

THE INFLUENCE OF FAMILY STRUCTURE ON THE TEST SCORES OF STUDENTS

A Thesis by

Rita Subba

M.A, Tribhuwan University, 2007

B.A Tribhuwan University, 2005

Submitted to the Department of Sociology
and the faculty of the Graduate School of
Wichita State University
in partial fulfillment of
the requirements for the degree of
Master of Arts

May 2012

©Copyright 2012 by Rita Subba

All Rights Reserved

THE INFLUENCE OF FAMILY STRUCTURE IN THE TEST SCORES OF STUDENTS

The following faculty members have examined the final copy of this thesis for form and content, and recommend that it be accepted in partial fulfillment of the requirement for the degree of Master of Arts, with a major in Sociology.

Ron Matson, Committee Chair

Twyla Hill, Committee Member

Natalie Grant, Committee Member

ABSTRACT

This study examined the effect of being raised in one-parent and two parent family structures on the academic achievement of students by looking at the test scores of their standardized composite math/reading tests. The study also looks for the possible influence of gender/race and structural factors like socioeconomic status, school's geographic location, and economic resources on the test scores of students. Using a sample of students raised in biological one-parent and two-parent family structures from the Educational Longitudinal Survey 2002 dataset, cross-sex theory, resources theory and interpersonal theory have been used to explain the effect for both the full sample and for father-headed one-parent families and mother-headed one-parent families. The research found no significant gender effect on the test scores of students, however, the research result found strong impact for race and socioeconomic status on achievement. Family structure showed moderate effects. Students raised in two-parent families outperform students raised in one-parent families. However, the research findings indicated that socioeconomic status and race are stronger predictors of test scores than family structure.

TABLE OF CONTENTS

Chapter	Page
1. Introduction	1
2. Literature Review	2
2.1 Gender/Race	3
2.2 Structural Factors	7
2.3 Family Structure	11
3. Sample and Methodology	19
3.1 Sample	19
3.2 Variables	20
3.2.1 Dependent Variable	20
3.2.2 Independent Variables	21
3.2.3 Gender /Race	21
3.2.4 Structural Factors	23
3.2.5 Family Structure	24
3.3. Analysis	26
4. Results	27
4.1 Univariate Analysis	27
4.2 Bivariate Analysis	28
4.3 Multivariate Analysis	31
5. Discussion	34
5.1 Limitations	37
5.2 Future Research and Policy Implications	38
BIBLIOGRAPHY	41
APPENDIX	46

1. Introduction

The importance of education is undeniable. Education is considered as the only medium to bridge the gap between economic and social disparities. Those who seek answers to what helps and hinders the educational achievement of children find that multiple factors like family structure, race/ethnicity, and socioeconomic status of parents play vital roles. The changing scenario in American household structure corresponds to the changing scenario in the classroom. Social science experts estimate that between 25 and 70 percent of all children in the United States will live with only one parent before they reach the age of 18 years (Kinnear, 1999). The earlier research on single-parent households indicates that living in a single-parent household often coincides with living in poverty (Bianchi 1984:191). McLanahan and Sandefur (1994) suggest that, regardless of race, one-parent families are more likely to be poorer than two-parent families. They found that in 1992 compared to 3.6 percent of two-parent families, 13.6 percent of one-parent white families lived in poverty. However, in one-parent households, there exists an income gap regarding the gender of the head of the families. Mother-headed single-parent families are the “poorest of all major demographic groups regardless of how poverty is measured” (Garfinkel and McLanahan 1986:11).

Things have not changed after two decades for mother-headed single-parent households. The United States Census Bureau states that the poverty rate and the number of households below poverty line have increased for female-headed one-parent families. In 2009, the poverty rate for female-headed one-parent households was 21.9 percent and 4.4 million whereas, in 2010, the rate was 31.6 percent and 4.7 million (DeNavas-Walt, Proctor and Smith 2011). So far as father-headed one-parent households are concerned, the poverty rate and the number in 2009 and

2010 were not statistically different (15.8 percent and 880,000 in 2010 compared to 16.9 percent and 942,000 in 2009). The poverty rate and number of households below poverty for two parent households in 2009 was 5.8 percent and 3.4 million whereas in 2010 it only increased to 6.2 percent and 3.5 million households. These statistics demonstrate that compared to two-parent households, one-parent households are economically disadvantaged.

The children raised in one-parent households and two-parent households differ in their academic achievement. Since standardized test scores have always been a yardstick to measure the academic status of schools and children, this study emphasizes the test scores of students as the dependent variables. There are gaps between the test scores of students based on what race they belong to, what kind of family structure they come from, the socioeconomic status of their parents, and many other factors. The past research conducted on test scores and the analysis of what factors lead the students to variations in academics are discussed in order to understand the causes of test score discrepancies. The purpose of this research is to examine the influence of gender/race, structural factors and family structure on academic achievement of students by using Educational Longitudinal Survey 2002 dataset.

2. Literature Review

To make theoretical sense of diverse studies conducted over time, the earlier literature can be divided into three categories: gender/race, structural, and family structure. In the following section of this literature review, I describe how these three have been found to impact test scores of students. Gender/ race theory will explore differences between the test scores of boys and girls, and it will also explore the cross-sex and same-sex parenting and its effect on the

test scores of students. Structuralist theories explore the influence of socioeconomic status, availability of economic resources, and the school's region on the academic performance of their children. Family structure theory explores the effect of single vs. two-parent homes, availability of interpersonal resources, and number of siblings on student achievement as measured by test scores.

2.1 Gender/Race

Gender/Race theorists argue that gender and race affect the academic achievement of students. Gender-based studies focus on the gender of parents and the children. Gender theory avers that female students perform better in academics than male students. I will discuss "same-sex" parenting (parent is same sex as child) and show how past literature explores the effect of gender in higher education and the impact of race and socioeconomic status on achievement.

There are more studies on the mother-headed single parent family than on father-headed single parent family. The National Center for Education Statistics (2005) reported that in 1995, 12.2 million one-parent households were maintained by women without husbands present whereas only 3.2 million one-parent families were maintained by men with no wives present.

A significant portion of the literature focuses on the effects of either mother-headed single-parent families or father-headed single-parent families on the academic achievement of children living within them (Alderman-Swain and Battle 2000; Battle 1999; Battle and Coates 2004; Downey 1994; Downey and Powell 1993; Lee and Kushner 2008). These studies tested the impact of children living with same-sex parents and academic achievement in high school and beyond. Gender theorists argue that the academic achievement of children is determined by the

gender of parents and the gender of children. First, there is the argument for same-sex parenting, which assumes that sons living with fathers and daughters living with mothers perform well academically, as their gender similarities help them to form a closer bond (Downey 1994). Secondly, there are comparative studies between children from mother-headed single-parent families and those from father-headed single-parent families which argue that the children from mother-headed families tend to do worse in school than their counterparts (Downey and Powell 1993).

Lee and Kushner (2008), in a comparative study of adolescents living with parents of the same sex (parent is same sex as child) and adolescents living with cross-sex parents, found that living with the same-sex parent in a single parent household does not benefit the adolescents as much as living with a cross-sex single parent. However, daughters in single-father homes outperformed the other adolescents living with cross-gender parents. Lee and Kushner's findings actually seem to extend the earlier research by Lee, Kushner and Cho (2007) who found that daughters living with their single fathers performed better academically than others. Similarly, research conducted exclusively on African-American father-headed and mother-headed single-parent families is also consistent with the earlier finding. Alderman-Swain and Battle (2000) conducted research on eighth-grade students to examine the impacts of living in a mother-headed or father-headed single household. They found that students living with their fathers performed better than the female students living with their mothers. However, the gender of students living with their fathers is not specified. The studies are divided in their conclusions. There is no agreement that gender of either parents or children makes a difference in the academic achievement.

Regarding the gender of students, the past literature perpetuates contradictory findings on the correlation between gender of student and test scores. Tate (1997) indicates that male students perform better on standardized measures of mathematics achievement especially on more advanced level of mathematic achievement. However, the research conducted by Duckworth & Seligman (2006) finds that the female students leave school with overall good GPAs and score significantly higher final grades in Algebra, Social studies, and English than male students. Their research was based on 198 eighth-grade students from socioeconomically and ethnically diverse public magnet schools. According to Niederle and Vesterlund (2010), although the female and male students invest in mathematics equally, the male students outshine the females because of the pressure of competition. The research suggests that female students take less challenging courses and perform worse under pressure. Mau and Lynn (2000) also suggest that male students score higher in math and science and female students scored higher in reading and amount of homework. As quoted in Brown and Brown (2007), the assessments of 2003 Program for International Student Assessment (PISA) conducted by the Organization for Economic Corporation and Development (OECD), the variation within the American students in terms of gender, race and socioeconomic status was wider compared to the gap between American students and other 30 European and wealthy nations.

