IMPRESSIVE NUMBERS ON THE COURT AND IN THE CLASSROOM: EVALUATING ATHLETIC PARTICIPATION AND TEST SCORES

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ATHLETIC PARTICIPATION AND TEST SCORES.

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
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ABSTRACT

Every student goes to school; every student takes standardized tests. This research project addresses whether or not being involved in high school athletics can affect test scores. The data is from the Educational Longitudinal Study (2003). Analyses were done in order to see if there is a difference in the relationship between test scores of students that participated in sports compared to those who did not. The overall finding is that participation in sports increased test scores. Students who were involved in sports on average scored .50 points higher on standardized tests. Students who spent more time watching TV or playing video games decreased their test score by .13. Characteristics of the school were also variables. The higher the percentage of students on the free lunch program at the school, the lower the individual student's score. Family influences that were tested were such things as the socioeconomic status of the family and the number of siblings the student had. The higher the socioeconomic status the higher the test scores. The more siblings a student has the lower the scores. The peer level factors that were tested were if the student had friends who dropped out of school and if school was important to peers. The results showed if a student had friends who dropped out of school they scored 1.99 points lower on standardized test. Students who had peers that felt school was important tended to score .55 points higher.

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1. Introduction

In today's society education is paramount if one is looking for a good job with financial security. The question is how does one attain the education that is needed to be successful? According to the Bureau of Labor Statistics (2008) the higher the degree that one obtains the greater the weekly earnings will be on average and the lower the level of unemployment.

In order to get into college a student must take a battery of tests such as the ACT and SAT. These scores determine where a person can go to college, and what school they can or cannot get into. McCormick and Tinsley (1987) argue that success in athletics often goes hand in hand with academic success. Eide and Ronan (2001) found that in 1992 over eighty percent of seniors were involved in some sort of school-sponsored extracurricular activity. Eide and Ronan (2001) found that of the school-sponsored activities that varsity sports was the most popular regardless of the students' race, gender or ethnicity. Sports are a big part of the American culture and athletes are viewed in a different light than the average citizen.

The purpose of this research study is to explore the relationship between participation in high school sports and the impact on the participants test score. In this paper the areas that will be covered are student characteristics, school level factors, family influence, peer influence and the conceptual model. Each area will show how specific areas can influence and affect the students' test scores.

2. Literature Review

Feldman and Matjasko (2005) found a positive relationship between participating in extracurricular activities and students overall achievement. Videon (2002) found that

athletics helped to develop qualities in students such as perseverance, hard work, self-discipline, teamwork and respect. Sports seem to provide a unique area to develop these skills. Videon (2002) states that participating in sports helps to build character and allows participants to attain skills and resources that will transfer to other areas leading to success in the other areas.

Feldman and Matjasko (2005) found that students who were involved in sports such as football and basketball had a higher value for academic achievement and also the athletes had higher aspirations for education compared to other students. Barber, Eccles and Stone (2001) found that participation in activities such as sport led to higher educational attainment and school achievement as well as occupational status later in life. Videon (2002) stated that sports participants had better records of attendance, fewer discipline referrals and a higher level of self-esteem in relation to academics than non-participants, and student athletes are also more likely to attend and graduate from college. Crosnoe (2002) found sports participation is a way to consume free time, increase bonds to school staff, and can be used as an outlet for energy and effort for students. Crosnoe (2002) also stated that sport participation requires meeting grade and behavior prerequisites, which increased the students' status in certain peer groups, raising their social status as well as increasing aspirations for their future college plans. College attendance and graduation is key to attaining a job with financial stability. Barron, Ewing and Waddell (2000) found that students who participated in sports were paid 31% higher wages than others who did not participate in sports. Barron et al (2000) also found that student athletes were paid 12% higher salaries.

2.1 Student Characteristics

Student characteristics are the demographics and behaviors that have been found to affect academic achievement. The student characteristics expectations are influenced by the sex of the student. Research has found that females are, or are expected to be, better at reading and verbal skills, while males are expected to be better in math and science. Lynn and Mikk (2009) found that females ranging from 16 to 18 years old usually obtained higher reading mean test scores than males of the same age. Muller (1998) looked at students' attitudes and parental involvement as it relates to mathematical achievement. Muller (1998) found that when grades and expectations were controlled, the coefficient became significant for gender and showed that males scored about .6 of a test question higher than females in math. More recent research conducted by Hyde and Mertz (2009) shows that girls are now performing as well as boys on the standardized math test on all grade levels. Nowell and Hedges (1998) further support this claim with their research that found, the smallest difference in standardized scores between boys and girls was in math, followed by science, reading and finally writing.

Race is also a factor in student characteristics. It is stated by Mickelson and Greene (2006) that when looking at academic achievement, African American students average lower test scores than that of Asians and Whites. Mickelson and Greene (2006) found that black males were more at risk for poor grades, dropping-out and for suspensions than any other race. Mickelson and Greene (2006) used the NELS and found that high schools with 44%-75% Asian and/or White Americans had the highest academic

achievement on average for all racial groups. This particular racial composition in high school also created the smallest gap between the races in the test scores.

Student characteristics are affected by many things, including if the student has a disability. Alster (1997) showed how students with documented disabilities score lower on tests, for such things as math, when given a set time frame. Centra (1986) did a study to see what the effects of allowing extra time on test would do for students that had a learning disability. The study found that the extra exam time allowed them to increase their scores on the Scholastic Aptitude Test (SAT).

The basic idea is if a student wants to excel in school by getting higher grades they need to participate in class and do all assigned homework. Cooper, Robinson and Patall (2006) looked into doing homework and grade achievement. They found that there is a relationship between the two, but they primarily focused on grades seven through twelve. Therefore, there was no way for the researchers to conclude that doing homework would cause improved academic attainment because they did not look at all grades that a student attains. The researchers expected to find that doing homework would lead to improved academic achievement.

Some students may spend time watching television and playing games on the computer instead of doing homework. Since doing either one of these things could have a negative impact on the test scores, and since the two are so closely related, time spent on the computer and watching television have been combined for this research. There has been little research on whether or not time spent watching television has an impact on students' academic achievement. Williams, Haertel, Haertel, and Walberg (1982) concluded that there was a small negative impact on student achievement and

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the amount of time spent watching television. They stated that the negative impact of television watching is so small that there have to be other factors involved. Williams et al. (1982) found that the real link was due to the amount of hours watched by a student: if a student watched ten or less hours a week they might actually improve their achievement, but if they watched thirty-five to forty hours a week they would lower their academic achievement. There was a much stronger negative relationship on academic achievement and viewing television for females than males.

Subrahmanyam, Krau, Greenfield and Gross (2000) studied the effects of computers and academic achievement. They also researched how having a computer in the home affected student academic achievement. Greenfield and Gross (2000) found that teenagers, ranging in ages from thirteen to seventeen, used the computer more for homework and educational purposes than for games. Greenfield and Gross (2000) also found that if high school students used educational software programs at home, they scored higher than other students on computer literacy tests. Greenfield and Gross (2000) state further that students who had higher overall grades in math and English were those that had computers in the home.

Some literature states that being involved in sports or other extracurricular activities has a negative impact on the student. Long and Caudill (1991) have found that athletes in college settings have a lower grade point average (GPA) and usually have more physical, psychological and substance abuse problems than students not involved in athletics. Long and Caudill (1991) further found that athletes are less likely to talk about the responsibilities of leadership roles than students not involved in athletics. Holland and Andre (1987) looked at male students and the scores they received on the SAT.

