoring on eighth grade standardized tests.

New York state academic intervention services. Gentilcore (2002) completed a study of an English Language Arts Academic Intervention Services (AIS) program at a suburban middle school in Long Island, New York. The relationship between program participation and performance on the California Achievement Test was the purpose of the study. The design utilized was a quasi-experimental, control-treatment, post-intervention study of the program over a two-year period. The sample included eighth grade students enrolled in the middle school in the 1999-2000 and 2000-2001 school years. There were 108 students in the treatment group and 43 students in the control group. Approximately 5% of the sample was minority students and slightly less than half, approximately 49%, were females. The study found no significant differences between the control and treatment groups.

Although this is a dissertation, it is not a rigorous analysis. An example of a design flaw is that all students received a recommendation level based on a pretest result. The author determined post-hoc that there was no difference between the pretest results of the treatment and control groups. This calls into question the validity of the pretest. If students were recommended for the program based on their test results, there should be some difference in the results. These factors lessen the study credibility.

Promising afterschool programs study. Vandell, Reisner, and Pierce (2007) identified a relationship between afterschool program participation on standardized test scores for elementary and middle school children. The two-year study identified 35 high quality programs from eight states in six major metropolitan centers and six other urban

and rural locations. Nineteen programs served elementary students and 16 programs served middle school students. The authors state that quality was determined through telephone interviews, document reviews, and site visits. Continued quality was verified through annual visits to conduct interviews and site observations. A rating system was used to verify quality as the study progressed. Student sample characteristics included 1,796 third and fourth grade students and 1,118 sixth and seventh grade students. The sample was 47% male at the elementary and middle school levels. At the elementary level, 77% of the students were Hispanic and 8% were black. At the middle school level, 49% of the students were Hispanic and 13% were black. At the end of the second year, 1,434 of the elementary participants and 855 of the middle school participants were available for data collection.

Of the overall sample, 54% of the students routinely participated in afterschool programs and 49% of the middle school students routinely participated in afterschool programs. Routine participation was defined as attending their program 2-3 days per week. This was the program only group. Of students that did participate in afterschool programs, approximately 33% of the elementary students and middle school students participated in multiple afterschool programs. This was the program plus group. The low supervision group spent 1-3 days a week unsupervised by adults after-school. Approximately 15% of the elementary and middle school samples were in the low supervision group.

An imputation procedure was run for missing data due to students being unavailable for data analysis at the end of the two-year period. The authors then fit two-level random-intercept HLM models for students nested within schools. Scores from year

one were contrasted with scores from year two. The contrasts were program only vs. low supervision and program plus vs. low supervision. If statistically significant differences were identified, effect sizes were calculated and compared to other studies.

The study identified that elementary school students that regularly attended afterschool programs demonstrated significant gains in standardized math test scores compared to low supervision students. The program plus group demonstrated gains of 20 percentiles in math achievement scores over the two-year period yielding an effect size of .73 when compared to the low supervision group. The program only group demonstrated gains of 12 percentiles in math achievement scores over the two-year period yielding an effect size of .52 when compared to the low supervision group. No significant results were found for reading achievement test scores.

Similar results were found at the middle school level. Statistically significant gains were also identified for program plus and program only middle school students with gains of 12 percentiles when compared to the low supervision group. For the program plus group an effect size of .57 was found and for the program only group, an effect size of .55 was found. No significant results were found for reading achievement test scores.

While the analysis itself is well described and appears to be high quality, there are basic design issues related to this study. The primary issue is self-selection, meaning that the students were not randomly assigned to their groups. This raises concerns on the validity of the findings. This lack of random assignment may account for the large test score gains in math achievement. While dramatic impacts are identified, the study design does not contribute to its credibility.

Rural, Indiana secondary students. Wilcox (2012) completed a dissertation to examine the relationship between extracurricular participation and academic performance. Rural Indiana eighth and tenth grade students were the focus population. Standardized test performance, attendance, and discipline contacts were the study dependent variables. Four research questions were standardized test specific. Mean language arts and mathematics test score differences between extracurricular participants and non-participants were two research questions. Two-tailed t-tests were completed to investigate these questions. The third and fourth research questions asked if extracurricular performance was a predictor of language arts standardized test and mathematics performance, respectively. Multiple regression was applied to investigate these research questions.

Six rural Indiana schools participated in the study. It was stated that all Indiana rural schools with less than 750 students were asked to participate. The number of schools contacted was not provided. Four-hundred and nineteen students were included in the study. One-hundred and sixty-nine students (40.3%) were eighth-grade students and 250 (59.7%) were tenth-grade students. The gender distribution was nearly equal with 208 males (49.6%), 210 females (50.1%), and one (0%) unidentified. Two-hundred and fifty-five students (60.9%) participated in at least one extracurricular activity while 164 (39.1%) did not.

Two standardized test scores were used. The End of Course Assessment given to tenth grade students that have completed Algebra I and English 10 was one test. The Indiana Statewide Testing for Educational Progress (ISTEP) was the second test. Mathematics and language arts sections are included in the test which is administered to

seventh and eighth grade students. The test scores were standardized to create mathematics and language arts test z-scores.

Extracurricular participants (M=.23, SD=.95) scored significantly higher in language arts when compared to non-participants (M=-.34, SD=.98) ($t(367)=5.599$, $p<.001$). Extracurricular participants (M=.24, SD=.98) scored significantly higher in mathematics when compared to non-participants (M=-.24, SD=.96) ($t(310)=4.311$, $p<.001$). The language arts assessment score multiple regression included lunch status, attendance, discipline, gender, and extracurricular participation were the independent variables. The model accounted for 11.5% of the language arts assessment scores. Extracurricular participation level was a significant predictor ($\beta=.177$, $t=4.337$, $p<.05$). The mathematics assessment score multiple regression included the same independent variables. The model accounted for 14.3% of the mathematics assessment scores. Extracurricular participation level was a significant predictor ($\beta=.199$, $t=5.099$, $p<.05$).

The study concluded that extracurricular participation is related to standardized test performance. Overall, the study is complete and the findings are linked to the data. There are, however, some methodological concerns. The multiple regression states that extracurricular participation level is the independent variable. What is not explained is whether this represented the number of activities or if this was a dummy variable. Related to the means tests for research questions one and two, the t-test result degrees of freedom were noted as, for example, 1, 310. This would be an incorrect degrees of freedom representation. While the study findings appear reasonable, there are some methodological concerns that could be addressed to strengthen the study.

San Francisco Beacon Initiative. Yu, Len, Leufgen, and Rubin (2008) of Social Policy Associates completed an evaluation of the San Francisco Beacon Initiative (SFBI) in 2008. This evaluation considered eight Beacon Centers and, in part, California Standards Test (CST) proficiency scores. SFBI is a public-private partnership to promote youth and family centers in San Francisco public schools. Nearly half, 47%, of the participants were between 10 to 13 years of age and just over half, 53%, were male. Asian students represented 46% of the population and African Americans represented 22%.

CST proficiency levels for matched data were compiled for the 2006-2007 and 2007-2008 school years. CST English Language Arts and CST Mathematics were considered. The Beacon student results were compared with non-Beacon students. Beacon children results were grouped into four 45 day attendance groupings with the highest attendance grouping being 136 or more days of attendance. At the elementary and high school levels, a greater percentage of non-Beacon children achieved proficiency on both CST tests. At the middle school level, a greater percentage of children that attended a Beacon Center for 136 days or more were proficient on both CST tests when compared to non-Beacon children. A lower percentage of middle school children that attended a Beacon Center for 135 days or less achieved proficiency scores on both CST tests.

The evaluation did not focus on CST performance. Only descriptive statistics were presented. The data presentation may be misleading as the non-Beacon children are not broken into attendance groupings like the Beacon children. CST performance may have been more aligned if the non-Beacon children were broken into groups. Although

the data is presented in a tabular format, the authors did not comment on the within group proficiency level differences.

Structured after-school groups: Four-hundred and twenty-four Tennessee sixth through twelfth grade students completed an after-school group participation questionnaire. Homework, television viewing, extracurricular activities, other after-school groups, and jobs were the five areas included on the questionnaire. Cooper, Valentine, Nye, and Lindsay (1999) investigated the relationship of these activities on standardized test scores and class grades. The authors hypothesized that homework would be the strongest academic achievement predictor. It was also hypothesized that the four other areas would be positive academic achievement predictors. The interest areas for this review are extracurricular activities, other groups outside of school, and standardized test scores.

The sample was drawn from one large 65,000 student metropolitan school district, one 12,000 suburban school district, and one 2,200 rural school district. The authors described each respondent as a unit of student questionnaire response, student parent questionnaire response, and teacher provided student grades. The final sample included 51 metropolitan school district units, 221 suburban school district units, and 152 rural school district units. Specific student characteristics were reported. Females comprised 53% of the sample while males were 47% of the sample. By ethnicity, 91% of the students were white, 7% were African-American, and 2% were other. Nearly half of the students, 49% had an adult at home after school. Seven percent received a free lunch. The sample, as stated by the authors, was not representative of the overall population. As an example, the authors noted that 91% of the sample was white while 64% of the school

district students were white. Seven percent of the sample received free lunch while 40% of all school district students were free-lunch eligible.

The Tennessee Comprehensive Assessment Program (TCAP) was the study standardized achievement test. Raw scores were standardized based on the homework questionnaire the student completed. Two-hundred forty-seven students completed the math homework questionnaire and 177 students completed the English homework questionnaire. The TCAP mean score was standardized to 0 with 1 SD. The standardized score range was -3.68 to 2.10. The TCAP was completed in April, 1995.

A Homework Process Inventory was given to students and parents. Job, extracurricular activity, other outside of school group, and television questions were included in the questionnaire. Questionnaire extracurricular activity examples included school sports and clubs. Questionnaire other structured activity examples included nonschool sports, religious groups, or clubs. Parents and students provided the number of activity hours. Zero hours, 1-2 hours, 3-5 hours, 6-10 hours, 11-15 hours, and more than 15 hours were the questionnaire time selections available. The Homework Process Inventory was completed in October 1994.

Hierarchial multiple regressions were completed for standardized tests, teacher-assigned grades, and residual grades. The five after-school activities accounted for 7% of the standardized test score variance ($F(5,273) = 4.54$, $p < .0001$). The contribution of each after-school activity was then considered. Structured groups were positively associated with standardized test scores ($F(1,273)=5.61$, $p<.05$). Extracurricular activities were not statistically significantly associated with standardized test scores. Linear regressions were also conducted to identify curvilinear trends. A curvilinear trend was indentified between

time spent in extracurricular activities and standardized test scores ($F(1,320)=3.94$, $p<.05$). No other linear regression results were significant.

The authors concluded that after-school activities contributed to academic achievement prediction. The five after-school activities increased achievement test score prediction by 7%. It was also concluded that forming a positive identification with school through extracurricular activities can positively influence school performance unless the time investment becomes so great that there is no time for other activities such as homework. This was the curvilinear trend.

This is a detailed study. All procedures are fully described. There are, however, two potential flaws. One is that the recruitment procedure did not generate a representative sample. The authors acknowledge this limitation but the discussion did not comment on this. The second flaw is that the linear regression statistical method may have been inappropriate. The questionnaire set up the hour participation as ordinal measures. It appears, however, that the analysis treated the time selections as continuous measures. For example, 1=0 hours on the questionnaire for extracurricular activities and other structured groups participation and 2=1-2 hours. When providing descriptive statistics, the authors stated that the mean response for students in extracurricular activities was 2.68 and 2.71 in structured groups. Means and standard deviations are not a valid ordinal data interpretation (Jaeger, 1990). A continuous independent variable is also a regression assumption (Howell, 2010). If the authors treated ordinal measures as continuous data, the linear regression results are questionable.

Structured Leisure Activities. Fletcher, Nickerson, and Wright (2003) examined, in part, the association of structured leisure activities and performance on standardized

math and reading state-wide exams. The structured leisure activities included sports teams, church activities, and other clubs and organizations. The sample included 147 fourth-grade students attending a suburban elementary school in the southeast United States. Several demographic characteristics were provided. The sample race breakout was 65% white and 35% African American and the gender breakout was 53% male and 47% female. The Hollingshead Four Factor Index of Social Status was used to assess Socioeconomic Status (SES). The mean SES score was 37.94 with the authors stating this represents skilled craftsmen, clerical, and sales workers.

Math and reading test scores were averaged because of the high correlation between the test scores (*r*=.82). The test score average was 151.53 (SD=8.97). Student parents were asked during home interviews to list any organizations, clubs, teams or groups the child belonged to with three being the maximum number. Seven percent listed three activities, 18% listed two activities, 41% listed one activity, and 31% listed no activities. The research team coded the responses. The mean number of organized sports participated in was.51 (SD=.67), church activities was .19 (SD=.43), and club involvement was .3 (SD=.49).

A series of MANOVAs were completed. In addition to the structured leisure activities, demographic independent variables included gender, ethnicity, and SES. The dependent variables included in academic competence were test scores, GPA, and teacher perceptions of academic competence. Focusing on test scores, the model including gender, ethnicity and SES yielded an R^2 of .40 for achievement test scores. Structured leisure activities were added to the model which yielded an R^2 of .41. Participation in sports, church, or other clubs were not significant predictors of standardized test scores.

The structured leisure activity model increased the R^2 by .01. Univariate results demonstrated that children in sports (t=.96), church activities (t=.50), and clubs (t=1.83) did not have higher test scores than children that did not participate in these activities. The authors did not report the degrees of freedom or the specific probability levels. The conclusion is that gender and SES were the significant variables in the prediction of test scores.

Multiple factors support analysis quality. The methodology is fully described and reliable and valid instruments were used to define the variables such as SES. A lack of information is the major problem with the study. How the SES scores were grouped from higher to lower is not described. This was obviously done as the authors noted a finding in this area. The mean test scores were also not provided. This information would have been informative. The authors also only reported degrees of freedom and probability levels for statistically significant results. This information would also yield a better understanding of the results. Overall, the study is credible but could be improved by detailing the information specified.

Tennessee extracurricular participation study. Sinha (2010) completed a dissertation to determine whether extracurricular participation was related to the academic performance of urban Tennessee seventh and eighth graders. The standardized test Tennessee Comprehensive Assessment Program (TCAP), GPA, and ThinkLink which is a knowledge assessment to identify weaknesses for TCAP performance were the outcome variables. This review focuses on the standardized TCAP test. An overall comparison between extracurricular and non-extracurricular participants overall, in mathematics, in language arts, and gender were the research question areas.

An 820 student body middle school in a small suburban Tennessee community, population 20,000, was the study setting. The student body was 51% male and 49% female. The population proportion by race is Hispanic (50%), African-American (20%), white (15%), and other (15%). The sample included 361 students. The sample demographics were not provided. Data collection occurred from April 2009 to August 2009. Students completed a survey to report on extracurricular activities. The school provided TCAP scores.

T-tests were used for the questions comparing extracurricular participant and non-participant TCAP scores. Overall, extracurricular participants (M=369.6, SD=22.1) had TCAP scores statistically significantly higher than non-participants (M=357.8, SD=29.4) ($t(2,359)=3.87$, $p<.01$). The next research question considered mathematics scores. Extracurricular participants (M=545.4, SD=36.5) had mathematics TCAP scores statistically significantly higher than non-participants (M=524.1, SD=45.1) ($t(2,359)=4.51$, $p<.01$). The next research question considered language arts scores. Extracurricular participants (M=537.9, SD=31.0) had language arts TCAP scores statistically significantly higher than non-participants (M=518.2, SD=47.1) ($t(2,359)=4.17$, $p<.01$).

An ANOVA was used to examine examination of gender differences between male and female extracurricular participants and non-participants. The F-test results were non-significant ($F(1,324)=3.14$, $p=0.08$). The author did note that the results were close to the .05 significance level. No in-depth discussion was provided on why the differences in mean test scores was found or why the ANOVA did not identify a statistically significant difference.

There are basic areas that would have strengthened the study. Although demographics were provided on the school population, no sample demographics were provided. This would have provided a perspective on sample representativeness. Information on how the 361 students were selected was also not provided. The statistical tests appear appropriate. There is, however, an unexplained test score difference. When looking at overall scores, the mean scores compared were in the 350-400 range. When the mathematics and language arts scores were presented, there was a 500-550 mean score range. Explaining how the score ranges changed would support study credibility. The study did demonstrate that extracurricular participants had higher test scores than non-participants overall, in mathematics, and in language arts.

The After-School Corporation. Reisner, White, Russell, and Birmingham (2004) of Policy Studies Associates, Inc. completed an evaluation of The After-School Corporation (TASC). This is a New York City based public-private partnership for the purpose of developing and operating school-based after-school services for public school students in the elementary and secondary grades. The four-year evaluation focused on 96 TASC after-school projects with a sample of 52,000 after-school participants and 91,000 students enrolled in TASC schools that did not participate in TASC projects. Students recruited to participate in the programs were, according to the report, at risk of educational failure due to poverty, low achievement and other factors. Program activities were designed to build student academic skills through homework assistance, organized reading, recreational reading, math games, word games, and organized writing.

To assess academic change due to TASC participation, the evaluation team developed longitudinal data files for all participants and non-participants. Computations

on performance changes on the city and state English Language Arts/Reading and Math Achievement tests were done. Standardized test scores were computed for each student for one year prior to program participation, one-year after participation, and two-years after participation. Math achievement improvements were identified at the third to eighth grade levels with an average change in scores being 1.4 standardized scaled points after two-years of participation when compared to non-participants. This change was found to be statistically significant with an effect size of .42. After two program years, active participants who attended 60% or more of the possible time demonstrated an increase of 2.6 standardized scale points when compared to nonparticipants for an effect size of .79. No statistically significant changes were noted for the English Language Arts/Reading tests after two years of program participation.

Of interest to this analysis is that the evaluation team considered the performance of African-American children and other minorities. The authors note that black students from third to eighth grade that were active TASC participants gained more than expected in math after one or two years of program participation. After two-years, the effect size was .58 for black students in math when compared to non-participants.

At the high school level, the evaluation found that TASC participants passed the New York State Regents exam at higher levels than non-participants. The evaluation team decided not to compare actual test scores with non-participants for a variety of reasons including a smaller sample of high schools and the absence of annual measures.

This is a high quality evaluation. The methodology utilized is fully described. Data on which the conclusions are based is clearly presented. The study found clear evidence of a gain in mathematics achievement over non-participants. Based on the

program activities, the finding may be an artifact of the sampling procedure. As noted, TASC participants were recruited due to their at-risk status. What is not clear is the status of non-TASC participants. What is also not clear is whether the non-participants were involved in other enrichment activities. This information could create a more in-depth understanding of program impact. Overall, however, the study has given evidence that two years of TASC participation has an impact on math achievement. This was also found for the African-American participants in third through eighth grades. No impact was identified in the English Language Arts/Reading areas.

21st Century Learning Centers: Louisiana Evaluation. Jenner and Jenner (2007) conducted a first-year evaluation of academic impacts of 21st Century Learning Centers (CCLC) in Louisiana. The program is dedicated to at-risk students. A specific research question in this analysis was whether participants in the CCLC programs demonstrate improved spring core test scores when compared to non-participants. The authors employed a nonequivalent control group design. Standardized test scores were given in the fall and spring in one academic school year. An OLS regression was used, according to the authors, to statistically control for variation outside of experimental control. The Iowa Test of Basic Skills (ITBS) test was utilized. The ITBS measures skills in reading, language arts, math, social sciences, science and information sources (Jenner & Jenner, 2007). The Fall 2003 test was used as the pretest and the Spring 2004 test was used as the posttest.

The study included third (43%) and fifth (57%) grade students. Males represented 51% of the sample. Minority students represented 60% of the sample with 98.9% of those students being African American. Sixty-eight percent of the sample received free or

reduced lunch. On the fall pretest, the non-participant mean ITBS test score was 46.96 while the participant mean test score was 40.41 giving a difference of 6.55. On the spring posttest, the non-participant mean ITBS test score was 51.08 while the participant mean test score was 47.17 giving a difference of 3.91. Although the exact probability is not provided, the authors state that the test statistic is statistically significant. To determine if this reduction between the participants and non-participants was meaningful, the authors derived the effect size of .13.

There are two potential issues with this analysis. One is the ITBS usage. Test score differences may be the result of test familiarity rather than program impact. There is a testing validity threat given the short amount of time between test administrations even though forms A and B of the ITBS were utilized (Campbell & Stanley, 1963). There is also a regression to the mean validity threat (Campbell & Stanley, 1963). The other issue is a misinterpretation of effect size. The authors state that an effect size of .13 means that the average participant will perform 13% of a standard deviation better than an average non-participant. This is an incorrect effect size interpretation. What it instead means is that the average person in the experimental group is .13 standard deviations above the average person in the control group and, therefore, exceeds the scores of 13% of the control group. A more correct interpretation of effect size lessens the impact the authors claimed to have found. Cohen's guidelines to interpreting effect size indicate that any effect size less than .2 is a small effect size (Cohen, 1969).

21st Century Learning Centers: National Evaluation. The U.S. Department of Education (2003) funded Mathematica Policy Research, Inc. and Decision Information Resources, Inc. to perform a national evaluation of the 21st Century Community Learning

Centers Program. As noted, this program is dedicated to at-risk students. The study was divided into a middle school study and an elementary school study and was designed to examine the outcomes of the typical program at each level. Standardized test scores were one of the outcomes included in the elementary school evaluation, so this will be the only facet of the evaluation included in this analysis.

Baseline data was collected in the fall and spring of the 1999-2000 school year. Follow up data was collected at the end of the 2000-2001 school year. The elementary sample of students that completed a standardized test included 798 students in the baseline group and 621 in the follow-up group. Approximately half of the baseline sample was males in the treatment (46.4%) and control group (50.6 %). In the follow-up, 43.2% were males in the treatment group and 55.3% were males in the control group. In the baseline data, 66.7% of the students in the treatment group and 72.5% of students in the control group were black. In the follow-up data collection, 70.3% of the students in the treatment group and 74.9% in the control group were black.

The reading component of the Stanford Achievement Test was the standardized test used in the elementary school study. A total of 497 treatment group and 301 comparison group students completed the test in the baseline group. The control group had a mean score of 36.6, and the treatment group had a mean score of 36.3, giving a non-statistically significant difference of .3 (p=.94). A total of 285 treatment group students and 153 control group students completed the test in the follow-up study. The treatment group mean score was 31.1 and the control group mean score was 27.0 giving a non-statistically significant difference of 4.1 (p=.24). The authors concluded that there is

no evidence of an academic impact related to test scores from the 21st Century Learning Centers.

This was a rigorous evaluation. The methodology is explained in depth and the procedures are fully documented. Regarding the findings related to standardized test scores, it may not be reasonable to expect a result in a short period of time. Kane (2004) reported that the study was biased to not find results because of a low threshold to be included in the treatment group. The authors themselves point out that the elementary school sample findings should be viewed as preliminary as future iterations of the evaluation will include a larger sample. It is also stated that the sample is not representative of all 21st Century Learning Centers but does have internal validity for attributing student outcome differences to the program. The study criticisms are important to consider. At the time of the evaluation, however, program participation did not impact test scores.

21st Century Learning Centers: Saint Paul Public Schools. Wahlstrom, Sheldon, and Murphy (2004) of the Center for Applied Research and Educational Improvement at the University of Minnesota completed a summative evaluation of the Saint Paul Public Schools 21st Century Community Learning Centers Program. Titled Pathways to Progress, the program served 3,000 students between 2000 and 2003 in eight different after-school sites. Students from kindergarten to eighth grade were served across program sites. One of the goals of the program was to increase student academic achievement.

A post hoc matched pair technique was used to evaluate academic impact. The treatment group included students who attended the program 30 or more days each year. The control group was matched non-participants. For all three years of the program, there

were 42 matched pairs. For two years of the program, there were 148 matched pairs. Weighted samples were used to ensure that every school was mathematically equivalent to others in terms of participants. The standardized test utilized was the Stanford Achievement Test, tenth edition (SAT10). For the three-year matched pairs, in reading and math, half of the program participants scored in the upper two quartiles compared to approximately one-third of the control group in both content areas. For the two-year matched pairs, in reading and math approximately 36% of the treatment group scored in the top two quartiles compared to 18.5% of the control group in reading and 31.2% of the control group in math.

The evaluation also analyzed standardized test scores over a five year period for the matched pairs. This included two years prior to program participation and the three years of program participation. In the last year of the program the school district changed standardized tests from the MAT7 to the SAT10. For the three-year group in reading, both the treatment and control groups demonstrated improvements with the gap closing between the two groups after the change in the test. In math, the treatment group demonstrated continuous improvement over all three years while the control group displayed a drop after the change to the SAT10. For the two year matched pairs in reading, the control group outperformed in the first program year while the treatment group outperformed the control group in years two and three. In math, the gap between the treatment and control groups increased each program year.

Overall this is a rigorous study, but there are potential issues. The weighted sample procedure applied is unclear. The more substantial issue is that the presentation of the data makes it appear as though the program had a more dramatic impact than it did.

Statistically significant differences were only identified for the two-year matched pairs for all schools when the three program years are applied. A significant difference was also found for two-year matched pair middle school students in the second year of the program. Given that no other significant differences were identified in any other year or student level in math, there may be a Type I error. The authors state for example that program participants often started with lower scores but their own tests failed to identify any statistically significant differences between the two groups prior to program participation. Overall, the study is clear and the procedures are well documented; however, the authors appear to overstate the program impact.

Urban After-School Programs. Mahoney, Lord, and Carryl (2005) conducted a longitudinal study of after-school program participation and, in part, impacts on reading achievement. The study focused on children in grades one through three in three Northeastern U.S. public schools. The schools were located in an economically disadvantaged, urban city with a population of approximately 140,000. The OST programs studied were part of a city-wide after-school initiative in the school district. One of the goals of the program was to promote academic competence. The researchers, instead, studied after-school time. The recruitment process included mailings and telephone calls to inform and gain consent from parents to participate in the study. Consent was gained from 599 participants. The sample was 48.5% female. When race/ethnicity is considered, the sample was 50% Hispanic, 36% Black, 10% White, 2% Asian, and 2% other. The authors note this is similar to the population of the participating schools.

The Developmental Reading Assessment (DRA) was the standardized test used to measure reading achievement. In a 2003 parent survey, parents reported on the after-school arrangements for their children. Reading achievement scores were known for 83% of the sample. Related to the reading achievement part of the analysis, four patterns of after-school care were identified. These included after-school program, parent, parent/non-adult, other adult/non-adult. A 5 (afterschool care pattern) x 3 (grade) x 2 (gender) MANCOVA was first conducted. Reading achievement was one of the dependent variables. A statistically significant MANCOVA association ($F(16, 822)=2.08$, $p<.01$) was found for the pattern of afterschool care. A separate ANCOVA followed by pairwise t tests were performed for all the dependent variables including reading achievement. The study found that reading achievement was higher for children highly engaged in the afterschool program when compared to the other care patterns. Children with low engagement in the afterschool program only scored higher than children in the other adult/non-adult pattern of care. The level of engagement was based on ratings by the afterschool program teacher.

This is a highly rigorous, detailed study. The main criticism is the lack of full information. Effect sizes were not presented. The inclusion of this type of information would better inform the reader on whether the differences identified were meaningful. Also, the delineation between high engagement and low engagement in the after-school program seems subjective as it is based on teacher ratings. Overall, however, this is a highly credible study.

Virtual Y Program. Eddins (2005) of the National Center for School and Communities at Fordham University in New York completed a summary of seven

program evaluation years of the YMCA of Greater New York's Virtual Y Program. The program serves second through fourth grade students in a varying number of sites per year. The program targets low income public school children who receive, in part, reinforcement in reading and math. At the time of the report, over 50,000 students participated in the program. From 1997 to 2000, the program participants were approximately evenly split between female (approximately 52%) and male (approximately 48%) students. From 1997 to 2000, approximately 80% of the participants were Latino (an average of 40%) or African American (an average of 40%).

The evaluation team obtained test data from the New York City Board of Education. The authors state that the city and state exams utilize items from the Terra Nova Test Series published by CTB/McGraw-Hill. The test scores were compared for Virtual Y participants and non-participants in grades three and four in the school district. The study found that there was no significant difference between the two groups in reading scores. A statistically significant difference was found in math test scores.

It is difficult to judge the credibility of the study. This is not a full research report and the methodology description is brief. The documentation of the population and the tests used do suggest that a fairly rigorous study was completed. The selection of the control group, however, is not clear.

Secondary source studies. The Harvard Family Research Project maintains an Out-of-School Time Program Research and Evaluation Database at http://www.hfrp.org/out-of-school-time/ost-database-bibliography/database. This database was searched using the following criteria: Type: After-school, Design: Experimental, Non-Experimental, Quasi-Experimental, Methods: Tests/Assessments, and

Summative/Outcomes: Academic. The same inclusion criteria as previously noted was applied to the search results. These criteria were study publication in 1997 or later, the inclusion of an external comparison group and the results of standardized tests compared with the comparison group. If the original source was available, it is included in this analysis. Evaluations where the original source is not available are listed in Table 10.