Past studies have tried to explain the nexus between race/ethnicity and lower academic achievement. However, the outcome of their studies reflects the interdependency of race, academic achievement and socioeconomic status. Tate (1997) in his research concluded that throughout the years, the score gap between students from various races and ethnic groups have gradually narrowed, however, Asian and White students continue to perform significantly higher

than African American and Hispanic Students. According to Tate (1997), the score gap between White/Asian students and African American/Hispanic students is consistent with the reviews conducted by Secada (1992), and Locheed et al (1985).

Carlson and Corcoran (2001) found that African-American children score lower in math than White children. Most of the studies focus on the discrepancies between African-American and White families. The African American children have lower test scores than White children because of poverty, underfunded schools and single-family structure (Jencks and Phillips, 1998). Brooks-Gunn et al. (1996) found that Black children do worse on cognitive tests such as intelligence and ability tests and preschool readiness tests than do White children. However, Fram et al. (2007) found no significant difference in reading skills between Black and White preschool children, or between Hispanic and White children who had repeated kindergarten. McLanahan and Sandefur (1994) found that, children from White single-parent families were more likely to drop out of high school than were African-American children living in single-parent families. Although no clear explanation is given, it is indicated that African-American children adjust better than White children to life in single-parent families. Almost all studies have used the race/ethnicity of students or their parents in research on the relationship between the academic achievement of students and family structure (Bogenschneider 1997; Brooks - Gunn, Klebanov, and Duncan 1996; Entwisle and Alexander 1995; Fram et al 2007; Jeynes 2000).

Summarily, the gender of parents and the gender of students make a significant difference in the academic well-being of students. Research indicates that daughters living in father-headed single families perform better academically than the sons and daughters living in mother-headed

single families. Similarly, boys raised in mother-headed single families tend to have more behavioral problems than girls raised in mother-headed or father-headed single families. However, the gender/race variable provides us very limited evidence on the whole scenario. Arguably, gender affects the academic achievement but there are many other factors that are associated with lower academic performance. For instance, the amount of economic and the parental resources received by children affects the academic achievement of children; the gender model fails to incorporate the importance of resources in boosting the academic achievement of children.

2.2 Structural Factors

Structural theorists explain how individuals are shaped by the macro structures of society. Structural theorists focus on the interrelationships between the larger social structures or institutions of society, and also how these structures and institutions affect individuals in society (Ritzer 2006). Structural theorists argue that socioeconomic status has constraining effects on parents. The fact that “living in a single-parent household is often coincident with living in poverty” (Bianchi 1984:191) indicates a relationship between economy and family structure. Past research has strongly indicated that, apart from socioeconomic status, the race/ethnicity of the parents affects the academic achievement of children from different family structures (Bianchi 1984; Lee, Kushner and Cho 2007; Pong 1997).

The effect of family structure on socioeconomic status is mutually reinforcing. Garfinkel and McLanahan (1986) found that about half of the single mothers are dependent on government assistance. Moreover, compared with children who grow up in two-parent families, the mother-only children are less successful on average when they become adults. According to Alexander

& Entwisle (1995), more single-parent households exist with incomes below the poverty line than do two-parent households; the children from single-parent families with low economic status will have access to fewer educational and recreational resources and materials resulting in lower school grades of those children. Alexander and Entwisle's findings are consistent with the findings of Fram, Miller-Cribbs and Horn (2007) who found that children coming from single parent homes attend school with high proportions of ethnic minorities of their region.

Social scientists argue that the reason behind lower socioeconomic status of one-parent families is apparently the number of bread winners in the family. Since one-parent families will have only one member responsible for meeting the economic as well as emotional needs of their families, they tend to have lower socioeconomic status. However, mother-headed single-parent families are the "poorest of all major demographic groups regardless of how poverty is measured" (Garfinkel and McLanahan 1986:11). Entering single motherhood constrains women from pursuing careers, and, even if single mothers are employed, the pay gap between male and female workers impacts the socioeconomic status (Kinnear 1999). Although race/ethnicity is widely used in examining the effects of family structure on test scores, it should be considered that most of the time, socioeconomic status has a stronger influence on test scores or academic achievement of students.

Structuralist theories explain that the academic achievement of children is the result of variations in socioeconomic status. Studies tend to show that most single-parent families have low incomes compared to two-parent families, and most are from minority groups. McLanahan and Sandefur (1994) suggest that, regardless of race, one-parent families are more likely to be poorer than two-parent families. They found that compared to 3.6 percent of two-parent families,

13.6 percent of one-parent white families lived in poverty. As for African-American families, 48.8 percent of one-parent families live in poverty compared to 19.3 percent of two-parent families. Poverty is determined by family structure as well as race/ethnicity.

Resource theorists argue that economic resources influence the academic achievement of children. Resources theory postulates that the more economic resources the students have, the higher their test scores are. “Economic parental resources are defined as investments parents make in their children that are conditioned by income” (Downey, 1994: 133). Past research strongly suggests that family structure is a strong predictor of test scores of children. However, family structure and resources are closely tied. Research indicates that single-parent families have lower incomes compared to those of two-parent families, and because of low incomes, single-parent families tend to have fewer resources which contributes to lower academic achievement for their children. According to Kinnear (1999), “the benefits that children in two-parent families receive are broader than just what an additional parent can provide. Growing up with a single parent can often deprive a child of economic and community resources, in addition to the loss of parental resources” (p. 52).

Various research suggests that changes in resources happens later than the changes in family structure, which in time, affects the grades and test scores of students (Archibald, 2006; Astone and McLanahan, 1991; Downey, 1993; Downey, 1994; Downey, 1995, Lee et al, 2007; Berger, 2005). Single mothers tend to be poorer than single fathers, and two parent families are better off than single families or in other words, one parent households are more disadvantaged compared to two parent households (Downey, 1994; Entwisle and Alexander 1995; Pong 1997). Moreover, there are non-financial consequences to having a low income household.

Israel and Brealeu (2004) indicate that resources increase educational outcomes, and Amato (2005) suggests that “it is difficult for poor single parents to afford the books, home computers, and private lessons that make it easier for their children to succeed in school” (p. 82). After interviewing 64 single low-income parents about their educational interests, problems and support they get as single-parents from the state and society, Gladow and Ray (1984) found that single parents indicated that “handling family finances” is their most pressing problem. “Meeting the children’s emotional needs’ and “handling or controlling the children” were the fourth and fifth most serious problems faced by single-parents respectively. These findings are consistent with earlier studies (Gladow and Ray, 1984).

Related with socioeconomic status is the location of school attended by the students. Most of the research indicates the racial and ethnic composition of school affecting the overall performance of students. However, as the ELS dataset does not have the variable that measures the racial/ethnic composition of school, the geographical location of school has been used in this study. As quoted in Brown & Brown (2007), the results of International Mathematics and Science Study (TIMSS) tests where roughly 60 countries participated, show that fourth and eighth grade students in affluent suburban U.S school districts scores nearly as well as students in Singapore, which is the runaway leader on TIMSS math scores. The research conducted indicates that being a rural school is associated with more difficulty in hiring certified teachers.

Summarily, resources, whether economic or interpersonal, make a difference on the academic achievement of children. Resource theorists explain academic achievement as an outcome of either economic or interpersonal resources. Studies show that single parents tend to have fewer resources, thus contributing to lower academic achievement among their children.

Although resource theory explores the effect of family structures on the availability of resources and also the influence of resources on the test scores of children, it ignores several other important determinants like parenting styles, school factors, and student's performances. So the structural factors- socioeconomic status, the parental or economic resources- are inadequate to explain all aspects associated with standardized test scores of students. The structural theory fails to address the influence of gender based results. Studies suggest that girls living in father-headed households perform better than other boys and girls living in mother-headed single-parent households. Moreover, the socioeconomic status of single-parent households differs based on who the bread-winner of the family is; the income of women-headed single-parent households is found to be lower than the income of men-headed single-parent households. Therefore apart from structural factors, gender/race is another important determining factor explaining the variation in standardized test scores of students. However, what stands out in both structural and gender perspectives is the importance of family structure. The literature clearly shows how structural factors like socioeconomic status, resources are determined by the type of family composition, and the gender of the head of the household affects the distribution of resources resulting in lower or higher test scores of the children.