When Holland and Andre (1987) observed men that only participated in athletics they found that their scores were lower than that of male non-athletes. Females were also involved in this study by Holland and Andre (1987), but there was not a significant difference in the GPA of female athletes compared to the female non-athletes. The research by Maloney and McCormick (1993) mirrored this study to some degree. They found that college athletes did not perform as well in the classroom as nonathletic students. When the GPA of non-athletes (2.68) was compared to the GPA of athletes (2.38) it was found to be lower among the student athletes. Maloney and McCormick (1993) concluded that there was a negative impact on a student athletes' grades that occurred during the season of athletic participation.

On the other side of the debate, Broh (2002) found, by using the National Education Longitudinal Study of 1988 (NELS), that there is evidence to show that participation in sports improves the academic performance of the student. Broh (2002) also found that if a student was involved in athletics it increased their achievement in the classroom as well as on standardized testing. Covay and Carbonaro (2010) argued that a reason for the increase in scores is due to the similar setting of a classroom and extracurricular activities. When students participate in extracurricular activities such as music and sports, the activities promote things such as having higher values and striving for higher achievement in school. As Covay and Carbonaro (2010) point out these skills then are evaluated by the public either in a game or recital setting much like is done in the classroom. Covay and Carbonaro (2010) discuss how in the classroom and in extracurricular settings, students are managed by a leader who is usually an adult and the student is subordinate to that person. The adult then sets goals, organizes

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tasks to increase mastery of a skill as well as providing instruction. These skills will translate into the classroom and allow the student to succeed.

2.2 School Level

Lynn and Mikk (2009) found factors that influence academic achievement at the school level are such things as the school's socioeconomic status, racial component, and academic climate, specifically school and class size. The school's socioeconomic status is evaluated in part by the percentage of the student body on the free lunch program. As a final point school size and classroom size can influence academic achievement of the student. Each will be described in detail below.

Okpala and Okpala (2001) looked at the number of students that are on the free or reduced lunch program to determine the school's socioeconomic status. Okpala and Okpala (2001) found in their research, that having a higher number of students enrolled in the program will have a negative impact on the individual student's math scores. The most pressing factor that affects the family is socioeconomic status. Socioeconomic status in an educational setting is determined by whether or not the student is on the free or reduced school lunch program. Okpala and Okpala (2001) found that the amount of students in these programs was negatively related to a student's academic achievement in math. It further supports the idea that economic status is directly correlated to a student's academic achievement. Sirin (2005) also supported the findings that there was a medium to strong relationship between socioeconomic status and the student's academic achievement. Overall, the findings indicate that the lower the school's socioeconomic status, the lower the school's overall test scores.

Videon (2002) found that school size had an impact on participation in sports. Students who attended smaller schools had a higher chance of participating in sports. Videon (2002) associated this with the fact that there were fewer students to fill the positions on a team; in a larger school setting there would be more students trying out and more competition. Cotton (1996) found that states with the largest schools and school districts have the highest number of students who have dropped out and have the lowest school achievement in regards to test scores. Lee & Smith (1997) found that an ideal school would have about 600-900 students. In schools that were smaller than this, students learned less. Lee & Smith (1997) also found a decrease in learning of students in schools that were larger than 2100 students. Lindsay (1982) found that higher academic achievement was related to smaller schools. Fowler and Walberg (1991) related achievement to the small school environment as well. Students in smaller schools had enhanced educational outcomes, regardless of socioeconomic status and gender. Kuziemko (2006) found that achievement was specifically related to math scores and attendance rates.

Nye, Hedges and Konstantopoulous (2000) conducted research on the effects of class size of a student and the effect of the student's academic achievement and found that the smaller the class size the better the academic performance. Finn and Achilles (1990) found in their research that smaller class size had an effect on the students by raising their test scores in reading and math. The smaller class size also helped the minority students raise their test scores. Rice (1999) defined class size into two different variables: the time that is devoted to the instruction of the student, and the time that is spent in non-instructional activities. Rice (1999) found that class size had a large impact

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on student's performance. Granted, the impact of class size varied from activity to every student, but the overall opinion was that there was improved performance in grades for students in smaller classes. Glass (1982) states the overall reasoning is that smaller class size works to improve students' scores because the smaller class size allows for more one on one time with the students leading to more improved student attention. Nye et al. (2000) concluded that there is a large enough impact on class size that it should be a part of educational policies. The data on classroom sizes are consistent and benefit all kinds of students in all kinds of schools.

2.3 Family Level

The family structure can influence academic achievement in several different ways, such as the size of the family, the birth order of the student in relationship to other siblings, the family socioeconomic status as well as the involvement of the family in the students' school life. Blake (1989) found that having a smaller family composition, usually consisting of one or two siblings, had a positive effect on verbal skills. Other factors that contributed are the age of the individual, sex of the siblings, and parents' education. Nutall, Nutall, Polit and Hunter (1976) further confirmed this claim. Nutall et al (1976) also found that if the first born was a female she would have a higher educational attainment than other females born later in the birth order. They state that they found a sex-specific pattern that explained their results.

In all previous literature, the involvement of a student's family seemed to help increase academic performance. The size of the family in which the student is raised is also a factor. Blake (1989) states that if a student only has one or two siblings there is a greater opportunity for excelling compared to a family of seven or more siblings. The

smaller family allows for more verbal ability and one on one time for such things as school work.

The socioeconomic status of the family can directly and indirectly effect a students' academic achievement. Sirin (2005) found that the family socioeconomic status is one of the strongest correlating factors to academic performance. The family socioeconomic status is directly related by being able to provide resources for the student at home. Covay and Carbonaro (2010) state that, students from families that have a higher socioeconomic status excelled more in the classroom and were more likely to succeed than other students.

Students with parents that are involved in their school work seem to get higher grades. Clark (1993) states this is in part because these parents set higher standards. Clark (1993) also found that the attitudes of the family, as well as behaviors, can promote positive achievement from all socioeconomic backgrounds. Students with high levels of achievement had parents who were involved in their learning and even spent more time on homework, including using additional tools like a dictionary or thesaurus. At minimum, Clark (1993) shows that most parents are involved in their children's homework, even if it is just talking about it with their student.

Becher (1984) states that students that have high levels of achievement have parents that set high expectations for them, as well as interact with them and think of themselves as teachers, not just parents. Benson, Stuart, and Elliott (1980) supported this claim by stating that these were the parents who also were involved in school activities. This allowed the student to achieve more regardless of their socioeconomic status. Becher (1984) found that this involvement will create a more positive attitude

about school and the school staff which in turn increases self-confidence, helping to increase performance. Benson et al (1980) found that these activities included engaging in hobbies, eating dinner together and spending time together on the weekend. Clark (1993) also found that the students who were on the lower end of the achievement scale came from homes of parents who were not employed outside the home, were typically young and had not been to college. This is in part because the parents did not have the resources to help their students achieve more.