Table 10

Secondary source studies on OST impact

Program	Grade Served	English/ Language Arts Impact	Math Impact	No Impact
Basics Afterschool Program (Harvard Family Research Project, n.d.a).	K-6	X	X	
CHAMPS (Harvard Family Research Project, n.d.b).	K-6	X	X	
Foundations After-school Enrichment Program (Harvard Family Research Project, n.d.c).	1-6	X	X	
Sacramento START (Harvard Family Research Project, n.d.d).	K-6	X-Lowest Quartile)	X-Lowest Quartile)	X-Other Quartiles
Woodcraft Rangers' Nvision After-school Program (Harvard Family Research Project, n.d.e).	K-12			X

Five evaluations that met all inclusion criteria were identified. Two evaluations identified statistically significant impacts in English/Language Arts areas and Mathematics (Harvard Family Research Project, n.d.a; Harvard Family Research Project, n.d.c). Two evaluations identified partial impacts in English/Language Arts areas and Mathematics (Harvard Family Research Project, n.d.b; Harvard Family Research Project,

n.d.d). One evaluation did not identify any impacts related to standardized test results (Harvard Family Research Project, n.d.e).

Meta-Analyses. Two meta-analyses have been completed that include standardized test results as an outcome variable. One study considered OST programs focused on at-risk students and the other focused on programs that promote personal and social skills. Each study identified positive impacts on standardized test results with significant effect sizes ranging from .05 (Lauer et al., 2006) to .31 (Durlak, Weissberg & Collaborative for Academic, Social, and Emotional Learning, 2007).

Programs for at-risk students. Lauer, Akiba, Wilkerson, Apthorp, Snow, and Martin-Glenn (2006) performed a meta-analysis of 35 OST studies that included control or comparison groups. Based on the inclusion criteria, 30 studies addressed reading outcomes, 22 addressed mathematics outcomes, and 17 of these addressed outcomes in each area. Of interest to this analysis, 30 of the 35 studies were published before 2002 or did not utilize standardized tests. An individual assessment of the other studies is included in this analysis. The meta-analytic process was 1) computation of an effect size for each study, 2) computation of an overall effect size across research studies, 3) homogeneity analysis, and 4) moderator analysis.

In the reading area, the average effect size for a fixed-effects model is .05. For a random effects model, the average effect size was .13. In the mathematics area, the average effect size for a fixed-effects model is .09. For a random effects model, the average effect size was .17. The authors conclude that the overall effect sizes were statistically greater than zero. This gives evidence that the OST programs can have positive effects on the achievement of at-risk students.

This is an in-depth analysis. It characterizes the quality of the studies included in their analysis and fully describes their analytical procedures. The only thing that may be questionable is that the effect sizes are weighted by the sample size using the assumption that studies with larger samples produce more reliable estimates. While this is a reasonable assumption, only seven of the reading studies and one of the mathematics studies are rated as being high quality. The analysis, therefore, weights moderate and low quality studies at the same level as high quality studies. A positive, however, is that the effect sizes identified are noted as giving evidence of a small OST impact on academic achievement. The study results are not overstated.

Programs that promote personal and social skills. Durlak, Weissberg, and the Collaborative for Academic, Social, and Emotional Learning (2007) performed a meta-analysis of 73 OST studies that promote personal and social skills. These 73 studies were included in 49 different reports. Of interest to this analysis, 68 of the 73 studies did not utilize standardized tests and are, therefore, not individually reviewed. For each individual study, the analysis combined the effect size results for reading and mathematics programs to yield one effect size per study. The study employed a random-effects model. A total of 20 programs considered achievement test results. The mean effect size identified for the 20 programs was .16 which was significant at the .05 level. The program considered differences between programs that utilized evidenced-based approaches and those that did not. Of the ten programs that utilized evidenced-based approaches, an effect size of .31 was found in relation to achievement test results. Of the ten programs that did not utilize evidenced-based approaches, an effect size of .03 was

found in relation to achievement test results. The evidenced-based program results were significant at the .05 level.

This is an in-depth analysis. The analytical procedures are fully described and the results are clearly described. Study quality may have been improved by not combining the results of different content area tests. This may have revealed some important results. There is also a failure to break out results by educational level which may have revealed important results. The identification, however, of programs that utilize evidenced-based approaches as having a greater impact is important. This would be considered to be a credible study.

Summary. Multiple findings emerged from the OST program study review. The first finding is evidence that OST programs are related to higher standardized test scores. Two studies, the Chicago Debate League (CDL) (Anderson & Muzak, 2012) and the Georgia extracurricular activities (Craft, 2012), examined college entrance exam standardized test scores. Anderson and Muzak (2012) found that CDL participants had higher English, reading, mathematics and science scores than non-participants. CDL participants were also more likely to meet ACT college readiness benchmarks in English, reading, and science. Craft (2012) found that Georgia school club participants had higher SAT scores than non-participants. The evidence, however, is inconsistent. The CDL study found that while participants had higher ACT mathematics scores than non-participants they were not more likely to meet the ACT college readiness mathematics benchmark (Anderson & Muzak, 2012). The Georgia extracurricular activities study found that sports and music participants were not more likely than non-participants to have higher SAT scores (Craft, 2012).

The second finding is that positive results are more consistently identified with mathematics test scores. Twenty original source and secondary studies investigated mathematics test scores. Sixteen (80%) identified positive impacts. Three (15%) had mixed results. One (5%) found OST programs had no mathematics test score impact. Positive results were noted across student levels. At the elementary level, four of six studies (66.7%) identified positive mathematics test score results with two (33.3%) having mixed results. At the middle school level, five of six studies (83.3%) identified positive mathematics test score results and one (16.7%) found no impact. At the high school level, one study reported specifically on mathematics test scores. This study found a positive result. Six studies focused on multiple student levels with five of six (83.3%) finding a positive mathematics test score result and one finding mixed results.

A third OST program impact finding is that positive results are slightly less likely to be related to higher language arts standardized test scores. Twenty-one studies examined this test content area. Thirteen (61.9%) OST program studies identified positive language arts test score results. Five (23.8%) OST program studies found no impact on language arts tests score results. Three (14.3%) found mixed results. At the elementary level, four of seven (57.1%) OST program studies found positive language arts test score results, two (28.6%) found mixed results, and one (14.3%) found no impact. At the middle school level, four of five (80%) OST program studies found positive language arts test score results and one (20%) found no impact. The one OST program study that focused on high school students identified a positive language arts test score result. Seven studies focused on multiple student levels.

A fourth finding of note is that there were no single-parent family specific focused studies. Lauver (2002) did include single-parent families as an independent variable. This study did not identify impacts on standardized test results so no in-depth commentary was provided on differences between children from single-parent families and two-parent families. Intact biological families were a church activities study independent variable (Regnerus, 2000). In a model that included extracurricular activities and intact biological families, the family variable was not significant. Regnerus (2000), however, did not define intact biological families. This may or may not have related to single-parent families. The OST program study review is the final area that establishes study importance and leads to the literature review conclusion.

A fifth finding is that there were no studies that explicitly focused on high achieving students. It is likely that the CDL study (Anderson & Muzak, 2012) included high achieving students as successful debate performance served as a study independent variable. Other studies with large sample also likely included high achieving students. No identified studies, however, specifically noted a focus on high achieving students that participate in OST activities.

Conclusion

The literature review shed light in multiple areas. These areas were aligned with the five areas that support study importance. The study areas were 1) Prevalence and Characteristics of Black Children from Single-parent Families, 2) School Extracurricular Activity Status, 3) Standardized Test Relevance, 4) Standardized Test Achievement Gaps, and 5) Afterschool Program Impacts. The findings reveal longstanding societal and academic trends. Each trend can be aligned with the literature review focus areas.

The first trend is black children raised by single-parents. Nearly two-thirds of U.S. black children are raised in single-parent families based on census data and other sources that analyze census data. This is 30% more than national averages and 40% more than white children that live in single-parent families. This is a persistent trend. The Anne E. Casey Foundation has documented that from 2004 to 2010 approximately two-thirds of black or African-American children are being raised by single parents. The difference from 2004 to 2010 between black and African-American children, national averages, and white children being raised in single-parent families has also remained consistent. The literature review revealing that the study focus population has single parent rates higher than overall national rates and white family rates is a critical finding. This persistent trend supports the study focus population importance.

OST program participation is the second trend. Black children participate less in extracurricular activities when compared to national averages and to non-Hispanic white children. Children from families with parents that have never been married or parents that have been separated, divorced, or widowed also participate less in extracurricular activities. The exception was the NSAF survey study that found that black youth, possibly due to academic deficits, were more likely to participate in after-school tutoring programs when compared to white children (Wimer et al., 2006). The literature in this area is deep but the OST participation rate result inconsistency is an important finding. This may reveal differing OST participation definitions or measurement methodologies. What is consistent is that black or African American children have lower OST participation rates except in the study noted. If it is found that OST activity participants

have higher college entrance exam scores than non-participants, taking steps to respond to this trend could represent a potential intervention area.

The third trend is OST program budget appropriation cuts. The 20 largest U.S. school districts are cutting appropriations for extracurricular activities by an average of 10%. Federal programs and foundations may be filling the appropriation cut void. An example is the 21st Century Learning Centers federal program. School districts and private organizations, however, have to compete for these funds. The potential cost of this is that it may lower OST program access to only school districts with skilled grant writers. It also may impact programs in terms of sustainability and consistency of program activities. An additional finding was revealed. An important finding is the investment that school districts and other entities make in OST programs is not clear. This analysis considered the budget appropriations of the top 20 U.S. school districts. What it does not consider is school district staff time spent on OST program policy development, grant writing to generate OST funding, and time spent developing OST funding and staffing partnerships. While the funding investment may have decreased the human capital investment may have increased. This literature does not document this area. The focus here, therefore, is on actual budget appropriations. If the study identifies that OST programs impact college entrance exam scores, the impact of an effective intervention may be limited due to inconsistent funding.

Standardized test relevance is the fourth trend. The available literature in this area is vast. Evidence of its validity to predict FYGPA was presented. This analysis cited studies as early as 1983 and as late as 2010 noting the SAT predictive validity of FYGPA with the 1983 study being a historical examination of 1930-1980 test takers (Mattern, et.

al, 2010; Wilson, 1983). This represents longitudinal trend supporting SAT validity. The SAT and ACT are widely used. Nearly 80% of the institutions that offer baccalaureate degrees require or recommend a standardized test result to be considered for admission (Zwick, 2007). The validity evidence and widespread usage of standardized tests supports the study research focus.

The achievement gap is the fifth trend. The available literature in this area is vast. This analysis noted that the mean 2010 SAT scores for black or African-American children is approximately 230 points less than the national average overall and 207 points less in critical reading in mathematics. This is a longstanding trend. NCES notes that from 1986 to 2010, the average difference for black children and the national average is 201.2 points (Snyder & Dillow, 2012). The ACT also has this longitudinal achievement gap trend. Since 1999, black children have scored an average of 3.9 points lower than the ACT national average and 5.0 points lower than the white children average (Snyder & Dillow, 2012). This longitudinal achievement gap trend supports study importance. If black OST program participants have higher standardized test scores than non-participants, this would provide evidence on a method to impact the achievement gap.

The available evidence on the impact of OST programs on standardized test scores is mixed but generally supports a positive relationship. Positive mathematics test score results are slightly more consistent than language arts areas. Eighty percent of the mathematics studies (16 of 20) identified positive impacts while 61.9% (13 of 21) identified positive impacts. The literature review spanned 1997 to 2012 giving evidence of an OST impact trend on standardized test scores. The literature, however, is sparse on OST impact on standardized college entrance exams. Recent positive evidence has been

identified. Anderson and Muzak (2012) and Craft (2012) developed evidence that OST program participants have higher standardized test scores than non-participants. This study will contribute to the evidence on OST impact on standardized test scores and deepen the literature base.

Research Gaps. The literature review identified three important research gaps and one research contribution area. The first research gap is there are no studies identified that place a high emphasis on children from single-parent families. One study specifically used this as a predictor variable but did not discuss in depth as the program in the study was not found to have an impact on standardized test scores (Lauver, 2002) and one included intact biological families without defining this term (Regnerus, 2000). While it is likely that many of the studies had a population of children from single-parent families, the publications did not specifically address this. OST impact on college entrance exam scores for black or African-American children from single-parent families is the thrust of this analysis and indicates that the study can contribute to the OST standardized test score impact literature.

The second research gap is that there are no identified studies that specifically examine the OST standardized test score impact by gender. There are gender specific studies. The BUGS study did focus on females and identified a standardized test score impact but this was a gender specific program (Tyler-Wood, et. al, 2012). Sinha (2012) studied gender differences and found no statistically significant differences between OST participant and non-participant standardized test scores. Sinha (2012) did not, however, compare female and male OST participants. A gender difference examination can contribute to the OST program standardized test score impact literature.

The third research gap relates to high achieving black or African American students. There are no identified studies for this population that specifically examines the OST participation standardized test score impact. A study of this unique population can contribute to the OST and high achieving African American student literature bases.

There is an additional research contribution area. There is recent evidence that OST participants have higher standardized test scores than non-participants (Anderson & Muzak, 2012; Craft, 2012). The research conducted in this study can contribute to this growing OST participation impact on standardized test scores knowledge base.

Chapter Three

Methodology Overview

The purpose of this quantitative secondary data analysis study was to identify whether OST programs were associated with higher standardized test scores for high achieving black or African-American children of single parents that apply to competitive college scholarship programs. The results gave evidence on the potential impact OST programs have on standardized test scores. This provides stakeholders with evidence of an effective intervention to increase college admittance potential and student potential to attend more selective institutions.

The study purpose informed the methodology. One research question identified means testing as an appropriate method. A second research question identified correlation as an appropriate method. Two sub-research questions and one main research question identified regression as an appropriate method. Program application data from a national scholarship program was utilized. The instrumentation section more fully describes the data. The methodology was specifically designed to provide standardized test score impact evidence due to OST participation. The research process steps included 1) dataset acquisition, 2) data import into statistical program, 3) data integrity checks, 4) imputation for missing values, 5) data transformations for any variables that are not normally distributed, 6) data analysis, and 6) results reporting.

A review of the research questions followed by hypotheses related to the research questions opens the chapter. The research procedures overview includes an instrumentation description and a discussion of the population and sample. This is followed by a discussion of the data analysis and presentation procedures. Design issues

are discussed to close the research procedures section. The chapter intent is to provide a full overview of the study procedures.

Research Questions

Three research questions related OST program impact on standardized test score results guided the study. High achieving black or African-American children of single-parents that apply to a competitive college scholarship program were specific population of interest. The first research question considered the impact of general OST program participation. The second research question and two sub-research questions considered OST participation levels overall and by gender. The third research question considered the contribution OST participation makes to standardized test performance by gender. The research questions were:

1. To what extent is there a statistically significant difference in mean standardized test scores among black or African-American children of single parents who have applied for a competitive college scholarship program given their participation in Out-of-School Time (OST) programs?
2. To what extent is there a statistically significant relationship between OST participation variable and standardized test scores among black or African-American children of single parents who have applied for a competitive college scholarship program?
    a. To what extent is there a statistically significant relationship between OST participation variable and standardized test scores among male black or African-American children of single parents who have applied for a competitive college scholarship program?

b. To what extent is there a statistically significant relationship between OST participation variable and standardized test scores among female black or African-American children of single parents who have applied for a competitive college scholarship program?

3. To what extent does OST participation contribute by gender to standardized test performance of black or African-American children from single-parent families when controlling for high school GPA and parent education level among a sample of black or African-American children of single parents who have applied for a competitive college scholarship program?

Research Hypotheses. A null hypothesis was developed for the primary and secondary research questions. The following null hypotheses were tested:

H_{O1}: There is not statistically significant difference in mean standardized test scores given OST participation.

H_{O2}: There is no relationship between standardized test scores and OST participation for high achieving black or African-American children of single parents that apply for a competitive college scholarship program.

H_{O2a}: OST participation does not contribute to standardized test performance for black or African-American male children of single parents that apply for a competitive college scholarship program.

H_{O2b}: OST participation does not contribute to standardized test performance for black or African-American female children of single parents that apply for a competitive college scholarship program.

H_{O3}: OST participation does not contribute by gender to the standardized test score performance for high achieving black or African-American children from single-parent families that apply for a competitive college scholarship program when controlling for high school GPA, and parent education level.

Variable Definitions

Several variable definitions provide a deeper picture study context.

- OST Programs: The National Institute on Out-of-School Time definition is used for this study. Programs, activities, and opportunities that occur during non-school hours is the definition utilized (NIOST, n.d.). Applicants enter activities participated beginning in the junior year to the mid-point of the senior year when the application is due. Only activities that are completed during the school year are included.
- OST Participation: Total OST participation hours identified on the student application.
- Single-Parent: Students that selected that their parent was never married on the FAFSA form. FAFSA selections were Married or Remarried, Single, Divorced or Separated, and Widowed. Single refers to marital status. According to the FAFSA instructions, students provide information on the form on the parent lived with the most in previous year. If the student lived with both unmarried parents for an equal amount of time, the FAFSA instructions state that the student should report information on the parent that provided the most financial support in the previous year (ED, 2011)

- Standardized Test Scores: The combined SAT critical reading and mathematics section scores. These are combined to enable usage of the SAT/ACT concurrence tables.
- Parent-Education Levels: A High Parent Education Level represents parents that have a college or beyond education level based on the FAFSA form entry. A Low Parent Education Level represents a parent who has a high school education or a middle school/junior high education level based on the FAFSA form.
- Gender: Whether the student is male or female.
- High School GPA: This is the student Grade Point Average on a 4.0 scale. The program application requests this information.

Research Procedures

The research process is detailed here. Instrumentation delves more in depth into the data that utilized for this analysis. The population and sample section discusses the inclusion characteristics. The data preparation section discusses how data integrity was checked. The data analysis and presentation section discusses how the data was analyzed and presented.

Instrumentation. This was a secondary data analysis study. Program application data for a national scholarship program designed for minority students that are PELL eligible was the data utilized. The program application has two facets. The standard application completed by the student is the first facet. The Free Application for Federal Student Aid (FAFSA) form is the second facet. Each applicant grants permission to the program to access this information to verify PELL eligibility.

The program application provided access personal and academic information. This included gender, race/ethnicity, high school attended, high school grade point average, standardized test scores and OST activities. For the OST activities, each applicant provided the total number of hours, the name of the organization and a description of their activities. Applicants provided information for two full school years, and one-half of the school year prior to the January application due date. The actual application is not included to maintain program confidentiality. The application questions related to the study are presented in Appendix A.

The FAFSA form provided parent marital status, highest grade completed by the parent, and parent adjusted gross income. For the parent marital status, applicants select married or remarried, single, divorced or separated, or widowed. Applicants that selected single were the study focus. For the parents highest grade completed, applicants select middle school/junior high, high school, college or beyond, or other/unknown. For parent income, applicants enter information from the parent tax return. A FAFSA form sample is included in Appendix B.

There were concerns with the available data. Applicants self-reported information on the program application and FAFSA. Applicants may have under or overestimate academic information and time spent on OST activities. Applicants may have also under or overestimated parental income. There is evidence, however, that self-reported standardized test scores are valid (Cole & Gonyea, 2010). Similar evidence on the self-report of other information was not identified.

Institutional Review Board Requirement. According to the GWU Human Research Determination Worksheet (n.d.), this study did not require IRB approval. The

researcher did not be collect data through intervention or interaction with an individual. The researcher also did not use direct identifiers that would link the individual data to the identity of the subject. GWU IRB personnel reviewed the Human Research Determination Worksheet and determined in June, 2012 that IRB approval was not required.

Population and Sample. The study population was intended to be black or African American children of single parents that complete a college entrance exam. The sample was drawn from applicants to a national, competitive college scholarship program. As noted, the sample characteristics limited the study to a more specific population. The study population is limited to high achieving black or African American children of single parents that apply to a competitive college scholarship program. High achieving refers to the sample mean GPAs and standardized test scores. Table 11 details the differences and similarities between the population and sample.

Table 11

Comparison of sample characteristics to national statistics

	Sample	National Rates	Difference
Children from single parent families (the sample is 100% single parents. applicant proportion displayed)	42%	66%	-24%
Parent College or Beyond Education Level	42.8%	50.9%	-8.1%
Parent AGI <$20K	35.3%	33.1%	2.2%
Parent AGI $20K-$40K	44.0%	23.5%	20.5%
Parent AGI $40K-$75K	19.2%	21.0%	-1.8%
Parent AGI >$75K	1.5%	22.4%	-20.9%

	Sample	National Rates	Difference
Average high school GPA	3.7	2.7	1.0
Overall SAT Score for black students	939	855	84
Male SAT Score for black students	930	860	70
Female SAT Score for black students	943	852	91
SAT Critical Reading/Mathematics compared to white children	939	1064	-125
OST Participation	88.3%	35% to 21%	53.3% to 64.3%

Characteristics for the participants in this study were 1) black or African American race, 2) standardized test scores or provided information to impute standardized test score, 3) a single, never married parent, and 4) OST participation reported. Student self-report as black or African American is the first population characteristic. The program application provides four race/ethnicity categories including African American/Black. The application states that individuals should select their primary ethnicity. Only individuals that selected African American/Black were included in the study.

Standardized test scores is the second characteristic. Students self-report their SAT Critical Reading, SAT Mathematics, SAT Writing, or ACT Composite. For this analysis, the combined SAT Critical Reading and Mathematics Scores were utilized. Using these test results allowed the researcher to take advantage of ACT-SAT Concordance tables. It was a researcher judgment to use the concordance tables so all students had the opportunity to be included. Of all ACT test takers, 14% are black. Of all

SAT test takers, 12% are black (Aud, Fox & KewalRamani, 2010). Missing test score data was imputed. The program application variables included in the imputation procedure were: age, gender, high school GPA, parent education level, expected major in college, and parent income level. R's spline function was used to replace missing data through cubic spline interpolation. The sample combined critical reading and mathematics standardized test score is 125 points lower than national white SAT test-taker averages. This demonstrates that even for this high achieving population, there is still an achievement gap between white and black students.

Applicants with single, never married parents was the third population characteristic. Children from divorced families were not included in the study. The reason for this is that the FAFSA data source did not include when the parents divorced. Including only children that indicated that their parent was never married increased the likelihood that the sample consisted of children raised in similar family types.

Applicants that completed the full program application was the fourth characteristic as this ensured that that the OST participation section was completed. All individuals that fulfilled the specified population characteristics were utilized in the analysis. These population characteristics do limit study result generalizability. The data is limited to students that have applied to a national scholarship program. The results are not, therefore, generalizable to all college admittance test takers. The results are only generalizable to students that have applied to national scholarship programs. Even though the program is designed for PELL eligible students, non-PELL eligible students apply for the program. Specific to OST participation, Table 11 demonstrates that the sample OST participation rate is much higher than estimated national averages. This does not

necessarily limit study generalizability but does highlight a significant difference. The sample OST non-participants are still representative of high-achieving black or African American students that apply to a competitive national scholarship program.

Data Preparation. After data organization, each case for each variable was reviewed to identify missing data and to identify any outliers. Appendix C provides this information. A stem and leaf plot was also developed in order to detect any unusual values. Missing values were identified using R's is.na function. Missing data was imputed using R's cubic spline function. Extreme values were reviewed for accuracy and deleted if the data could not be verified. This is a valid reason to remove outliers (Pedhazur, 1997). If, for example, a student had a combined SAT score of 3000, this represents an impossible score and was deleted from the sample. Transformation methods were applied for any continuous variables that were not normally distributed. Transformations were continued in order to attain normal distributions as indicated by the Shapiro-Wilk test. Categorical variables were similarly checked with frequency distributions to identify any data entry errors or other data irregularities.

Data Analysis and Presentation. The analysis intent for the first research question was to compare standardized test score means based on OST participation. Descriptive statistics associated with each research question were developed. Specific statistical tests were then performed and are subsequently described. Statistically significant differences provided evidence of higher test scores for OST program participants. The contribution OST programs make to standardized test scores was also identified.

Research Question One. Research question one focused on general OST program participation. The question was: To what extent is there a statistically significant difference in mean standardized test scores among black or African-American children of single parents who have applied for a competitive college scholarship program given their participation in Out-of-School Time (OST) programs? An independent samples t-test was completed to determine the evidence of a difference in the standardized test score means between the OST participants and non-participants. Students that did not participate in OST programs are equivalent to a control group. Students that did participate in OST programs are representative of a treatment group. The null hypothesis for this question was: There is no statistically significant difference in mean standardized test scores given OST participation. The dependent variable for the independent sample t-test was the student test score. The independent variable was OST group. Descriptive statistics were presented as displayed in Table 12.

Table 12

Descriptive statistic presentation for research question one

Group	M	SD	SE	Minimum	Maximum
OST program Participant					
Non-OST participant					

An independent samples t-test was completed to determine if there was a statistically significant difference between children that do and do not participate in OST programs. Four assumptions were satisfied to complete this test: 1) normality, 2) independence, 3) homogeneity of variance, and 4) the dependent variable is interval or ratio data (Cohen & Lea, 2004). The Shapiro-Wilk test was the normality test applied.

Levene's Test for Equality of Variance was used to test for variance homogeneity. Assumption testing is discussed in the results section with associated graphs presented in the appendices. The independent samples t-test was completed using R's t.test function after the assumptions were satisfied. The t-test output table is displayed in the following format.

Table 13

Format for independent samples t-test

					95% CI	
	t	df	*P*	M	LL	UL
Score Difference						

The independent samples t-test provided evidence of a mean difference between the standardized test scores of black or African-American children that do or do not participate in OST programs at the .05 level. The statistically significant, test results are summarized as follows: There was a statistically significant effect for OST participation, $t(df) = result$, $p < .05$, with students participating in OST programs receiving higher scores than non OST participants. The effect size was derived to inform on how different the group means are by standardized units. Hedges g* effect size was derived to determine the standard deviation difference between groups. A g* greater than 1 is evidence that the mean of one group is a full standard deviation higher than the other group (Grissom & Kim, 2005).

Research Question Two. The second research question considered the relationship between OST participation and standardized test scores. The specific question was: To what extent is there a statistically significant relationship between OST

participation variable and standardized test scores among black or African-American children of single parents who have applied for a competitive college scholarship program? The null hypothesis was: There is no relationship between standardized test scores and OST participation for high achieving black or African-American children of single parents that apply for a competitive college scholarship program. This question was examined by developing a scatterplot of OST participation hours and standardized test scores. The scatterplot was produced using R's plot function. This is presented in the results section. The scatterplot identified a linear relationship. A Pearson's Product Moment correlation coefficient was then computed to quantify the relationship between OST participation and standardized test scores. R's cor function was used to complete the analysis. Results are presented in the following format: r = __, n = __, p = __.

Research Questions Two A and B. Research questions two A and B asked the contribution OST programs make to standardized test scores. A simple linear regression was the method applied to identify the contribution. Research question two A considered male students. Research question two B considered female students. Standardized test scores were the dependent variable for each question.

Four linear regression assumptions were tested: 1) linearity, 2) independence of errors, 3) homoscedasticity, and 4) normality of the error distribution (Howell, 2010). A scatterplot was developed to test for linearity. The Durbin-Watson Test was used to test for error independence. The Breusch-Pagan test was used to check for independence. The standardized test scores for constant error variance. Normality was tested by developing a residual plot of the errors. An outlier check was also completed. The assumptions were

satisfied. Appendix D displays the assumption checks. R's regression function, lm, was used to create the regression object. Table 14 displays how the results are presented.

Table 14

Coefficient summary table format for the simple linear regressions

	Coefficients				
	Unstandardized		Standardized		
	B	SE	B	t	*p*
(Constant)					
OST Participation					

The R, R^2 are also provided to present the standardized test score variance accounted for in the models. The model format is: $\hat{Y}=\alpha+\beta_1 X_1$. The final model defined the contribution OST participation makes to the prediction of standardized test scores. Male and female models are presented.

Research Question Three. Research question three examined whether OST participation is significant predictor of standardized test scores by gender. Specifically, the third research question was: To what extent does OST participation contribute by gender to standardized test performance of black or African-American children from single-parent families when controlling for high school GPA and parent education level among a sample of black or African-American children of single parents who have applied for a competitive college scholarship program? A multiple regression model was developed to determine whether OST participation was statistically significant predictor of standardized test scores. The null hypothesis for this question was: OST participation does not contribute by gender to the standardized test score performance for high achieving black or African-American children from single-parent families that apply for a competitive college scholarship program when controlling for high school GPA, and

parent education level. The first step to complete the analysis was the definition of the variables which is provided in Table 15.