2.3 Family Structure

Family structure is interrelated with other structural factors. Although family structure could have been integrated as one of the structural factors that affects the test scores, I chose to isolate the effect of family structure on test scores for two reasons. First, family structure had been constantly identified as one of the important factors in shaping the well-being of children by

several studies (Astone and McLanahan 1991; Alexander and Entwisle, 1995; Downey and Powell 1993; Jeynes 2000; Pong, 1997; Mulky, Crain and Harrington, 1992; Shaff, Wolfinger, Kowalski-Jones and Smith 2008). Second, in analyzing the effects of structural factors like socioeconomic status, resources, and gender/race on test scores of students, the studies indicate that all those factors are shaped by the type or size of family the students come from. Therefore, to analyze and test the independent effect of family structure on the test scores of students, I have isolated family structure.

Past research indicates that children raised in single-parent families will experience more difficult time in school in terms of discipline and socializing with peers; compared to children growing in two-parent (husband-wife) families, children from single-parent families are more likely to drop out of school, to show lower levels of academic achievement, to give birth out of wedlock, to end up being single parents themselves, and to become more dependent on government assistance (Astone and McLanahan 1991; Alexander and Entwisle, 1995; Downey and Powell 1993; Jeynes 2000; Pong, 1997; Mulky, Crain and Harrington, 1992; Shaff, Wolfinger, Kowalski-Jones and Smith 2008).

Undoubtedly, a strong relationship exists between family structure and educational attainment measured in test scores. Earlier studies on test scores of students from different grades, ranging from first grade to high school and even after high school, suggest that family structure is one of the most important determinants of test scores (Astone and McLanahan 1991; Alexander and Entwisle 1995; Downey and Powell 1993; Jeynes 2000; Pong 1997; Mulky, Crain and Harrington 1992; Shaff, Wolfinger, Kowalski-Jones and Smith 2008). However, there were some complications. Few studies focus on the test scores of students only (Alexander and

Entwisle 1995; Downey 1994). Many studies employ different variables to measure the performance of students, using indicators such as test scores, grades, educational attainment, pursuit of higher education after high school, and I.Q. level. Moreover, some studies compare the educational performance of children coming from female and male-headed single-parent households (Alderman-Swain and Battle 2000; Battle 1999; Downey 1994; Lee and Kushner 2008). Other studies place children coming from step families in the same category as children coming from single parent households, as all children share one biological parent in the household (Astone and McLanahan, 1991). However, even in those studies which compare children coming from single mother or single father households to those from step parent households, the children coming from two-parent households outperform children from single parent and step parent households (Astone and McLanahan 1991; Alexander and Entwisle 1995; Downey and Powell 1993; Pong 1997; Mulky et al 1992; Shaff et al 2008).

Furthermore, Pong (1997), who carried out a comparative study between the eighth-grade math and reading achievement scores of students with one-parent to those of two-parent families, found that there is a negative relationship between test scores and family structure. Students from single-parent families and stepfamilies performed more poorly than students from two-parent families. However, Pong (1997) concludes his findings by stating that “the negative effect of single parent families and stepfamilies is partly explained by the relatively low socioeconomic status of children” (p. 734). Research indicates the presence of a patterned relationship between family structure, socioeconomic status, and lower test scores.

However, there are still other factors that neutralize the effects of family structure on the academic performance of children. According to Amato (2005), what predicts children’s

cognitive, emotional and social well-being is the quality of parenting and not necessarily the family structure. For instance, studies have indicated that children from divorced families face similar problems as do children from discordant two-parent families. In addition, Israel and Beaulieu (2004) indicate that students living with a one-parent family obtained higher test scores than those with two-parent families or other family arrangements. One of the reasons for this was the influence of number of siblings in the household. As the number of siblings increases, the test scores of students decreases. Jeynes (2000) found that although the relationship between family structure and the academic achievement of children exists, socioeconomic status can decrease the actual impacts of different types of family structures. Summarily, socioeconomic status is indicated as the stronger influence on the academic performance of children by current literature, while family structure is seen as the stronger of the two in the past literature.

Downey (1994) discusses interpersonal parental resources, which refer to the parent's involvement in their child's day-to-day activities, and parental supervision. The interpersonal parental resources are more important than economic parental resources in shaping the behavioral factors of children. According to interpersonal resources theory, the more parents communicate and spend time with their children, the higher the children score on tests. Children from two-parent households should be able to spend more time with their parents than the students from one-parent families. Downey (1994) measures interpersonal parental resources by asking eight questions to parents about their involvement in their children's PTA activities, their educational expectations, how well they know their children's friends, how often they help their children with their homework, and how often parents talk to children about their academic situations. He indicates that despite the advantages of more resources the children living with

father-headed single families get, the only difference between the children from single mother and single father headed households is in math testing. The children from single mother-headed households and single father-headed households differed in math testing; the students from single mother households scored lower than the students from single father households.

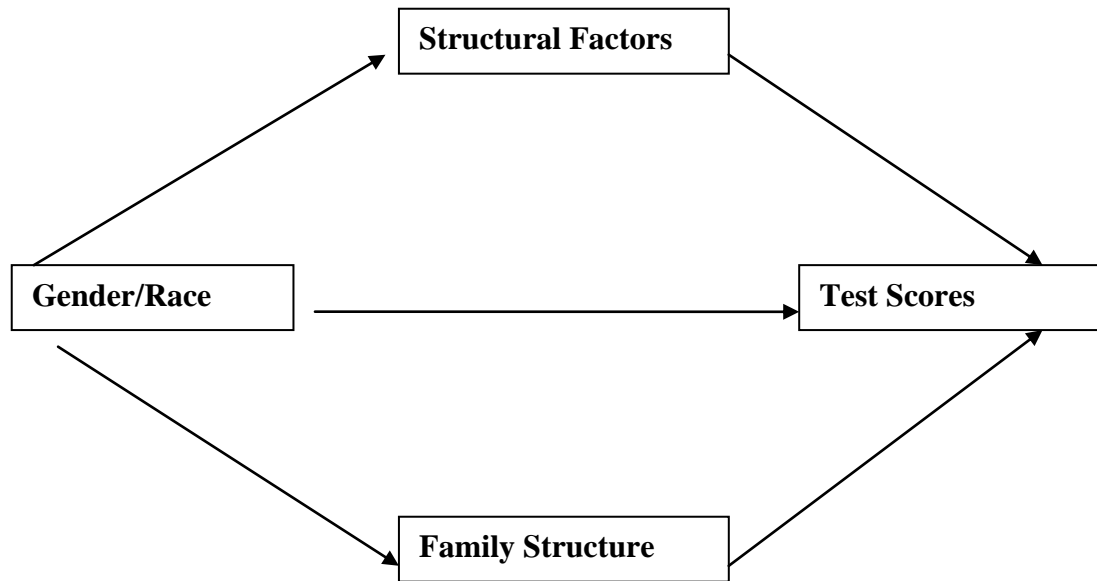
Regarding the interpersonal parental resources, Downey (1994) concludes that children from single mother-headed households receive less economic parental resources than children from single father-headed households whereas children from single father-headed households receive less interpersonal parental resources than children from single mother-headed households. His findings seem to contradict the findings of Astone and McLanahan (1991) who argue that as single mothers work long hours outside homes, they get less time to spend with their children, and spending less time with children makes it difficult for single mothers to discipline and supervise their children.

Amato (2005) suggests that children in divorced families tend to have weaker emotional bonds with mothers and fathers than do their peers in two-parent families. In contrast, McLanahan and Astone (1991) found that, “children of single parents are more likely than other children to spend time talking to their parents” (p. 316). They concluded that single parents make confidants of their children. Zimmerman, Salem and Kenneth (1995) also found that youth living in single-mother households reported more parental support than those living in other family constellations. Single mothers seemed to compensate for the absence of the father by providing support for their sons. Examining the effects of parental resources, Downey (1995) suggests that children from two-parent families have more parental resources, which in turn benefits their academic achievement. Lee et al. (2007) argue that parent involvement should also take into

consideration the effect of gender. His research examined the influence of gender of parents and children, and parental involvement in school on the academic achievement of adolescents in single-parent families. He found that daughters living with highly involved single fathers fare better academically than their counterparts.

