

BEFORE AND AFTER FOOTBALL: IMPACT ON STUDENT BEHAVIORAL AND
ACADEMIC OUTCOMES

A Record of Study

by

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ABSTRACT

This study was undertaken by the researcher to examine the impact that the adoption of a football program had on a small rural Texas high school as indicated by student behavioral and academic outcomes. The researcher used extant data gathered from the student management software system, which included attendance records, discipline records, and standardized test scores. The data were examined using a *t*-test and box and whisker plots.

The data revealed that there was very little impact on student behavioral outcomes as measured by attendance and discipline. The results for test scores revealed an impact. Tests for mathematics, reading/ELA, social studies and science revealed an increase in raw scores. The greatest increases in scores were in reading/ELA and mathematics.

DEDICATION

This work is dedicated to several groups of people that have helped me along this journey. To my family who endured the time I spent working on my research and the writing, re-writing and writing some more. Elizabeth, Grace and Madison you were my inspiration and Wayne, you were steadfast and encouraging. To my sister, Nicole, who always was there to watch over our parents and supported all of my efforts. My beloved friend, Teresa, who was an angel for my mother and my true friend. To my best friend, Lin, who taught me what football was all about. My wonder-twin, Cris, no matter how tough it got, I could always count on you to talk me through.

Thanks to the SGISD Board of Trustees who had the vision to make football a reality for our school, especially Alexandra, my constant advocate, friend, and partner in transforming SGISD into the excellent educational institution that it is today. I drew my strength from the men and boys who blazed a trail for AHS as the football program was born. Coach Springs, Coach Moon, and Coach Lozano-thank you for your love for the game and for the boys who played it so hard. You all left everything on the field.

Most all this work is dedicated to my parents, Charlie and Peggy. Although you are not here to see me finish, you were with me every step of the way. My goal was to make you proud and hope you know how much I love you both. I am the person I am today because of you.

Jeremiah 29:11

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CHAPTER I

INTRODUCTION

If you drive through almost any Texas town on a Friday night in the fall of the year, the glow of stadium lights is likely to draw you in like a moth to a flame. You can follow that glow or look for that small green sign that simply says “Stadium” and find your way to the hotbed of excitement that makes every town come together for a few hours every week.

Football in the state of Texas is legendary. Many a superintendent in the state has lost his or her job, not because their academic ratings were poor, but because a coach’s win/loss record on the gridiron was not sufficient. The debate over extracurricular activities and their impact on student success has raged in boardrooms and teachers’ lounges across the state and perhaps the nation for decades. Millions of dollars in district funds and countless amounts of booster club monies are spent on football every year. In this era of declining state funding and increasing academic accountability, however, it is imperative that school districts examine every program and decide whether or not the cost of the program merits the funds that are being expended. Although many districts consider athletics to be a sacred cow, some districts are in such dire financial straits that no program, not even football, is safe from budgetary reductions. Perhaps this is the time to shine an even brighter light on the effect football has on high school students’ success. The effects of football can be examined quantitatively in two areas—student behavior, as measured by attendance and discipline, and student performance, as measured by standardized test scores.

Student Behavior

Positive or negative student behavior can be gauged by examining various factors, including attendance rates and discipline records. Attendance and dropout rates illustrate the extent that students are engaged in school. Positive behavior can be associated with higher attendance rates and lower numbers of discipline referrals, while negative student behavior has been associated with low attendance rates and higher numbers of discipline referrals. Extracurricular activities such as sports are tools that schools often employ to try keep student engaged in school. Although research has indicated some negative behaviors associated with team sports, overall the evidence indicates participation by students in team sports has a positive influence on student behavior.