Table 15

Description of variables

Variable	Label	Variable Type	Regression Equation	Description
SAT Score	SAT	Dependent	Y	Continuous variable of SATV+SATM
High School GPA	GPA	Independent	$X_{1,}$	Application GPA Entry
Parent Education Level	PARED	Independent	X_2	1=High Parent Ed, 0= Low Parent Ed
OST Participation	OST	Independent	X_3,	Continuous variable of total OST participation hours

The program application asks students to enter their cumulative GPA. Regarding parent education level, the FAFSA asks students to select from three education levels: Middle School/Junior High, High School, College or Beyond, or Unknown. The three categories were dummy coded into two levels. High parent education represents parents that achieved a college or beyond level. Low parent education represents parents with a middle school or junior high education or high school education. Applicants that select unknown were not included in the analysis. Several steps were followed in the parent education level dummy coding process. A basic rule of dummy coding is that there are k-1 categories (Pedhazur, 1997). The k-1 rule enables the calculation of unique least-square estimates and prevents collinearity (Pedhazur, 1997). Interpretability is also an important consideration. Because the nominal variable has to be numeric for the regression procedure, the numeric representation has to be intuitive (Cohen & Lea, 2004). Coding high as 1, moderate as 2 and low as three or the opposite may create a misleading

analysis; the results may be numerically correct but the interpretation is not intuitive. Dummy coding into two categories increases interpretability and clearly denotes group membership (Pedhazur, 1997). A significant β for a dummy variable is analogous to a significant mean difference between two groups (Pedhazur, 1997). Coding parent education as high and low in this analysis can be easily interpreted. High parent education in this analysis is coded as one and low parent education is coded as zero. The β, therefore, indicates the mean standardized test score difference between the high parent education level and the low parent education level. The high and low level represent parallel regression lines with the β representing the difference between the high and low levels.

Five multiple linear regression assumptions were tested by gender: 1) normality, 2) independence, 3) homogeneity of variance, 4) interval or ratio data, and 5) at least a 5:1 ratio of cases to variables (Howell, 2010). A normal probability plot was developed to test for normality. Levene's test for equality of variance was applied to test for homogeneity. Independence was checked with the Durbin-Watson statistic or by examining the distribution of the dependent variable and each categorical independent variable level.

R's regression function, lm, was used to create the multiple regression object by gender. The stepAIC procedure was applied to complete the forward regression after R's lm procedure created the regression object. The first multiple regression models by gender included GPA and OST participation independent variables. The second multiple regression models by gender included GPA, parent education level, and OST

participation independent variables. The model summary table is displayed in the following format:

Table 16

Model summary table format

				Change Statistics				
Model	R	R^2_{adj}	SE	R^2	F	df1	df2	*p*
Model 1								
Model 2								
Model *n*								

In addition to the model summary, a coefficient table was produced to define the regression formula. Table 17 displays the format for the R output.

Table 17

Coefficient summary table format

		Coefficients				
		Unstandardized		Standardized		
Model		B	SE	B	t	*p*
Model 1	(Constant)					
	Variable 1					
Model 2	(Constant)					
	Variable 1					
	Variable 2					
Model *n*	(Constant)					
	Variable 1					
	Variable *n*					

Evaluation of the models was based on the change in the R^2 as variables are entered into the model. This is a support model selection method (Pedhazur, 1997). This enabled the identification of the most robust model. The R^2 informs on the amount of variance in standardized test scores accounted for by the model. OST participation variables were significant and are included in the final regression model. The model format is: $\hat{Y}=\alpha$

$+\beta_1 X_1 + \ldots + \beta_n X_n$. The final model defined the contribution OST participation makes to the prediction of standardized test scores.

Design Issues

Several design issues were considered. An overall design issue was that it was unknown whether there would be a high proportion of black or African-American students of single parents that have or have not participated in OST programs. This was not inevitably an issue as a national dataset over a multi-year period was used.

An additional design threat was that FAFSA does not indicate whether the child is living with both parents that are unmarried or on other family types where there are two parent figures in the home. As noted, the FAFSA asks the applicant to note the marital status of the parents. This analysis limits the population to single parents. This threat is that some may be being raised in a household with two parent figures even though they indicated that their parent was single and not married/remarried, divorced or separated, or widowed.

Other design issues were associated with the research questions. For research questions one, it was likely that a statistically significant difference would be identified because of the sample size. The effect size was, therefore, the primary statistic that provided OST impact evidence. The effect size focus was the method used to maintain the national dataset value.

The use of the ACT-SAT concordance tables which are a tool for identifying comparable scores (ACT, n.d.) is the final design threat. According to the tables, an ACT Composite Score of 36, for example, compares to a combined SAT Critical Reading and Mathematics score of 1600. Concordant scores are defined as scores that have similar

percentile ranks (ACT, n.d.). The ACT states that the concordance tables are less accurate than other statistical procedures (ACT, n.d.). The ACT and SAT do not, however, measure identical constructs with the ACT stating its test is more curriculum based than the SAT (ACT, n.d.). Equivalent constructs is a requirement for equating test scores (Dorans & Holland, 2000). It is a researcher judgment, therefore, to utilize the concordance tables rather than equate the scores. It is important to acknowledge that there may be a loss of some precision from using the tables rather than equating the scores.

Summary

Chapter three outlined the study procedures. It outlined that the basic steps in the research process included 1) Dataset acquisition, 2) data import data into a statistical program, 3) Data integrity checks, 4) Missing value imputation, 5) Data transformations for any variables that are not normally distributed, 6) Data analysis, and 7) Results reporting.

The research questions were the critical methodology element. Research question one examined whether there is a difference in standardized test scores between students that do and do not participate in OST programs. Research question two examined the relationship between OST participation and standardized test scores. Research questions two-A and two-B examined the contribution OST participation made to standardized test scores by gender. Research question three identified the contribution OST participation makes to standardized test scores by gender in a model that included GPA and parent education level. Multiple regression models were developed for males and females. Developing impact evidence related to the research questions contributed to the knowledge base associated with OST programs. The impacts identified for black or

African-American children from single-parent families provide evidence for school districts and other stakeholders on an effective intervention to support this population segment.

Chapter Four

Introduction

The study purpose was to identify whether OST programs are associated with higher standardized test scores for black or African-American children of single parents. The study was a secondary analysis of standardized test score data and participation in OST activities. The intent was to provide evidence on the impact of OST programs on standardized test scores for the focus population. Results provided stakeholders with evidence that can inform their policies and budget decisions related to OST programs as an intervention to increase college admittance. Three research questions were investigated:

1. To what extent is there a statistically significant difference in mean standardized test scores among black or African-American children of single parents who have applied for a competitive college scholarship program given their participation in Out-of-School Time (OST) programs?
2. To what extent is there a statistically significant relationship between OST participation variable and standardized test scores among black or African-American children of single parents who have applied for a competitive college scholarship program?
    a. To what extent is there a statistically significant relationship between OST participation variable and standardized test scores among male black or African-American children of single parents who have applied for a competitive college scholarship program?

b. To what extent is there a statistically significant relationship between OST participation variable and standardized test scores among female black or African-American children of single parents who have applied for a competitive college scholarship program?

3. To what extent does OST participation contribute by gender to standardized test performance of black or African-American children from single-parent families when controlling for high school GPA and parent education level among a sample of black or African-American children of single parents who have applied for a competitive college scholarship program?

Data Preparation

Several data preparation steps were taken. In accordance with The George Washington University IRB procedures noting that an application was not required, all variables that could lead to the deductive disclosure of the students included in the sample were removed. A general ID was created for each case. This ID was linked with the application data and kept in a separate file.

All ACT standardized test scores were converted to SAT scores using the ACT-SAT concordance tables. The researcher completed this procedure. Data was sorted by test type and then score to facilitate usage of the concordance tables. There were 357 ACT scores converted to SAT scores. ACT's concordance tables convert the score to a combination of the SAT critical reading and mathematics scores. The study used these two SAT test scores. The concordance table does not include the SAT writing test. The data was then loaded into the R statistical program.

Standard data preparation procedures then occurred. Continuous variable frequency histograms were developed. This enabled a distribution examination. OST participation hours, standardized test scores, and GPA were the continuous variables. Stem and whisker plots were developed to enable an outlier check. Appendix C displays the histograms and stem and whisker plots. Four potential OST participation hour outliers were identified. As an example, the most extreme outlier indicated that the student's OST participation was an average of 76 hours per week. Four cases with OST participation averages of 60 hours a week or more were removed from the dataset. Data entry errors or extreme values not related to the study purpose represent substantive reasons to remove outliers (Pedhazur, 1997). No substantive reason was identified to remove GPA and standardized test scores that extended past the range of the box-and-whisker plots. The data entries were plausible so no substantive reason was evident to remove these cases. This information is displayed in Appendix C. Specific diagnostics for each procedure applied in this analysis are discussed in the appropriate sections.

A missing data check was the next step. There were few missing data cases as this was scholarship program application data and federal financial aid data. Standardized test scores were the only important missing data cases. There were seven missing test scores. R's spline function which replaces missing data through cubic spline interpolation was used for these cases. Each research question may have had other cases removed for reasons specific to the analyses. The specific research question section discusses this.

Sample Description

The sample included 2363 black or African American students that applied for the scholarship program. All of the students have single parents according to their FAFSA

form that indicated their parents were single rather than married/remarried, divorced, or widowed. These students applied to the scholarship program between 2008 to 2012.

Table 11 highlighted several important differences between the sample population and national statistics. Approximately 42% of the program applicants were from single parent families which is lower than the 66% national black or African American single parent rate. Sample parents have observed slightly lower educational achievement rates. Half of U. S. African Americans over 25 have achieved some college or beyond (50.9%) education which is 8.1% greater than the 42.8% sample percentage.

AGI statistics were not available by race and family type. The sample $20K AGI or below proportion (35.3%) is nearly identical to national rates (33.1%). The sample $20K-$40K proportion (44.0%) is 20.5% higher than national rates (23.5%). The sample $40K-$75 AGI proportion (19.2%) is nearly identical to national rates (21.0%). The sample $75K or greater AGI proportion (1.5%) is 20.9% lower than national rates (22.4%). Generally, a higher sample populates the $40K AGI or lower ranges when compared to national rates. To reiterate, the race and family type national AGI rates are not available.

There is evidence that the sample performs at higher rates in academic areas. The sample average GPA is 3.7 compared to the African American national rate of 2.69. The SAT critical reading and mathematics scores were combined into a total score. In order to utilize the ACT-SAT concordance tables. The writing subtest is not utilized in this analysis. The sample mean SAT score (939) is 84 points higher than national African American mean SAT scores (855). The male sample mean SAT score (930) is 70 points higher than national African American male mean SAT scores (860). The female sample

mean SAT score (943) is 91 points higher than national African American mean SAT scores (852). Table 18 presents the national averages and the sample averages for the combined scores.

Table 18

Study sample critical reading and mathematics total score averages compared to the national averages

	Full Sample	Male Subset	Female Subset
Sample Average	939	930	943
National Average	855	860	852
Difference	84	70	91

Table 18 displays the difference between black male and black female standardized test scores is 13 points. As noted, however, black males have lower high school graduation rates (Education Week, n.d.), lower college graduation rates (Snyder & Dillow, 2012), higher dropout rates (Snyder & Dillow, 2012), and higher discipline rates (Losen & Skiba, 2010). These factors may affect the proportion of black males that attempt a college entrance exam. This may, in part, account for the low standardized test score difference between black males and females

A large OST participation difference was identified. The sample OST participant proportion (88.3%) was higher than estimated national rates. The sample OST participation rates are 53.3% to 64.3% higher than national rates. Students reported an average of 3.1 activities with an average of 254.2 hours. The minimum number of activities is zero and the maximum is five yielding a range of five activities. The range for average hours is 3,237 hours with a minimum of zero hours and a maximum of 3,237 hours. The median participation rate is three activities and 245 hours.

A high rate of female students reported participation in OST activities (n=1466, 92.8%). The mean activity participation rate was 3.2. The mean hour participation rate was 262.2. The female participation range was 3,237 hours with a minimum of zero hours and a maximum of 3,237 hours. The median participation female rates are 3 activities and 155 hours. Similarly, 84.1% of the male students (n= 738) participated OST programs. The averages were 2.9 activities and 224.5 total hours. The male participation range is 2,800 hours with a minimum of zero hours and a maximum of 2,800 hours. The median participation male rates are 3 activities and 127 hours.

Summary. The sample description gives evidence that study results are generalizable to a select population of high achieving black or African American children of single parents that apply to competitive college scholarship programs programs. The 3.7 high school GPA was higher than the national average of 2.67 for black or African American children. The average SAT scores in critical reading and mathematics were 84 points higher than the national average. The overall OST participation levels are also higher than national rates. The sample OST participation level is 88.3% while the national participation level has been estimated to be 35% (U.S. Census Bureau, 2007) to 21% (Afterschool Alliance, 2009). In addition, the proportion of children of single parents is approximately 23% lower than the total population proportion.

The sample characteristics create a context for the result generalizability. Results are presented by research question. There are three primary research questions. Each informs on the impact of OST participation on standardized test scores. Means testing is applied for the first research question. A correlation analysis was applied for the second

research question. A bivariate linear regression was utilized for the research question two sub-questions. A multiple regression model was developed for the last research question.

Research Question Review

Three research questions guided the study. The first research question considered the difference in mean standardized test scores between children that did and did not participate in single parent families. The second research question considered the OST participation and standardized test score relationship. The third research question examined whether OST participation is a significant standardized test score predictor.

Research Question One. Research question one focused on general participation in OST programs and is stated as: To what extent is there a statistically significant difference in mean standardized test scores among black or African-American children of single parents who have applied for a competitive college scholarship program given their participation in Out-of-School Time (OST) programs? The null hypothesis for this question is: There is no statistically significant difference in mean standardized test scores given OST participation. The dependent variable for the independent sample t-test was the student test score. The independent variable was OST group. Any student that reported OST participation was in the program participant group. Students with zero OST participation hours were included students in the non-OST participant group. Table 19 presents the descriptive statistics.

Table 19

Descriptive statistics for OST and non-OST participants

					Range		95% CI	
Group	N	M	SD	SE	Min	Max	LL	UL
OST participant	2087	952.5	119.1	2.6	614	1331	947.4	957.6
Non-OST	276	934.3	107.6	6.5	638	1249	921.6	947.0

Independent sample t-test assumptions were checked. Normality was first checked. The Kolmogorov and Smirnov (KS) test was used. The KS null hypothesis is that the sample is normality distributed. KS=.036 with a p-value greater than .10 for the non-OST participant group. KS=.014 with a p-value greater than .10 for the OST participant group. This gave normal distribution evidence for each group. The normality assumption was satisfied. Independence is the second assumption. There was no identified relationship between a non-OST participant and an OST participant. Membership in either group was not impacted by membership in the other group. The observations are, therefore, independent. The independence assumption is satisfied.

Variance homogeneity is the third assumption. The Levene's Test for Equality of Variance was used. Variance equality is the null hypothesis. The results were non-significant ($F(505,1581)=1.059$, $p=.208$). This evidence fulfilled the variance homogeneity assumption. A dependent variable that is interval or ratio data is the fourth assumption. Standardized test scores are continuous, interval data that indicate the order and magnitude of the test scores. This was evidence that the fourth assumption was fulfilled. The t-test was completed with all assumptions satisfied. Table 20 displays the t-test results.

Table 20

t-test results for test score differences between OST and non-OST participants

					95% CI	
	t	df	*P*	M	LL	UL
Score Difference	2.413	2361	0.0159	18.203	3.409	32.998

Test results provided evidence that the mean test score between the two groups is different, $t(2361) = 2.413$, df=2361, p = 0.0159. This probability is less than the .05 alpha level. OST participants had a mean standardized test score 18.203 points higher than non-OST participants with a 95% confidence interval of 3.409 to 32.998.

Hedges' g* was derived to determine the standard deviation difference between groups. A g* greater than 1 is evidence that the mean of one group is a full standard deviation higher than the other group (Grissom & Kim, 2005). Hedges' g* is derived with the following formula: $\bar{X}_1$-$\bar{X}_2/s*$ where $s*$ is the pooled standard deviation. For these results, g*=0.16 indicating that the standard difference between the OST group and the non-OST group is less than one standard deviation. An effect size of less than .2 is considered a small effect (Cohen, 1988). There was evidence of a small effect due to OST participation on standardized test scores.

Research Question Two: Research question two asked: To what extent is there a statistically significant relationship between OST participation variable and standardized test scores among black or African-American children of single parents who have applied for a competitive college scholarship program? A correlation coefficient indicates relationship strength (Howell, 2010). A scatterplot was created to determine if there were a relationship between OST participation and standardized test score. R's plot function was used to create the plot. R's abline function was used to add a regression line. The

regression line indicated a positive relationship between OST participation and standardized test scores. Plot results are displayed in Figure 3.

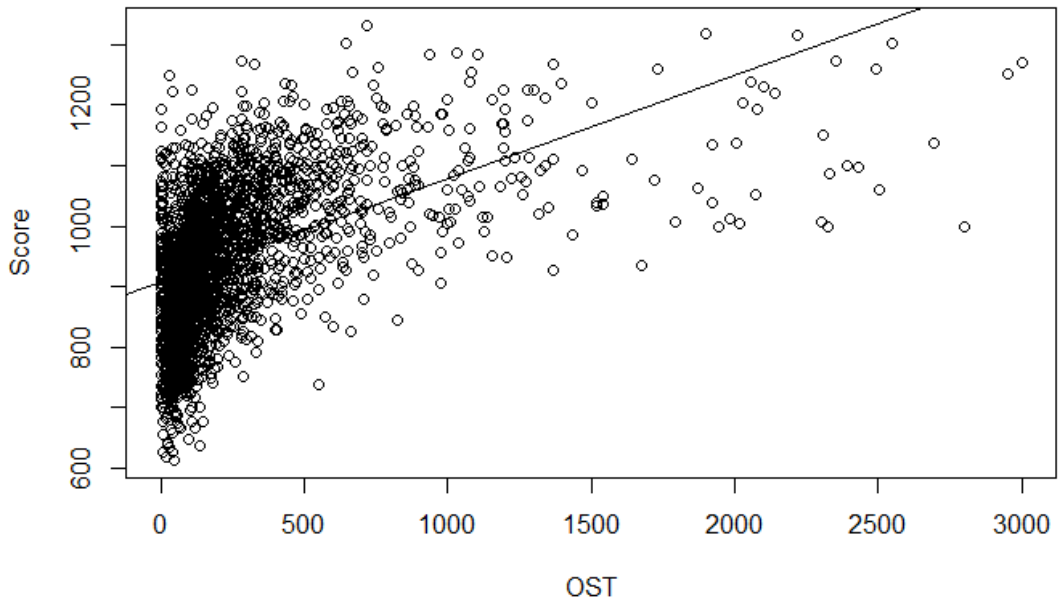

Figure 3. Plot of relationship between OST participation and SAT scores

A Pearson's Product Moment correlation is an appropriate method with continuous variables (Cohen & Lea, 2004). R's cor function was used to calculate the correlation. R's cor.test function was used to calculate the correlation p-value. Results were *r*=.4852, n=2364, p <.000. The scatterplot and correlation results give evidence of a positive relationship between OST participation and standardized test scores.

Research Question Two A: Male Sample. Research question two A asked: To what extent is there a statistically significant relationship between OST participation variable and standardized test scores among male black or African-American children of single parents who have applied for a competitive college scholarship program? The null hypothesis is OST participation does not contribute to standardized test scores for male students.

The mean male standardized test score for high OST participants is 999.67 with an SD of 97.52. The mean male standardized test score for low OST participants is 899.28 with an SD of 104.50. Overall, the mean male standardized test score is 943.33 with an SD of 113.02.

Four linear regression assumptions were tested: 1) linearity, 2) independence of errors, 3) homoscedasticity, and 4) normality of the error distribution (Howell, 2010). A scatterplot was developed to test for linearity. The Durbin-Watson Test was used to test for error independence. The Breusch-Pagan test was used to check for independence. The standardized test scores for constant error variance. Normality was tested by developing a residual plot of the errors. An outlier check was also completed. The diagnostics are displayed in Appendix D. The assumptions were satisfied. The linear regression procedure could proceed. R's lm function facilitated model completion.

Table 21

Male simple linear regression results

	B	SE	t	*p*
(Constant)	910.216	4.748	191.72	<.000
OST Participation	0.148	0.013	11.77	<.000
R^2=.1587				
Adj R^2=.1576				
F(1,734)=138.5, p<.000				

The model predicted 15.8% of the standardized test score variance. This model was significant at the .05 level (F(1,734)=138.5, p<.000). OST participation was a significant predictor (t=11.77, p<.000). The final model for male students is as follows: $\hat{Y}$=910.216 +0.148(X) where Y is the predicted standardized test score and X is OST participation. To interpret the model, every one hour of OST participation results in a 0.148 standardized test score increase.

Research Question Two B: Female Sample. Research question two A asked: To what extent is there a statistically significant relationship between OST participation variable and standardized test scores among female black or African-American children of single parents who have applied for a competitive college scholarship program? The null hypothesis is OST participation does not contribute to standardized test scores for female students.

The mean female standardized test score for high OST participants is 1009.32 with an SD of 106.1. The mean female standardized test score for low OST participants is 890.33 with an SD of 100.9. Overall, the mean female standardized test score is 952.94 with an SD of 119.47.

Four linear regression assumptions were tested: 1) linearity, 2) independence of errors, 3) homoscedasticity, and 4) normality of the error distribution (Howell, 2010). A scatterplot was developed to test for linearity. The Durbin-Watson Test was used to test for error independence. The Breusch-Pagan test was used to check for independence. The standardized test scores for constant error variance. Normality was tested by developing a residual plot of the errors. An outlier check was also completed. The diagnostics are displayed in Appendix D. The assumptions were satisfied. The linear regression procedure could proceed. R's lm function facilitated model completion.

Table 22

Female sample linear regression

	B	SE	t	*p*
(Constant)	906.7	3.175	285.87	<.000
OST Participation	.174	7.167	24.38	<.000
R^2=.2667				
Adj R^2=.2662				
F(1,1621)=589.5, p<.000				

The model predicted 26.6% of the standardized test score variance. This model was significant at the .05 level ($F(1,1621)=589.5$, $p<.000$). OST participation was a significant predictor ($t=24.38$, $p<.000$). The final model for female students is as follows: $\hat{Y}=906.7 +.174 (X)$ where Y is the predicted standardized test score and X is OST participation. To interpret the model, every one hour of OST participation results in a 0.148 standardized test score increase.

Research question two summary. A positive OST participation and standardized test score Pearson's Product Moment correlation was identified ($r=.4852$, $n=2364$, $p<.000$). Male and female simple linear regressions were completed. Standardized test scores were the dependent variable. OST participation was the independent variable. Table 23 summarizes the male-female differences.

Table 23

Comparison of male and female linear regression results

	OST β	Model R^2_{adj}	Model
Males	.148	.1576	$\hat{Y}=910.216 +.148(X)$
Female	.174	.2662	$\hat{Y}=906.7 +.174(X)$
Difference	.026	.1086	

The female model accounts for 10.9% more variance than the male model. In addition, there is an .026 point difference between the contribution OST participation makes per hour to the prediction of standardized test scores. The female β is .174 compared to the male β of .148. The female contribution is, therefore, 17.6% higher than the male contribution.

Research Question Three. Research question three examined whether OST participation is a standardized test score significant predictor. The research question investigated was: To what extent does OST participation contribute by gender to

standardized test performance of black or African-American children from single-parent families when controlling for high school GPA and parent education level among a sample of black or African-American children of single parents who have applied for a competitive college scholarship program? The null hypothesis was OST participation does not contribute by gender to the standardized test score performance for high achieving black or African-American children from single-parent families that apply to competitive college scholarship programs when controlling for high school GPA, and Parent Education Level. A multiple linear regression was the method used to investigate this question. The models were created by gender and sequence. The first models included GPA and OST. The second models included GPA, Parent Education Level, and OST. All assumption checks are available in Appendix E.

GPA and OST Participation models. Forward stepwise regression was used to determine the contribution GPA and OST participation make to standardized test scores. The entry order for the first sequence was GPA followed by OST. The entry order for the second sequence was reversed. Table 24 displays the male forward regression model results. The full regression tables are available in Appendix F.

Table 24

Male results summary

				Change Statistics				
First Sequence	*R*	R^2_{adj}	SE	R^2_{adj}	F	df1	df2	*p*
GPA	.1650	.1639	103.5	--	--	1	729	--
GPA+OST	.3090	.3071	94.2	.1432	18.7	2	728	0
Second Sequence								
OST	.1575	.1563	104.0	--	--	1	729	--
OST+GPA	.3090	.3071	91.7	.1508	26.6	2	728	0

Table 25 displays the coefficient table that defined the male forward regression formula.

Table 25

Male sample coefficient table

First Sequence		B	t	Sig
GPA	(Constant)	312.13	5.92	< 0.001***
	GPA	171.88	12.00	< 0.001***
GPA + OST	(Constant)	306.00	6.37	< 0.001***
	GPA	164.90	12.64	< 0.001***
	OST	0.1408	12.32	< 0.001***
Second Sequence				
OST	(Constant)	910.64	190.42	< 0.001***
	OST	0.1471	11.67	< 0.001***
OST + GPA	(Constant)	306.00	6.37	< 0.001***
	OST	0.1408	12.32	< 0.001***
	GPA	164.90	12.64	< 0.001***

A difference is noted in the male sample forward regression results. The model that included only GPA accounted for 16.4% of the standardized test score variance ($F(1,729)=144.1$, $p<.001$). The model that included only OST participation accounted for 15.6% of the standardized test score variance ($F(1,729)=136.2$, $p<.001$). The forward regression sequence results that included OST and GPA accounted for 30.7% of the standardized test score variance ($F(2,728)=162.8$, $p<.001$). Based on these results, the final male model is $\hat{Y}=306.00 + 164.9(X_1) + 0.1408(X_2)$ where X_1 is GPA and X_2 is OST participation. To interpret, for every one GPA unit increase, the model predicts a male standardized test score increase of 165.3. For every one OST hour increase, the model predicts a male standardized test score increase of 0.1408.

An identical analysis was conducted for the female sample. The entry order for the first sequence was GPA followed by OST which was reversed for the second

sequence. Table 26 displays the female forward regression model results. The full regression tables are available in Appendix F.

Table 26

Female results summary

				Change Statistics				
First Sequence	*R*	R^2_{adj}	SE	R^2_{adj}	F	df1	df2	*p*
GPA	.1483	.1478	110.3	--	--	1	1612	--
GPA+OST	.4150	.4143	91.45	.2665	290.8	2	1611	0
Second Sequence								
OST	.2662	.2657	102.4	--	--	1	1612	--
OST+GPA	.4150	.4143	91.5	.1486	-13.2	2	1611	0

Table 27 displays the coefficient table that defined the female forward regression formula.

Table 27

Female sample coefficient table

First Sequence		B	t	Sig
GPA	(Constant)	254.45	6.09	< 0.001***
	GPA	187.86	16.75	< 0.001***
GPA + OST	(Constant)	206.76	5.96	< 0.001***
	GPA	188.22	20.25	< 0.001***
	OST	0.1737	27.10	< 0.001***
Second Sequence				
OST	(Constant)	907.10	284.58	< 0.001***
	OST	0.1735	24.18	< 0.001***
OST + GPA	(Constant)	206.76	5.96	< 0.001***
	OST	0.1737	27.10	< 0.001***
	GPA	188.22	20.25	< 0.001***

A difference is noted in the female sample forward regression results. The model that included only GPA accounted for 14.8% of the standardized test score variance

(F(1,1612)=280.7, p<.001). The model that included only OST participation accounted for 26.6% of the standardized test score variance (F(1,1612)=584.7, p<.001).. The forward regression sequence results that included OST and GPA accounted for 41.4% of the standardized test score variance (F(2,1611)=571.5, p<.001). Based on these results, the final female model is $\hat{Y}=206.76 + 181.22(X_1) + 0.1737(X_2)$ where X_1 is GPA and X_2 is OST participation. To interpret, for every one GPA unit increase, the model predicts a female standardized test score increase of 181.5. For every one OST hour increase, the model predicts a female standardized test score increase of 0.1737.

GPA and OST model summary. Male and female multiple linear regressions were completed. Standardized test scores were the dependent variable. GPA and OST participation were the independent variable. Table 28 summarizes the male-female differences related to OST participation.

Table 28

Comparison of male-female multiple regression results related to OST participation

	OST β	Model R^2_{adj}	Model
Males	.1408	.3071	$\hat{Y}=306.00 + 164.90(X_1) +0.1408(X_2)$
Female	.1737	.4143	$\hat{Y}=206.76 +188.22(X_1) +0.1737(X_2)$
Difference	.0329	.1072	

The female model accounts for 10.8% more variance than the male model. In addition, there is a 0.329 point difference between the contribution OST participation makes to the prediction of standardized test scores. The female β is .1737 compared to the male β of .1408. The female model contribution is, therefore, 23.4% higher than the male model.