Considering the perspectives of gender/race, structural factors, and family structure on the relationship between family structure and academic achievement of children show how connected one influencing factor is to the others. My alternative model (Figure 1) proposed in this thesis consists of gender/race, structural factors, and family structure having a direct association with poorer academic achievement, especially scores on standardized tests. This model will also reflect the influence of gender/race on structural factors like socioeconomic status, resources, school location, and family structure.

Figure 1. Alternative Model



As the above diagram shows, Gender /Race directly influences the test scores of students, a fact which has been consistent in various research. The influence of gender/race is not only on test scores, but also on structural factors as well as on family structure affecting test scores. This model also will test the indirect effect of gender on family structure and structural factors on test scores of children. Although more research focuses on the same-sex parenting and its effects on the test scores of children, some research indicates that academic performance of sons and daughters from single-parent families differs significantly. Hypothesis one is based on a general gender proposition suggested by many studies that girls perform better than boys academically. Hypothesis two is based on same-sex parenting theory which argues that when children live with

the same gender parents (the gender of the child and single parent is similar), they fare better, as the similarities of their gender will help form a closer bond between the child and the parent.

Hypothesis three tests the effect of race on the test score of students.

1. Girls from both one-parent and two-parent households score higher on math/reading tests than boys from both one-parent and two-parent households.
2. Students living in cross-sex one-parent households score higher on math/reading tests than students living in same-sex one-parent households.
3. Net of other factors, minority children score lower on math/reading tests than white children.

Hypothesis four will test the possible correlation between race and socioeconomic status of parents. The next model segment covers relationships between structural factors and test scores. The structural factors constitute socioeconomic status, and the availability of economic resources, the geographical location of schools students attend. The socioeconomic status is measured by the annual income of the parents combined, and the level of education completed by the parents. So far as the economic resources are concerned, it is measured by the extent to which students have educational materials. The following hypotheses will be tested:

4. Net of other factors, the children whose parents' socioeconomic status is higher score better on composite math/reading standardized test than the children whose parents' socioeconomic status is lower.
5. Students who have more home resources score higher on composite math/reading standardized test than children who have fewer home resources.

6. Students who attend suburban schools score higher on composite math/reading standardized test than students who attend urban schools.

The next part of the logic model is family structure illustrating how it affects test scores of students. Different family structures includes: single-parent family versus two-parent family; male-headed one-parent family versus female-headed one-parent family. Based on my alternative model, I intend to test the following hypothesis

7. Net of other factors, children in two-parent families score higher on composite math/reading standardized test than children in one-parent families.
8. Students who interact with their parents more score higher on composite math/reading standardized test than students who interact less with their parents.
9. Students who have more siblings in family score lower on composite math/reading standardized test than students who have fewer sibling or no siblings at all.

3. Sample and Methodology

3.1 Sample

The data used in this study came from the Educational Longitudinal Study (U.S Dept. of Education 2004) which is a national probability sample of 752 participating public, Catholic, and other private schools in the spring term of the 2001 and 2002 school year. Out of 17, 591 eligible selected sophomores, 15,362 completed a base year questionnaire, as did 13,488 parents, 7135 teachers, 718 librarians, and 743 principals. The ELS 2002 consisted of five separate

questionnaires for students, parents, teacher, school and library media center, two achievement tests for students (assessment of reading/mathematics), and a school observation form.

A number of sample restrictions were made in order to get the specific sample for analysis. The student and parent's incomplete or invalid surveys were removed. Steps were taken to ensure that only valid data were used for standardized test scores, which serves as the dependent variable, by dropping all the incomplete and missing test scores of students. Most important of all, steps were further taken to ensure that only three family types- father- headed single parent, mother-headed single parent, and two-parent family- were selected for the study. Only biological two-parent and one-parent families were selected for this study. Students living in one-parent families with other guardians or step-parents or adopted parents were not included in the study. After applying the restrictions, the final sample size was reduced to 8743 students.

ELS had supplied standardized weights in order to compensate for oversampling. However, the ELS weights cannot be used for bivariate and multivariate analysis as it may bias statistical parameters by reducing sampling error. Therefore to correct the possible bias, a relative weight was created and applied to make findings more generalizable. This relative weight will retain the original sample size while maintaining the proportions as in the population. The relative weight was created by dividing the standard weight by its mean.

3.2 Variables

3.2.1 Dependent Variable.

The standardized test scores served as the dependent variable for this study. The standardized composite test was administered by the National Center for Education Statistics to assess the

reading and mathematics of participating 10th grade students. The test score variable was also recoded into an index of 0 to 100%. This will allow all the possible test score values to fall in between 0 to 100 range. The test scores of the total 8,743 students ranged from 23.53 to 79.02. In order to find out the overall performance of student achievement, this study uses the combined test scores of math and reading standardized tests.

3.2.2 Independent Variables

Gender and race, structural factors and family structures served as the independent variables which will likely affect the test score of students.

3.2.3 Gender /Race

The gender of students and parents were required to analyze the data. Gender is a nominal-level variable. By gender, it indicates the gender of students and the gender of the head of the one-parent households. The gender of students was recoded into a binary (0, 1) denoting male students as 0 and female students as 1.

Another variable was created taking only one-parent families. It was a nominal level variable created by computing family structure and the gender of students. The variable included four categories, 1 represented male students living with mother only household, 2 represented female students living with mother only households, 3 represented male students living with father only households, and 4 represented female student living with father only households. In order to test hypothesis two which expected that students raised in cross-sex (the gender of student is opposite to the gender of parent) families perform better in test scores than the students

raised in same-sex (the gender of student is similar to the gender of parent) families, this variable was further recoded into another variable (`cross_sex`) which measured male students living in mother-headed one-parent households and female students living in father-headed one-parent households. The variable was then transformed to a binary (0, 1) denoting cross-sex households as 0, and same-sex households as 1.

It is expected that boys living with mother-headed one-parent households will score lower on standardized test than boys living with father-headed one-parent households or in other words, students living in cross-sex households will score higher on standardized test than students living in same-sex households. It is also expected that girls from one-parent and two-parent households score higher than the boys from one-parent and two-parent households.

The race/ethnicity of parents is a nominal-level variable. In order to find similar test scores within the race/ethnicities, a post-hoc Scheffe test was conducted. Based on the test result, the white, non-Hispanic and Asian, Hawaii/Pacific islanders were collapsed into one category as the average test scores of children from those races were similar. The other races including Hispanic, Black or African-American, and American Indian were all combined into one group due to the similarities in the test scores. The test scores of children from Multiracial, non-Hispanic race fell in the middle category as it was neither high as the White and the Asians nor was it as low as the other remaining races. However, considering the small sample size and the closeness of the score to the other non-White and non-Asian group, the multiracial, non-Hispanic race was combined with the Hispanic, Black or African-American, and American Indian race. The race/ethnicity of parents was then recoded into a binary of (0, 1) denoting 0 as the

White/Asian and 1 as the others. It is expected that children from White/Asian group will score higher on standardized tests than the children from other minority groups.

3.2.4 Structural Factors

Structural factors include variables like socioeconomic status, availability of economic resources to children, and the geographic location of school.

ELS created the socioeconomic status or SES variable by combining parents' income, occupation and education. The SES variable is standardized interval-level variable which ranges from -1.97 to 1.98. The lower the score is, the lower the family's socioeconomic status is. The higher the score is, the higher the family's socioeconomic status. It is hypothesized that the students from higher socioeconomic statuses will score higher on standardized tests. However, in addition to the original SES variable, SES variable has also been transformed into quartile in order to test the relationship between socioeconomic status and test scores. The SES quartile variable was divided into the lowest quartile, lower quartile, high quartile and the highest quartile is a nominal variable. The standardized SES variable will be used for OLS regression whereas the SES quartile will be used for bivariate analysis.

To measure economic resources, ten binary variables were used that included items whether the family has access to daily newspaper, regularly received magazines, has a DVD player, has a computer and access to the internet, has an electric dishwasher, has clothes dryer, has more than 50 books, has a fax machine, and whether student has his/her own room. A summated index variable was created to measure family resources by combining all these ten variables. Students who reported having 0 to 7 items were categorized as students having fewer economic

resources and students who reported having 8 to 10 items were categorized as students having more economic resources. After that two more binary variables that measured whether the family has a computer that a tenth grader may use and whether the computer has access to internet were added to compute a new variable to measure the economic resources of the household. The variable was named *bireshm*, with 0 denoting fewer resources and 1 denoting more resources. It is expected that increased home resources will be associated with higher test scores.