2.4 Peer Level

While student characteristics, school level factors, and the family all have a role in student performance, peers also have an important impact on the test scores a student will obtain. Wentzel and Caldwell (1997) did research on peer groups and acceptance. They found that group membership, acceptance in a friendship circle, had become the most constant predictor of grades over a period of time. Feldman and Matjasko (2005) discovered that students' reasoning for participating in sports was one of three main reasons, enjoyment, having the skill, or because it allowed them to see their friends. They also found that pro-social behavior was significantly related to classroom achievement. Students develop pro-social behavior through their peer relationships. With this information, it would be safe to state that positive peer relations will have an effect on a student's academic achievement. Austin and Draper (1984) tested this using the scores of a group of students who had taken the Iowa Test of Basic Skills. Austin and Draper (1984) had also collected data on acceptance and social impact. Once the ITBS test was gathered with the data on acceptance, it was found that acceptance resulted in higher academic achievement. Austin and Draper (1984) state the students

who ranked in the above average percent of achievement were more often considered popular rather than isolated or rejected. One reason found by Hanushek, Kain, Markman and Rivkin (2003) was that students who have positive peer relations do well on tests because they are making friends with the same goals and ambitions. Overall, the research finds that a positive influence from peers in a school setting will create higher test scores. Feldman and Matjasko (2005) found student athletes had friends that were also successful in academics, as a result increasing the participants' grades. Hanushek et al (2003) point out as well that a student with peers that have an increased level of achievement will score better as well. In turn the school itself will also increase its test score distribution. O'Neil, Welsh, Parke, Wang and Strand (1997) pointed out that rejection of peers, as early as kindergarten, can cause social rejection that could last for years.

Peer groups can also be a negative influence. Social rejection by peers can affect work habits and even academic achievement. Students that were socially accepted seem to be buffered from any signs of academic difficulty. DeRosier, Kupersmidt and Patterson (1994) found that on all levels of rejection, there was a greater level of absenteeism from school, as well as teacher related problems in the classroom. If the student felt rejected by their peers there would be more of a tendency to miss school and or cause problems in the classroom; this then has a negative effect on the students' achievement. Cairns, Cairns and Neckerman (1989) found another negative impact of peer groups is the effect of peers dropping out of school. Cairns et al (1989) stated of their subjects that dropped out of school they were more likely to affiliate with other students that were at risk for dropping out. Cairnes et al (1989) research supports the

idea that if a student has peers that drop out of school, the student will be more likely to score lower on tests for the duration of their education.

2.5 Conceptual Model

The conceptual model looks at how sports, student characteristics, school level factors, family level factors, and peer level factors affect each student and test scores. Athletics help to develop qualities in students such as, perseverance, hard work, self-discipline, teamwork and respect. Students who are involved in sports have a higher value for academic achievement and also the athletes had higher aspirations for education compared to other students. Student characteristics are the demographics and behaviors that have been found to affect academic achievement. Some examples of these factors are sex, race and time a student spends on homework per week. For example, as the student's time spent on homework increases the higher the student will score on standardized test. The school is the setting in which these behaviors take place. Factors of the school are such thing as school size and the percentage of the population on the free lunch program. For example the student's test scores will decrease as the school size increases. School size also impacts the student characteristics as well, for example the smaller the school is the more opportunity the student has to compete in sports. The family level factors are such things as parental living conditions and number of siblings as well as socioeconomic status. For example the larger the student's family size the lower the student's test scores. The final part to this model is the peer level factors. Peers consist of the students close network of friends. Some examples that influence test score are the amount of friends the student has that has dropped out of school or the influence the friends have on getting good

grades. The more peers that a student has that have dropped out, the more chance the student has to have lower test scores.

2.6 Hypotheses:

Student Characteristics

1. Students' participation in high school athletics will increase the students test scores net of other factors.

2. The more time a student spends on homework the higher the student's test scores net of other factors.

School level factors

3. The larger the school size the lower the student's tests scores net of other factors.

4. The larger the school's student population on the free or reduced lunch programs the lower the test scores net of other factors.

Family level factors

5. The higher the family's socioeconomic status the higher the test scores net of other factors.

6. The larger the family size the lower the test scores net of other factors

Peer level factors

7. The more friends a student has that have dropped out of school the lower the student will score on standardized test net of other factors.

8. The more the peers feel that school is important the higher the student will score on standardized test net of other factors.

3. Data and methodology

3.1 Data

The data that was gathered for this thesis research came from The Educational Longitudinal Study (ELS) from 2002. This research was conducted on behalf of the US

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Department of Education. This national study had a total of 15,362 tenth graders selected at random. This sample included students from both private and public schools.

This research focused on tenth grade students. The first sample restriction imposed on the data was to include questionnaires that students, parents and administrators had filled out correctly and completely. After that, a second restriction was created to only include those participants that had valid test scores in reading and mathematics. After the sample restrictions were constructed, the base sample size reduced to 10,930 participants.

The ELS has weighted data, which is used to correct for oversampling. Oversampling is done to make sure that the survey can be generalized to the population. Weights are incompatible with many statistical packages, and they also may create a bias by inflating the data. This is easily corrected by creating a relative weight; a relative weight is constructed by dividing the current weight by the mean of the current weight. This allows for the data to go back to the original sample size but keeping the percentage breakdowns that were found using the weighted data.

3.2 Variables

The primary research question of this study is to see if there is a connection between student test scores and participation in sports. To determine the academic achievement of the student, test scores were used from the standardized test in math and reading. This interval level variable ranges from 22.50 to 77.09. The variable was then ranked into quintiles, deciles and centiles.

3.2.1 Student Characteristics

Student characteristic variables are related to how the student performs in school. Factors in this research included the number of sports programs at the high school, whether or not a student participated in high school sports, sex, race, minority, handicap, if a student was held back, how many schools the student has attended, prepared for class, time spent on doing homework, time spent doing other activities such as watching television or playing videogames, deviance, number of extracurricular activities offered by the school, and if the student was involved in the extracurricular activities.

The number of sports programs is an interval level variable. It is constructed as an index by adding all the sports together from the ELS. Sports that were included were baseball, softball, basketball, football, soccer, and interscholastic team sports, interscholastic individual sports, and interscholastic cheer or drill team. The responses were coded to create a (0, 1) binary, this new variable was sports participation, in which 0 is "no participation" and 1 is "participated in sports". Sex was coded as a (0, 1) binary, in which 0 is "male" and 1 is "female". The Race variable started as a nominal variable, which was recorded into a binary called minority. In the minority binary 0 "not minority" and 1 is "minority". Minority status was determined by looking at each race and comparing the test scores, Whites and Asians scored extremely high so they were combined together and the remaining races were viewed as minority.

The ELS looks at many student impairments to determine disability status. For this variable an index was created using the variables indicating if the student had specific learning disabilities, if they had a speech or language impairment, if there was

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mental retardation, if there was an emotional disturbance, if there was a hearing impairment, orthopedic impairment, visual impairments or other disabilities. Once the index was created it was transformed into the disability (0, 1) binary in which, 0 "no disability" and 1 was "disabled". The variable of held back is also a (0, 1) binary in which 0 "never held back" and 1 indicating "held back a grade". A (0, 1) binary was created out of the variable in which a student changed schools during high school. 0 showed "no change" and 1 showed "changing of high schools".

The variable of not being prepared was comprised of three different variables from the ELS. They included if a student went to class without pencil or pen, if the student went to class without books and if a student went to class without their homework done. Each variable was turned into a (0, 1) binary in which 0 "indicated the students were in class with everything" and 1 "indicated they did not come to class prepared". An index was constructed to include all under the not prepared (0, 1) binary again 0 "prepared for class" and 1 "not prepared for class". Hours spent on homework is a variable that is an index created from the variables of how many hours a student spent on homework in school and how many hours the student spent on homework at home. The new variable was created to include all hours and it is an interval level variable. Hours spent watching television and playing video games was constructed in the same way. This included the original questions of hours spent watching TV/DVDs on weekends, hours spent on video/computer games on weekends, time spent on computer for school work and finally time spent on computer for activities other than homework. This index allowed for an interval level variable to show the time spent on TV/computer as a whole.