GPA, Parent Education Level and OST Participation models. Forward stepwise regression was used to determine the contribution GPA, Parent Education Level, and OST participation make to standardized test scores. The first sequence entry order was

GPA followed by Parent Education Level and OST participation level. The second sequence entry order was GPA, OST, and Parent Education Level. The third sequence entry order was Parent Education Level, GPA, and OST. The fourth sequence entry order was Parent Education Level, OST, and GPA. The fifth sequence entry order was OST, GPA, and Parent Education Level. The last sequence entry order was OST, Parent Education Level, and GPA. The purpose of completing six sequences was to ensure that OST participation was included as an entry with each variable.

For the male sample, 34 cases selected unknown for parent education level. These cases were removed from the data set leaving 702 cases. Table 29 displays the male forward regression model results. The model with the star indicates the best model as indicated by the model comparison. Models were selected based on the change in variance accounted for by adding the independent variable. The full regression tables and the ANOVA model comparisons are available in Appendix G.

Table 29

Male results summary

				Change Statistics				
First Sequence	*R*	R^2_{adj}	SE	R^2_{adj}	F	df1	df2	*p*
GPA	.1779	.1768	103.5	--	--	1	700	--
GPA+ PARED	..1816	.1793	102.3	.0025	-73.9	2	699	0
GPA+PARED+OST	.3219	.3189	93.19	.1396	32.83	3	698	0
Second Sequence								
GPA	.1779	.1768	103.5	--	--	1	700	--
GPA+ OST	.3170	.3150	93.46	.1382	10.7	2	699	0
GPA+OST+ PARED	.3219	.3189	93.19	.0039	-51.8	3	698	0
Third Sequence								
PARED	.0042	.0028	112.8	--	--	1	700	--
PARED+GPA	.1816	.1793	102.3	.1765	74.63	2	699	0
PARED+GPA+OST	.3219	.3189	93.19	.1396	32.83	3	698	0

				Change Statistics				
First Sequence	*R*	R^2_{adj}	SE	R^2_{adj}	F	df1	df2	*p*
Fourth Sequence								
PARED	.0041	.0028	112.8	--	--	1	700	--
PARED+OST	.1575	.1551	103.8	.1523	62.38	2	699	>0.4
PARED+OST+GPA	.3219	.3189	93.19	.1638	45.08	3	698	0
Fifth Sequence								
OST	.1520	.1508	104.1	--	--	1	700	--
OST+GPA	.3170	.3150	93.46	.1642	36.7	2	699	0
OST+GPA+PARED	.3219	.3189	93.19	.0039	-51.8	3	698	>0.4
Sixth Sequence								
OST	.1520	.1508	104.1	--	--	1	700	--
OST+PARED	.1575	.1551	103.8	.0043	-60.18	2	699	0
OST+PARED+GPA	.3219	.3189	93.19	.1638	45.08	3	698	0

Table 30 displays the coefficient table that defined the male forward regression formula.

Table 30

Male sample coefficient table

First Sequence		β	T	Sig
GPA	(Constant)	250.04	4.42	< 0.001***
	GPA	188.83	12.31	< 0.001***
GPA +	(Constant)	244.66	4.33	< 0.001***
PARED	GPA	188.58	12.31	< 0.001***
	PARED	13.79	1.78	0.0758.
GPA +	(Constant)	237.98	4.62	< 0.001***
PARED +	GPA	181.66	13.00	< 0.001***
OST	PARED	15.84	2.24	0.0253*
	OST	0.1378	12.01	< 0.001***

Second Sequence		β	T	Sig
GPA	(Constant)	250.04	4.42	< 0.001***
	GPA	188.83	12.31	< 0.001***
GPA + OST	(Constant)	244.18	4.73	< 0.001***
	GPA	181.98	12.99	< 0.001***
	OST	0.1372	11.93	< 0.001***
GPA + OST +	(Constant)	237.98	4.62	< 0.001***
PARED	GPA	181.66	13.00	< 0.001***
	OST	0.1378	12.01	< 0.001***
	PARED	15.84	2.24	0.0253*
Third Sequence				
PARED	(Constant)	937.66	162.52	< 0.001***
	PARED	14.65	1.72	0.0868.
PARED +	(Constant)	244.66	4.33	< 0.001***
GPA	PARED	13.79	1.78	0.0758.
	GPA	188.58	12.31	< 0.001***
PARED +	(Constant)	237.98	4.62	< 0.001***
GPA + OST	PARED	15.84	2.24	0.0383*
	GPA	181.66	13.00	< 0.001***
	OST	0.1378	12.01	< 0.001***
Fourth Sequence				
PARED	(Constant)	937.66	162.52	< 0.001***
	PARED	14.65	1.72	0.0868.
PARED +	(Constant)	904.12	148.54	< 0.001***
OST	PARED	16.77	2.131	0.0334*
	OST	0.1440	11.28	< 0.001***
PARED +	(Constant)	237.98	4.62	< 0.001***
OST + GPA	PARED	15.84	2.24	0.0383*
	OST	0.1378	12.01	< 0.001***
	GPA	181.66	13.00	< 0.001***
Fifth Sequence				
OST	(Constant)	911.91	186.9	< 0.001***
	OST	0.1433	11.2	< 0.001***
OST + GPA	(Constant)	244.18	4.73	< 0.001***
	OST	0.1372	11.93	< 0.001***
	GPA	181.98	12.99	< 0.001***
OST + GPA+	(Constant)	237.98	4.62	< 0.001***
PARED	OST	0.1378	12.01	< 0.001***
	GPA	181.66	13.00	< 0.001***
	PARED	15.84	2.24	0.0253*

Sixth Sequence		β	T	Sig
OST	(Constant)	911.91	186.9	< 0.001***
	OST	0.1433	11.2	< 0.001***
OST +	(Constant)	904.11	148.54	< 0.001***
PARED	OST	0.1440	11.28	< 0.001***
	PARED	16.77	2.131	< 0.001***
OST +	(Constant)	237.98	4.62	< 0.001***
PARED +	OST	0.1378	12.01	< 0.001***
GPA	PARED	15.84	2.24	0.0253*
	GPA	181.66	13.00	< 0.001***

Tables 29 and 30 indicate the several important elements. Table 30 displays that in each model OST participation was a significant predictor at the .05 level. Table 29 displays that in each model, OST participation added 13.8% to 15.2% of the variance accounted for in standardized test scores. Conversely, parent education level added less than 0.4% of the variance accounted for in male standardized test scores. Parent education level was not included in selected model due to this low contribution. The male prediction model selected is: $\hat{Y}=244.18 + 181.98(X_1) + 0.1372(X_2)$ where X_1 is GPA and X_2 is OST participation. To interpret the model, for every one point increase in GPA, standardized test scores increase 181.98. For every one hour increase in OST participation, standardized test scores increase 0.1372.

For the female sample, 56 cases selected unknown for parent education level. These cases were removed from the data set leaving 1558 cases. Table 31 displays the male forward regression model results. The full regression tables are available in Appendix G.

Table 31

Female results summary

				Change Statistics				
First Sequence	*R*	R^2_{adj}	SE	R^2_{adj}	F	df1	df2	*p*
GPA	.1800	.1795	106.4	--	--	1	1556	--
GPA+ PARED	.1942	.1932	105.5	.0137	-154.1	2	1555	0
GPA+PARED+OST	.4396	.4385	88.0	.2453	218.9	3	1554	0
Second Sequence								
GPA	.1800	.1795	106.4	--	--	1	1556	--
GPA+ OST	.4250	.4243	89.1	.2448	233.2	2	1555	0
GPA+OST+ PARED	.4396	.4385	87.99	.0142	-168.4	3	1554	0
Third Sequence								
PARED	.0161	.0155	116.5	--	--	1	1556	--
PARED+GPA	.1942	.1932	105.5	.1777	161.9	2	1555	0
PARED+GPA+OST	.4396	..4385	88.0	.2453	218.9	3	1554	0
Fourth Sequence								
PARED	.0161	.0155	116.5	--	--	1	1556	--
PARED+OST	.2722	.2713	100.2	.2558	265.3	2	1555	0
PARED+OST+GPA	.4396	.4385	88.0	.1672	115.5	3	1554	0
Fifth Sequence								
OST	.2557	.2553	101.3	--	--	1	1556	--
OST+GPA	.4250	.4243	89.1	.1690	40.0	2	1555	0
OST+GPA+PARED	.4396	.4385	88.0	.0142	-168.4	3	1554	0
Sixth Sequence								
OST	.2557	.2553	101.3	--	--	1	1556	--
OST+PARED	.2722	.2713	100.2	.0160	-243.9	2	1555	0
OST+PARED+GPA	.4396	.4385	88.0	.1672	115.5	3	1554	0

Table 32 displays the coefficient table that defined the male forward regression formula.

Table 32

Female sample coefficient table

First Sequence		β	t	Sig
GPA	(Constant)	209.02	5.15	< 0.001***
	GPA	201.28	18.48	< 0.001***
GPA + PARED	(Constant)	200.49	4.98	< 0.001***
	GPA	200.24	18.54	< 0.001***
	PARED	28.22	5.24	< 0.001***
GPA + PARED + OST	(Constant)	179.2	5.33	< 0.001***
	GPA	194.2	21.54	< 0.001***
	PARED	28.6	6.36	< 0.001***
	OST	0.1635	26.09	< 0.001***
Second Sequence		β	t	Sig
GPA	(Constant)	209.02	5.15	< 0.001***
	GPA	201.28	18.48	< 0.001***
GPA + OST	(Constant)	187.8	5.53	< 0.001***
	GPA	195.3	21.40	< 0.001***
	OST	0.1634	25.74	< 0.001***
GPA + OST + PARED	(Constant)	179.2	5.33	< 0.001***
	GPA	194.2	21.54	< 0.001***
	OST	0.1634	26.09	< 0.001***
	PARED	28.57	6.36	< 0.001***
Third Sequence				
PARED	(Constant)	943.86	239.5	< 0.001***
	PARED	30.05	5.05	< 0.001***
PARED + GPA	(Constant)	200.49	4.98	< 0.001***
	PARED	28.22	5.24	< 0.001***
	GPA	200.24	18.54	<0.001***
PARED + GPA + OST	(Constant)	179.2	5.33	< 0.001***
	PARED	28.57	6.36	< 0.001***
	GPA	194.2	21.54	< 0.001***
	OST	0.1635	26.09	< 0.001***
Fourth Sequence				
PARED	(Constant)	943.86	239.5	< 0.001***
	PARED	30.05	5.05	< 0.001***
PARED + OST	(Constant)	899.2	231.03	< 0.001***
	PARED	30.35	5.93	< 0.001***
	OST	0.1670	23.39	< 0.001***
PARED + OST + GPA	(Constant)	179.2	5.33	< 0.001***
	PARED	28.57	6.36	< 0.001***
	OST	0.1635	26.09	< 0.001***
	GPA	184.2	21.54	< 0.001***

Fifth Sequence		β	t	Sig
OST	(Constant)	912.5	284.34	< 0.001***
	OST	0.1669	23.12	< 0.001***
OST + GPA	(Constant)	187.8	5.53	< 0.001***
	OST	0.1634	25.74	< 0.001***
	GPA	195.3	21.40	< 0.001***
OST + GPA+	(Constant)	179.2	5.33	< 0.001***
PARED	OST	0.1635	26.09	< 0.001***
	GPA	194.2	21.54	< 0.001***
	PARED	28.57	6.36	< 0.001***
Sixth Sequence				
OST	(Constant)	912.5	284.34	< 0.001***
	OST	0.1669	23.12	< 0.001***
OST +	(Constant)	899.2	231.03	< 0.001***
PARED	OST	0.1670	23.39	< 0.001***
	PARED	30.35	5.93	< 0.001***
OST +	(Constant)	179.2	5.33	< 0.001***
PARED +	OST	0.1635	26.09	< 0.001***
GPA	PARED	28.57	6.36	< 0.001***
	GPA	194.2	21.54	< 0.001***

Tables 31 and 32 indicate the several important elements. Table 32 displays that in each model OST participation was a significant predictor at the .05 level. Table 31 displays that in each model, OST participation added 24.5% to 25.6% of the variance accounted for in female standardized test scores. GPA added approximately 18% to the accounted for standardized test score variance. Parent education level added approximately 1.5% to the accounted for standardized test score variance. The female prediction model selected is: $\hat{Y}=179.2 + 194.2(X_1) + 28.6(X_2) + 0.1635(X_3)$ where X_1 is GPA, X_2 is parent education level, and X_3 is OST participation. To interpret the model, for every one point increase in GPA, standardized test scores increase 194.2. A high parent education level adds 28.6 points to the standardized test score. For every one hour increase in OST participation, standardized test scores increase 0.1635.

GPA, Parent Education Level, and OST model summary. Male and female multiple linear regressions were completed. Standardized test scores were the dependent variable. GPA, Parent Education Level, and OST participation were the independent variable. Table 33 summarizes the male-female differences related to OST participation.

Table 33

Comparison of male-female multiple regression results related to OST participation

Model IVs	OST β Male	R^2_{adj} Male	OST β Female	R^2_{adj} Female	OST β Difference	R^2_{adj} Difference
OST	.1433	.1508	.1669	.2553	.0236	.1045
OST, GPA	.1372	.3150	.1634	.4243	.0262	.1093
OST, PARED	.1440	.1551	.1670	..2713	.0230	.1162
OST, GPA, PARED	.1378	.3189	.1635	..4385	.0257	.1196
Final Male Model		$\hat{Y}$=244.18 + 181.98(GPA) + 0.1372(OST)				
Finale Female Model		$\hat{Y}$=179.2 + 194.2(GPA) + 28.6(PARED) + 0.1635(OST)				

OST participation in the female models accounts for 10.5% to 12.0% more standardized test score variance than the male models. There is a 0.23 to 0.262 point gender difference between the contribution OST participation makes to the prediction of standardized test scores. The female β is 0.1669 compared to the male β of 0.1433 in OST only models (16.5% difference). The female β is 0.1634 compared to the male β of 0.1372 in OST and GPA models (19.1% difference). The female β is 0.1670 compared to the male β of 0.1440 in OST and parent education level models (16.0% difference). The female β is 0.1635 compared to the male β of 0.1378 in OST, GPA and parent education level models (18.7% difference).

An important male-female difference is noted in the final models. Parent education level is dummy coded for high (1) and low (0) levels. High parent education level represents some college or beyond educational attainment. Low parent education

level represents a high school or lower educational attainment. This variable was not included in the final male model. It added less than 0.4% to the variance accounted for in standardized test scores. For females, parent education level added approximately 1.5% to the accounted for standardized test score variance. This variable is, therefore, included in the final female model.

Summary

High achieving black or African American children of single parents that apply to competitive college scholarship programs comprised the sample. The sample description outlined differences between the sample and overall population. The sample had higher academic performance, and higher rates of OST participation when compared to the overall population of black or African American children of single parents.

OST participation did have a positive impact on standardized test scores for this population. The score difference between high achieving black or African American students of single parents that apply to competitive college scholarship programs that did and did not participate in OST activities was the focus of the first research question. There was statistically significant evidence of a difference (t_{2361}=2.413, p=.0159). The OST participants had a 952.47 mean standardized test score while non-OST participants had a 934.27 mean standardized test score. Effect size results indicated that OST participation had a small effect on standardized test scores. Hedges' g* results indicated that the mean test score for OST participants is 0.16 deviations greater than non-OST participants. While there was evidence of an effect for this population, it was a small effect.

A scatterplot was developed to identify the focus population OST participation and standardized test score relationship. The line of best fit indicated a positive relationship. This relationship was confirmed through a Pearson's Product Moment correlation. A positive and statistically significant relationship was identified (r=.4852, n=2364, p<.000). The sample was divided into male and female subsets. Simple linear regressions were developed by gender. Standardized test scores were the dependent variable and OST participation was the independent variable. OST participation accounted for 15.8% of male standardized test scores. OST participation predicts a 0.148 male standardized test scores increase per additional participation hour. OST participation accounted for 26.7% of female standardized test scores. OST participation predicts a 0.174 female standardized test scores increase per additional participation hour. The female model accounted for 10.9% more of the standardized test score variance when compared to the male model. The OST contribution to standardized test scores was 17.6% higher in the female model when compared to the male model.

Multiple linear regressions by gender were conducted to determine the contribution OST participation makes to standardized test scores. The first multiple regression included OST participation and GPA as independent variables. A forward stepwise regression was applied. OST participation predicted 30.7% of the male standardized test score variance and 41.4% of the female standardized test score variance. The final male prediction model was $\hat{Y}=306 + 164.9(X_1) + 0.1408(X_2)$ where X_1 is GPA and X_2 is OST participation. To explain the model, for every one unit increase in GPA, male standardized test scores increase 164.9 points. For every one hour increase in OST participation, male standardized test scores increase 0.1408. The final female prediction

model was $\hat{Y}=206.76 + 188.22(X_1) + 0.1737(X_2)$ where X_1 is GPA and X_2 is OST participation. To explain the model, for every one unit increase in GPA, female standardized test scores increase 188.22 points. For every one hour increase in OST participation, male standardized test scores increase 0.1737.

Parent education level was added in a second multiple linear regression model series. Forward stepwise regressions were conducted. The model selected was based on the change in the standardized test score variance accounted for by the models (Neter, Kutner, Nachtsheim & Wasserman, 1996). For males, the final model was $\hat{Y}=244.18 + 181.98(X_1) + 0.1372(X_2)$ where X_1 is GPA and X_2 is OST participation. To explain the model, for every one unit increase in GPA, male standardized test scores increase 181.98 points. For every one hour increase in OST participation, male standardized test scores increase 0.1372. The results associated with this model accounted for 31.5% of the male standardized test score variance. OST participation increased the variance accounted for 13.8%. For females, the final model was $\hat{Y} =179.2 + 194.2(X_1) + 28.6(X_2) + 0.1635(X_3)$ where X_1 is GPA, X_2 is parent education level, and X_3 is OST participation. To explain the model, for every one unit increase in GPA, female standardized test scores increase 194.2 points. Female students that have some college or beyond educated parents have standardized test scores 28.6 points higher than students with parents that have lower education levels. For every one hour increase in OST participation, female standardized test scores increase 0.1635. The results associated with this model accounted for 43.9% of the female standardized test score variance. OST participation increased the variance accounted for 24.5%.

Two differences were evident between male and female results. The first is that the female model accounted for 12.4% overall greater variance in standardized test scores. OST participation accounted for 10.7% more variance in the female model (24.5%) when compared to the male model (13.8%). The second difference is that parent education level is not included in the male model. The reason for this is that parent education level contributed only 0.3% to accounted for male standardized test score variance while contributing 1.4% in the female model. These results are further explored in Chapter Five.

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Chapter Five

Introduction

The study purpose was to identify whether OST programs are associated with an increase in standardized test scores for black or African-American children of single parents overall and by gender. The sample demographics reveal that study results are associated with high achieving black or African American children of single parents. The study contribution is that OST program participation impacts standardized test scores for the focus population. Policies and budget decisions related to OST programs as an intervention to increase college admittance and admittance to more selective institutions can be informed by these results.

The study responded to three research gaps. The study emphasis on OST participation impact for black children of single parents was the first gap fulfilled. The high percentage of black children being raised by single parents informs on this research gap importance. It is estimated that 66% of black or African American children are being raised in single parent families (Annie E. Casey Foundation, 2012). The study emphasis on the gender differential for OST participation impact on standardized test performance was the second research gap fulfilled. No identified studies examined the gender OST participation differential. The study emphasis on high achieving black or African American children was the third research gap fulfilled. No identified studies specifically focused on this population. A final study contribution is that few studies focused on OST participation and college entrance exams. Two studies identified a positive relationship between OST participation and college entrance exams (Anderson & Muzak, 2012; Craft, 2012). This study contributes to this limited literature base.

Six major findings were identified. One, OST participation does have an impact on standardized test performance for high achieving black or African American children of single parents. A comparison of standardized test scores for students that do and do not participate in OST activities demonstrated this. Two, the OST participation level impacts standardized test performance for the focus population. Correlations between OST participation and standardized test scores and regression analyses demonstrated this. Three, there are gender differences in test performance related to OST participation. OST levels appear more impactful on standardized test scores for black or African-American female children of single parents at the lower OST participation levels when compared to males. Four, parent education level is not an important standardized test score performance predictor. Five is OST participation accounts for similar or greater test score variance than GPA depending on gender. Six is the potential contribution policy makers can have on helping their students gain admission to a more selective IHEs. These findings are discussed in more detail in the subsequent sections.

The results presented in Chapter Four are first reviewed. The six major findings are then discussed more in depth. The study conceptual framework is revisited based on the study results. Policy and practice implications are then presented. The discussion closes with suggestions for further research and final reflections.

Results Summary

Research Question One. The first research question was: To what extent is there a statistically significant difference in mean standardized test scores among black or African-American children of single parents who have applied for a competitive college scholarship program given their participation in Out-of-School Time (OST) programs?

An independent samples t-test was conducted to identify if there was a statistically significant difference in test scores between students that do and do not participate in OST programs. A statistically significant difference was identified. The null hypothesis of no difference was rejected. The mean difference between the two-groups was 18.203. When the 95% confidence interval is considered, the difference is between 3.41 and 33 points.

Research Question Two. The second research question was: To what extent is there a statistically significant relationship between OST participation variable and standardized test scores among black or African-American children of single parents who have applied for a competitive college scholarship program? A positive relationship was identified through a statistically significant Pearson's Product Moment correlation result (r=.4852, p<.000). Research questions two-A and B considered the contribution OST participation made to standardized test scores by gender. Simple linear regressions were conducted. Standardized test scores were the dependent variable. OST participation was the independent variable. OST was a significant standardized test score predictor for males and females. The female model (26.7%) accounted for 10.9% more accounted for variance than the male model (15.8%). The final male regression model was $\hat{Y}=910.216 + 0.148(X_1)$ where X_1 is OST participation. For every one hour increase in male OST participation, standardized test scores increase 0.148. The final female regression model was $\hat{Y}=906.7 + 0.174(X_1)$ where X_1 is OST participation. For every one hour increase in female OST participation, standardized test scores increase 0.174.

Research Question Three. Research question three was: To what extent does OST participation contribute by gender to standardized test performance of black or

African-American children from single-parent families when controlling for high school GPA and parent education level among a sample of black or African-American children of single parents who have applied for a competitive college scholarship program? A forward stepwise regression was conducted to identify the extent that OST participation contributes to standardized test score performance. The first model sequence included GPA and OST participation. All entry order combinations were attempted. GPA and OST participation were statistically significant standardized test score predictors. The female model (41.4%) accounted for 10.7% more of the test score variance than the male model (30.7%). The final male regression model was $\hat{Y}=306 + 164.9(X_1) +0.1408(X_2)$ where X_1 is GPA and X_2 is OST participation. The final female regression model was $\hat{Y}=206.76 + 188.22(X_1) +0.1737(X_2)$ where X_1 is GPA and X_2 is OST participation.

The second model sequence included GPA, parent education level, and OST participation. All entry order combinations were attempted. GPA and OST participation were statistically significant standardized test score predictors in all models. Parent education level was a statistically significant predictor in all female model combinations and in the male models that included all variables. The selected female model (43.9%) accounted for 12.4% more of the test score variance than the male model (31.5%). OST participation contributed 23.5% of the female model accounted for variance and 17.8% of the male model accounted for variance. The final male regression model was $\hat{Y}=244.18 + 181.98(X_1) +0.1372 (X_2)$ where X_1 is GPA and X_2 is OST participation. The final female regression model was $\hat{Y}=179.2 + 194.2(X_1) +28.6(X_2) +0.1635(X_2)$ where X_1 is GPA, X_2 is parent education level, and X_3 is OST participation. The male model did not include

parent education level because it added only 0.3% of the accounted for standardized test score variance.

Findings

There are six major findings. These findings relate to a specific population of high achieving black or African American children of single parents that apply to national scholarship programs. As noted in Table 11, sample student GPAs are a full point higher than national averages. The sample GPA is 3.7 while the national African American GPA is 2.69. The sample also has higher overall mean SAT scores (84 points higher) and by gender (males: 70 points higher, females: 91 points higher). This provides the study generalizability context.

Finding One: OST Participants have Higher Standardized Test Scores than Non-Participants. The first research question identified a mean difference in test scores between students that do and do not participate in OST programs for black or African-American children of single parents. The score difference is from 3.5 to 33.0 points. While there is a small difference, the evidence does suggest that OST participation is of value to black or African American children of single parents in increasing standardized test scores. In addition, there is a moderate correlation (r=.4828, p<.000) between OST participation and standardized test scores. Correlations between +/- .3 and +/-.5 are considered moderate correlations (Cohen & Lea, 2004).

OST participants performing higher on standardized tests is consistent with previous studies. Of the 30 original and secondary source studies cited, 25 (83.3%) found a test score impact on all or part of the study participant populations. Two studies focused on college entrance exams. Anderson and Muzak (2012) found that debate league

participants had statistically significantly greater ACT scores than non-participants. Craft (2012) found that school club participants had higher SAT scores than non-participants. Craft further noted that sports and music participants did not have statistically significantly higher SAT scores. Evidence that OST participation positively impacts college entrance exam standardized test scores for the focus population is the major contribution to this literature base.

Why OST participation impacts standardized test scores is the important question. The cultural capital theoretical framework may provide an answer. This theory suggested that educational attainment derives from family and community networks rather than talent and achievement (Swartz, 1997). Cultural capital is built through these networks (Bourdieu & Passeron, 1990). The cultural capital manifestations are the resources provided by the family and community networks. Verbal facility, cultural awareness, educational credentials and other elements that create opportunities are the resources provided (Swartz, 1997). The cultural capital definition notes that the societal structure is maintained through the positive reinforcement given to individuals that have greater cultural opportunities (Bourdieu & Passeron, 1990). Schools serve as an institutionalized form of cultural capital that is linked to social inequality because of the generational transmission of cultural capital (Bourdieu & Passeron, 1990). These family and community networks are monopolized by individuals and groups (Laureau & Weiniger, 2003).

This study focused on high achieving black or African American children of single parents. The high performing nature of the sample indicates that the family networks may be successfully developing cultural capital. The OST participation

community networks further develop cultural capital. The demonstrated OST participation relationship to standardized test scores may represent a way that the cultural capital has been further developed. The evidence that high achieving students that participate in OST activities have higher standardized test scores may have a relationship to increased cultural capital. The OST activity provider may be a type of community network that provides these resources such as cultural awareness or activities that create cultural opportunity.

This brings the discussion to the habitus concept as part of the cultural capital theory. Habitus is the subjective outlook individuals have on how they operate in their environment based on feedback they typically receive from the external environment (Bourdieu & Passeron, 1990). OST participation may impact the feedback high achieving black or African American children receive from their external environment which, therefore, positively reforms the subjective outlook the children have of themselves. The congruence between the external environment feedback and habitus is analogous to self-efficacy (Bandura, 1994). OST participation, therefore, provides opportunities to develop cultural capital which impacts self-efficacy and academic achievement. This may explain why black or African American children that participate in OST activities have higher standardized test scores than children who do not.

Finding Two: OST Participation Level is Important. A consistency is noted in the contribution OST participation makes to standardized test scores. In the three male prediction models, the β and the accounted for variance added by OST was similar: simple linear regression (β=0.148, R^2_{adj} change=.1576); first multiple regression model (β=.1408, R^2_{adj} change=.1432); second multiple regression model (β=.1372, R^2_{adj}

change=.1382). For males, the OST participation level contribution to standardized test scores is 0.1372 to 0.148. As a reminder, even though the first and second regression models included GPA and OST, a slight difference is not surprising. The parent education level for 34 cases was unknown. These cases were removed from the analysis which may have caused slight variations even though the second and third models were identical.

In the three female prediction models, the β and the accounted for variance added by OST was also similar: simple linear regression (β=0.174, R^2_{adj} change=.2667); first multiple regression model (β=0.1737, R^2_{adj} change=.2665); second multiple regression model (β=0.1635, R^2_{adj} change=.2453). For females, the OST high participation level contribution to standardized test scores is 0.1635 to 0.174.

This finding is consistent with three studies that considered engagement level in OST programs. The Chicago Debate League study found that students that participated in more debates had higher ACT scores than students that participated in fewer debates (Anderson & Muzak, 2012). The Urban After-Schools Programs study compared DRA standardized test scores by program engagement level. This study found that highly engaged students had higher reading achievement scores than students with low engagement levels (Mahoney, Lord & Carryl, 2005). The San Francisco Beacon Initiative found that program attendees had CST math achievement scores 1.4 standardized scale points greater than non-participants (Yu, Len, Leufgen & Rubin, 2008). Students that attended at least 60% of the time over a two-year period, however, had CST math achievement scores 2.4 standardized scale points greater than non-participants (Yu, Len,

Leufgen & Rubin, 2008). No other studies explicitly focused on participation level other than non-specific references to regular attendance.