The variable that represented the location of school either in urban, rural or suburban is a nominal level variable. The variable was further recoded into dummy variables representing three types of school location. It is expected that students at suburban school score higher than rural or urban schools.

3.2.5 Family Structure

Family structure is a nominal variable which is anticipated to have a strong influence on the test scores of students. For the sake of this study, only three types of family structure have been extracted from the original ELS dataset. Only students living in biological two-parents and one-parent households were selected. To compare the children's test scores from one-parent families and two parent families, a binary (as already discussed in Gender section) of (0,1) has been created, with 0 denoting two-parent families and 1 denoting one-parent families. However, in order to test hypothesis two and three temporary variables were created. The gender of the head of the one parent families was also recoded into a binary of (0,1) denoting 0 as mother-headed one-parent household and 1 as father-headed one-parent households. In order to compare students' achievement from two-parent households and one-parent households, a new variable

was created that combined the mother-headed and father-headed one-parent households into one single variable. The variable was recoded into a binary of (0, 1) denoting 0 as two-parent and 1 as one-parent households.

Similarly, to measure interpersonal resources, nine variables that indicated the communication between family and students were employed. Those nine variables measured how often children and parents interact about school courses, activities, study, current events and other troubling things. The missing values were removed and each variable was transformed into binary with 0 denoting lesser communication and 1 denoting more communication. Then the variables were summed and a scale variable was created out of it. A binary variable was created 0 indicating lesser communication with parents and 1 indicating more communication with parents. Students who reported communicating with parents from 0 to 6 issues were categorized as students who have lesser communication with parents, and students who reported communicating with parents from 7 to 9 issues were categorized as students who have more communication with parents. The research hypothesized those students who communicate with their parents more will score higher on standardized tests than the students who communicate less with their parents.

It is also hypothesized that parents spending quality time with their children will help the children perform better on standardized tests. Quality time consisted of 12 binary variables that measure whether the parents attended school activities, sports events outside school, religious services, or family social functions with their 10th graders. It also consisted of variables that measure if parents took day trips/vacations, worked on hobby/played sports, went shopping and to restaurants, spent time talking and did something else fun with 10th graders. Students who

reported doing 0 to 10 activities with their parents were categorized as students who spent less quality time with their parents and students who reported doing 11 to 12 activities with their parents were categorized as students who spent more quality time with their parents. In order to measure the quality time, a binary variable has been created with 0 indicating less quality time between the students and their parents, and 1 indicating more quality time between the students and their parents.

The last variable included in family structure model is the number of siblings. It is expected that students who have more siblings at home scored lower in standardized test than the students who have fewer or no siblings. The students reported having no siblings to having 6 siblings at home. For this study, since a very tiny percentage(3.2) of students reported having no siblings at home, students who reported no siblings and students who reported one sibling were categorized as students who have fewer siblings and the rest of the students who had 2 to 6 siblings were categorized as students who have more siblings. This variable was recoded into a binary of (0, 1) and 0 indicating fewer siblings at home, and 1 indicating have more than one siblings at home. It is expected that students who have fewer siblings at home will score higher on standardized test than students who have more siblings at home.

3.3. Analysis

Univariate statistics are used on all interval variables to find the mean and standard deviation, and on other variables to calculate the percentage of full sample distribution. Appropriate bivariate statistics are carried out to find the relationship between the variables as per the hypotheses. A one sample t-test is conducted to test hypothesis one, two three, five, seven

and eight as those hypotheses have interval dependent variables and nominal independent variables. A one-way anova is conducted to test hypotheses four, and six as the dependent variable is interval, and the nominal independent variable have more than two categories.

Multivariate statistics are used to examine the effects of independent variables on test scores net of all other factors. For this study, two separate multiple regression are used. The first multiple regression compares one-parent families and two-parent families. The second multiple regression compares single-parent cross-sex families and same-sex families.

4. Results

4.1 Univariate Analysis

Table 1 presents the mean and standard deviation of test score and socioeconomic status, and the full sample distribution of gender, race, family types, material resources, school type, number of siblings, parent interaction, and quality time. The average test score of students was 51.74 with the standard deviation of 9.47. The male students comprised 49.3 percent of the total population, and female 50.7 percent. So far as race is concerned, 69.8 percent identified themselves as White and Asian, 30.2 percent identified themselves as others. The socioeconomic status index indicated that the average ranking of socioeconomic index is .085 with a standard deviation of .74. About 51.4 percent of students reported having home resources at home. About 19.8 percent of schools were located in rural, 52 percent suburban and 28.2 percent in urban neighborhoods. Family structure is one of the most important variables in this study. Only 26.8 percent of students reported being raised in one-parent families, whereas 73.2 percent of students reported being raised in two-parent families. Among the one-parent families,

23.8 percent were mother-headed and 3.8 percent were father headed. The percentage of students who reported having more than one sibling at home was 60.8. Around 54.7 percent of students said they interacted with their parents frequently and 54.5 percent of students were positive that their parents spent quality time with them.

4.2 Bivariate Analysis

Table 2.1 shows the average test scores of students based on gender, cross-sex families, race and family structure. A one sample t-test was performed to test the relationship between the independent variables gender, cross-sex, minority, home resources, parent's communication, quality time, presence of siblings, and family structure and the dependent variable test score.

According to Table 2.1, the gender of students does not affect the test scores ($t=0.96$, $p >.05$). The average test scores of male students and female students were 51.84 and 51.64 respectively. The result refutes hypothesis one. Female students do not score higher than the male students on standardized test. The fact that no association between gender and standardized test score is found could be due to the confounding effect of collapsing math and reading test scores. Similarly, students raised in cross-sex families also do not score higher than the students raised in same-sex families. According to the one-sample t-test, the relationship between cross-sex parenting and test score was non-existent ($t=0.544$, $p >.05$). The average test score of students raised in cross-sex households was 48.49 with a standard deviation of 9.81 whereas the average test score of students raised in same-sex households was 48.28 with a standard deviation of 9.03. The result again refutes the hypothesis that students from cross-sex parenting perform better than students from a same-sex household.

However, there is a very strong relationship between race and test score ($t=42.791$, $p<.001$). The average test score of White/Asian students was 54.34 with a standard deviation of 8.59 whereas the average test score of other or minority was 45.75 with a standard deviation of 8.68. The relationship was statistically significant and meaningful ($d >.20$). Race affects the test scores of students. The White/Asian students score higher than minority students. The result supports hypothesis three that minority students score lower than White/Asian students.

A t-test was also performed to test the strength of association between student's home resources and test scores. According to the test, there exists a strong relationship between home resources and test scores ($t= -34.43$, $p<.001$), and the relationship is statistically significant and meaningful ($d>.20$). The average test score of students with fewer home resources was lower ($t = 48.56, S.D = 9.31$) than the test scores of students with more home resources ($t = 55.10, S.D = 8.44$). The more resources students have at home, the higher their test scores are, as hypothesized.

A t-test was also performed to test the strength of relationship between family structures (one-parent vs. two-parent). According to the test, there is a strong relationship between family structure and test score ($t=20.58$, $p < .001$). The average score of students raised in one-parent families was less than the average score of students raised in two-parent families ($48.38 < 52.98$). The relationship was statistically significant and meaningful ($d > .20$). This supports the hypothesis.

The t-test conducted to test the association of communication between parents and children and test scores indicates that there is a strong, significant relationship between

communication and test scores ($t= 23.97, p<.001$). The relationship was also meaningful ($d > .20$). The average scores of students who reported having less communication with parents was 49.12 with a standard deviation of 9.37, while the mean scores of students who reported having more communication with their parents was 53.9 with a standard deviation of 9.01. The students who have more communication with their parents perform better in standardized tests than students who have less communication with their parents. This supports the hypothesis that communication between students and their parents affects the test scores of students.

Not only communication, spending quality time with 10th graders also seems to have impact on the test scores as well. The t-test result indicates that there is a moderate association between quality time spent together by parents and 10th graders and the test scores ($t= -15.61, p <.001$). The association was also meaningful ($d >.20$). The students whose parents spent more quality time with them scored 52.69 on average with a 9.37 standard deviation while the students whose parents spent less quality time with them had an average score 49.03 with a standard deviation of 9.2. This supports the hypothesis that the more quality time spent with children, the higher the children score on standardized tests.

The association between presence of siblings in household and test scores was moderate and statistically significant ($t= 13.29, p<.001$). The association was also meaningful ($d>.20$). The average test score of students who had no siblings or just had one sibling was 53.38 with a standard deviation of 8.94, whereas the average test score of students who had more than one sibling was 50.69 with a standard deviation of 9.66). The less the number of siblings students have, the higher the students score on tests. This supports the hypothesis that the more siblings the students have, the lower they perform on standardized tests.