Positive influences on student behavior that can be attributed to extracurricular activities such as team sports include building relationships and school identification. One way that students stay engaged in school is by building relationships with their teachers, coaches, and peers. Team sports, such as football, increase a student's sense of belonging and have been shown to have a pronounced effect on helping students to stay in school (Jordan, 1999). Students who participate in sports are more likely to identify with school and be more engaged (Marsh, 1993) and have more positive attitudes toward school (Rees, Howell, & Miracle, 1990). Team sports can influence the way young men make value based decisions, follow rules, gain positive role models and deal with peer pressure, which are all contributing factors to how they behave both in and out of school (Steinfeldt, Rutkowski, Vaughan, & Steinfeldt, 2011).

Although the research literature on negative in-school impacts of participation in athletics is scant, some studies have suggested that participation in sports or students' self-identification as athletes has a negative impact on the behavior of young adults in general (Fisher, Juszczak, Friedman, & Fisher, 1996). For example, identification as an athlete may lead the students to participate in acts of juvenile delinquency (Gardner, Roth, & Brooks-Gunn, 2009) or result in a higher incident of alcohol use (Barber, Eccles, & Stone, 2001). Increased aggression and irritability may also be negative by-products of participation in team sports specifically, such as football (Rees et al., 1990), while other negative influences on student behavior associated with sports participation include the increased use of steroids and unhealthy weight loss or gain (Fisher et al., 1996).

Academic Success

Accountability has become the most hated word in education today. Educators live and die by test scores and accountability ratings that are assigned to campuses and districts by state regulatory agencies. Therefore, it is impossible to evaluate a program without taking into consideration the effect it has had on student achievement as measured by standardized state testing. Participation in team sports in the 10th and 12th grades was linked to a small but consistent positive correlation in student math scores (Broh, 2002). For high school boys, participation in team sports was an additional predictor of academic success not found in the female participants (Fox, Barr-Anderson, Neumann-Sztainer, & Wall, 2010). The positive link between sports and academics may even be stronger for economically disadvantaged and minority students (Rosewater,

2009). The success in school attributed to participation in extracurricular activities may also extend beyond high school and into college (Marsh & Kleitman, 2003). If the correlation holds true, that participants are more successful in college, participation in extracurricular activities becomes even more important as schools are being held accountable for the college readiness and college success of their graduates. Examining athletic participation through the lens of potential impact on academic success is paramount in the light of increasing accountability and new standards.

Other Contributing Factors

Positive outcomes in academics, such as more positive student behavior, improved attendance, lowered dropout rates, engagement in school, and increased academic success have been related to participation in sports and extracurricular activities (Eccles, Barber, Stone, & Hunt, 2003; Feldman & Matjasko, 2005). What makes this an area of interest is whether the results that were generated were specific to the sport's influence on the student or to the student who participated in the sport. Higher achieving students are more likely to participate in sports early in their educational careers, although lower-achieving students join in later, but by high school, participation rates dwindle and only the highest performing students remain in the programs (Videon, 2002). In order to answer research questions, it is important to understand the factors that influence students to participate in sports and whether or not these are the same factors that might also influence academic success (Eitle & Eitle, 2002). Simply stated, a strong possibility exists that these same students would have been just as successful even if they had not participated in sports.

Specific Problem

Santa Gertrudis Academy High School (SGAHS) is a small high school located in Kingsville, Texas. The school, which opened for the 1994-95 school year, was started as a partnership between two school districts: Santa Gertrudis Independent School District (SGISD) and Driscoll Independent School District (DISD). These two PreK-8 districts founded the high school in order to provide a small and nurturing learning environment for their high school students. When SGAHS opened, a limited number of extra-curricular activities were offered to students. These activities included academic competitions such as debate, number sense, and literary events. Sports were also offered in the first few years, including basketball and volleyball. Football was not introduced to the school until the 2007-08 school year.