Cultural capital theory was related to finding one. OST participation can help high achieving black or African American children of single parents develop their self-efficacy and promote academic achievement which would help to break the monopoly individuals and groups have on the generational transmission of cultural capital. The increased OST participation time impact on standardized test scores may represent a way that students maximize the resources gained from OST participation. The increased time represents an increase in opportunities to develop cultural capital. High achieving black or African American children of single parents maximize the knowledge and skills required to negotiate their educational experience through OST participation above what is gained from their family networks which are the more traditional methods of generationally transmitting cultural capital (Bourdieu and Passeron, 1990). This finding represents a way that children can overcome the bias in schools that, according to Lamont and Lareau (1988), represent the dominant class. Simply stated, the more a student participates in OST activities, the greater opportunities they have and the greater cultural capital they acquire.

Finding Three: OST Impact Differs by Gender for Black or African American Children of Single Parents. Research questions two and three considered gender. There is a consistent difference between the male and female results. Female βs and OST R^2_{adj} were consistently higher than males. The simple linear regression β difference was .034 and the OST R^2_{adj} difference was .109. In the first multiple linear regression that included GPA and OST as independent variables, the β difference was

0.033 and the OST R^2_{adj} difference was .107. In the second multiple linear regression that included GPA, OST, and parent education level, the β difference was from 0.023 to 0.262 and the OST R^2_{adj} difference was from .1045 to .1196.

Findings one and two discussed how OST participation is beneficial to the students in developing cultural capital. Females appear to derive OST activity network benefits related to standardized test scores at greater levels than males. Why this gender difference is present is the important question. Studies specific to standardized test scores gender were not prolific in the literature. Although gender is often included as independent variables, results related to this are not widely discussed. The BUGS study did focus on females and identified a standardized test score impact but this was a gender specific program (Tyler-Wood, Ellison, Lim, & Periathiruvadi, 2012). Sinha (2012) also studied gender differences and found no statistically significant differences between OST participant and non-participant standardized test scores. Sinha (2012) did not compare female and male OST participants.

Activity type may reveal why this difference is evident. There is some evidence of OST program type gender differences. Males participate in more sports related activities while girls are more involved in academics and socializing (Hofferth & Jankuniene, 2001; Posner & Vandell, 1999). Craft (2012) found that students that participate in school clubs observed statistically significantly greater standardized test scores than non-participants while sports participants did not observe statistically significantly greater scores. It is possible that academic and social OST activities provide community networks that provide greater resources, language facility is an example, that can be developed through sport activities. OST activities alternative to sports may more impact

the subjective outlook the students have on how to operate in their environment because of the feedback they receive. This analysis did not partition OST activity by type. If males have higher sports participation than females, this may inform on the gender difference. The gender difference related to parent education level is discussed in a subsequent finding.

Finding Four: Parent Education Level Not an Important Predictor of Standardized Test Score Performance for High Achieving Black or African American Children of Single Parents. High and low parent education levels were considered by this study. A high education level represented some college or beyond. A low education level represented a high school education or lower. For female students, a high parent education level of college or beyond accounts for only 1.4% of the standardized test score variance. The β was 28.57. For male students, a high parent education level of college or beyond accounts for only 0.3% of the standardized test score variance. The β was 15.84. Because of this low contribution in variance accounted for, parent education level was not included in the final male model. This is the gender difference noted referred to in Finding Three.

This finding is contrary to the available literature. Marchant and Paulson (2005) included parent education in a model to predict individual SAT scores. The study found that parent education was a statistically significant standardized test score predictor ($\beta=68$, $p<.001$). The 2010 College-Bound Seniors Total Group Profile revealed that students of parents with higher education levels score higher on the SAT (College Board, 2010). For example, parents that have earned a graduate degree have children with a

mean 561critical reading scores while those with a high school diploma have a mean 464 critical reading score (College Board, 2010).

The high achieving sample nature may explain this. As noted, the sample had higher GPA and standardized test score means. The 2010 College-Bound Seniors Total Group Profile revealed that SAT scores increase as GPA increases (College Board, 2010). Students with a GPA equivalent to an A have a 584 mean SAT mathematics score. Students with a GPA equivalent to a B have a 462 mean SAT mathematics score (College Board, 2010). For high achieving black or African American students of single parents, their academic achievement may be more impactful than the parent education level achieved.

Cultural capital development may also be related to this area. The OST community networks for high achieving black or African American children of single parents may provide resources independent from the family networks. Rather than providing resources the students do not have, cultural capital is maximized through OST participation. Scott and Marshall (2007) posited that the cultural capital a person has is the result of the degree of symmetry or conflict between the environment and the habitus. The high achieving students already have a positive outlook on how they are to operate in an academic environment. High OST participation for high achieving students increases the symmetry between the expectations they receive from their environment and the expectations they have of themselves.

Finding Five: OST Participation and GPA Account for Less Standardized Test Score Variance for Males. OST Participation Accounts for More Test Score Variance for Females. Another gender difference is revealed when variance accounted

for is examined. In the male multiple regression, OST participation accounted for approximately 14% of the standardized test score variance. This is less than the test score variance accounted for by GPA (approximately 18%).

Female OST participation accounts for more standardized test score variance than GPA. OST participation accounted for approximately 25% of the female standardized test scores. GPA accounted for approximately 18%. This may be associated with the Finding Three suppositions related to OST participation types by gender.

Finding Six: Selective Institution Admittance Opportunity. Selective institutions based on admittance rates have students with higher SAT score means. The institutions with admittance rates between 1%-20% have a combined SAT critical reading and mathematics average of 1254. The institutions with admittance rates between 20%-40% have a combined SAT critical reading and mathematics average of 1070 which is 184 points lower than the mean for the most selective institutions. The institutions with admittance rates between 40%-60% have a combined SAT critical reading and mathematics average of 953 which is 117 points lower than the institutions that accept 20%-40% of the students.

As noted in finding two, the multiple regression models predicts that a male student will have standardized test scores .1372 to .1440 points per one hour OST participation increases. The multiple regression models predicts that a female student will have standardized test scores .1634 to .1670 points per one hour OST participation increases. There are numerous impacts associated with attending a more selective institution which the conclusion section explores.

Conclusion

There is a consistent theme in the first three study findings. There is evidence that high achieving black or African American children of single parents that participate in OST programs have higher standardized test scores than non-participants. This is also limited to students that apply to national scholarship programs. The OST programs provide the students with opportunities to develop cultural capital above what has been developed in their family networks. The participation refines the subjective outlook the students have on how to operate in their environment because of the feedback they receive through the OST programs. The OST participation represents a community network that increases student self-efficacy and academic achievement. There is further evidence that greater OST participation provides a higher return in terms of standardized test scores. This is especially true for female students. Female students derive a standardized test score return higher than male students. For each gender, by providing the cultural capital required for school success, OST participation significantly improves academic achievement for black or African American children of single parents.

A study conclusion consistent with the first three findings also relates to the conceptual framework. The framework noted that the OST participation empirical benefits were academic performance, social skill development and self-efficacy. A theoretical benefit was increased standardized test scores. The evidence supports the conclusion that increased standardized test scores for black or African American children of single parents are an empirical OST participation benefit.

A final conclusion is that the study evidence presents an opportunity for policy makers. OST programs represent a proactive intervention to increase standardized test

scores for black or African American children of single parents. OST programs, therefore, are a worthy investment for school districts, governmental agencies, and other funders that seek positive returns in terms of student outcomes.

Conceptual Framework

Investigating the impact of OST participation on higher standardized test scores was the study purpose. Evidence of a standardized test score benefit for black or African-American children of single parents that apply to national scholarship programs was found. Two conceptual framework revisions are supported. Higher standardized test scores are now an empirical benefit rather than a theoretical benefit. Increased acceptance into more selective IHEs is a second framework revision. This is illustrated in Figure 4.

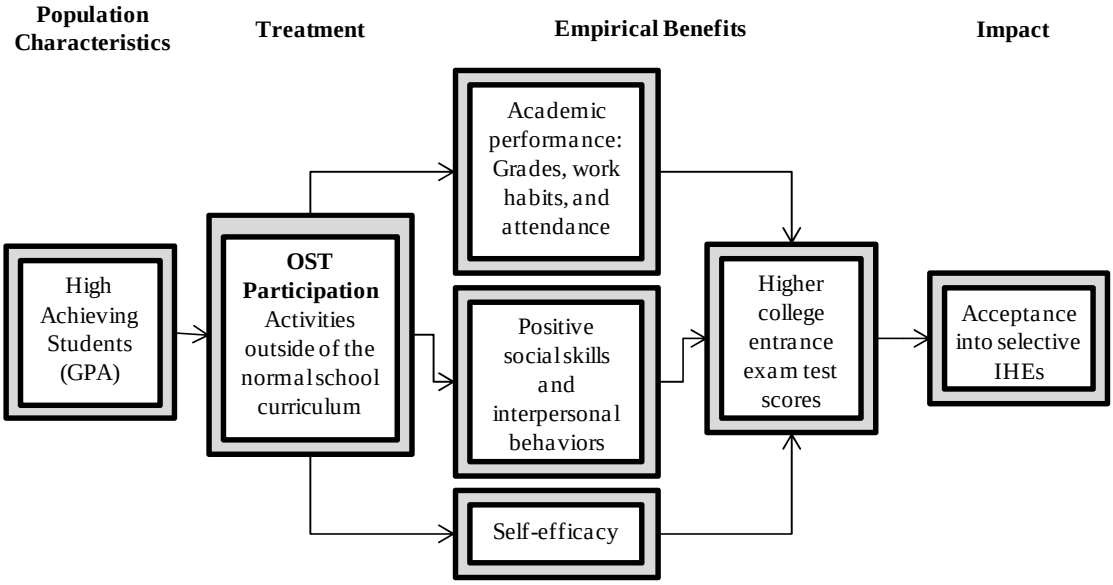

Figure 4. Revised conceptual framework linking OST participation with higher standardized test scores based on study findings.

The literature review noted that standardized test scores at selective institutions are higher than less selective institutions in terms of acceptance rates. The expanded conceptual model posits that increased test scores will result in increased acceptance rates to selective institutions. Minority students yield important benefits by attending more

selective institutions. Support resources, degree attainment, and monetary return are the benefits.

Support Resources. Support resources are the first benefit. Tinto (1975) posited that student persistence is the result of academic and social integration into the institution. Academic characteristics, academic goals, interactions with peers and faculty, and other out-of-classroom factors influence this integration (Jenson, 2011). It is noteworthy that the integration influences cited by Jensen (2011) are representative of the cultural capital of a student and the habitus concept. Specifically, student performance self-expectations (i.e. goals) are influenced by the expectations of the external environment (i.e. peer and faculty interactions). Institutions, therefore, can provide minority students with cultural capital opportunities to support their ability to overcome persistence barriers and succeed in degree attainment (Tierney, 2004). In summarizing research on student retention, Jenson (2011) noted that academic integration is impacted by the ability to join major related academic clubs and have undergraduate research experiences with a professor. Academic clubs and undergraduate research experiences are representative of OST activities at the post-secondary level. Using IPEDS data, Hillman (2012) noted that highly selective institutions have more academic resources to provide experiences such as undergraduate research. This indicates that selective institutions likely have greater resources to provide students with the types of experiences that give the students more opportunities to develop their cultural capital.

Degree Attainment. Degree attainment is a second benefit. Melguizo (2008) utilized National Education Longitudinal Study data to examine the impact of attending selective institutions by race and ethnicity. The study found that African American

students that attend institutions with average SAT scores higher than 1240 are more likely to complete a bachelor's degree. Melguizo (2010) also identified that minority students that were selected for a national scholarship program were slightly more likely to graduate if they attend more selective institutions. The logistic regression examined students that attend the most selective (1250 SAT score average or higher), highly selective (SAT score of 1150 to 1250), very selective (SAT score of 1050 to 1150) and nonselective (SAT score less than 1050) institutions. Additional studies have documented that institutional selectivity is associated with higher college completion rates for minority students (Alon & Tienda, 2005; Astin, 1985; Bowen, et al., 2009; Bowen & Bok, 1998; Kane, 1998). This information supports efforts to increase test scores so students can attend more selective institutions for undergraduate degree attainment.

Economic Benefits. Third, there are economic benefits of attending more selective institutions. Dale and Kruger (2011) investigated the monetary return of attending a selective institution. Using data from the 2002 College and Beyond Survey linked to detailed earnings records from the Social Security Administration, the study found that the monetary return is high for minority students that attend a selective institution. Wages are the monetary return. Selectivity is based on acceptance rates. As opposed to minority students and students of parents with lower education levels, non-minority students and students with parents that have higher levels of education did not realize greater monetary returns due to selective institution attendance (Dale & Kruger, 2011).

Why these benefits are noted for minority students and students of parents with lower education levels is the question. A possible explanation, the authors surmise, is that

more selective IHEs provide the students access to networks that would not otherwise be available to them (Dale & Kruger, 2011). This supposition directly relates to the theoretical and conceptual frameworks that guided this study. Bourdieu's cultural capital theory maintains that cultural habits and temperaments gained through networks are profit generating resources (Lareau & Weiniger, 2003). Findings related to the monetary gains of attending more selective institutions (Dale & Kruger, 2011) provide a tangible perspective on the importance of increasing test scores. Identifying ways, therefore, to enable black and African-American students of single parents to gain access to more selective institutions has great longitudinal benefits. Investing in OST programs to increase standardized test scores is a worthy investment for black or African American children of single parents.

Implications for Policy and Practice

The more in-depth conceptual framework informs the implications for policy and practice. The policy implications are specific to high achieving black or African American students of single parents that apply to competitive college scholarship programs. This analysis gives evidence of a positive intervention than can maximize the student educational attainment.

School Level. At the school level, mandating OST participation would not be a reasonable policy. There are steps, however, that can be taken to increase OST participation. A positive policy and practice intervention may include developing programs or assessments that assist students and their parents in identifying interests so that OST participation may increase. Having the interest areas defined can help the families and institutions identify OST programs.

A policy and practice targeted intervention may also involve the education of parents and high achieving students on the potential benefits of OST participation. As the study sample was most representative of high performing black or African American children from single parent families, targeted education and outreach methods to this population would target those that would most benefit from education efforts. The education focus would be to communicate that one benefit of OST participation is improved standardized test performance which can increase the likelihood that a student would gain admittance to a more selective institution and potentially increase career opportunities. This analysis gives evidence that OST participation provides students opportunities to maximize their cultural capital. It was earlier discussed that the OST community networks for high achieving black or African American children of single parents may provide resources independent from the family networks. Rather than providing resources the students do not have, cultural capital is maximized through OST participation. Related to the habitus concept, high OST participation for these high achieving students increases the symmetry between the expectations they receive from their environment and the expectations they have of themselves to increase their academic performance. Cultural capital development actions are an important practice impact area.

A practice focus may also be OST program activity type recommendations. The study demonstrated that black female OST participation contributes more to the prediction of college entrance exam scores than black male OST participation. It may be beneficial to design OST programs that would increase male participation outside of sport activities. Research indicates that females participate less in sports when compared to

males (Hofferth & Jankuniene, 2001; Posner & Vandell, 1999). Cultural capital resources that contribute to standardized test performance may be developed more by non-sport activities. Maximizing male participation in these activity types may be a beneficial practice.

Removing participation barriers is an additional policy and practice intervention. Parents of minority children perceive it is more difficult to identify high quality or affordable OST programs (Duffett & Johnson, 2004). Waiving OST participation fees, providing transportation, or other actions that would lessen participation barriers would be a proactive intervention for black or African American children of single parents.

District Level. Budgets for OST activities have decreased approximately 10% as indicated by the analysis of the top 20 U. S. school districts in terms of student population between fiscal years 2009 and 2010. These results indicate that efforts should be made when creating school budgets to fund to the greatest extent possible OST activities. This analysis indicates that participation in OST activities can have far reaching effects. A higher SAT score can open the door to opportunities that may not have been previously available to students. As was noted in the literature review, partnerships with community groups are a growing effort to provide OST programming to students. A policy and practice implication is that the school districts need to ensure that there is a selection process that verifies the capacity of the partner to operate OST programs. If there are funding partnerships, school districts need to encourage longitudinal contributions to maintain OST programs.

There is another facet related to selecting partners that have the capacity to operate OST programs. Funding OST efforts outside the core operational school district

budgets can be problematic as programs are dependent on time-limited funding and have difficulty in finding sustainability funding when grants expire (Wright & Deich, 2002). If the selection process identifies partners that have the capacity to deliver OST programs, the district has an obligation to ensure that there is longitudinal funding available to maintain consistent, high quality OST programs.

It is also suggested that school districts identify the indirect costs associated with OST activities. The study documented that direct budget appropriations are decreasing. Data to define indirect costs is not available. School districts may be indirectly increasing OST costs by increasing staff time associated managing OST providers, funding capture management, grant writing, reporting to external funders, and other costs that may not be documented. Opportunity costs should also be defined. Time spent on activities noted may decrease time available for other activities that could maximize district education outcomes.

A last practice implication at the district level is that methods can be developed to communicate to teachers and principals the benefits of OST participation for high achieving black or African American children of single parents. Knowing that OST participation can benefit this population of students may encourage educators at the school level to communicate program options with parents and students.

Government Level. It was pointed out that the 21st Century Community Learning Centers is a U.S. Department of Education Office of Elementary and Secondary Education program for SEAs. This intervention method has varying success levels (ED, 2003, Jenner & Jenner, 2007; Wahlstrom, et al., 2004). Forcing school districts to compete for limited funding is the problem with this intervention. Funder priorities force

school districts to change what may be successful OST programs. There is evidence that OST programs are beneficial for black or African American children of single parents which suggests the need for more consistent funding to support a successful intervention.

Replicating the study with a wider sample is a recommendation in the subsequent section. If additional research indicates that OST programming is a positive intervention for additional populations, this would provide greater evidence that funding should be increased. If students can increase their SAT scores through an OST program intervention, the potential contribution a student can make to society is an important long-term benefit. An OST program intervention targeted for black or African American children can have a positive societal impact. Methods to provide increased funding would be a worthwhile investment.

Further Research Recommendations

Further research can be conducted in several areas. The first is to replicate the study utilizing broader sample. The study sample participated more in OST activities, had higher academic performance, and had a lower proportion from single parent families when compared to the overall population of black or African American children of single parents. A study with a wider sample may produce different findings.

A second further research area is to replicate the study with the inclusion of the SAT's writing subsection. This study included only the critical reading and mathematics sections so that the ACT-SAT concordance tables could be utilized. Including all SAT subsections may produce different results.

A third further research area would be to expand the study to other underrepresented/underserved populations. It is estimated that 52% of American Indian

children and 41% of Hispanic children are being raised in single parent families (Annie E. Casey Foundation, 2012). In 2011, American Indian SAT test takers had average standardized test scores 136 points lower than white children and 51 points lower than the national average (College Board, 2012). Hispanic or Latino children had average standardized test scores 224 points lower than white children and 139 points lower than the national average (College Board, 2012). These factors indicate that it would be positive to identify interventions such as OST programs would impact standardized test scores for these populations. It would be useful to first utilize a sample of high achieving students from each race/ethnicity group and then expand to a wider population.

A fourth further research area would be to expand the study to include children from other family types. This study was limited to high achieving black or African American children of single parents. Other family types that could be considered would be children with divorced parents, children with parents that have remarried, or children that are classified as independent. It would be worthwhile to identify whether the study results are isolated to the focus population for this study or if the results are consistent among a wider population.

A fifth further research area would be to examine the specific OST activities more closely. The U.S. Census Bureau utilizes sports, clubs, and lessons as designations for extracurricular activities. It would be worthwhile to identify whether the impact on standardized test scores differs by OST type. This may also shed light on why this study found that females were more impacted than males by OST participation. It was theorized that a lower female proportion participates in athletics and that the OST activities they did participate in were more conducive to developing cultural capital.

A sixth suggested research area would be to conduct OST participation impact qualitative studies. A more in depth understanding of the OST impact on participating students would be a benefit. Data to confirm the study cultural capital theoretical framework would be a second benefit. Content analysis of qualitative data related to OST participation may deepen the understanding of the appropriateness of the theoretical framework.

A seventh suggested research area would be to develop a hierarchical linear model related to OST impact on standardized test scores. Students exist in a hierarchical or nested social structure. A student, for example, is in a specific class within a specific school, lives in a neighborhood, the school is in a specific school district, and the hierarchy of more environments continues (Osborne, 2000). If more detailed data that defines the hierarchy is available, it would be possible to use the HLM methodology. The advantage of HLM is that it produces error terms that consider the nested nature of the data and reduces the potential for a Type I error (Raudenbush & Byrk, 2002).

These suggested research areas would deepen the understanding of OST participation on standardized test scores. Positive findings from these studies with these foci would likely better encourage policy change at the school, district, and government levels.

Reflections

A Washington Post story proclaimed that 2012 SAT reading scores hit a four-decade low (Layton & Brown, 2012). The news story noted that scores for every racial group except Asians declined and that 57% of the test takers did not score high enough to indicate future college success (Layton & Brown, 2012). In 2011, FairTest reported that

since 2006 overall test scores decreased by only three points, black student scores decreased 19 points (Resnick, 2011). These examples demonstrate the widespread attention giving to standardized test score performance and the concerns that arise when there is a perceived score decline.

Despite this widespread attention, there is an on-going discussion standardized testing value. While there is merit to both sides of the discussion related to the appropriate use of standardized testing, the fact is that a review of 2010 IPEDS data noted that of the 1,690 U.S. institutions that offer baccalaureate degrees, 79.5% require or recommend a standardized test for admittance. Further, Zwick (2007) cited a National Association for College Admission Counseling (NACAC) Admission Trends Survey which found that 70% of four-year institutions consider standardized test scores, with 40% requiring a minimum score. Pragmatically, it is important to identify methods to help students increase their standardized test scores.

The study results are encouraging. There is evidence that OST programs provide high achieving black or African American children of single parents with opportunities to develop their cultural capital. This promotes greater self-efficacy and academic achievement with a benefit being increased standardized test scores. While encouraging, the results do have the potential for misuse. Advocates may exaggerate the findings that increasing OST program participation will increase standardized test scores for all populations. Non-advocates may state that study results are limited to a sample of already high achieving students so nothing was learned. Either extreme would be inappropriate.

From an advocacy perspective, the study findings can be utilized as part of the knowledge base that gives evidence of the positive impact of OST programs on

standardized test scores. This has only recently been identified in the literature specific to college entrance exams or with children of single parents. There is clear evidence that increasing levels of OST participation has an effect on standardized test scores for high achieving black or African American children of single parents within the sample characteristics context. The appropriate advocacy position is to advocate OST programs for high achieving students to excel at even higher levels. The societal benefits of this are important. Greater standardized test performance increase student opportunities to gain entrance to more selective institutions. The study noted the economic benefits associated with attending highly selective institutions.

For non-advocates or policy makers, it is important that the study results not be ignored because of the sample limitations. There is evidence of an intervention for a population that can benefit from positive interventions. This places the results in the correct context. Although school districts are faced with difficult budgetary decisions, reducing or eliminating programs should be avoided to the greatest extent possible because of the potential positive benefits. Enabling students to increase their possibilities for admission to more selective institutions is a worthwhile investment.

Perhaps the most critical result of this study is that further investigation is warranted. As noted in the recommended research section, collecting data from samples that are broader population will increase the understanding of OST participation impact on standardized test scores.

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Appendix A

Application Questions

The actual application is not displayed to limit potential program identification. Question wording is changed slightly to limit potential program identification. Question wording here and on the application is brief. Applications are submitted electronically.

Demographic Information:

- Race/Ethnicity
- Gender

Academic Information:

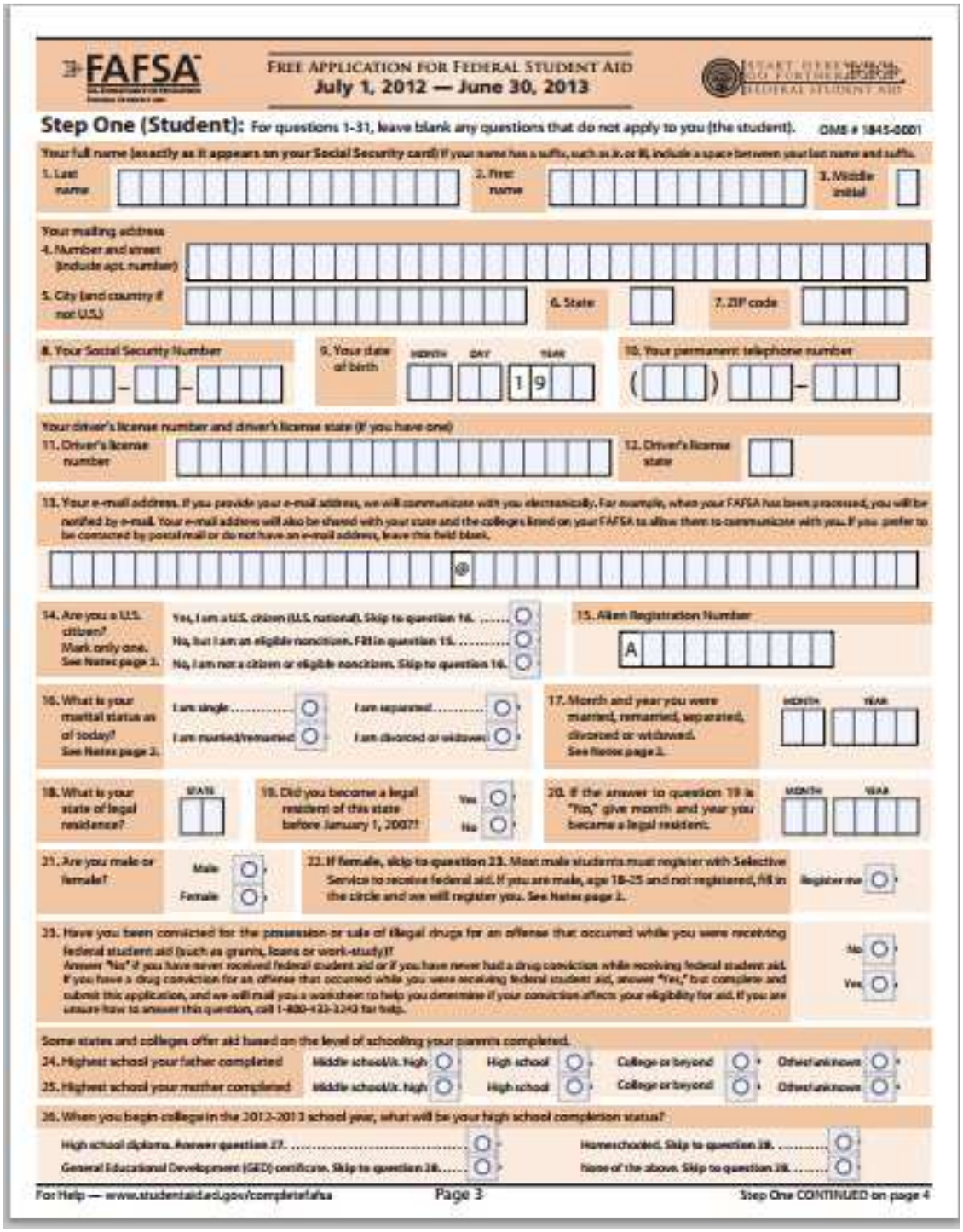
- Cumulative GPA
- SAT Scores: Critical Reading, Mathematics, Writing (asked on a secondary form for longitudinal program effectiveness tracking.)

Extracurricular Participation Information *(up to five activities can be entered)*:

- Time Period Identification (by Semester)
- Organization
- Activity Description
- Total hour participation

Appendix B

FAFSA Application



FREE APPLICATION FOR FEDERAL STUDENT AID
July 1, 2012 — June 30, 2013

Step One (Student): For questions 1-31, leave blank any questions that do not apply to you (the student). OMB # 1845-0001

Your full name (exactly as it appears on your Social Security card) If your name has a suffix, such as Jr. or III, include a space between your last name and suffix.

1. Last name
2. First name
3. Middle initial

Your mailing address

4. Number and street (include apt. number)
5. City (and country if not U.S.)
6. State
7. ZIP code

8. Your Social Security Number
9. Your date of birth — MONTH DAY YEAR 19
10. Your permanent telephone number

Your driver's license number and driver's license state (if you have one)

11. Driver's license number
12. Driver's license state

13. Your e-mail address. If you provide your e-mail address, we will communicate with you electronically. For example, when your FAFSA has been processed, you will be notified by e-mail. Your e-mail address will also be shared with your state and the colleges listed on your FAFSA to allow them to communicate with you. If you prefer to be contacted by postal mail or do not have an e-mail address, leave this field blank.