Deviance was created as a (0, 1) binary. It was created by an index of the following variables: if a student was late to class, how many times a student cut or skipped class, how many times they were absent from school, if the student got into trouble, if they were ever put on in-school suspension, how many times suspended from school and if the student was ever transferred for behavioral problems. Each variable was coded so if the participant did any of the above listed activities they received a 1. If the participant did not meet the criteria the answer was coded as a 0. The final variable is extracurricular activities. An index was created for intramural sports which included the following, intramural sports baseball, basketball, football, soccer, other team sports, individual sports and cheerleading and drill. Then a second index was created regarding whether or not a student participated in other school related activities such as band, chorus, school plays, musicals, student government, honor society, yearbook, newspaper, service clubs, hobby clubs, vocational clubs and how often art and music classes were taken. Then the two indexes were added together and created a (0, 1) binary for students extracurricular activities, in which 0 "no activities" and 1 "involved in activities".

3.2.2 School level variables

School level variables are ones that are related to how the school affects the student's test scores. Examples of factors would be if the school is private, school size, if the school has a free lunch program and the percent of students enrolled in this program, the percent of students enrolled in college preparation programs, problems of the school and the level of security measures.

The private school variable is a (0, 1) binary in which 0 "not a private school" and 1 "private school". The school class size is an interval level variable measuring the number of students. This was constructed by the October 2001 total enrollment and the 10th grade enrollment from 2001-2002 school rosters. The variable for the number of students on the free lunch program is an interval level variable which was used to set up a standard for socioeconomic status. The college preparation variable is interval level, this shows the percentage of students who are taking college preparation classes.

The level of school problems was created into a scale. The following variables were used when creating the scale: how often tardiness is a problem, absenteeism is a problem, cutting class is a problem, if there are physical conflicts in the school, how often robbery or theft is a problem, if vandalism is a problem, if there is use of illegal drugs, how often drugs/alcohol is a problem, how often drugs are near the school, how often weapon possession is a problem, physical abuse of teachers, racial tension, student bullying, verbal abuse of teachers, disorder in the classroom, student disrespect for teachers, gang activity and cult extremist group activities at school. When the following variables were used the cronbach alpha score was .870, indicating a strong relationship between the included variables. The scale possible values of 1 to 5, a 1 indicating the school has few problems on a daily basis and a 5 indicating the student feels that the school has many problems on a daily basis.

The final variable for school level factors is school security. This was created as an index using the following variables: if there was controlled access to buildings during school hours, as well as controlled access to the grounds, require student pass through metal detectors, random metal detector checks, closed campus for students during

lunch, random dog sniffing from drugs, random sweeps for contraband, require drug testing for any student, require all students to wear uniforms, enforce strict dress code, require clear book bags or ban book bags, require students to wear badges or picture id, require faculty or staff to wear badges or picture id, use paid security during school hours, use security cameras to monitor school, use paid security as students arrive and leave, use paid security at school activities, use paid security outside of school hours and use paid security at other time. The index suggests that the lower the score the less security measures the school puts in place on a daily basis. The index is rated from 0 to 16. A score of 16 would result in the student feeling that the school was aware of security issues and did each of the above measures every day to avoid any security issues.

3.2.3 Family level variables

The family can affect the test scores of the student. To test this component I included socioeconomic status, family type which looked at single or two parent homes, parents' education level, location of where the family lives, and parent's level of communication.

The variable for socioeconomic status was already included in the ELS data but the variable needed to be transformed into a 100% index. To create this index, the maximum SES value was added to the minimum SES value and then the sum of this was divided by the range of possible SES scores, which was then multiplied by 100. The new SES variable was then used to create quintiles. The SES quintiles were used for the analysis.

Family type is a variable that is nominal, listing either single parent home or two parent home. These were then created into a (0, 1) binary. For single parent household 0 is "not a single parent home" and 1 is "a single parent home". The two parent home variable is listed as 0 "not a two parent home" and 1 is "having a two parent home". Parents' level of education is already included in the ELS, and was used in its original format. The school location variable was examined as whether it is rural or in the city, was transformed into a binary where 0 "rural" and 1 "not rural". The number of siblings in the family was left as an interval level variable.

Parents'/student communication variable is a scale created out of sixteen different variables. Some of the variables included items such as communication with parents on things such as school activities, things studied in school, and other issues on the student side. The scale also includes variables on the parents' side such as advice given to student, course select and plans for college entrance exams. The cronbach alpha for this scale was .843 showing a strong relationship between the included variables. This allowed me to combine the variables together and create the scale. The scale was ranked from 1 to 3, 1 being never talked about and 3 being often talked about.

3.2.4 Peer level variables

Peers also can influence a students' academic achievement. Variables that will be used are sibling dropout, peer dropout, level of school importance to peers, level of school not important to peer and sport participation important to peers.

Sibling drop out was created as a (0 1) binary, in which 0 "no siblings have dropped out" and 1 "has had a sibling dropout". Peer drop out was also created in the same (0,

1) binary, in which 0 "did not have friends drop out" and 1 "had friends drop out". On the scale of whether school is important to peers the variables used were: important to friends to attend class, important to friends to study, important to friends to get good grades, important to friends to finish high school and important to friends to continue education past high school. The cronbach alpha for this scale was .836 indicating a strong relationship between the variables used in the scale. The scale was ranked from 1 to 3, where 1 is "not important" and 3 is "important". A second scale was created in opposition of importance; this was showing the level peers felt popularity was important. The following variables were used: it was important to be popular, important to have a steady boyfriend/girlfriend, important to get together with friends and important to friends to go to parties. The cronbach alpha was .700 indicating a strong relationship between the variables used for this scale. The scale was ranked from 1 to 3, where 1 is "not important" and 3 is "important".

The final variable in this section is the importance of sports to peers. There is a question from the ELS that ranks the importance of playing sports to friends, which was transformed into a binary. The original responses were listed as not important, somewhat important and important. Since this variable is being created to see if sports are important it was coded into a dual response variable, 1 "not important" and the 3 was coded as the "somewhat important and important" responses. In this scale the lower number has a more negative impact, and the scoring of a three is the positive answer and shows that sports are important to peers.

4. Results

4.1 Univariate and Bivariate Analysis

Table one is comprised of univariate and bivariate results for the full sample by participation in high school sports based upon test scores of the participants. The full weighted sample size is 10,930, of that sample 52.61% participated in high school sports and non participants made up 49.66% of the sample. The dependent variable, test scores, is measured by points scored on standardized reading and math exams. The average test scores for the full sample of student participants is 51.10; the range of the test scores were 22.50 to 77.09. Students who participated in sports scored 52.60 and non participants scored 49.66. Test score differences between groups suggest that students who are involved in high school sports will earn 2.94 points higher on test scores than students who do not participate. The two sample t-test results show that students who participate in sports earn significantly (t-test is significant at .001 level) higher test scores than students who do not participate. There was a meaningful difference in test scores as well; the modified chow test showed the effects size was greater than .20.

4.1.1 Student Characteristics

Overall 50% of the sample is female. Of the students who participated in sports 49% were female and 52% of the students who did not participate were female. Female participants were significantly (t-test significance levels .05) more likely not to participate in sports.

Overall 32% of the sample was members of minority groups. Of the students who participated in sports 27% were members of minority groups and 36% of the students

who did not participate were members of minority groups. Minority group respondents were significantly (t-test significance level .001) less likely to participate in sports.