Football is a sport that requires dedication from its athletes and coaches and resources from the school district. A number of studies have been done to measure the impact of football and other team sports on student achievement. Team sports have been shown to have positive correlations to student achievement (Fox et al., 2010), but not all of the research is positive; conversely, some studies suggest that the link between football and academic achievement is negative (Eitle & Eitle, 2002; Gardner et al., 2009). The majority of the studies have focused on the students who actually participated in a sports-related activity or another type of physical activity. There do not appear to be any studies that examined the effect that the introduction of a team sport, and more specifically football, has had on the entire population of a school.

Issue to be Investigated

Football has been a controversial, and at times inflammatory, topic in many schools. The controversies surrounding the establishment of a football program at SGAHS have given rise to concerns about student behavior and student performance. Therefore, I chose to investigate the outcomes after football was instituted.

Justification and Purpose

The decision to implement a football program was not lightly made by the administration and Board of Trustees of SGISD. The district is dedicated to providing students with a quality-learning environment and to improving student success. Additional programs, especially ones that are costly, should enhance the quality of educational offerings and motivate students to do better in school.

In April 2006, I was chosen by the SGISD Board of Trustees to lead the district. The members of the board set two goals for me when I was hired. The first goal was to improve the instructional facilities of the elementary and high schools. The second goal was to facilitate improvement of the high school in relation to the state accountability standards. At that time in Texas, students were required to take a series of standardized tests known as the Texas Assessment of Knowledge and Skills (TAKS). The tests were administered in the 9th, 10th, and 11th grades for high school students. Students were required to pass the tests in the 11th grade in order to graduate, but all tests that were given counted in determining the accountability rating of the campus and the district.

At that time there were areas of the tests in which the SGAHS students were in danger of not meeting the state standards; only 55% of the freshman and 51% of the

sophomores had passed the mathematics TAKS for the 2004-05 school year. The 2005-06 school year passing rates for freshman and sophomores in mathematics were 47% and 57%, respectively. In 2006-07, the freshman passing rate for the mathematics TAKS was 60%, and the sophomore mathematics-passing rate was 67%. In 2007-08, scores continued to improve at a rate that merited further investigation. As an instructional leader, it was important to me to understand what could have impacted the scores positively and how the score improvement could be replicated.

Considering that the 2007-08 school year was the first year that SGAHS had a football program, the possibility of a correlation between implementation of football and the rising test scores was very interesting. Aspects of student behavior, such as attendance and discipline, also needed to be examined for possible improvement. As I looked at the research, several important concepts began to emerge. One concept is that of student engagement—the relationships that students develop with their peers and coaches as a function of being part of the team—and how that affects their achievement (Broh, 2002). The link between extracurricular activities and adolescent self-image is also an important issue that can affect achievement (Guest & Schneider, 2003). Participation in sports has also been positively linked to student achievement on standardized tests and to post high school success (Marsh, 1993).

The question of whether the football program has had a negative or a positive impact on the school in general has been a topic of discussion at school board meetings, administrator meetings, and informal meetings with the community and stakeholders. When SGAHS was established, the primary mission was academics, although some team

and individual sports and activities were offered. Previous boards and administrations had discussed the possibility of adding football, but concerns about cost and deviating from the mission of academics had outweighed the possible benefits of the program's addition. The board and administration took a risk by moving forward with the football program despite the concerns that had been raised in the past. It became important to determine whether this decision had been a beneficial one for the campus and the district.

This research is unique to SGAHS because the football program was recently established. The majority of schools with football programs have had them for many years. Given the recent implementation of the program, data was available on how students were performing before the program was implemented and can be compared to the same type of data generated since the program has been in place. Extant data from the district included test attendance records, discipline records, and standardized test scores.

The purpose of the current study was to determine the effect football had over the last five years on SGAHS student attendance, discipline, and standardized test scores. This was achieved by comparing achievement data at the school before and after football was instituted—taking into account other variables that might have also contributed to such change.

Research Questions

The following questions will provide the overarching context for the examination of the extant data.

1. Has student attendance changed since the football program was implemented?
2. Has the number of discipline referrals changed since the football program was implemented?
3. Have standardized test scores changed since the football program was implemented?