14. Are you a U.S. citizen? Mark only one. See Notes page 3.
- Yes, I am a U.S. citizen (U.S. national). Skip to question 16.
- No, but I am an eligible noncitizen. Fill in question 15.
- No, I am not a citizen or eligible noncitizen. Skip to question 16.

15. Alien Registration Number — A

16. What is your marital status as of today? See Notes page 3.
- I am single
- I am married/remarried
- I am separated
- I am divorced or widowed

17. Month and year you were married, remarried, separated, divorced or widowed. See Notes page 3. — MONTH YEAR

18. What is your state of legal residence? STATE

19. Did you become a legal resident of this state before January 1, 2007? Yes / No

20. If the answer to question 19 is "No," give month and year you became a legal resident. — MONTH YEAR

21. Are you male or female?
- Male
- Female

22. If female, skip to question 23. Most male students must register with Selective Service to receive federal aid. If you are male, age 18–25 and not registered, fill in the circle and we will register you. See Notes page 3. — Register me

23. Have you been convicted for the possession or sale of illegal drugs for an offense that occurred while you were receiving federal student aid (such as grants, loans or work-study)?
Answer "No" if you have never received federal student aid or if you have never had a drug conviction while receiving federal student aid. If you have a drug conviction for an offense that occurred while you were receiving federal student aid, answer "Yes," but complete and submit this application, and we will mail you a worksheet to help you determine if your conviction affects your eligibility for aid. If you are unsure how to answer this question, call 1-800-433-3243 for help.
- No
- Yes

Some states and colleges offer aid based on the level of schooling your parents completed.

24. Highest school your father completed — Middle school/Jr. high / High school / College or beyond / Other/unknown
25. Highest school your mother completed — Middle school/Jr. high / High school / College or beyond / Other/unknown

26. When you begin college in the 2012-2013 school year, what will be your high school completion status?
- High school diploma. Answer question 27.
- General Educational Development (GED) certificate. Skip to question 28.
- Homeschooled. Skip to question 28.
- None of the above. Skip to question 28.

For Help — www.studentaid.ed.gov/completefafsa — Page 3 — Step One CONTINUED on page 4

27. What is the name of the high school where you received or will receive your high school diploma? Enter the complete high school name, and the city and state where the high school is located.

High School Name

High School City

STATE

28. Will you have your first bachelor's degree before July 1, 2012?

Yes ○ 1 No ○ 2

29. When you begin the 2012-2013 school year, what will be your grade level?

- Never attended college and 1st year undergraduate ○ 1
- Attended college before and 1st year undergraduate ○ 2
- 2nd year undergraduate/sophomore ○ 3
- 3rd year undergraduate/junior ○ 4
- 4th year undergraduate/senior ○ 5
- 5th year/other undergraduate ○ 6
- 1st year graduate/professional ○ 7
- Continuing graduate/professional or beyond ○ 8

30. When you begin the 2012-2013 school year, what degree or certificate will you be working on?

- 1st bachelor's degree ○ 1
- 2nd bachelor's degree ○ 2
- Associate degree (occupational or technical program) ○ 3
- Associate degree (general education or transfer program) ○ 4
- Certificate or diploma (occupational, technical or education program of less than two years) ○ 5
- Certificate or diploma (occupational, technical or education program of two or more years) ○ 6
- Teaching credential (nondegree program) ○ 7
- Graduate or professional degree ○ 8
- Other/undecided ○ 9

31. Are you interested in being considered for work-study? Yes ○ 1 No ○ 2 Don't know ○ 3

Step Two (Student):

Answer questions 32–57 about yourself (the student). If you are single, separated, divorced or widowed, answer only about yourself. If you are married or remarried as of today, include information about your spouse (husband or wife).

32. For 2011, have you (the student) completed your IRS income tax return or another tax return listed in question 33?

- I have already completed my return ○ 1
- I will file but have not yet completed my return ○ 2
- I'm not going to file. **Skip to question 38.** ○ 3

33. What income tax return did you file or will you file for 2011?

- IRS 1040 ○ 1
- IRS 1040A or 1040EZ ○ 2
- A foreign tax return. **See Notes page 2.** ○ 3
- A tax return with Puerto Rico, another U.S. territory, or Freely Associated State. **See Notes page 2.** ○ 4

34. If you have filed or will file a 1040, were you eligible to file a 1040A or 1040EZ? **See Notes page 2.** Yes ○ 1 No ○ 2 Don't know ○ 3

For questions 35–44, if the answer is zero or the question does not apply to you, enter 0. Report whole dollar amounts with no cents.

35. What was your (and spouse's) adjusted gross income for 2011? Adjusted gross income is on IRS Form 1040—line 37; 1040A—line 21; or 1040EZ—line 4. $

36. Enter your (and spouse's) income tax for 2011. Income tax amount is on IRS Form 1040—line 55; 1040A—line 35; or 1040EZ—line 10. $

37. Enter your (and spouse's) exemptions for 2011. Exemptions are on IRS Form 1040—line 6d or Form 1040A—line 6d. For Form 1040EZ, **see Notes page 2.**

Questions 38 and 39 ask about earnings (wages, salaries, tips, etc.) in 2011. Answer the questions whether or not a tax return was filed. This information may be on the W-2 forms, or on IRS Form 1040—lines 7 + 12 + 18 + Box 14 (Code A) of IRS Schedule K-1 (Form 1065); on 1040A—line 7; or on 1040EZ—line 1. If any individual earning item is negative, do not include that item in your calculation.

38. How much did you earn from working in 2011? $

39. How much did your spouse earn from working in 2011? $

40. As of today, what is your (and spouse's) total current balance of cash, savings and checking accounts? **Don't include** student financial aid. $

41. As of today, what is the net worth of your (and spouse's) investments, including real estate? **Don't include** the home you live in. Net worth means current value minus debt. **See Notes page 2.** $

42. As of today, what is the net worth of your (and spouse's) current businesses and/or investment farms? **Don't include** a family farm or family business with 100 or fewer full-time or full-time equivalent employees. **See Notes page 2.** $

Step Two CONTINUED from page 4

43. Student's 2011 Additional Financial Information (Enter the combined amounts for you and your spouse.)

a. Education credits (American Opportunity, Hope or Lifetime Learning tax credits) from IRS Form 1040—line 49 or 1040A—line 31. $

b. Child support paid because of divorce or separation or as a result of a legal requirement. Don't include support for children in your household, as reported in question 93. $

c. Taxable earnings from need-based employment programs, such as Federal Work-Study and need-based employment portions of fellowships and assistantships. $

d. Taxable student grant and scholarship aid reported to the IRS in your adjusted gross income. Include AmeriCorps benefits (awards, living allowances and interest accrual payments), as well as grant and scholarship portions of fellowships and assistantships. $

e. Combat pay or special combat pay. Only enter the amount that was taxable and included in your adjusted gross income. Don't include untaxed combat pay. $

f. Earnings from work under a cooperative education program offered by a college. $

44. Student's 2011 Untaxed Income (Enter the combined amounts for you and your spouse.)

a. Payments to tax-deferred pension and savings plans (paid directly or withheld from earnings), including, but not limited to, amounts reported on the W-2 forms in Boxes 12a through 12d, codes D, E, F, G, H and S. $

b. IRA deductions and payments to self-employed SEP, SIMPLE, Keogh and other qualified plans from IRS Form 1040—line 28 + line 32 or 1040A—line 17. $

c. Child support received for any of your children. Don't include foster care or adoption payments. $

d. Tax-exempt interest income from IRS Form 1040—line 8b or 1040A—line 8b. $

e. Untaxed portions of IRA distributions from IRS Form 1040—lines (15a minus 15b) or 1040A—lines (11a minus 11b). Exclude rollovers. If negative, enter a zero here. $

f. Untaxed portions of pensions from IRS Form 1040—lines (16a minus 16b) or 1040A—lines (12a minus 12b). Exclude rollovers. If negative, enter a zero here. $

g. Housing, food and other living allowances paid to members of the military, clergy and others (including cash payments and cash value of benefits). Don't include the value of on-base military housing or the value of a basic military allowance for housing. $

h. Veterans noneducation benefits, such as Disability, Death Pension, or Dependency & Indemnity Compensation (DIC) and/or VA Educational Work-Study allowances. $

i. Other untaxed income not reported in items 44a through 44h, such as workers' compensation, disability, etc. Also include the first-time homebuyer tax credit from IRS Form 1040—line 67. Don't include student aid, earned income credit, additional child tax credit, welfare payments, untaxed Social Security benefits, Supplemental Security Income, Workforce Investment Act educational benefits, on-base military housing or a military housing allowance, combat pay, benefits from flexible spending arrangements (e.g., cafeteria plans), foreign income exclusion or credit for federal tax on special fuels. $

j. Money received, or paid on your behalf (e.g., bills), not reported elsewhere on this form. $

Step Three (Student):

Answer the questions in this step to determine if you will need to provide parental information. Once you answer "Yes" to any of the questions in this step, skip Step Four and go to Step Five on page 8.

45. Were you born before January 1, 1989? Yes ○ No ○

46. As of today, are you married? (Also answer "Yes" if you are separated but not divorced.) Yes ○ No ○

47. At the beginning of the 2012-2013 school year, will you be working on a master's or doctorate program (such as an MA, MBA, MD, JD, PhD, EdD, graduate certificate, etc.)? Yes ○ No ○

48. Are you currently serving on active duty in the U.S. Armed Forces for purposes other than training? See Notes page 3. Yes ○ No ○

49. Are you a veteran of the U.S. Armed Forces? See Notes page 3. Yes ○ No ○

50. Do you have children who will receive more than half of their support from you between July 1, 2012 and June 30, 2013? Yes ○ No ○

51. Do you have dependents (other than your children or spouse) who live with you and who receive more than half of their support from you, now and through June 30, 2013? Yes ○ No ○

52. At any time since you turned age 13, were both your parents deceased, were you in foster care or were you a dependent or ward of the court? See Notes page 9. Yes ○ No ○

53. As determined by a court in your state of legal residence, are you or were you an emancipated minor? See Notes page 9. Yes ○ No ○

54. As determined by a court in your state of legal residence, are you or were you in legal guardianship? See Notes page 9. Yes ○ No ○

55. At any time on or after July 1, 2011, did your high school or school district homeless liaison determine that you were an unaccompanied youth who was homeless? See Notes page 9. Yes ○ No ○

56. At any time on or after July 1, 2011, did the director of an emergency shelter or transitional housing program funded by the U.S. Department of Housing and Urban Development determine that you were an unaccompanied youth who was homeless? See Notes page 9. Yes ○ No ○

57. At any time on or after July 1, 2011, did the director of a runaway or homeless youth basic center or transitional living program determine that you were an unaccompanied youth who was homeless or were self-supporting and at risk of being homeless? See Notes page 9. Yes ○ No ○

If you (the student) answered "No" to every question in Step Three, go to Step Four.
If you answered "Yes" to any question in Step Three, skip Step Four and go to Step Five on page 8.
(Health professions students: Your college may require you to complete Step Four even if you answered "Yes" to any Step Three question.)
If you believe that you are unable to provide parental information, see Notes page 9.

Step Four (Parent): Complete this step if you (the student) answered "No" to all questions in Step Three.

Answer all the questions in Step Four even if you do not live with your parents. Grandparents, foster parents, legal guardians, aunts and uncles are not considered parents on this form unless they have legally adopted you. If your parents are living and married to each other, answer the questions about them. If your parent is single, widowed, divorced, separated or remarried, see the Notes on page 9 for additional instructions.

58. What is your parents' marital status as of today?
- Married or remarried ○ 1
- Single ○ 2
- Divorced or separated ○ 3
- Widowed ○ 4

59. Month and year they were married, remarried, separated, divorced or widowed. MONTH ____ YEAR ____

What are the Social Security Numbers, names and dates of birth of the parents reporting information on this form?
If your parent does not have a Social Security Number, you must enter 000-00-0000. If the name includes a suffix, such as Jr. or III, include a space between the last name and suffix. Enter two digits for each day and month (e.g., for May 31, enter 05 31).

60. FATHER'S/STEPFATHER'S SOCIAL SECURITY NUMBER ___ - ___ - ____
61. FATHER'S/STEPFATHER'S LAST NAME, AND ____,
62. FIRST INITIAL ____
63. FATHER'S/STEPFATHER'S DATE OF BIRTH 19__

64. MOTHER'S/STEPMOTHER'S SOCIAL SECURITY NUMBER ___ - ___ - ____
65. MOTHER'S/STEPMOTHER'S LAST NAME, AND ____,
66. FIRST INITIAL ____
67. MOTHER'S/STEPMOTHER'S DATE OF BIRTH 19__

68. **Your parents' e-mail address.** If you provide your parents' e-mail address, we will let them know your FAFSA has been processed. This e-mail address will also be shared with your state and the colleges listed on your FAFSA to allow them to electronically communicate with your parents.

69. What is your parents' state of legal residence? STATE ____

70. Did your parents become legal residents of this state before January 1, 2007?
- Yes ○ 1
- No ○ 2

71. If the answer to question 70 is "No," give the month and year legal residency began for the parent who has lived in the state the longest. MONTH ____ YEAR ____

72. How many people are in your parents' household?
Include:
- yourself, even if you don't live with your parents,
- your parents,
- your parents' other children if (a) your parents will provide more than half of their support between July 1, 2012 and June 30, 2013, or (b) the children could answer "No" to every question in Step Three on page 5 of this form, and
- other people if they now live with your parents, your parents provide more than half of their support and your parents will continue to provide more than half of their support between July 1, 2012 and June 30, 2013.

____

73. How many people in your parents' household (from question 72) will be college students between July 1, 2012 and June 30, 2013? Always count yourself as a college student. Do not include your parents. You may include others only if they will attend, at least half-time in 2012-2013, a program that leads to a college degree or certificate. ____

In 2010 or 2011, did you, your parents or anyone in your parents' household (from question 72) receive benefits from any of the federal programs listed? Mark all that apply. Answering these questions will not reduce eligibility for student aid or these programs. Supplemental Nutrition Assistance Program (SNAP) is the new name for Food Stamps. SNAP, Food Stamps and/or TANF may have a different name in your parents' state. Call 1-800-4-FED-AID to find out the name of the state's program.

74. Supplemental Security Income (SSI) ○ 1
75. Food Stamps ○ 1
76. Free or Reduced Price Lunch ○ 1
77. Temporary Assistance for Needy Families (TANF) ○ 1
78. Special Supplemental Nutrition Program for Women, Infants and Children (WIC) ○ 1

79. For 2011, have your parents completed their IRS income tax return or another tax return listed in question 80?
- My parents have already completed their return ○ 1
- My parents will file but have not yet completed their return ○ 2
- My parents are not going to file. Skip to question 86. ○ 3

80. What income tax return did your parents file or will they file for 2011?
- IRS 1040 ○ 1
- IRS 1040A or 1040EZ ○ 2
- A foreign tax return. See Notes page 2. ○ 3
- A tax return with Puerto Rico, another U.S. territory or Freely Associated State. See Notes page 2. ○ 4

81. If your parents have filed or will file a 1040, were they eligible to file a 1040A or 1040EZ? See Notes page 2.
- Yes ○ 1
- No ○ 2
- Don't know ○ 3

82. As of today, is either of your parents a dislocated worker? See Notes page 9.
- Yes ○ 1
- No ○ 2
- Don't know ○ 3

Step Four CONTINUED from page 6

For questions 83–92, if the answer is zero or the question does not apply, enter 0. Report whole dollar amounts with no cents.

83. What was your parents' adjusted gross income for 2011? Adjusted gross income is on IRS Form 1040—line 37; 1040A—line 21; or 1040EZ—line 4. $

84. Enter your parents' income tax for 2011. Income tax amount is on IRS Form 1040—line 55; 1040A—line 35; or 1040EZ—line 10. $

85. Enter your parents' exemptions for 2011. Exemptions are on IRS Form 1040—line 6d or on Form 1040A—line 6d. For Form 1040EZ, see Notes page 2.

Questions 86 and 87 ask about earnings (wages, salaries, tips, etc.) in 2011. Answer the questions whether or not a tax return was filed. This information may be on the W-2 forms, or on IRS Form 1040—lines 7 + 12 + 18 + Box 14 (Code A) of IRS Schedule K-1 (Form 1065); on 1040A—line 7; or on 1040EZ—line 1. If any individual earning item is negative, do not include that item in your calculation.

86. How much did your father/stepfather earn from working in 2011? $

87. How much did your mother/stepmother earn from working in 2011? $

88. As of today, what is your parents' total current balance of cash, savings and checking accounts? $

89. As of today, what is the net worth of your parents' investments, including real estate? Don't include the home in which your parents live. Net worth means current value minus debt. See Notes page 2. $

90. As of today, what is the net worth of your parents' current businesses and/or investment farms? Don't include a family farm or family business with 100 or fewer full-time or full-time equivalent employees. See Notes page 2. $

91. Parents' 2011 Additional Financial Information (Enter the amounts for your parent(s).)

a. Education credits (American Opportunity, Hope or Lifetime Learning tax credits) from IRS Form 1040—line 49 or 1040A—line 31. $

b. Child support paid because of divorce or separation or as a result of a legal requirement. Don't include support for children in your parents' household, as reported in question 72. $

c. Your parents' taxable earnings from need-based employment programs, such as Federal Work-Study and need-based employment portions of fellowships and assistantships. $

d. Your parents' taxable student grant and scholarship aid reported to the IRS in your parents' adjusted gross income. Includes AmeriCorps benefits (awards, living allowances and interest accrual payments), as well as grant and scholarship portions of fellowships and assistantships. $

e. Combat pay or special combat pay. Only enter the amount that was taxable and included in your parents' adjusted gross income. Do not enter untaxed combat pay. $

f. Earnings from work under a cooperative education program offered by a college. $

92. Parents' 2011 Untaxed Income (Enter the amounts for your parent(s).)

a. Payments to tax-deferred pension and savings plans (paid directly or withheld from earnings), including, but not limited to, amounts reported on the W-2 forms in Boxes 12a through 12d, codes D, E, F, G, H and S. $

b. IRA deductions and payments to self-employed SEP, SIMPLE, Keogh and other qualified plans from IRS Form 1040—line 28 + line 32 or 1040A—line 17. $

c. Child support received for any of your parents' children. Don't include foster care or adoption payments. $

d. Tax-exempt interest income from IRS Form 1040—line 8b or 1040A—line 8b. $

e. Untaxed portions of IRA distributions from IRS Form 1040—lines (15a minus 15b) or 1040A—lines (11a minus 11b). Exclude rollovers. If negative, enter a zero here. $

f. Untaxed portions of pensions from IRS Form 1040—lines (16a minus 16b) or 1040A—lines (12a minus 12b). Exclude rollovers. If negative, enter a zero here. $

g. Housing, food and other living allowances paid to members of the military, clergy and others (including cash payments and cash value of benefits). Don't include the value of on-base military housing or the value of a basic military allowance for housing. $

h. Veterans noneducation benefits, such as Disability, Death Pension, or Dependency & Indemnity Compensation (DIC) and/or VA Educational Work-Study allowances. $

i. Other untaxed income not reported in items 92a through 92h, such as workers' compensation, disability, etc. Also include the first-time homebuyer tax credit from IRS Form 1040—line 67. Don't include student aid, earned income credit, additional child tax credit, welfare payments, untaxed Social Security benefits, Supplemental Security Income, Workforce Investment Act educational benefits, on-base military housing or a military housing allowance, combat pay, benefits from flexible spending arrangements (e.g., cafeteria plans), foreign income exclusion or credit for federal tax on special fuels. $

Step Five (Student): Complete this step only if you (the student) answered "Yes" to any questions in Step Three.

93. How many people are in your household?
Include:
- yourself (and your spouse),
- your children, if you will provide more than half of their support between July 1, 2012 and June 30, 2013, and
- other people if they now live with you, you provide more than half of their support and you will continue to provide more than half of their support between July 1, 2012 and June 30, 2013.

94. How many people in your (and your spouse's) household (from question 93) will be college students between July 1, 2012 and June 30, 2013? Always count yourself as a college student. Include others only if they will attend, at least half-time in 2012-2013, a program that leads to a college degree or certificate.

In 2010 or 2011, did you (or your spouse) or anyone in your household (from question 93) receive benefits from any of the federal programs listed? Mark all that apply. Answering these questions will not reduce eligibility for student aid or these programs. Supplemental Nutrition Assistance Program (SNAP) is the new name for Food Stamps. SNAP, Food Stamps and/or TANF may have a different name in your state. Call 1-800-4-FED-AID to find out the name of the state's program.

95. Supplemental Security Income (SSI) ○ 96. Food Stamps ○ 97. Free or Reduced Price Lunch ○ 98. Temporary Assistance for Needy Families (TANF) ○ 99. Special Supplemental Nutrition Program for Women, Infants and Children (WIC) ○

100. As of today, are you (or your spouse) a dislocated worker? See Notes page 9. Yes ○ No ○ Don't know ○

Step Six (Student): Indicate which colleges you want to receive your FAFSA information.

Enter the six-digit federal school code and your housing plans. You can find the school codes at www.fafsa.gov or by calling 1-800-4-FED-AID. If you cannot get the code, write in the complete name, address, city and state of the college. For state aid, you may wish to list your preferred college first. To find out how to have more colleges receive your FAFSA information, read *What is the FAFSA?* on page 10.

						HOUSING PLANS
101.a	1st FEDERAL SCHOOL CODE	OR	NAME OF COLLEGE / ADDRESS AND CITY	STATE	101.b	on campus ○ / with parent ○ / off campus ○
101.c	2nd FEDERAL SCHOOL CODE	OR	NAME OF COLLEGE / ADDRESS AND CITY	STATE	101.d	on campus ○ / with parent ○ / off campus ○
101.e	3rd FEDERAL SCHOOL CODE	OR	NAME OF COLLEGE / ADDRESS AND CITY	STATE	101.f	on campus ○ / with parent ○ / off campus ○
101.g	4th FEDERAL SCHOOL CODE	OR	NAME OF COLLEGE / ADDRESS AND CITY	STATE	101.h	on campus ○ / with parent ○ / off campus ○

Step Seven (Student and Parent): Read, sign and date.

If you are the student, by signing this application you certify that you (1) will use federal and/or state student financial aid only to pay the cost of attending an institution of higher education, (2) are not in default on a federal student loan or have made satisfactory arrangements to repay it, (3) do not owe money back on a federal student grant or have made satisfactory arrangements to repay it, (4) will notify your college if you default on a federal student loan and (5) will not receive a Federal Pell Grant from more than one college for the same period of time.

If you are the parent or the student, by signing this application you agree, if asked, to provide information that will verify the accuracy of your completed form. This information may include U.S. or state income tax forms that you filed or are required to file. Also, you certify that you understand that the Secretary of Education has the authority to verify information reported on this application with the Internal Revenue Service and other federal agencies. If you sign any document related to the federal student aid programs electronically using a personal identification number (PIN), you certify that you are the person identified by the PIN and have not disclosed that PIN to anyone else. If you purposely give false or misleading information, you may be fined up to $20,000, sent to prison, or both.

102. Date this form was completed
MONTH DAY 2012 ○ or 2013 ○

103. Student (Sign below)
1

Parent (A parent from Step Four sign below.)
2

If you or your family paid a fee for someone to fill out this form or to advise you on how to fill it out, that person must complete this part.

Preparer's name, firm and address

104. Preparer's Social Security Number (or 105)

105. Employer ID number (or 104)

106. Preparer's signature and date

COLLEGE USE ONLY
D/O ○ Homeless Youth Determination ○ FEDERAL SCHOOL CODE

FAA Signature

DATA ENTRY USE ONLY: ○ P ○ L ○ E

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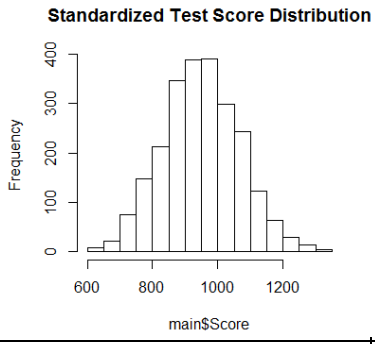
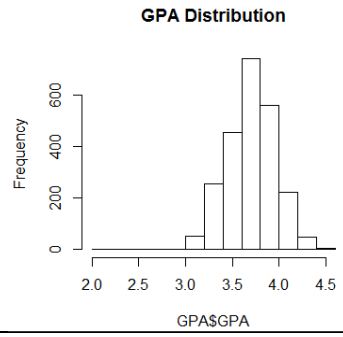
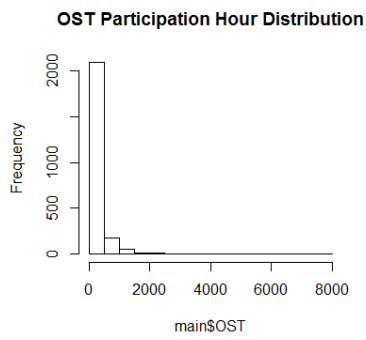
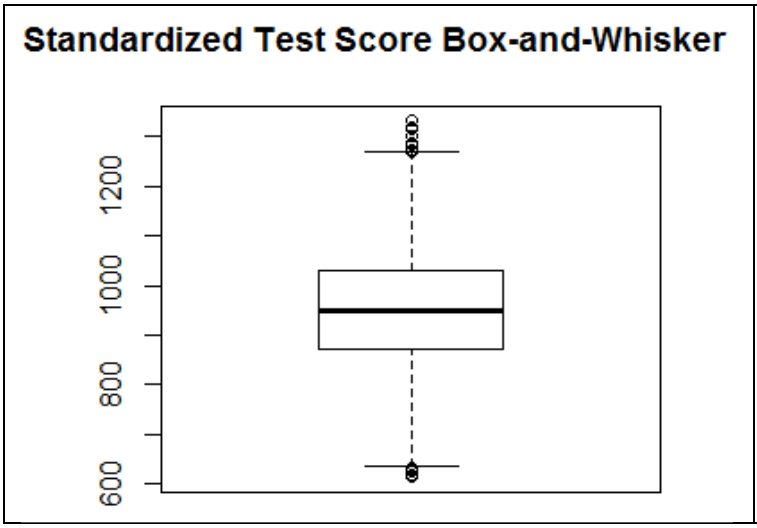
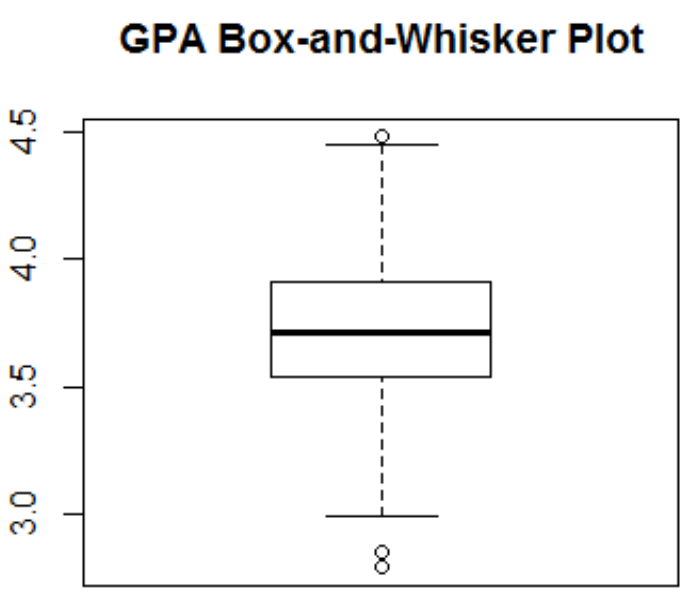
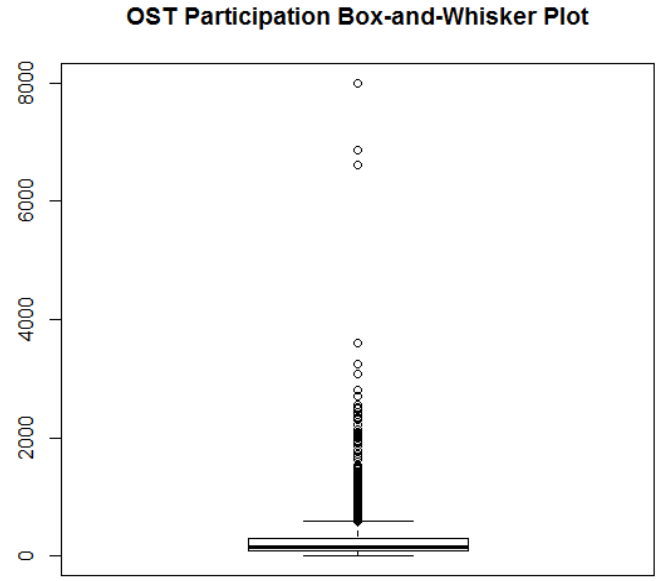
Appendix C

Frequency distributions for continuous variables

		
Displays Normal Distribution Evidence	Displays Normal Distribution Evidence	Displays Negatively Skewed Distribution Evidence

Box and Whisker Plots to Identify Outliers

	Potential outliers were identified in the upper (11) and lower (8) bounds. These cases were checked for data entry errors. The scores were within possible SAT scores. There was no substantive reason to remove these cases. There must be a substantive reason to remove outliers such as data error or special properties not being studied (Pedhazur, 1997)

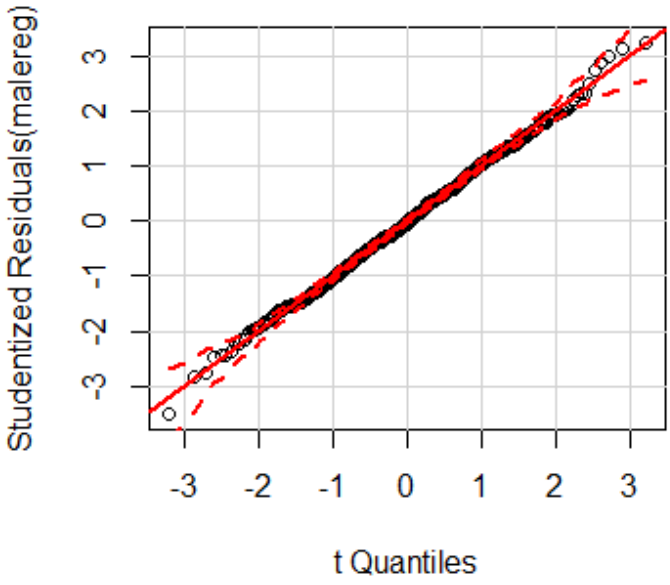
	Potential outliers were identified in the upper (1) and lower (2) bounds. These cases were checked for data entry errors. The scores were within possible GPA ranges. There was no substantive reason to remove these cases.
	A large number of potential outliers were identified in the upper range. Four cases were removed because they were evidently data entry errors. This is a reason to remove outliers (Pedhazur, 1997). There was no substantive reason to remove the other cases.