Overall 12% of the sample has disabilities. Of the students who participated in sports 9.76% had disabilities and 14% of the students who did not participate had disabilities. Disabled students are significantly (t-test significance level .001) less likely to participate in sports.

Overall 12% of the sample has been held back. Of the students who participated in sports 10% had been held back and 15% of the students who did not participate had been held back. Students who were held back were significantly (t-test significance level .001) less likely to participate in sports.

Overall 32% of the sample has been enrolled in multiple schools. Of the students who participated in sports 28% had been enrolled in many schools and 35% of the students who did not participate were enrolled in many schools. Students who have been enrolled in many schools were significantly (t-test significance level .001) less likely to participate in sports.

Overall 33% of the sample was not prepared for class. Of the students who participated in sports 29% were not prepared and 37% of the students who did not participate were not prepared for class. Students who were not prepared for class were significantly (t-test significance level .001) less likely to participate in sports.

Overall 68% of the sample is involved in extracurricular activities. Of the students who participated in sports 81% were involved in extracurricular activities and 55% of the students who did not participate were involved in extracurricular activities. Students

involved in extracurricular activities were significantly (t-test significance level .001) more likely to participate in sports.

4.1.2 School Level Factors

Overall 8% of the sample was enrolled in a private school. Of the students who participated in sports 10% attended private schools and 5% of the students who did not participate in sports attended private schools. Private school students were significantly (t-test significance level .001) less likely to participate in sports.

Overall 24% of the full sample has students on the free lunch program. Of the students who participated in sports 22% of their school was on the free lunch program on average. The students who did not participate in sports attended schools with 26% of the student body on the free lunch program. Students who went to schools with a larger percentage of students on the free or reduced lunch program were significantly (t-test significance level .001) less likely to participate in sports.

4.1.3 Family Level Factors

Overall 23% of the full sample reported living in a single parent home. 20% of students who participated in sports lived in a single parent home and 26% of the students who did not participate lived in a single parent home. Students who lived in single parent homes were significantly (t-test significance level .001) less likely to participate in sports.

Overall 20% of the sample attended a school in a rural location. Of the students who participated in sports 21% attended a rural school and 19% of the students who did not participate attended rurally located schools. Students who attended a rurally located school were significantly (t-test significance level .001) less likely to participate in sports.

Overall in the sample families had an average of 2.3 siblings. Of the students who participated in sports the average number of siblings was 2.12 and 2.44 for the students who did not participate in sports. Students who had a higher number of siblings were significantly (t-test significance level .001) less likely to participate in sports.

4.1.4 Peer Level Factors

Overall 16% of the sample had siblings who dropped out of school. Of the student who participated in sports 12% had a sibling drop out and 19% of the students who did not participate had a sibling who dropped out. Students who had siblings who dropped out of school were significantly (t-test significance level .001) less likely to participate in sports.

Overall 36% of the sample had peers who dropped out of school. Of the students who participated in sports 37% had a peer drop out and 47% of the students who did not participate had a peer who dropped out. Students who had peers who drop out of school were significantly (t-test significance level .001) less likely to participate in sports.

Peers had an impact on if school was important. The overall sample scored the importance level as 2.07. Of the students who participated in sports, they rated the fact that their peers felt school was important as 2.13 and school importance was rated a 2 by students who did not participate. Students who had peers that feel school was more important were significantly (t-test significance level .001) more likely to participate in sports.

The overall sample scored popularity being important to peers at a level of 2.12. Of the students who participated in sports, popularity being important to peers was rated at 2.16 and rated at 2.09 for the students who did not participate. Participants who had

peers that feel popularity was more important were significantly (t-test significance level .001) more likely to participate in sports.

The final scale was created to test if sports were important to peers; it was coded like the previous scales with one being not important and three being important. The overall sample felt that having peers who felt sports were important ranked their average of feeling as 1.79. Of the students who participated in sports, and had friends who felt sports were important was ranked at a level of 2. Students who did not participate in sports ranked having friends who felt sports were important at level 1.59. Students who had peers that felt sports were more important were significantly (t-test significance level .001) more likely to participate in sports.

4.2 Multivariate Results

4.2.1 Student Characteristics

Table 2 shows the ordinarily least squares regression, regressing the dependent variable (test scores) onto the independent variables. The adjusted R square is .504, meaning that the saturated model explains nearly 50% of the variance in test scores in the full sample. Regression results show that net of other factors, students who participate in sports score .56 points higher than non participants in the full sample. This finding is statistically significant. Due to the interaction effects between the variable sports participation and other independent variables, the sample was split into two groups using the main independent variable participation or non participation.

Net of other factors, female students scored 1.67 points lower than males in the full sample. Females who participated in sports scored 1.69 points lower and females who did not participate scored 1.71 points lower. This was both statistically significant as well

as a meaningful difference. Females who participated in sports saw less of a negative impact on test scores than those who did not participate.

Net of other factors, students who are classified as minority scored 4.37 points lower than non-minority students in the full sample. Students who were classified as minority were also negatively affected in both groups as well. Minority students who participated in sports scored 4.67 points lower and minority students who did not participate scored 4.07 points lower. Membership in a minority group has a greater negative impact on test scores for those who participate in sports.

Net of other factors, students who were classified as having a disability scored 6.63 points lower than non disabled students in the full sample. Those disabled students who participated in sports lost 7.01 points and non participates scored 6.34 points lower. This finding was statistically significant as well as a meaningful difference. Students who are classified as having a disability and participated in sports saw a greater negative impact on test scores than those who did not participate in sports.

Net of other factors, students who were held back scored 4.63 points lower than students who were not held back. Students who were held back and participated in sports scored 5.03 points lower, and non participants who were held back scored 4.34 points lower. This finding was statistically significant as well a meaningful difference. Students who were held back and participated in sports saw a greater negative impact on test scores than those who did not participate.

Net of other factors, students who were not prepared for class scored 1.27 points lower on standardized test than those who were prepared in the full sample. Students who were not prepared and participated in sports lost .88 points and non participants

who were also not prepared lost 1.59 points. This finding was statistically significant as well as a meaningful difference. Students who were not prepared for class and participated in sports felt less of a negative impact on test scores than those who did not participate.

Net of other factors students who spent more time on homework increased test scores by .11 points in the full sample. Students who participated in sports increased their test scores by .12 points and those who did not participate in sports increase their test scores to .11 points. This finding was statistically significant across all models and also a meaningful difference. The OLS regression does find that students who participate in sports benefit from more time spent on homework compared to students who did not participate.

Net of other factors, students who spent more time watching TV or playing video games decreased test scores by .14 points in the full sample. Students who spent more time watching TV or playing video games and participated in sports decreased scores by .18 points, and non participated decreased their scores by .09 points. Both models saw a decrease on test scores with an increase in time spent watching TV or playing video games. This finding was statically significant as well as a meaningful difference. Students who did not participate in sports felt less of a negative impact on test scores than those who did participate.

Net of other factors, students who were classified as deviant scored .69 points lower than non deviant students in the full sample. Students who were classified as deviant and participated in sports decreased scores by .52 points and non participants decreased scores by .83 points. This finding was statically significant as well as a

meaningful difference. Students who were classified as deviant and participated in sports felt less of a negative impact on test scores than non participants.

Net of other factors, students who participated in extracurricular activities increased test scores by .56 points compared to those who did not in the full sample. This finding was statistically significant for the full sample but not across the models.

4.2.2 School Level Factors

Net of other factors, students who attended private schools increased test scores by .74 points compared to those who attended public schools. This finding was statically significant in the full sample. There was also significance in the non participants by increasing their scores .90 points.