Hypotheses

Based on the proposed research questions, the researcher proposes the following hypotheses:

- H1. Overall student attendance at SGAHS increased for the 2007-08 school year as compared to the 2006-07 school year as a result of the implementation of the football program.
- H2. The number of discipline referrals for the 2007-08 school year decreased as compared to the 2006-07 school year as a result of the implementation of the football program.

H3. Standardized test scores for all students increased for the 2007-08 school year when compared to the 2006-07 school year because of the implementation of the football program.

Limitations and Delimitations

The limitations of this study are related to the uniqueness of starting a football program, which is a rare event in schools in Texas. Football has been an integral part of most schools for decades; therefore, there is not a great deal of baseline data to compare before and after the implementation of a football program. The studies examined in the literature focused on team sports as a group or in a larger group of extracurricular activities in general, not just sports.

CHAPTER II

LITERATURE REVIEW

Introduction

In this chapter information regarding existing literature on the links between extracurricular activities and student behavior and performance was reviewed. The literature was reviewed in three categories: student attendance, student discipline, and academic performance.

Attendance

School attendance is important because of the link between attendance and learning. Research has shown a statistically significant positive link between attendance of students and their achievement as measured by state standardized tests; the more time students spend in school, the better their test scores (Roby, 2003). Similarly, Gottfried (2010) established a strong positive correlation between student attendance and grades. Passing courses and gaining credits in high school are extremely important to the success or failure of a high school student, especially during the freshman year. Students' ability to pass their courses is linked to their attendance; Balfanz and Byrnes (2012) noted that excessive absences at any time in the school career can diminish a student's possibility of academic success. Good attendance increases the opportunity for students to learn and to be more successful in school. Attendance, beginning as early as a student's freshman year, is a powerful indicator of how likely a student is to drop out of school. Attendance maybe even more powerful indicator than test scores (Allensworth & Easton, 2007).

Governmental agencies have recognized that attendance is important to students' educational success. Therefore, formulas for accountability ratings and school finance systems are tied to attendance. Federal guidelines under the No Child Left Behind (NCLB) Act require school districts to report participation rates in testing and publish attendance rates as part of the annual reporting component of NCLB (Railsback, 2004).

In Texas, the Texas Academic Performance Report (TAPR) uses attendance in the calculations for distinctions in areas of academic performance (Texas Education Agency, 2014). The attendance rate required for a school to achieve these distinctions is based on its comparison to other campuses in the designated comparison group (Texas Education Agency, 2014). Formulas are used to calculate the amount of funding that districts receive; attendance is a part of almost all of these calculations across the nation. In the state of Texas, current levels of funding for schools are based on Weighted Average Daily Attendance (WADA). The formula for calculating WADA is the number of students who attend school each day as an average of all of the days in the school calendar divided by the number of students who attend (Texas Education Agency, 2014). Different weights for funding are applied to certain groups of students such as those enrolled in special education or in Career and Technology Education (Texas Education Agency, 2014).

Administrative Responses

School districts are incentivized to increase student attendance because it is directly tied to the amount of money that a district receives (Ely & Fermanich, 2013). School administrators have tried to find ways to improve attendance and student engagement. Traditional approaches include rewarding students for coming to school, negative consequences for missing school, and the use of judicial systems to enforce compulsory attendance laws (Railsback, 2004). Programs effective in increasing attendance have been found to share a few common factors, such as a supportive staff, a positive school climate, strong teachers, and dedicated administrations (Railsback, 2004). These types of programs are aimed at keeping students in school.

School Identity and Social Status

Other programs, such as extracurricular activities, improve the feeling of belonging at school. Students who participate in extra-curricular activities are more likely to feel connected to their school, and students who participate in two or more types of activities, such as fine arts and sports, report higher rates of engagement (Knifsend & Graham, 2012). Participation in sports increases school attachment, and the student athletes are less likely to skip school (Eccles & Barber, 1999). Football, for example, is a sport with a high level of recognition (Hartnett, 2007). Students who play football are more likely to have a better social status in school, and students with higher social status have more engagement with their school (Hartnett, 2007). Strengthening the bond between the student and the school and elevating the social status of students helps to improve school attendance (Morgan, 2013).