Appendix D

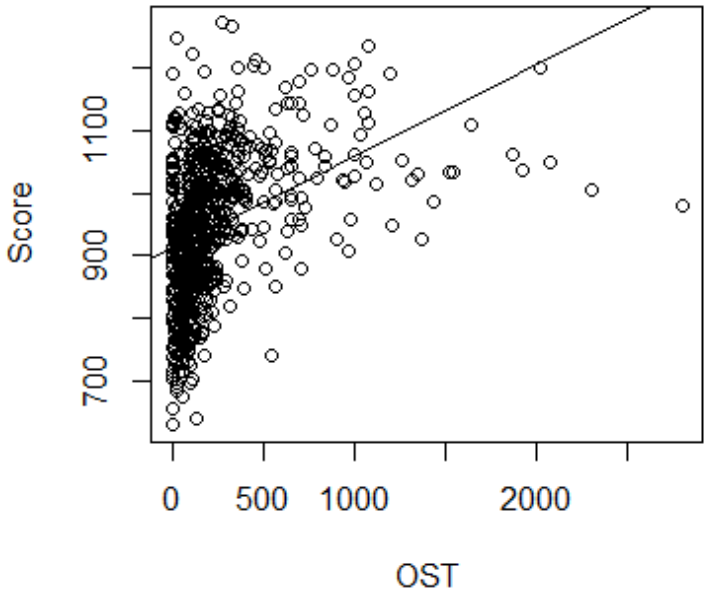
Research Question 2 Diagnostics

Male Sample

Outliers (R qqPlot function):



Linearity (R abline function): A linear relationship is noted due to the slope of the regression line.



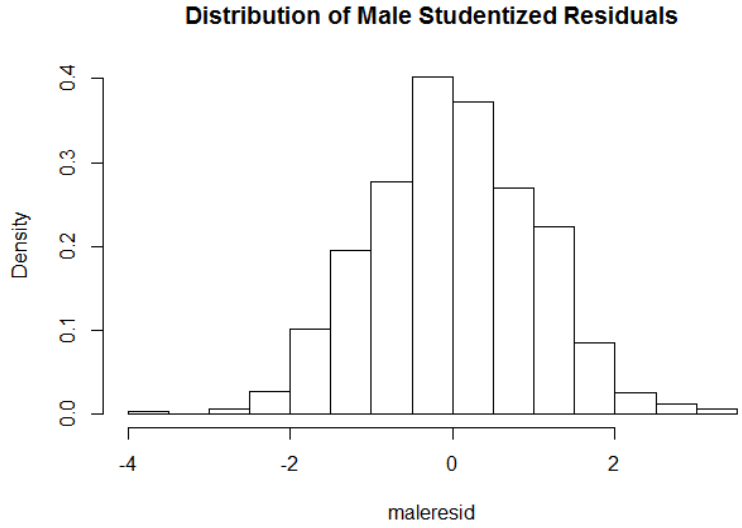
Error Independence (R durbinWatsonTest function)

lag	Autocorrelation	D-W Statistic	p-value
1	0.01360151	1.887701	0.3804

Homoscedascity (R ncvTest function):

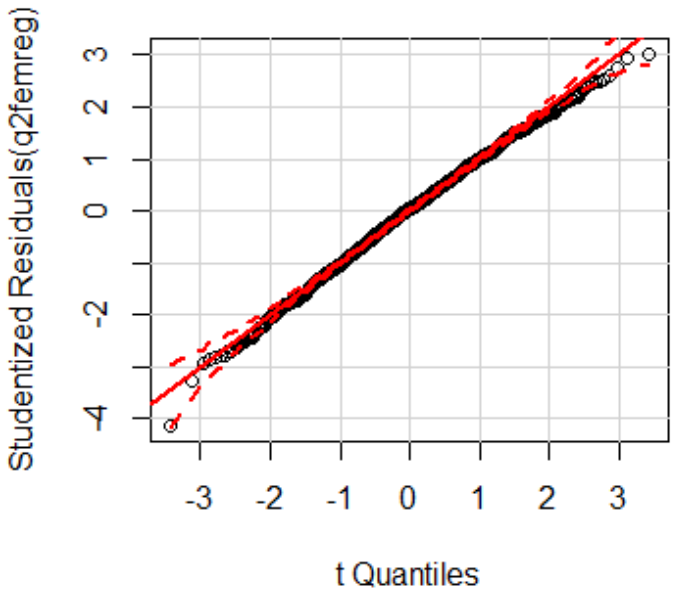
Non-constant Variance Score Test
Variance formula: ~ fitted.values
Chisquare = 1.712692 Df = 1 p = 0.1906365
p is greater than .05. There is no evidence to reject the null of non-constant error variance.

Normality (R studres and hist functions):

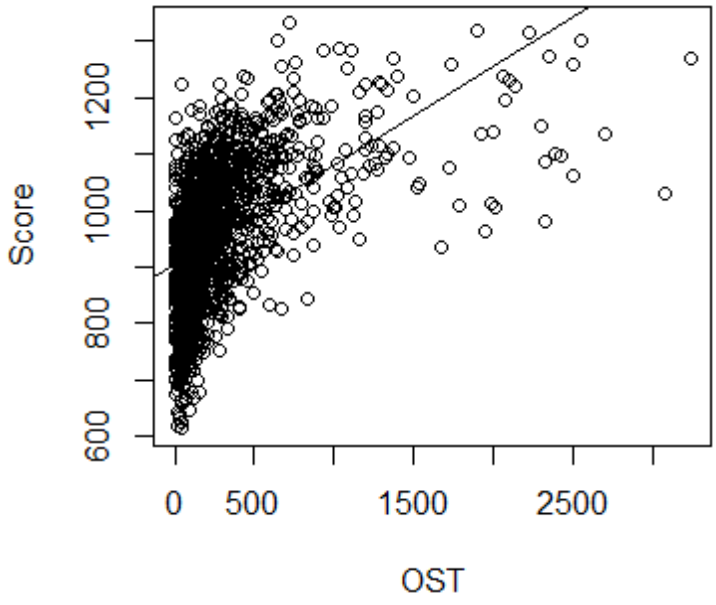


Female Sample

Outliers: (R qqPlot function)



Linearity (R abline function): A linear relationship is noted due to the slope of the regression line.



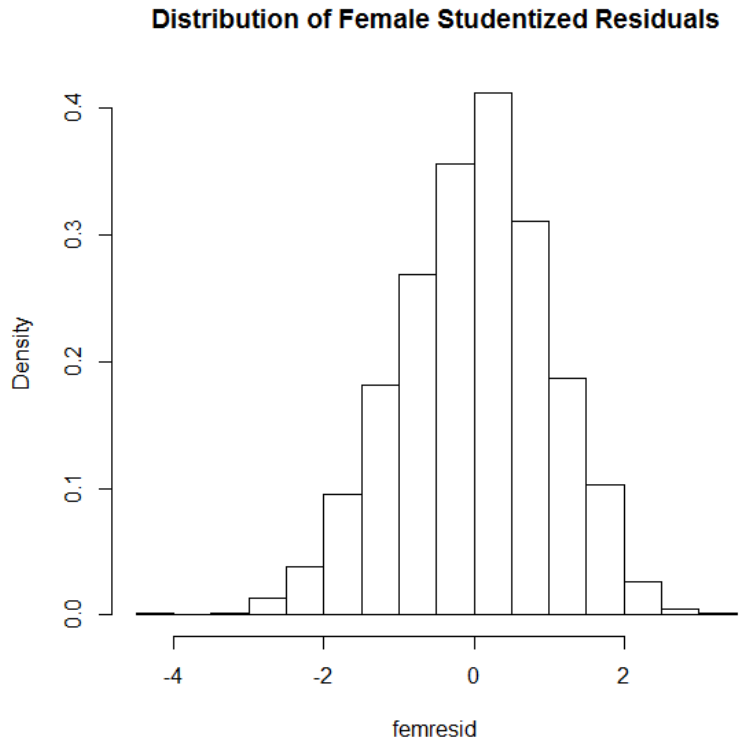
Error Independence (R durbinWatsonTest function)

lag	Autocorrelation	D-W Statistic	p-value
1	0.01125731	1.947651	0.5645

Homoscedascity (R ncvTest function):

Non-constant Variance Score Test
Variance formula: ~ fitted.values
Chisquare = 2.031589 Df = 1 p = 0.1540595
p is greater than .05. There is no evidence to reject the null of non-constant error variance.

Normality (R studres and hist functions):



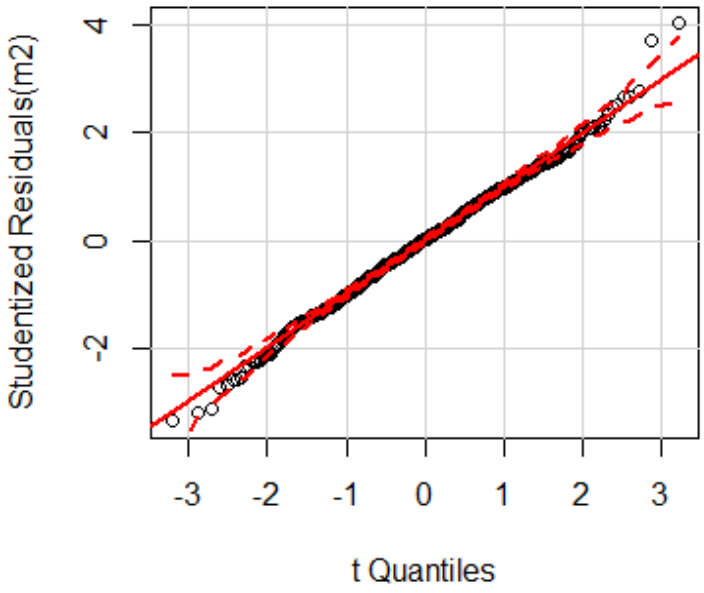
Appendix E

Research Question 3 Diagnostics

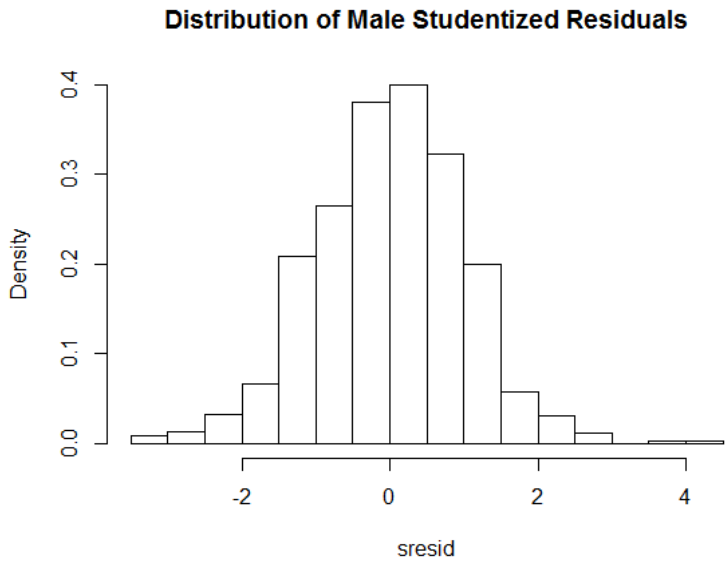
Male Model

Independent Variables = GPA and OST

Outlier Check



Non-normality



Non-Constant Error Variance

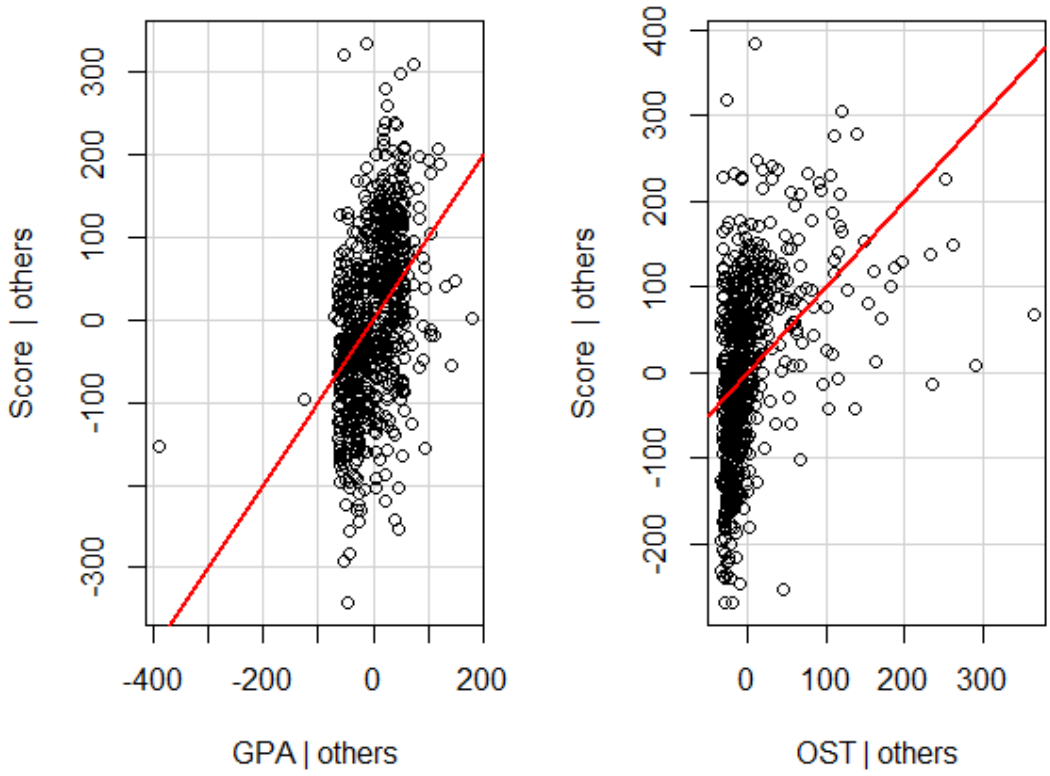
Non-constant Variance Score Test
Variance formula: ~ fitted.values
Chisquare = 0.8034998 Df = 1 p = 0.370049

Multi-Collinerity

> vif(m3)
GPA OST
1.001889 1.001889

> sqrt(vif(m3))>2
GPA OSTCAT
FALSE FALSE

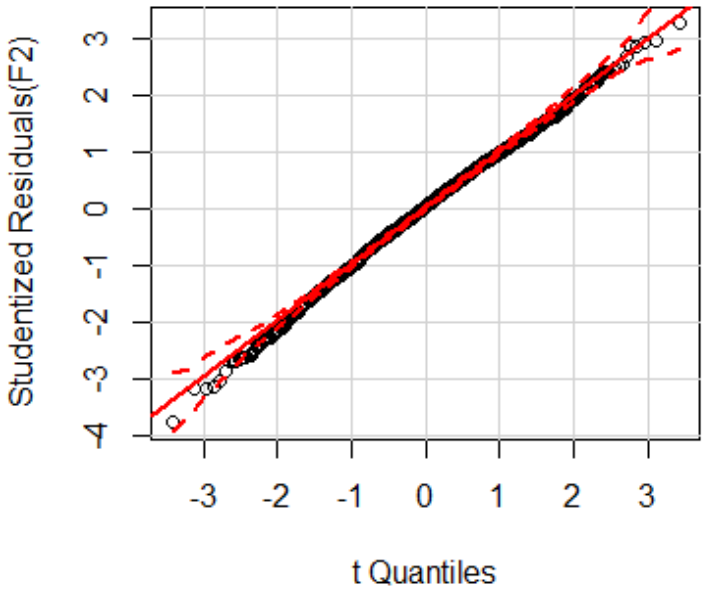
Non-Linearity



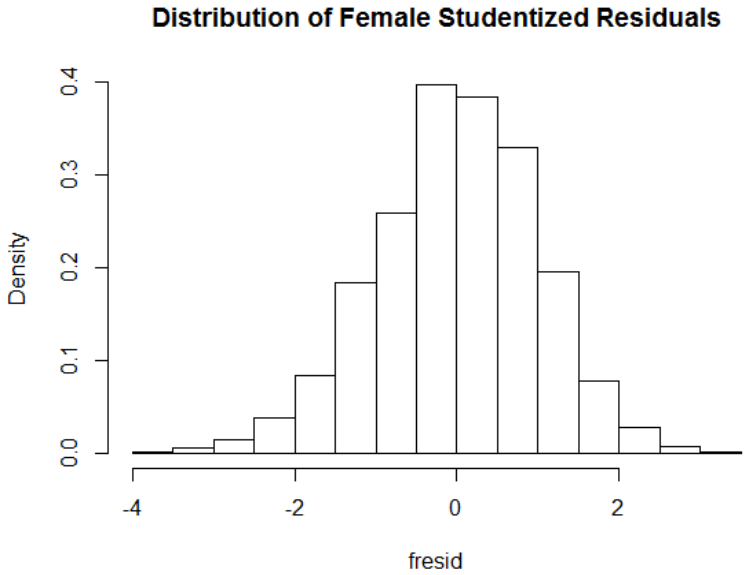
Female Model

Independent Variables = GPA and OST

Outlier Check



Non-normality



Non-Constant Error Variance

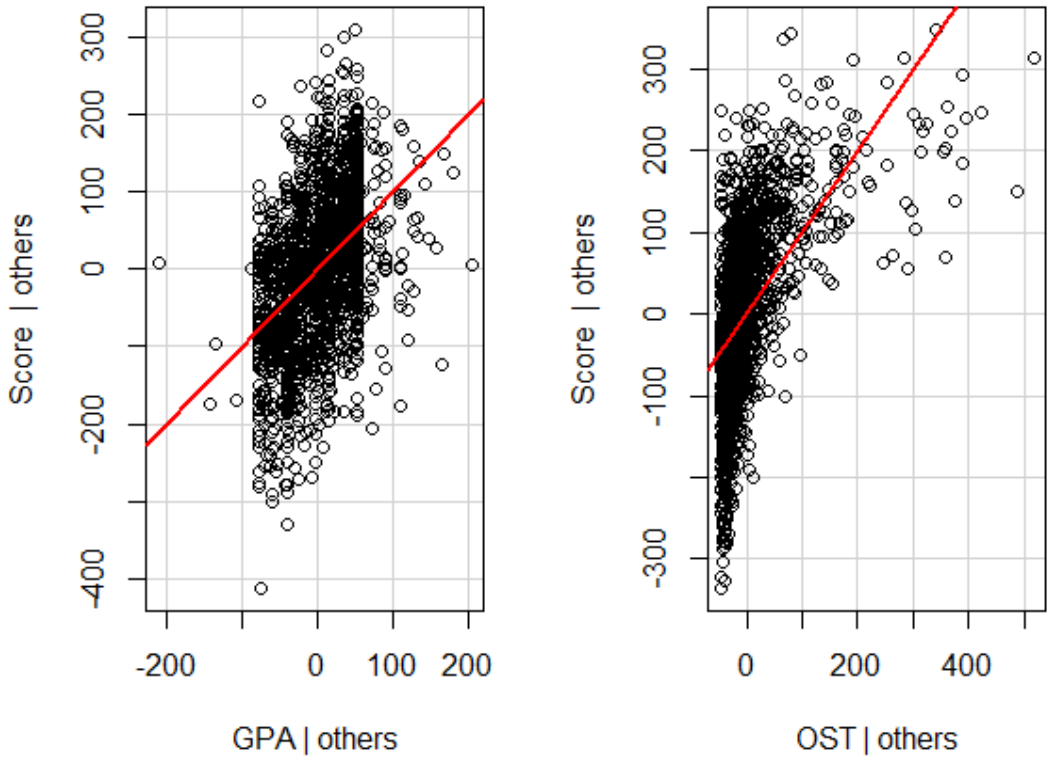
```
Non-constant Variance Score Test
Variance formula: ~ fitted.values
Chisquare = 0.9873805    Df = 1     p = 0.3203834
```

Multi-Collinerity

```
> vif(F2)
     GPA        OST
1.000002   1.000002

> sqrt(vif(F2))>2
   GPA         OST
 FALSE       FALSE
```

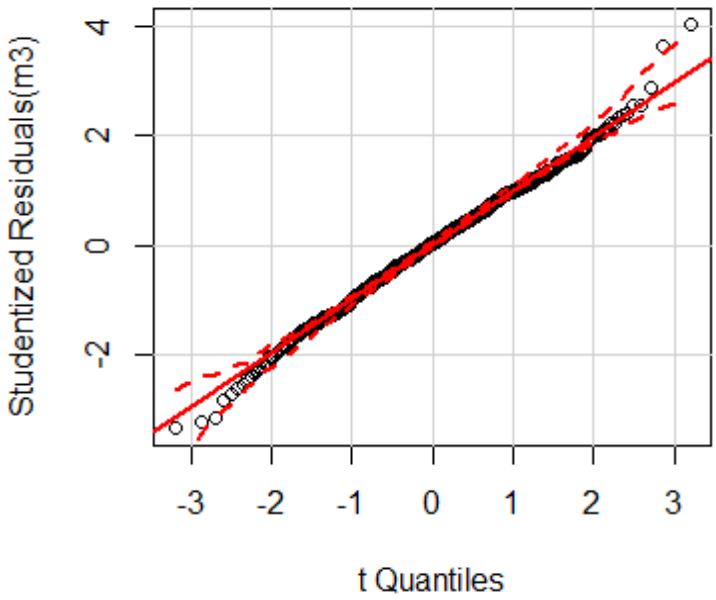
Non-Linearity



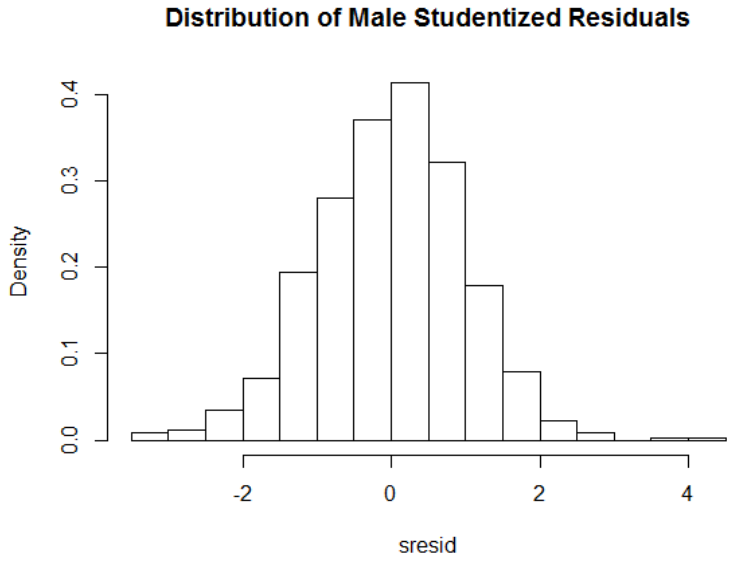
Male Model

Independent Variables = GPA, OST, Parent Education Level

Outlier Check



Non-normality



Non-Constant Error Variance

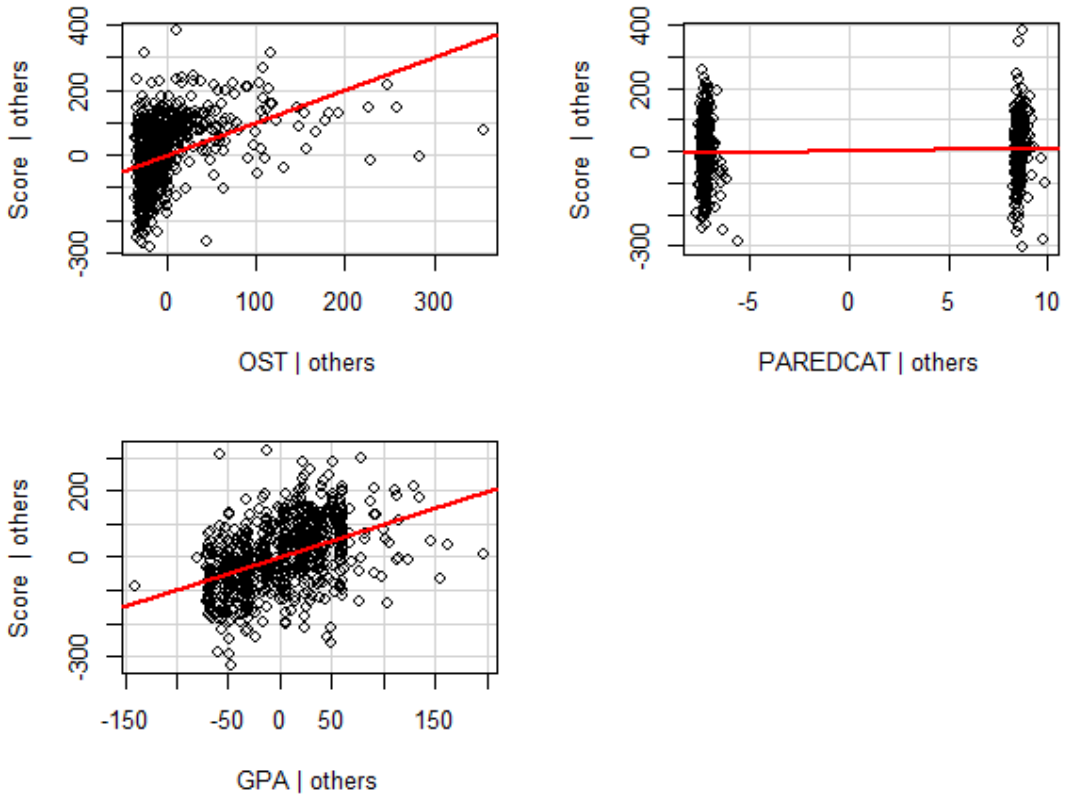
Non-constant Variance Score Test
Variance formula: ~ fitted.values
Chisquare = 1.179123 Df = 1 p = 0.2775346

Multi-Collinerity

```
> vif(m3)
     GPA      OST      PAREDCAT
1.001787 1.002272 1.000669

> sqrt(vif(m3))>2
   GPA      OSTCAT   PAREDCAT
   FALSE    FALSE    FALSE
```