Table 2.2 shows one way anova analysis for test score and socioeconomic quartiles and school location. There is a very strong relationship between socioeconomic status and test score of students ($F = 886.62, p < .001$). The average test score of students who fall in the lowest quartile of socioeconomic status was 45.47; the average test score of students who fall in the lower quartile was 50.22; the students who fall in high quartile received 53.24 and students who fall at the highest quartile of socioeconomic status had the highest average score of 58.06. Students whose socioeconomic status was lower scored lower on the standardized tests. As the socioeconomic quartile increased, so did the test score of students. This finding supports the hypothesis.

So far as the school location is concerned, there is a moderate relationship between school location and test score ($F = 28.77, p < .001$). The students who attended urban schools scored the lowest (51.98), and the students who attended the suburban schools scored the highest (52.3) among the three different locations. The finding supports the hypothesis.

4.3 Multivariate Analysis

Ordinary Least Squares (OLS) regression is conducted to examine how well the gender/race level, structural level and family structure level variables predict the test scores of students. There were two regression analyses conducted: the first regression was conducted for the full sample and the second regression was conducted for one-parent households only. The first regression analysis conducted predict how the students from two-parent and one-parent households fared in standardized test controlling for the gender/race level, structure level and family structure level variables. Similarly, the second multiple regression conducted predict how

students from mother-headed one-parent households and father-headed one-parent households performed in standardized tests controlling for gender/race level, structural level and family structure level variables. In order to meet the assumptions of regression analysis, the dependent variable (test score) was tested for normality. The test concluded that the null hypothesis was rejected. However, for normality the central limit theorem suggests it will not affect the study because the sample size for this study is 8743, which is over 1000 cases. For multicollinearity test, the value of VIF was lesser than 10 and the tolerance value was greater than 0.1 for all independent variables. The test cleared all variables from the possibility of multicollinearity. As for the outliers, the test indicated that the Mahalanobis distance did not exceed 25; the Cook's distance was less than 1. Also the standardized residual was within the range of -3.0 and 3.0. There were only 10 outlying cases out of 8743 cases which are less than 5 percent of the total sample, so outliers were not removed from the sample.

Table 3.1 compared the test scores of students raised in two-parent and one-parent households controlling gender, race, socioeconomic status, home resources, school's location, family structure, siblings, communication and quality time. The constant was 51.824 for the full sample. Being a female, one's test score was likely to decrease by 0.160 however the coefficient was not statistically significant. Being a minority, one's test score decreased by 5.232. A unit increase in socioeconomic status of parents increased the test score of student by 4.469. Having more home resources, student's test scores increased by 1.398. Compared to the test scores of students attending schools in suburban areas, the test scores of students attending school in rural area decreased by 0.081. Similarly, compared to the test scores of students attending schools in suburban areas, the test scores of students attending school in urban area decreased by 0.028.

However the coefficients for both rural and urban schools were not statistically significant. Being raised in a one-parent family lowered the student's test score by 1.039. Having more than one sibling at home caused the test score of students to decrease by 0.673. Parents communicating more with their 10th graders caused the test score to increase by 1.941. Spending more quality time with parents increased the test score by 0.231, however, the coefficient was not statistically significant. The Adjusted R Square of the regression model for full sample was 0.351 ($F = 473.614$, $p < 0.001$) which meant about one third of variance in the test scores was explained by these independent variables.

The second regression analysis was conducted on the test scores of students raised in one-parent households only. The constant for the second model was 51.151. Being a female decreased one's test score by 0.112 however, the coefficient was not statistically significant. Being a minority, student's test score decreased by 5.608. A unit increase in socioeconomic status caused the student's test score to increase by 4.103. Having more home resources the test scores was likely to be raised by 1.413. Attending rural schools, student's test scores shrunk by 0.555 and attending urban schools, student's test scores were reduced by 0.458. However, the coefficients for both rural and urban schools were not statistically significant. In addition, the coefficients for mother-headed households and same-sex households were also not statistically significant. Having more than one sibling at home caused the test scores of students to decrease by 0.984. Communicating more often with parents increase the test score of students by 1.758. Also spending more quality time with parents increase the test score of students by 0.562, however the coefficient for spending quality time was not statistically significant. The adjusted R Square for the second model was 0.303 ($F = 93.55$, $p < .001$) which meant that a little less than one

third of the variance in the dependent variables (test score) was explained by these independent variables.

5. Discussion

This research tested nine hypotheses from three different logic models: gender/race, structural factors and family structure. Out of nine hypotheses, seven hypotheses were supported and two were not supported as expected. The first hypothesis stated that the girls from both one-parent and two-parent households score higher in math/reading tests than boys from both one-parent and two-parent households. This study concludes that female and male students perform equally on standardized math/reading tests. Although the hypothesis was not supported, it reflects the conclusions of previous research. For instance Mau & Lynn (2000) suggested that male students tend to score higher in math and science, and female students tend to score higher in reading. Since the dependent variable is the combination of both math and reading test scores, the finding that male and female students perform equally better or equally worse in standardized test confirms what earlier research predicted.

Hypothesis two tested the effect of being raised in cross-sex and same-sex families on the test scores of students. Students raised in cross-sex household (the gender of one-parent households is opposite to the gender of the student) were expected to score higher than the students raised in same-sex households (the gender of one-parent household is similar to the gender of the student). The test did not support hypothesis two. This study finds that living in cross-sex or same-sex families has no significant influence on the academic achievement of students. The finding aligns with the previous research conclusion of Lee & Kushner (2008) who

suggested that living with the same-sex parent in a single parent household does not benefit the adolescents as much as living with the adolescents living with cross-gender parents. However, other research (Lee, Kushner & Cho 2007; Battle 1999) had found that children living with father-headed single-parent households performed better than students living with mother-headed single-parent households.

Hypothesis three was tested twice. The first t-test was conducted to test the strength of association between race and test scores; the second time, ordinary least square regression was run to test if net of other factors, minority children score lower on math/reading tests than White/Asian students. Both tests found that race was one of the important factors to determine the test scores of students. This finding confirms previous research which suggested that minority children score lower than White/Asian students (Alexander & Entwisle 1995; Bogenschneider 1997; Carlson & Corcoran 2001; Fram et al 2007). Hypothesis one, two and three comprised gender/race model. Hypothesis one was based on Gender theory and hypothesis two was based on same-sex theory. This study finds that gender has no influence on the standardized math/reading test score of students and students being raised in same-sex or cross-sex single-parent households does not make any difference in the test scores. However, this study has found that race is the second most powerful predictor among all of the independent variables employed in the research.

The second most important variable is socioeconomic status of parents. Hypothesis four, five and six are based on structural perspectives. The socioeconomic status, geographic location of school, and having educational/home resources indicated the structural factors that could impact the test scores. This study finds that the structural factors do affect test scores greatly. The

economic resources that parents provide to students help students score higher on tests. The finding of the study aligns with the previous research that socioeconomic status of parents affects the academic achievement of students. Students whose parents' have higher socioeconomic status are more likely to score higher in standardized tests than students whose parents' have lower socioeconomic status (Jeynes 2000; Pong 1997). Based on previous research, it was expected that students who have more educational resources are more likely to score higher on standardized test than students who have lower educational resources (Downey 1994; Downey 1995). The multivariate and bivariate results of this hypothesis indicated support which means that possessing more educational materials has significant influence on the test scores of students.

Another important factor that significantly affects the test score of students is family structure. Students raised in two-parent households score higher on standardized tests than students raised in one-parent households. This finding corroborates previous research findings discussed in the literature review section (Alexander and Entwisle 1995; Downey 1994).

Regarding interpersonal resources, which was measured as the communication between parents and students, this study found that students who interacted more with their parents scored higher in standardized tests than students who interacted less with their parents. This finding supports previous research findings of positive association between communication and test scores (McLahanhan and Aston 1991; Downey 1994; Israel and Beaulieu 2004). The last hypothesis tested whether the number of siblings at home affects the test scores of students. It was expected that the more siblings a student has at home, the lower the test score. The

hypothesis was supported which was noted in previous studies (Israel and Beaulieu 2004; Jeynes 2000).

5.1 Limitations

Although a part of the Educational Longitudinal Survey 2002, this research did not use the school-level and student-level predictors. Many researchers have indicated the existence of significant influence of school-level and student-level predictors on the academic achievement of students. This research also focused on biological two-parent and one-parent families only; however, it does not provide any information on the quality of marital life of parents and also the quality of parenting.