Net of other factors, an increase in school size increased test scores by .01 points in the full sample. Students who participated in sports and attended schools increased test scores by .01 points. Non participants did not see a difference in test scores. This finding was statistically significant but it was not a meaningful difference.

Net of other factors an increase in the percentage of the schools population on the free lunch program decreased test scores by .02 points in the full sample. Students who participated in sports and attended schools with the increase lost .02 points as well as non participants. The findings were statistically significant as well as a meaningful difference. Table 2 shows the unstandardized beta as -.02 for all models. This is probably due to a rounding issue with excel.

Net of other factors, and increase in the percentage of the schools population that is enrolled in college preparation program increased test scores by .01 points in the full sample. Those who participated in sports increased scores by .01 points as well as non

participants. This finding was statistically significant as well as a meaningful difference. This variable as well shows the increase on the unstandardized beta as .01 but this could also be due to a rounding issue in excel.

Net of other factors, an increase in problems in school resulted in a decrease of .49 points on standardized test scores in the full sample. This finding was statically significant but not a meaningful difference.

Net of other factors, an increase in school security decreased test scores by .13 points in the full sample. This was statically significant. The students who participated in sports had a decrease in scores by .20 points and this was significant for this model only.

4.2.3 Family Level Factors

Net of other factors with an increase in the socioeconomic status of the family test scores increased 1.80 points in the full sample. This increase was constant across all models. Students who had an increase in socioeconomic status and participated in sports saw an increase of 1.72 points, non participants saw an increase of 1.86 points. The findings were both statistically significant as well as a meaningful difference. Students who had an increase in socioeconomic status and did not participate in sports saw a higher return on test scores than those that participated in sports.

Net of other factors, students who live in single parent homes decreased test scores by .39 points in the full sample. Students who lived in single parent homes and participated in sports lost .62 points and non participants lost .23 points. This was only statistically significant for the full sample and the participation model.

Net of other factors an increase in family size resulted in a decrease of .32 points in the full sample. Students who had an increase in family size and participated in sports lost .24 points, those who did not participate in sports lost .36 points. In both models an increase in the family size resulted in a decrease in test scores. This finding was both statistically significant and a meaningful difference. Students who did not participate in sports however and had in increase in family size were impacted more than those that did participate.

Net of other factors, with an increase in parent and student communication test scores decreased by .67 points in the full sample. An increase in communication for those who participated in sports decreased scores by .72 points and non participants lost .61 points. This finding was statically significant for the full sample and for the participation model only.

4.2.4 Peer Level Factors

Net of other factors, an increase in the number of siblings who dropped out of school resulted in a decrease of .67 points in the full sample. Students who had siblings who dropped out of school and participated in sports decreased their test scores by .99 points and non participants by .39 points. This finding was statically significant but not a meaningful difference. Students from each model were impacted if they had siblings who dropped out of school but those who participated in sports had the greater negative impact.

Net of other factors, an increase in the number of peers who dropped out of school resulted in a decrease of 2.07 points in the full sample. Students who had friends who dropped out of school and participated in sports lost 2.03 points, and non

participants lost 2.09 points. The findings were both statistically significant as well as a meaningful difference. Students in each model were impacted if they had friends that dropped out of school but those who did not participate saw a greater negative impact on test scores.

Net of other factors, the more the student had friends who felt that school was important saw an increase of .53 points in the full sample. Students who had peers that felt that school was important and participated in sports increased scores by .38 points and non participants increased scores by .67 points. This was both statistically significant as well as a meaningful difference. Students who did not participate in sports benefited more by having friends who felt that school was important than those who participated.

Net of other factors, the more the student had friends who felt that popularity was important test scores decreased by 1.54 points in the full sample. Students who had peers that felt that popularity was important and participated in sports had a decrease of 1.54 points on test scores and non participants also decreased test scores by 1.54 points. This was a statically significant difference across models but not meaningful.

Net of other factors, the more the student had friends who felt that sports were important tests scores decreased by .62 points in the full sample. Students who had peers that felt that sports were important as well as participated in sports decreased scores by .63 points and non participants by .60 points. This was both a statistically significant difference as well as meaningful difference across models. Students who had friends who felt sports were important and participated in sports felt more of a negative impact on test scores.

5. Discussion

Overall most hypotheses were supported in this study. The only hypothesis that was not supported was the hypothesis that stated, as school size increased test scores would decrease, net of other factors. The hypotheses in relation to student characteristics were both supported. The first hypothesis was supported; net of other factors students who participate in sports will score higher on test scores. The study supported previous research, such as Feldman and Matjasko (2005), that there is a positive relationship between participation in extracurricular activities and the students' overall achievement. The study also notes similar findings to Broh (2002) that involvement in athletics increased achievement in the classroom as well as on standardized test scores. Students who participated in sports scored about half a point higher on standardized test in the current research. The second hypothesis, net of other factors, the more time a student spends on homework the higher the standardized test scores was also supported. This research found that students, who spent more time on homework, did see an increase in standardized test scores. Cooper, Robinson and Patall (2006) also found that there was a relationship between doing homework and academic achievement.

The hypotheses testing the school level variables tested such things as school size and population on the free lunch program. The hypothesis stating net of other factors, the larger the school size the lower the student will score on standardized testing was not supported. The hypothesis stating net of other factors, the larger the school population of students on the free lunch program the lower the standardized test scores, was supported. Earlier research, such as Okpala and Okpala 2001, found that free

lunch programs were a measure of the schools' socioeconomic status. Schools with higher numbers of students enrolled in the free lunch program had a negative impact on the individual's math scores. This research supports this claim and goes further in stating that it impacts reading scores also.

Previous research in relation to school size shows that the smaller the school the better academic achievement for the student. Cotton (1996) found that states with the largest schools, as well as districts, had the lowest scores in achievement and higher numbers of students who dropped out. Lindsay (1982) also found that higher academic achievement was related to smaller schools. School size did not only impact scores, it also impacted other areas as well. For example, Videon (2002) found that there was an impact on sports participation as well, students who attended smaller schools had a higher chance of being able to compete on the schools' teams.

Both hypotheses were supported for the family level factors. The first hypothesis was net of other factors, the higher the family's socioeconomic status the higher the standardized test scores. The second hypothesis was net of other factors, the larger the family size the lower the standardized test scores.

Previous research by Sirin (2005) found that the family socioeconomic status is a strong correlating factor in academic performance. The higher the family's status the more resources they can provide to the student in the home. Sirins' findings were supported by this research. It was found that the higher the socioeconomic status of the family, the higher the student would score. However, in the current study, participation in sports did not show as high of an additional increase on test scores as non-participants, but both groups saw a significant increase in scores with higher family

socioeconomic status. It was found in this research that students who did not participate in sports benefited more from an increase in socioeconomic status than those who did participate.

Previous research also reported that an increased number of siblings in the home would negatively impact test scores. This was corroborated by the current research. Blake (1989) found students with a smaller family composition, usually one or two siblings, had positive effects on verbal scores. Blake also found in the same study that with a smaller family composition the student had a greater opportunity for excelling compared to a family with seven or more siblings. Smaller families allowed for more verbal interaction and one on one time for school work with the parental figures in the home.

Finally, in relation to peer impact, both hypotheses were supported. The first being, net of other factors, the more friends a student has that have dropped out of school, the lower the standardized test scores. The second hypothesis, net of other factors, the more peers feel that school is important the higher the student will score on standardized tests.