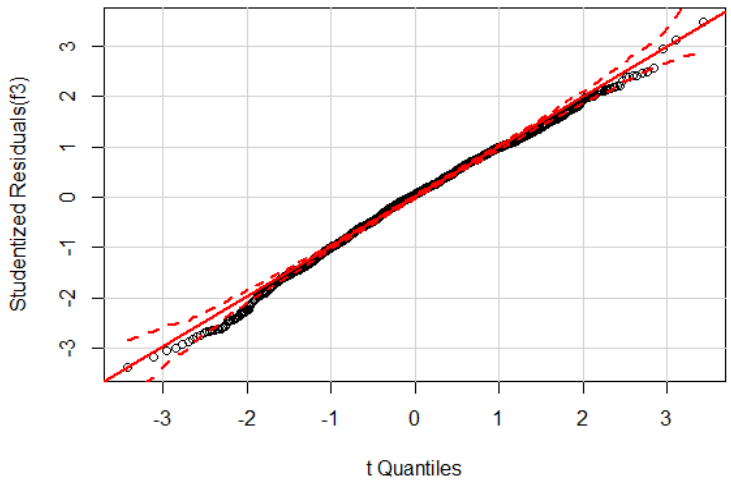
Non-Linerity



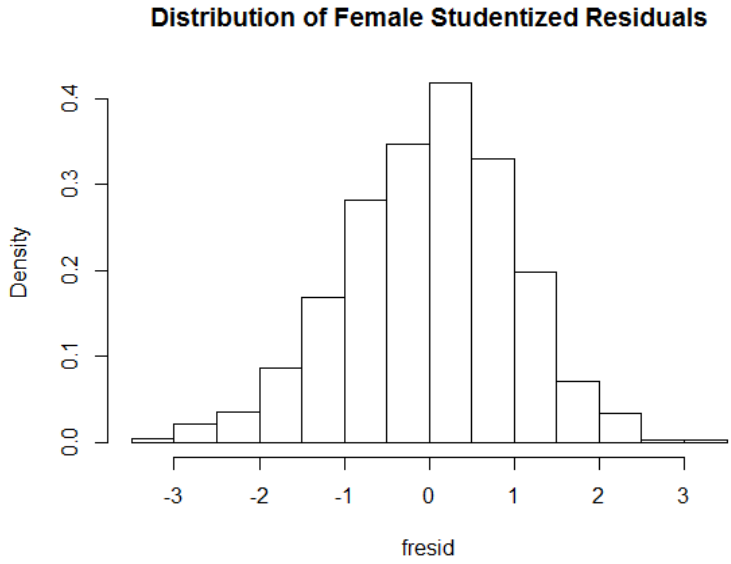
Female Model

Independent Variables = GPA, OST, Parent Education Level

Outlier Check



Non-normality



Non-Constant Error Variance

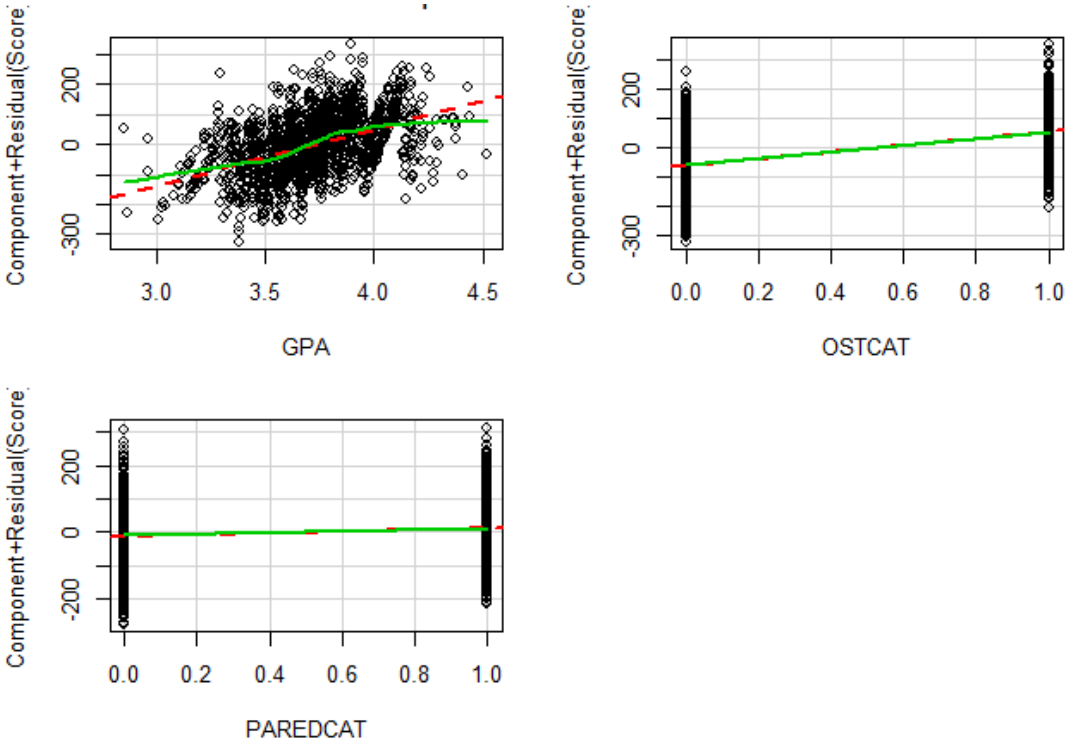
Non-constant Variance Score Test
Variance formula: ~ fitted.values
Chisquare = 1.658629 Df = 1 p = 0.1977885

Multi-Collinerity

```
> vif(f3)
     GPA         OST         PAREDCAT
1.000667    1.000346    1.000998

> sqrt(vif(f3))>2
     GPA         OST         PAREDCAT
   FALSE       FALSE       FALSE
```

Non-Linearity



Appendix F

Research Question 3 Regression Results

GPA and OST Sequences

Male Sample: GPA

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	312.13	52.77	5.915	5.11e-09 ***
GPA	171.88	14.32	12.002	< 2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 103.5 on 729 degrees of freedom
Multiple R-squared: 0.165, Adjusted R-squared: 0.1639
F-statistic: 144.1 on 1 and 729 DF, p-value: < 2.2e-16

Male Sample: GPA and OST

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
((Intercept)	306.00434	48.03985	6.37	3.35e-10 ***
GPA	164.89861	13.04825	12.64	< 2e-16 ***
OST	0.14083	0.01143	12.32	< 2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 94.21 on 728 degrees of freedom
Multiple R-squared: 0.309, Adjusted R-squared: 0.3071
F-statistic: 162.8 on 2 and 728 DF, p-value: < 2.2e-16

Male Sample: OST

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	910.6375	4.7823	190.42	<2e-16 ***
OST	0.1471	0.0126	11.67	<2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 104 on 729 degrees of freedom
Multiple R-squared: 0.1575, Adjusted R-squared: 0.1563
F-statistic: 136.2 on 1 and 729 DF, p-value: < 2.2e-16

Male Sample: OST and GPA

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	306.00434	48.03985	6.37	3.35e-10 ***
OST	0.14083	0.01143	12.32	< 2e-16 ***
GPA	164.89861	13.04825	12.64	< 2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 94.21 on 728 degrees of freedom
Multiple R-squared: 0.309, Adjusted R-squared: 0.3071
F-statistic: 162.8 on 2 and 728 DF, p-value: < 2.2e-16

Female Sample: GPA

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	254.45	41.81	6.085	1.45e-09 ***
GPA	187.86	11.21	16.754	< 2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 110.3 on 1612 degrees of freedom
Multiple R-squared: 0.1483, Adjusted R-squared: 0.1478
F-statistic: 280.7 on 1 and 1612 DF, p-value: < 2.2e-16

Female Sample: GPA + OST

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	206.76115	34.70672	5.957	3.14e-09 ***
GPA	188.21779	9.29543	20.248	< 2e-16 ***
OST	0.17373	0.00641	27.104	< 2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 91.45 on 1611 degrees of freedom
Multiple R-squared: 0.415, Adjusted R-squared: 0.4143
F-statistic: 571.5 on 2 and 1611 DF, p-value: < 2.2e-16

Female Sample: OST

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	907.1	3.188e+00	284.58	<2e-16 ***
OST	0.1735	7.177e-03	24.18	<2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 102.4 on 1612 degrees of freedom
Multiple R-squared: 0.2662, Adjusted R-squared: 0.2657
F-statistic: 584.7 on 1 and 1612 DF, p-value: < 2.2e-16

Female Sample: OST + GPA

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	206.76115	34.70672	5.957	3.14e-09 ***
OST	0.17373	0.00641	27.104	< 2e-16 ***
GPA	188.21779	9.29543	20.248	< 2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 91.45 on 1611 degrees of freedom
Multiple R-squared: 0.415, Adjusted R-squared: 0.4143
F-statistic: 571.5 on 2 and 1611 DF, p-value: < 2.2e-16

Appendix G

Research Question 3 Regression Results

GPA, Parent Education Level and OST Sequences

Male Sample: GPA

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	250.04	56.54	4.422	1.13e-05 ***
GPA	188.83	15.34	12.309	< 2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 102.5 on 700 degrees of freedom
Multiple R-squared: 0.1779, Adjusted R-squared: 0.1768
F-statistic: 151.5 on 1 and 700 DF, p-value: < 2.2e-16

Male Sample: GPA + Parent Education Level

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	244.664	56.534	4.328	1.73e-05 ***
GPA	188.584	15.318	12.311	< 2e-16 ***
PAREDCAT	13.785	7.752	1.778	0.0758 .

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 102.3 on 699 degrees of freedom
Multiple R-squared: 0.1816, Adjusted R-squared: 0.1793
F-statistic: 77.57 on 2 and 699 DF, p-value: < 2.2e-16

Male Sample: GPA + Parent Education Level + OST

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	237.98268	51.50284	4.621	4.55e-06 ***
GPA	181.66433	13.96625	13.007	< 2e-16 ***
PAREDCAT	15.83970	7.06423	2.242	0.0253 *
OST	0.13780	0.01147	12.014	< 2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 93.19 on 698 degrees of freedom
Multiple R-squared: 0.3219, Adjusted R-squared: 0.3189
F-statistic: 110.4 on 3 and 698 DF, p-value: < 2.2e-16

Model Comparison: Analysis of Variance

Model 1: Score ~ GPA
Model 2: Score ~ GPA + PAREDCAT
Model 3: Score ~ GPA + PAREDCAT + OST

	Res.Df	RSS	Df	Sum of Sq	F	Pr(>F)
1	700	7347821				
2	699	7314735	1	33086	3.81	0.05135 .
3	698	6061369	1	1253367	144.33	< 2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Male Sample: GPA

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	250.04	56.54	4.422	1.13e-05 ***
GPA	188.83	15.34	12.309	< 2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 102.5 on 700 degrees of freedom
Multiple R-squared: 0.1779, Adjusted R-squared: 0.1768
F-statistic: 151.5 on 1 and 700 DF, p-value: < 2.2e-16

Male Sample: GPA + OST

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	244.1824	51.5765	4.734	2.66e-06 ***
GPA	181.9803	14.0057	12.993	< 2e-16 ***
OST	0.1372	0.0115	11.929	< 2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 93.46 on 699 degrees of freedom
Multiple R-squared: 0.317, Adjusted R-squared: 0.315
F-statistic: 162.2 on 2 and 699 DF, p-value: < 2.2e-16su

Male Sample: GPA + OST + Parent Education Level

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	237.98268	51.50284	4.621	4.55e-06 ***
GPA	181.66433	13.96625	13.007	< 2e-16 ***
OST	0.13780	0.01147	12.014	< 2e-16 ***
PAREDCAT	15.83970	7.06423	2.242	0.0253 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 93.19 on 698 degrees of freedom
Multiple R-squared: 0.3219, Adjusted R-squared: 0.3189
F-statistic: 110.4 on 3 and 698 DF, p-value: < 2.2e-16

Model Comparison: Analysis of Variance Table

Model 1: Score ~ GPA
Model 2: Score ~ GPA + OST
Model 3: Score ~ GPA + OST + PAREDCAT

	Res.Df	RSS	Df	Sum of Sq	F	Pr(>F)
1	700	7347821				
2	699	6105028	1	1242793	143.1144	< 2e-16 ***
3	698	6061369	1	43660	5.0276	0.02526 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Male Sample: Parent Education Level

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	937.662	5.769	162.523	<2e-16 ***
PAREDCAT	14.653	8.545	1.715	0.0868 .

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 112.8 on 700 degrees of freedom
Multiple R-squared: 0.004183, Adjusted R-squared: 0.002761
F-statistic: 2.94 on 1 and 700 DF, p-value: 0.08683

Male Sample: Parent Education Level + GPA

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	244.664	56.534	4.328	1.73e-05 ***
PAREDCAT	13.785	7.752	1.778	0.0758 .
GPA	188.584	15.318	12.311	< 2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 102.3 on 699 degrees of freedom
Multiple R-squared: 0.1816, Adjusted R-squared: 0.1793
F-statistic: 77.57 on 2 and 699 DF, p-value: < 2.2e-16

Male Sample: Parent Education Level + GPA + OST

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	237.98268	51.50284	4.621	4.55e-06 ***
PAREDCAT	15.83970	7.06423	2.242	0.0253 *
GPA	181.66433	13.96625	13.007	< 2e-16 ***
OST	0.13780	0.01147	12.014	< 2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 93.19 on 698 degrees of freedom
Multiple R-squared: 0.3219, Adjusted R-squared: 0.3189
F-statistic: 110.4 on 3 and 698 DF, p-value: < 2.2e-16

Model Comparison: Analysis of Variance Table

Model 1: Score ~ PAREDCAT
Model 2: Score ~ PAREDCAT + GPA
Model 3: Score ~ PAREDCAT + GPA + OST

	Res.Df	RSS	Df	Sum of Sq	F	Pr(>F)
1	700	8900747				
2	699	7314735	1	1586011	182.64	< 2.2e-16 ***
3	698	6061369	1	1253367	144.33	< 2.2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Male Sample: Parent Education Level

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	937.662	5.769	162.523	<2e-16 ***
PAREDCAT	14.653	8.545	1.715	0.0868 .

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 112.8 on 700 degrees of freedom
Multiple R-squared: 0.004183, Adjusted R-squared: 0.002761
F-statistic: 2.94 on 1 and 700 DF, p-value: 0.08683

Male Sample: Parent Education Level + OST

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	904.11768	6.08691	148.535	<2e-16 ***
PAREDCAT	16.76670	7.86795	2.131	0.0334 *
OST	0.14395	0.01276	11.277	<2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 103.8 on 699 degrees of freedom
Multiple R-squared: 0.1575, Adjusted R-squared: 0.1551
F-statistic: 65.32 on 2 and 699 DF, p-value: < 2.2e-16

Male Sample: Parent Education Level + OST + GPA

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	237.98268	51.50284	4.621	4.55e-06 ***
PAREDCAT	15.83970	7.06423	2.242	0.0253 *
OST	0.13780	0.01147	12.014	< 2e-16 ***
GPA	181.66433	13.96625	13.007	< 2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 93.19 on 698 degrees of freedom
Multiple R-squared: 0.3219, Adjusted R-squared: 0.3189
F-statistic: 110.4 on 3 and 698 DF, p-value: < 2.2e-16

Model Comparison: Analysis of Variance Table

Model 1: Score ~ PAREDCAT
Model 2: Score ~ PAREDCAT + OST
Model 3: Score ~ PAREDCAT + OST + GPA

	Res.Df	RSS	Df	Sum of Sq	F	Pr(>F)
1	700	8900747				
2	699	7530616	1	1370131	157.78	< 2.2e-16 ***
3	698	6061369	1	1469247	169.19	< 2.2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Male Sample: OST

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	911.90726	4.87942	186.9	<2e-16 ***
OST	0.14330	0.01279	11.2	<2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 104.1 on 700 degrees of freedom
Multiple R-squared: 0.152, Adjusted R-squared: 0.1508
F-statistic: 125.5 on 1 and 700 DF, p-value: < 2.2e-16

Male Sample: OST + GPA

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	244.1824	51.5765	4.734	2.66e-06 ***
OST	0.1372	0.0115	11.929	< 2e-16 ***
GPA	181.9803	14.0057	12.993	< 2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 93.46 on 699 degrees of freedom
Multiple R-squared: 0.317, Adjusted R-squared: 0.315
F-statistic: 162.2 on 2 and 699 DF, p-value: < 2.2e-16

Male Sample: OST + GPA + Parent Education Level

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	237.98268	51.50284	4.621	4.55e-06 ***
OST	0.13780	0.01147	12.014	< 2e-16 ***
GPA	181.66433	13.96625	13.007	< 2e-16 ***
PAREDCAT	15.83970	7.06423	2.242	0.0253 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 93.19 on 698 degrees of freedom
Multiple R-squared: 0.3219, Adjusted R-squared: 0.3189
F-statistic: 110.4 on 3 and 698 DF, p-value: < 2.2e-16

Model Comparison: Analysis of Variance Table

Model 1: Score ~ OST
Model 2: Score ~ OST + GPA
Model 3: Score ~ OST + GPA + PAREDCAT

	Res.Df	RSS	Df	Sum of Sq	F	Pr(>F)
1	700	7579540				
2	699	6105028	1	1474512	169.7981	< 2e-16 ***
3	698	6061369	1	43660	5.0276	0.02526 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Male Sample: OST

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	911.90726	4.87942	186.9	<2e-16 ***
OST	0.14330	0.01279	11.2	<2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 104.1 on 700 degrees of freedom
Multiple R-squared: 0.152, Adjusted R-squared: 0.1508
F-statistic: 125.5 on 1 and 700 DF, p-value: < 2.2e-16

Male Sample: OST + Parent Education Level

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	904.11768	6.08691	148.535	<2e-16 ***
OST	0.14395	0.01276	11.277	<2e-16 ***
PAREDCAT	16.76670	7.86795	2.131	0.0334 *

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 103.8 on 699 degrees of freedom
Multiple R-squared: 0.1575, Adjusted R-squared: 0.1551
F-statistic: 65.32 on 2 and 699 DF, p-value: < 2.2e-16

Male Sample: OST + Parent Education Level + GPA

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	237.98268	51.50284	4.621	4.55e-06 ***
OST	0.13780	0.01147	12.014	< 2e-16 ***
PAREDCAT	15.83970	7.06423	2.242	0.0253 *
GPA	181.66433	13.96625	13.007	< 2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 93.19 on 698 degrees of freedom
Multiple R-squared: 0.3219, Adjusted R-squared: 0.3189
F-statistic: 110.4 on 3 and 698 DF, p-value: < 2.2e-16

Model Comparison: Analysis of Variance Table

Model 1: Score ~ OST
Model 2: Score ~ OST + PAREDCAT
Model 3: Score ~ OST + PAREDCAT + GPA

	Res.Df	RSS	Df	Sum of Sq	F	Pr(>F)
1	700	7579540				
2	699	7530616	1	48924	5.6339	0.01789 *
3	698	6061369	1	1469247	169.1919	< 2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Female Sample: GPA

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	209.02	40.57	5.153	2.9e-07 ***
GPA	201.28	10.89	18.481	< 2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 106.4 on 1556 degrees of freedom
Multiple R-squared: 0.18, Adjusted R-squared: 0.1795
F-statistic: 341.5 on 1 and 1556 DF, p-value: < 2.2e-16

Female Sample: GPA + Parent Education Level

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	200.493	40.259	4.98	7.06e-07 ***
GPA	200.238	10.802	18.54	< 2e-16 ***
PAREDCAT	28.221	5.386	5.24	1.83e-07 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 105.5 on 1555 degrees of freedom
Multiple R-squared: 0.1942, Adjusted R-squared: 0.1932
F-statistic: 187.4 on 2 and 1555 DF, p-value: < 2.2e-16

Female Sample: GPA + Parent Education Level + OST

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	179.2	3.359e+01	5.333	1.11e-07 ***
GPA	194.2	9.014e+00	21.544	< 2e-16 ***
PAREDCAT	28.57	4.493e+00	6.359	2.66e-10 ***
OST	.1635	6.269e-03	26.085	< 2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 87.99 on 1554 degrees of freedom
Multiple R-squared: 0.4396, Adjusted R-squared: 0.4385
F-statistic: 406.3 on 3 and 1554 DF, p-value: < 2.2e-16

Model Comparison Analysis of Variance Table

Analysis of Variance Table

Model 1: Score ~ GPA
Model 2: Score ~ GPA + PAREDCAT
Model 3: Score ~ GPA + PAREDCAT + OST

	Res.Df	RSS	Df	Sum of Sq	F	Pr(>F)
1	1556	17605965				
2	1555	17300478	1	305487	39.455	4.348e-10 ***
3	1554	12032034	1	5268444	680.447	< 2.2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Female Sample: GPA

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	209.02	40.57	5.153	2.9e-07 ***
GPA	201.28	10.89	18.481	< 2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 106.4 on 1556 degrees of freedom
Multiple R-squared: 0.18, Adjusted R-squared: 0.1795
F-statistic: 341.5 on 1 and 1556 DF, p-value: < 2.2e-16

Female Sample: GPA + OST

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	187.8	3.399e+01	5.525	3.85e-08 ***
GPA	195.3	9.126e+00	21.396	< 2e-16 ***
OST	.1634	6.348e-03	25.742	< 2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 89.1 on 1555 degrees of freedom
Multiple R-squared: 0.425, Adjusted R-squared: 0.4243
F-statistic: 574.7 on 2 and 1555 DF, p-value: < 2.2e-16

Female Sample: GPA + OST + Parent Education Level

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	179.2	3.359e+01	5.333	1.11e-07 ***
GPA	194.2	9.014e+00	21.544	< 2e-16 ***
OST	.1635	6.269e-03	26.085	< 2e-16 ***
PAREDCAT	28.57	4.493e+00	6.359	2.66e-10 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 87.99 on 1554 degrees of freedom
Multiple R-squared: 0.4396, Adjusted R-squared: 0.4385
F-statistic: 406.3 on 3 and 1554 DF, p-value: < 2.2e-16

Model Comparison: Analysis of Variance Table

Model 1: Score ~ GPA
Model 2: Score ~ GPA + OST
Model 3: Score ~ GPA + OST + PAREDCAT

	Res.Df	RSS	Df	Sum of Sq	F	Pr(>F)
1	1556	17605965				
2	1555	12345127	1	5260838	679.465	< 2.2e-16 ***
3	1554	12032034	1	313093	40.438	2.663e-10 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Female Sample: Parent Education Level

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	943.864	3.941	239.488	< 2e-16 ***
PAREDCAT	30.054	5.948	5.053	4.87e-07 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 116.5 on 1556 degrees of freedom
Multiple R-squared: 0.01614, Adjusted R-squared: 0.01551
F-statistic: 25.53 on 1 and 1556 DF, p-value: 4.87e-07

Female Sample: Parent Education Level + GPA

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	200.493	40.259	4.98	7.06e-07 ***
PAREDCAT	28.221	5.386	5.24	1.83e-07 ***
GPA	200.238	10.802	18.54	< 2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 105.5 on 1555 degrees of freedom
Multiple R-squared: 0.1942, Adjusted R-squared: 0.1932
F-statistic: 187.4 on 2 and 1555 DF, p-value: < 2.2e-16

Female Sample: Parent Education Level + GPA + OST

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	179.2	3.359e+01	5.333	1.11e-07 ***
PAREDCAT	28.57	4.493e+00	6.359	2.66e-10 ***
GPA	194.2	9.014e+00	21.544	< 2e-16 ***
OST	.1635	6.269e-03	26.085	< 2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 87.99 on 1554 degrees of freedom
Multiple R-squared: 0.4396, Adjusted R-squared: 0.4385
F-statistic: 406.3 on 3 and 1554 DF, p-value: < 2.2e-16

Model Comparison: Analysis of Variance Table

Model 1: Score ~ PAREDCAT
Model 2: Score ~ PAREDCAT + GPA
Model 3: Score ~ PAREDCAT + GPA + OST

	Res.Df	RSS	Df	Sum of Sq	F	Pr(>F)
1	1556	21123844				
2	1555	17300478	1	3823366	493.81	< 2.2e-16 ***
3	1554	12032034	1	5268444	680.45	< 2.2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Female Sample: Parent Education Level

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	943.864	3.941	239.488	< 2e-16 ***
PAREDCAT	30.054	5.948	5.053	4.87e-07 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 116.5 on 1556 degrees of freedom
Multiple R-squared: 0.01614, Adjusted R-squared: 0.01551
F-statistic: 25.53 on 1 and 1556 DF, p-value: 4.87e-07

Female Sample: Parent Education Level + OST

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	899.2	3.892e+00	231.032	< 2e-16 ***
PAREDCAT	30.35	5.117e+00	5.932	3.69e-09 ***
OST	.1670	7.139e-03	23.391	< 2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 100.2 on 1555 degrees of freedom
Multiple R-squared: 0.2722, Adjusted R-squared: 0.2713
F-statistic: 290.8 on 2 and 1555 DF, p-value: < 2.2e-16

Female Sample: Parent Education Level + OST + GPA

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	179.2	3.359e+01	5.333	1.11e-07 ***
PAREDCAT	28.57	4.493e+00	6.359	2.66e-10 ***
OST	.1635	6.269e-03	26.085	< 2e-16 ***
GPA	194.2	9.014e+00	21.544	< 2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 87.99 on 1554 degrees of freedom
Multiple R-squared: 0.4396, Adjusted R-squared: 0.4385
F-statistic: 406.3 on 3 and 1554 DF, p-value: < 2.2e-16

Model Comparison: Analysis of Variance Table

Model 1: Score ~ PAREDCAT
Model 2: Score ~ PAREDCAT + OST
Model 3: Score ~ PAREDCAT + OST + GPA

	Res.Df	RSS	Df	Sum of Sq	F	Pr(>F)
1	1556	21123844				
2	1555	15625842	1	5498002	710.10	< 2.2e-16 ***
3	1554	12032034	1	3593808	464.16	< 2.2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Female Sample: OST

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	912.5	3.209e+00	284.34	<2e-16 ***
OST	.1669	7.217e-03	23.12	<2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 101.3 on 1556 degrees of freedom
Multiple R-squared: 0.2557, Adjusted R-squared: 0.2553
F-statistic: 534.7 on 1 and 1556 DF, p-value: < 2.2e-16

Female Sample: OST + GPA

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	187.8	3.399e+01	5.525	3.85e-08 ***
OST	.1634	6.348e-03	25.742	< 2e-16 ***
GPA	195.3	9.126e+00	21.396	< 2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 89.1 on 1555 degrees of freedom
Multiple R-squared: 0.425, Adjusted R-squared: 0.4243
F-statistic: 574.7 on 2 and 1555 DF, p-value: < 2.2e-16

Female Sample: OST + GPA + Parent Education Level

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	179.2	3.359e+01	5.333	1.11e-07 ***
OST	.1635	6.269e-03	26.085	< 2e-16 ***
GPA	194.2	9.014e+00	21.544	< 2e-16 ***
PAREDCAT	28.57	4.493e+00	6.359	2.66e-10 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 87.99 on 1554 degrees of freedom
Multiple R-squared: 0.4396, Adjusted R-squared: 0.4385
F-statistic: 406.3 on 3 and 1554 DF, p-value: < 2.2e-16

Model Comparison: Analysis of Variance Table

Model 1: Score ~ OST
Model 2: Score ~ OST + GPA
Model 3: Score ~ OST + GPA + PAREDCAT

	Res.Df	RSS	Df	Sum of Sq	F	Pr(>F)
1	1556	15979386				
2	1555	12345127	1	3634259	469.384	< 2.2e-16 ***
3	1554	12032034	1	313093	40.438	2.663e-10 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Female Sample: OST

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	912.5	3.209e+00	284.34	<2e-16 ***
OST	.1669	7.217e-03	23.12	<2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 101.3 on 1556 degrees of freedom
Multiple R-squared: 0.2557, Adjusted R-squared: 0.2553
F-statistic: 534.7 on 1 and 1556 DF, p-value: < 2.2e-16

Female Sample: OST + Parent Education Level

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	899.2	3.892e+00	231.032	< 2e-16 ***
OST	.1670	7.139e-03	23.391	< 2e-16 ***
PAREDCAT	30.35	5.117e+00	5.932	3.69e-09 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 100.2 on 1555 degrees of freedom
Multiple R-squared: 0.2722, Adjusted R-squared: 0.2713
F-statistic: 290.8 on 2 and 1555 DF, p-value: < 2.2e-16

Female Sample: OST + Parent Education Level + GPA

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	179.2	3.359e+01	5.333	1.11e-07 ***
OST	.1635	6.269e-03	26.085	< 2e-16 ***
PAREDCAT	28.57	4.493e+00	6.359	2.66e-10 ***
GPA	194.2	9.014e+00	21.544	< 2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 87.99 on 1554 degrees of freedom
Multiple R-squared: 0.4396, Adjusted R-squared: 0.4385
F-statistic: 406.3 on 3 and 1554 DF, p-value: < 2.2e-16

Model Comparison: Analysis of Variance Table

Model 1: Score ~ OST
Model 2: Score ~ OST + PAREDCAT
Model 3: Score ~ OST + PAREDCAT + GPA

	Res.Df	RSS	Df	Sum of Sq	F	Pr(>F)
1	1556	15979386				
2	1555	15625842	1	353544	45.662	1.981e-11 ***
3	1554	12032034	1	3593808	464.159	< 2.2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1