Due to small sample sizes, some variables had to be manipulated and computed so that a proportional distribution of the sample could be achieved. For example, the variable quality time parents spent with the students had 12 components with 0 indicating no activities done together by parents and students, 1 indicating one activity a week students and parents did together and 2 indicating two activities a week parents and students did together and so on. As this study intended to test whether spending time together with parents increase the test scores of students, out of a total of 12 activities that students and parents do together, 0 to 10 activities had to be categorized as fewer activities and 11 to 12 activities as more activities in order to get a good distribution. This sort of manipulation of data could compromise the accuracy of findings. The economic recession of 2008 may limit the findings in this study because of its broad impact on unemployment and poverty.

Measuring the geographical location of the school, ELS does not provide any information on racial/ethnic composition of school attended by students. Others have found association between lower socioeconomic status and schools with greater number of ethnic students. However, this study has to be limited to three geographical locations suburban, urban and rural only.

5.2 Future Research and Policy Implications

The research indicates that race and socioeconomic status are the most important predictors of student's test score. The impact of family structure (especially one-parent and two-parent families) and economic and parental resources can be said to be the second most important predictors of the test scores of students. Most importantly all three predictors are connected. As mentioned in the findings section, students from lower socioeconomic status perform worse than students from higher socioeconomic status. Also minority students score lower on standardized tests than white/Asian students. As for the family structure, students from two-parent families do better in test than students from one-parent households. Since higher test scores opens doors to opportunities of higher education, it is important for government, educators, administrators, parents and students to be aware of the factors that are detrimental to test scores of students and be conscious of how the discrepancy in test scores can be eliminated. One policy implication would be to develop achievement tests that are more culturally sensitive.

Considering how one-parent households are more likely to have lower socioeconomic status which limits the interpersonal and economic resources of students, policies and programs that help one-parent households financially so that they could provide more economic resources

to students should be introduced. Such policies and programs should also help students from one-parent families to achieve the desired test scores from school and community. Community mentoring and extra volunteering classes offered by schools could be helpful for students from one-parent families to have good role models and catch up with their rest of their fellow classmates. Schools should consider introducing counseling for students from one-parent households so as to fill the void left by the absent parent. This study could influence educational policy in studying what factors contribute to discrepancies within the test scores. If educational credentials are a gateway into college, it is reasonable to assume that an association between test scores and college achievement exists. As this study confirms structural factors like socioeconomic status and the home resources that students have predict the test scores of children. Socioeconomic status and race are the strongest predictors of student's test scores. Although this study did not find family structure to be as influential a predictor of test scores as socioeconomic status and race, it is to be noted that family structure is tied to socioeconomic status and race forming a vicious cycle where minority students find themselves in lower income single-parent households (Entwisle and Alexander 1995; Fram et al 2007; Garfinkel and McLanahan 1986; Kinnear 1999). Being in lower income single-parent households enhances the chances of lower test scores which means lower chances of being enrolled in colleges or universities.

It is demonstrated from the multivariate analyses in this study as related to policy implications, home economic and interpersonal resources have independent effects on student test scores. Although race and class have greater impact on achievement, that does not weaken the effect of family resources (economic and interpersonal) on the achievement of students. Families, regardless of race and class, are able to improve performance through making use of

communication (interpersonal resources) and what home resources are available to enhance performance of the children from these families. The policy implications of this finding suggest that parenting classes would be one way to materialize the desired outcome.

BIBLIOGRAPHY

- Alderman-Swain, Wanda and Juan Battle. 2000. "The Invisible Gender: Educational Outcomes for African American Females in Father-Only Versus Mother-Only Households." *Race and Society* 3(2):165-182.
- Aldous, Joan. 1972. "Children's Perceptions of Adult Role Assignment: Father-Absence, Class, Race and Sex Influences". *Journal of Marriage and Family* 34(1): 55=65.
- Amato, Paul R. 2005. "The Impact of Family Formation Change on the Cognitive, Social, and Emotional Well-Being of the Next Generation." *The Future of Children* 15:75-92.
- Archibald, Sarah. 2006. "Narrowing in on Educational Resources That Do Affect Student Achievement." *Peabody Journal of Education* 81(4): 23-42.
- Battle, Juan. 1999. "How the Boys Really Made it Out of the Hood: Educational Outcomes for African-American Boys in Father-Only versus Mother-Only Households." *Race, Gender & Class* 6(2):130-146.
- Battle, Juan and Deborah L. Coates. 2004. "Father-Only and Mother-Only, Single-Parent Family Status of Black Girls and Achievement in Grade Twelve and at Two-Years Post High School." *Journal of Negro Education*. 73 (4):392-407.
- Berger, Lawrence M. 2005. "Income, Family Characteristics, and Physical Violence toward children." *Child Abuse and Neglect* 29(2):107-133.
- Bianchi, Suzanne M. 1984. "Children's Progress through School: A Research Note." *Sociology of Education* 57(3):184-192.
- Bogensneider, Karen. 1997. "Parental Involvement in Adolescent Schooling: a Proximal Process with Transcontextual Validity." *Journal of Marriage and the Family* 59(August):718-733.
- Brooks-Gunn, Jeanne, Pamela K. Klebanov, and Greg J. Duncan. 2008. "Ethnic Differences in Children's Intelligence Test Scores: Role of Economic Deprivation, Home Environment, and Maternal Characteristics". *Child Development* 67(2): 396-408.
- Brown, Alan S. and Linda L. Brown. 2007. What are science and math test scores really telling us? The Bent of Tau Beta Pi, 13-17.
<http://www.tbp.org/pages/Publications/Bent/Features/W07Brown.pdf>
- Carlson, Marcia J. and Mary E. Corcoran. 2001. "Family Structure and Children's Behavioral and Cognitive Outcomes." *Journal of Marriage and Family* 63: 779-792.

- Denavas-Walt, Carmen, Bernadette D. Proctor and Jessica C. Smith. 2011. *Income, Poverty, and Health Insurance Coverage in the United States: 2010*. Current Population Reports, U.S. Census Bureau.
- Downey, Douglas. 1993. "Do Children in Single-Parent Households Fare Better Living with Same-sex parents?" *Journal of Marriage and the Family* 55(1): 55-71.
- 1994. "The School Performance of Children from Single-Mother and Single-Father Families: Economics or Interpersonal Deprivation?" *Journal of Family Issues*. 15(1): 129-147.
- 1995. "When Bigger is not Better: Family Size, Parental Resources, and Children's Educational Performance." *American Sociological Review*. 60(5): 746-761.
- Downey, Douglas B and Brian Powell. 1993. "Do Children in Single-Parent Household Fare Better Living with Same-Sex Parents?" *Journal of Marriage and Family* 55(1):55-71.
- Duckworth, Angela L. and Martin Seligman E.P. 2006. "Self-Discipline gives girls the Edge: Gender in Self-Discipline, grades, and Achievement Test Scores". *Journal of Educational Psychology*. 98(1): 198-208.
- Entwisle, Doris R and Alexander L. Karl. 1995. "A Parent's Economic Shadow: Family Structure versus Family Resources as Influences on Early School Achievement." *Journal of Marriage and Family* 57(2): 399-409.
- Fram, Maryah S., Julie E. Miller-Cribbs, and Lee V. Horn (2007). "Poverty, Race, and the Contexts of Achievement: Examining Educational Experiences of Children in the U.S. South." *Social Work* 52(4):9-319.
- Gladow, Nancy W. and Margaret P. Ray. 1984. "The Low-Income Single Parent." *Journal of Extension* 22(5): 16-21.
- Hansen, Sandra L. 1996. "Gender, Family Resources, and Success in Science." *Journal of Family Studies* 17(1): 83-113.
- Israel, Glenn D. and Lionel, J. Beaulieu. 2004. "Investing in Communities: Social Capital's Role in Keeping Youth in School". *Community Development Society Journal* 34(2):35-57.
- Jeynes, William H. 2000. "The Effects of Several of the Most Common Family Structures on the Academic Achievement of Eighth Graders." *Marriage and Family Review* 30(1): 73-97.