Feldman and Matjasko (2005) found that students participated in sports for three main reasons. One of the three main reasons listed was it allowed them the opportunity to see their friends. Matjasko's (2005) study found that students who participated in sports had friends that were also successful in academics, which increased test scores. The research by Kain, Markman and Rivkin (2003) found that students will make friends with other students who have the same goals and ambitions. This indicates that positive

peer influence and peers' positive feelings about school will increase a student's test scores.

6. Limitations

This research has limitations. Specific examples are the adjusted R squared levels, limitations in the sample, and results that did not align with previous research. The first limitation was that the adjusted R squared in the OLS Regression was .50. This limitation is due to the fact that the variables included in the regression model only explained half of the variation in test scores, meaning some variables have been left out that should have been included. However, use of a secondary data set limits the variables available.

The limitations in the sample could have impacted the results due to the fact that it was a narrowly defined population. The ELS only looks at tenth grade students. This study was not longitudinal so it did not follow the students over their lifetime to see if participation in sports might have impacted their scores in a different way at different points in the educational career. The data would be more informative if they had used students in several age groups which would allow for comparisons among age groups and possibly longitudinal data could be collected. The use of only tenth graders does not show if there was an increase or decrease in scores from previous years.

The final limitation in the study includes the results that were not aligned with previous research. A specific example of this being the impact of school size on the students' academic achievement, which this study indicated that the larger the school, the more there was a positive impact on test scores, which was not indicated in previous research. This could be in part to the school having more resources, but there

was no specific evidence found to tell exactly why this increase happened. The second variable in this study was when the level of communication of the parent increased, the students test scores decreased. Previous research found that if a parent was in contact with the school the test scores should increase. The reasoning for this could be due to the line of questions asked about parents' communication. The questions could be interpreted as if the parent is inquiring due to current problems in school. If the parent was communicating with the student the questions should be worded differently. So this is a possible reason that the increase in communication resulted in decreased scores.

7. Conclusion

Hartmann (2008) calls for more research which this study attempts to address. Overall, this research found that students who participate in sports see a positive impact on their standardized test scores. Although participation in sports has a positive impact, it is not the sole reason the increase in scores. Other factors such as the school, family and peers also have an influence on a student's test scores. This research shows that if a student is already doing well in school, and they participate in sports, they will see a positive impact on their test scores. For those students who did not participate, there were other factors that impacted their grades positively, specifically, the families' socioeconomic status. An increase in socioeconomic status increased all students' test scores, but the students who did not participate in sports had a larger advantage from the increased socioeconomic status than those who did participate in sports. This research indicates that sports are an important way for students to achieve success, both in and out of the classroom, and could have detrimental effects if taken out of schools.

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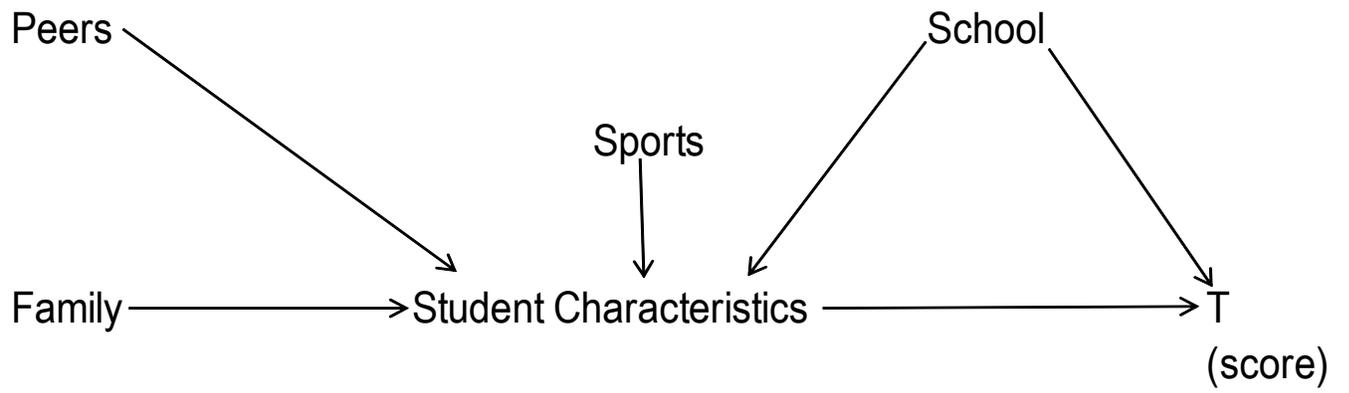
APPENDIX

Figure 1
Conceptual model

Peers   School

Sports

Family ———→ Student Characteristics ————————→ T
(score)

Table 1A

Values for students by sports participation

Variables	Full Sample	participation	1	2	Non participation	Score Difference
Dependent variable:						
Test Scores (mean):	51.1091	52.6082	***	^	49.6604	0.94397
Test Scores (median):	51.41	53.00			49.58	93.54%
	(9.43)	(9.20)			(9.43)	
Independent Variables						
Student Characteristics						
% Female (0,1)	50.90%	49.43%	*		52.32%	
	(0.50)	(0.50)			(0.50)	
% Minority (0,1)	32.07%	27.62%	***		36.37%	
	(0.47)	(0.45)			(0.48)	
% Disabled (0,1)	11.96%	9.76%	***		14.10%	
	(0.32)	(0.30)			(0.35)	
% Heldback (0,1)	12.56%	9.99%	***		15.05%	
	(0.33)	(0.30)			(0.36)	
% Enrolled in many schools (0,1)	31.77%	28.45%	***		34.99%	
	(0.47)	(0.45)			(0.48)	
% Not prepared (0,1)	33.04%	29.00%	***		36.94%	
	(0.47)	(0.45)			(0.48)	
Hours spent on homework	10.63	11.11			10.16	
	(8.79)	(9.06)			(8.49)	
Time spent watching TV/video	13.26	13.13			13.38	
	(6.06)	(6.09)			(6.03)	
% Deviant (0,1)	50.30%	46.83%			53.65%	
	(0.50)	(0.50)			(0.50)	
% In extracurricular (0,1)	68.28%	81.07%	***		55.90%	
	(0.47)	(0.39)			(0.50)	
School Level Factors						
Private school (0,1)	8.13%	10.71%	***		5.65%	
	(0.27)	(0.31)			(0.23)	
Size of school	48.42	44.91			51.82	
	(30.72)	(30.50)			(30.55)	
% Free lunch program	24.75%	22.65%	***		26.75%	
	(22.74)	(21.39)			(23.81)	
% College prep programs	57.61%	59.06%			56.21%	
	(29.83)	(29.96)			(29.65)	
Problems in schools	2.39	2.37			2.41	
	(0.34)	(0.34)			(0.34)	
School security	7.35	7.15			7.54	
	(2.64)	(2.63)			(2.62)	
Sample n (weighted)	10930	5372			5558	
	100%	49%			51%	