- 2005. "Effects of Parental Involvement and Family Structure on the Academic Achievement of Adolescents." *Marriage & Family Review* 37(3): 99-116.
- Jencks, Christopher and Meredith Phillips. Eds. 1998. The Black-White Test Score Gap. Washington, DC: Brookings.
- Kinnear, Karen L. 1999. Single Parents. Santa Barbara, CA: ABC-CLIO.
- Lee, Sang M. and Jason Kushner. 2008. "Single-Parent families: the Role of Parent's and Child's Gender on Academic Achievement." *Gender and Education* 20(6): 607-621.
- Lee Sang M, Kushner, Jason, and Cho, Seong Ho. 2007. "Effects of Parent's Gender, Child's Gender, and Parental Involvement on the Academic Achievement of Adolescents in Single Parent Families." *Sex Roles: A journal of Research* 56(3-4): 149-157.
- Lockheed, Marlaine E., Margaret Thorpe, Jeanne Brooks-Gunn, Patricia Casserly and Ann McAloon. 1985. Sex and Ethnic Differences in Middle School Mathematics, Science and Computer Science: What do we Know? Princeton, NJ: Educational Testing Service.
- Mau, Wei-Chueng and Robert Lynn. 2000. "Gender Differences in Homework and Test Scores in Mathematics, Reading & Science at 10th & 12th grades." *Psychology, Evolution & Gender* 2(2):119-125.
- McLanahan, Sarah S. and Marie N. Astone. 1991. "Family Structure, Parental Practices and High School Completion." *American Sociological Review* 56(3): 309-320.
- McLanahan, Sarah S. and Irwin Garfinkel. 1986. *Single Mothers and their Children: A New American Dilemma*. Washington, DC: Urban Institute Press.
- McLanahan, Sarah S. and Larry Bumpass. 1988. "Intergenerational Consequences of Family Disruption." *The American Journal of Sociology* 94(1): 130-152.
- McLanahan, Sara S., and Garry Sandefur. 1994. *Growing up with a Single Parent: What hurts, What Helps*. Cambridge, MA: Harvard University Press.
- Mulkey, Lynn M. Robert L. Crain and Alexander J.C. Harrington. 1992. "One-Parent Households and Achievement: Economic and Behavioral Explanations of a Small Effect". *Sociology of Education* 65(1):48-65.
- National Center for Education Statistics, Youth Indicator. 2005.

- Niederle, Muriel, Lise Vesterlund. 2010. "Explaining the Gender Gap in Math Test Scores: The Role of Competition". *Journal of Economic Perspectives* 24(2):129-144.
- Pong, Suet –Ling. 1997. "Family Structure, School Context, and Eight-Grade Math and Reading Assignment." *Journal of Marriage and the Family* 59(3): 734-746.
- Procidano, Mary E., Celia, Fisher B.1992. *Contemporary Families: A Handbook for School Professionals*. New York, NY: Teachers College press.
- Ritzer, George. 2006. *Contemporary Classical Theory and Classical Roots*. New York, NY: McGraw-Hill.
- Secada, Walter G.1992. "Race, Ethnicity, Social Class, Language, and Achievement in Mathematics." In Douglas A. Grouws, ed, handbook of Research on Mathematics Teaching and Learning (New York: Macmillan, 1992) p.630
- Shaff, Kimberly Anne, Wolfinger Nicholas H., Kowaleski-Jones, Lori and Smith, Ken R. 2008. "Family Structure Transitions and Child Achievement." *Sociological Spectrum* 28:681-704.
- Tate, William F. 1997. "Race-Ethnicity, SES, Gender, and Language Proficiency Trends in Mathematics Achievement: An Update." *Journal for Research in Mathematics Education*. 28(6): 652-679.
- U.S. Census Bureau. 2009. *Current Population Survey, Annual Social and Economic Supplement*. Washington, DC: Government Printing Office.
- U.S. Dept. of Education, National Center for Education Statistics. 2004. *Educational Longitudinal Survey (ELS), 2002: Base year Data File User's manual*, NCES 2004.405, by Steven J. Ingles, Daniel J. Pratt, James E. Rogers, Peter H. Siegel, and Ellen S. Stutts. Project Officer. Jeffrey A. Owings. Washington DC.
- Zimmerman, Marc A., Deborah A. Salem and Maton Kenneth I. 1995. "Family Structure and Psychological Correlates among Urban African-American Adolescent Males." *Child Development* 66: 1598-1613.

APPENDIX

Table 1 Univariate Analysis

Sample Distribution Across Variables		
Variables	Percentages	Mean
Test Score	Mean	51.74
	(Std. Dev)	(9.47)
Independent Variables		
Gender/Race		
Male	49.3 (4307)	
Female	50.7 (4436)	
White/Asian	70 (6101)	
Minority	30.2 (2642)	
Cross -Sex Family	46.4 (1086)	
Same-Sex Family	53.6 (1254)	
Structural Factors		
Socio-Economic Status mean		0.09
(Std. Dev)		(0.74)
Fewer Home Resources	51.4 (4491)	
More Home Resources	48.6 (4252)	
Rural	19.8 (1733)	
Suburban	52 (4547)	
Urban	28.2 (2643)	
Family Structure		
One Parent Family	26.8 (2340)	
Two Parent Family	73.2 (6403)	
Mother-Headed One Parent Family	23	

	(2008)	
Father-Headed One Parent Family	3.8	
	(332)	
Lesser than One or No Sibling	39.2	
	(3429)	
More than One Sibling	60.8	
	(5314)	
Less Communication	45.3	
	(3960)	
More Communication	54.7	
	(4783)	
Less Quality Time	25.8	
	(2252)	
More Quality Time	74.2	
	(6491)	
Total Sample	8743	

P < .001***, p < .005**, P < .05*

Table 2.1 Bivariate Analysis

T-Test of Independent Variables by Dependent Variable				
Variables	Mean	S.D	T-test	Cohen's D
Male	51.84	9.67	0.96	
Female	51.65	9.28		
Cross -Sex Family	48.49	9.82	0.54	
Same-Sex Family	48.27	9.03		
White/Asian	54.34	8.59	42.79 ***	0.9
Minority	45.75	8.68		
Fewer Home Resources	48.56	9.31	-34.43 ***	0.7
More Home Resources	55.1	8.44		
One Parent Family	48.38	9.4	20.58 ***	0.5
Two Parent Family	52.98	9.2		
Less Communication	49.12	9.37	-23.97 ***	0.5
More Communication	53.9	9.01		
Less Quality Time	49.03	9.73	-15.61 ***	0.4
More Quality Time	52.69	9.2		
Fewer Siblings	53.38	8.94	13.29 ***	0.3
More than One Siblings	50.69	9.66		

P < .001***, p < .005**, P < .05*

Table 2.2 Bivariate Analysis

One Way Anova of Independent Variables by Dependent Variable			
Variables	Mean	S.D	F-Test
Urban	50.54	9.99	28.77***
Suburban	52.31	9.27	
Rural	51.98	9.08	
Lowest Quartile	45.47	8.47	886.62***
Lower Quartile	50.22	8.58	
High Quartile	53.24	8.40	
Highest Quartile	58.06	7.71	

P < .001***, p < .005**, P < .05*

Table 3.1 Regression Analysis for Full Sample

Two-Parent Vs One-Parent

Variables	B		S.E	Beta
(Constant)	51.824	***	.349	
Female	-0.160	-	.165	-.008
Minority	-5.232	***	.199	-.254
Socio-Economic Status	4.469	***	.130	.351
Home Resources	1.398	***	.190	.074
Rural	-0.081	-	.218	-.003
Urban	-0.028	-	.195	-.001
One-Parent Family	-1.039	***	.194	-.049
Sibling	-0.673	***	.170	-.035
Communication	1.941	***	.175	.102
Quality Time	0.231	-	.195	.011
Adj. R Square	0.351			
F	473.614	***		
N	8729			

P < .001***, p < .005**, P < .05*

**Table 3.2 Regression Analysis for One-Parent Families
(Mother-Headed Vs Father-Headed)**

Variables	B	S.E	Beta
(Constant)	51.151 ***	.773	
Female	-.112 -	.470	-.006
Minority	-5.608 ***	.362	-.297
Socio-Economic Status	4.103 ***	.274	.295
Home Resources	1.413 ***	.400	.069
Rural	-.555 -	.450	-.023
Urban	-.458 -	.370	-.023
Mother-Headed	.051 -	.475	.002
Same-Sex	-.051 -	.469	-.003
Sibling	-.984 **	.349	-.050
Communication	1.758 ***	.345	.093
Quality Time	.562 -	.353	.028
Adj. R Square	0.303		
F	93.55 ***		
N	2339		

P < .001***, p < .005**, P < .05*