[1] = *** p<0.001; **p <0.01; *p<0.05
[2]= effect size greater >.20

Values for students by sports participation

	Full Sample	participation	[1]	[2]	Non participation
Independent Variables					
Family Level Factors					
Socioeconomic Status	3.00	3.25			2.77
	(2.64)	(2.63)			(2.62)
% 1 parent homes (0,1)	23.58%	20.95%	***		26.13%
	(0.42)	(0.41)			(0.44)
% Rural location (0,1)	20.54%	21.87%	***		19.25%
	(0.40)	(0.41)			(0.39)
Number of siblings	2.34	2.24	***		2.44
	(1.53)	(1.45)			(1.59)
Parent communication	2.16	2.21			2.12
	(0.28)	(0.27)			(0.27)
Peer Level Factors					
% Sibling who dropped out (0,1)	16.01%	12.69%	***		19.22%
	(0.37)	(0.33)			(0.39)
% Peers who dropped out (0,1)	36.67%	37.99%	***	^	47.84%
	(0.50)	(0.49)			(0.50)
School is important	2.07	2.13	*		2.00
	(0.77)	(0.76)			(0.77)
Popularity	2.12	2.16	***		2.09
	(0.41)	(0.41)			(0.40)
Sports are important	1.79	2.00	***		1.59
	(0.82)	(0.84)			(0.74)
Sample n (weighted)	10930	5372			5558
	100%	49%			51%

[1] = *** $p<0.001$; **$p <0.01$; *$p<0.05$

[2]= effect size greater >.20

Table 2
OLS Regression Analysis for the Sports Participation Model
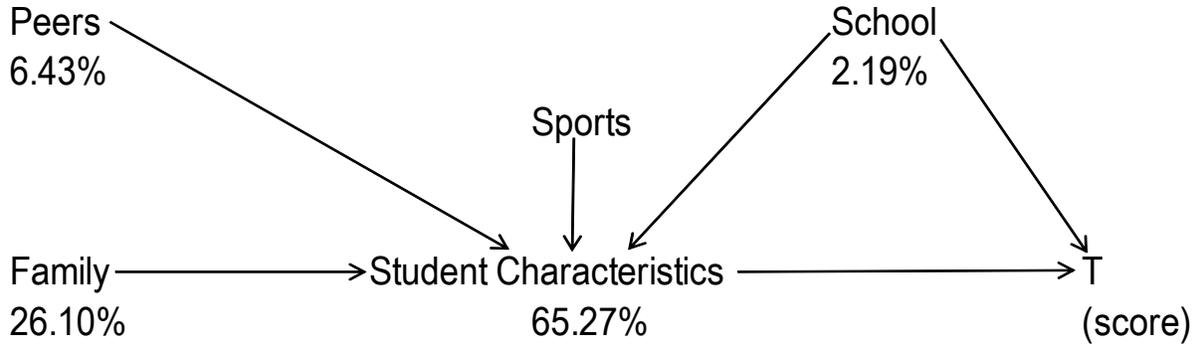(Dependent variable=test scores)

Independent Variables	Full Sample			Participants				Non Participants		
	Unstd	[1]	Std	Unstd	[1]	Std	[2]	Unstd	[1]	Std
Student Characteristics										
Sports Participation	0.56	***	0.03							
Female (0,1)	-1.67	***	-0.09	-1.69	***	-0.09	^	-1.71	***	-0.09
Minority (0,1)	-4.37	***	-0.22	-4.67	***	-0.23	^	-4.07	***	-0.21
Disabled (0,1)	-6.63	***	-0.23	-7.01	***	-0.23	^	-6.34	***	-0.23
Heldback (0,1)	-4.63	***	-0.16	-5.03	***	-0.16	^	-4.34	***	-0.16
Enrolled in many schools (0,1)	-0.05		0.00	-0.44	**	-0.02		0.31		0.02
Not Prepared (0,1)	-1.27	***	-0.06	-0.88	***	-0.04	^	-1.59	***	-0.08
Hours spent on homework	0.11	***	0.10	0.12	***	0.11	^	0.11	***	0.10
Time spent watching TV/Video	-0.14	***	-0.09	-0.18	***	-0.12	^	-0.09	***	-0.06
Deviant (0,1)	-0.69	***	-0.04	-0.52	**	-0.03	^	-0.83	***	-0.04
Extracurricular (0,1)	0.56	***	0.03	-0.05		0.00		1.00		0.05
School Level Factors										
Private School (0,1)	0.74	*	0.02	0.65		0.02		0.90	**	0.02
Size of school	0.01	*	0.02	0.01	**	0.03		0.00		0.01
Free lunch program	-0.02	***	-0.05	-0.02	***	-0.05	^	-0.02	***	-0.06
College Prep Programs	0.01	*	0.02	0.01	**	0.02	^	0.01	**	0.02
Problems in schools	-0.49	**	-0.02	-0.53	*	-0.02		-0.38		-0.01
School Security	-0.13	***	-0.04	-0.20	***	-0.06		-0.06		-0.02
Family Level Factors										
Socioeconomic Status	1.80	***	0.27	1.72	***	0.26	^	1.86	***	0.28
1 Parent homes (0,1)	-0.39	**	-0.02	-0.62	**	-0.03		-0.23		-0.01
Rural Location (0,1)	-0.12		-0.01	-0.32		-0.01		0.08		0.00
Number of siblings	-0.32	***	-0.05	-0.24	**	-0.04	^	-0.36	***	-0.06
Parent/student communication	-0.67	***	-0.02	-0.72	**	-0.02		-0.61		-0.02
Peer Level Factors										
Sibling who dropped out (0,1)	-0.67	***	-0.03	-0.99	***	-0.04		-0.39		-0.02
Peers who dropped out (0,1)	-2.07	***	-0.11	-2.03	***	-0.11	^	-2.09	***	-0.11
School is Important	0.53	***	0.04	0.38	***	0.03	^	0.67	***	0.06
Popularity	-1.54	***	-0.07	-1.54	***	-0.07		-1.54	***	-0.07
Sports are important	-0.62	***	-0.05	-0.63	***	-0.06	^	-0.60	***	-0.05
Constant	58.50	***		61.30	***			56.39	***	
Adjusted R-sq	0.50	***		0.49	***			0.49	***	

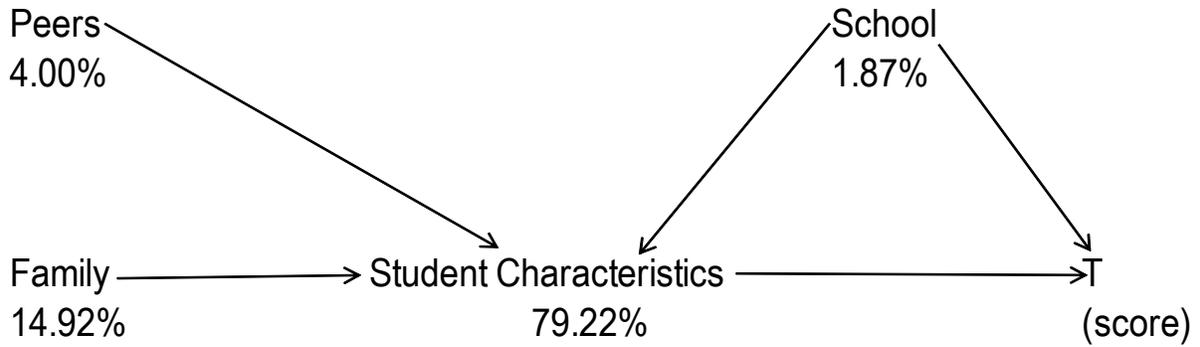[1] =***p<0.001; ** p<0.01; *p<0.05; ns non-significant

[2] =significant difference between participants and non participants at the .05 level

Figure 2
Shares of Unique Variance Explained

Full Sample

Peers
6.43%

School
2.19%

Sports

Family
26.10%

Student Characteristics
65.27%

T

(score)

Participation

Peers
4.00%

School
1.87%

Family
14.92%

Student Characteristics
79.22%

T

(score)

Non-Participation

Peers
6.98%

School
1.96%

Family
26.80%

Student Characteristics
64.26%

T

(score)