Discipline

In order to insure that schools are a desirable place in which teachers can effectively provide instruction, student behavior should be viewed as a crucial element (Flannery, 2011). Poor behavior can also be associated with poor academics, which is another reason for schools to find ways to promote positive student behavior (Morgan, 2013). Students who do not follow the rules and violate the school code of conduct are often suspended from school, which results in lost learning time and is not an effective method of promoting positive behavior (Fenning, 2011).

Federal and state accountability standards are also based on the number and type of discipline issues that occur on a campus. Under NCLB guidelines, schools are rated on the number of minority or special education students that are placed in disciplinary settings such as In-School or Out of School Suspension; this statistic is part of the Performance-Based Monitoring Analysis System (PBMAS). In the state of Texas, each year schools are required to report at an annual public hearing their academic results, as well as the number of violent or criminal offenses (Texas Education Agency, 2014). A new aspect for accountability and school rankings, independent websites such as Niche (www.niche.com) score schools based on factors that include safety (Niche, 2015).

School administrator's work diligently to find ways to improve student behavior. Extracurricular activities can have a positive influence on students who might engage in high-risk behavior (Cohen, Taylor, Zonta, Vestal, & Schuster, 2007). Greater adjustment to school and increased self-esteem were reported from engagement in

different types of extracurricular activities, including community service groups and team sports (Fredricks & Eccles, 2006).

Test Scores

In an effort to measure the progress of students, schools have used some type of test or testing system for decades. With the use of test scores as a political and economic tool, however, testing and scores have taken on a much greater meaning for schools and school districts (Parkison, 2009). The federal government through NCLB and the reauthorization of Title I requires every state to use some type of standardized testing and to report the scores from those tests to the public (Hong & Youngs, 2008). High stakes testing has become an inextricable part of our culture and is based on the competitiveness of American society (Nichols & Berliner, 2008). Due to the pressure of federal accountability, states also use their own testing programs to determine accountability, such as the STAAR tests, which are used in the Texas state accountability ratings (Texas Education Agency, 2014).

While schools have used classroom strategies, remediation programs, and instructional programs to help boost test scores, the current review of literature focused on the impact of extracurricular activities and physical activity, including sports, on student achievement as measured by test scores. Adding some type of physical activity to the school day can enhance academic performance (Rasberry et al., 2011).

Camp (1990) concluded that there was “at least a symbiotic relationship” (p. 278) between participation and achievement. Math and science scores were examined in 12th graders participating in sports, and a rise in scores was reported for participants while non-participants scored lower on their tests (Lipscomb, 2007). A study in New Zealand associated participation in team sports with a rise in test scores on literacy tests (Shulruf, Tumen, & Tolley, 2008), while an Irish study concluded that participation in sports significantly raised test scores on exams needed for graduation, known as Leaving Certificates (Bradley, Keane, & Crawford, 2013).

Many of the lowest achieving students on standardized tests are students who are economically disadvantaged (Baker & Johnson, 2010). Schools may take resources away from higher achieving students to help remediate lower achieving students, thus reducing opportunities for students who could be high achieving (Krieg, 2008). A study by Marsh and Kleitman (2002) suggested that the involvement of student in extra-curricular activities may close the achievement gap between economically disadvantaged students and their non-economically disadvantaged peers.

This same study also suggested that extra-curricular activities “complement rather than compete” (p. 508) with traditional school programs.

Conclusion

The literature analyzed in this review points the researcher in the direction of a positive relationship between sports and student behavioral and academic outcomes. Although the effects were small, they were consistent in a study by Fejgin (1994) students who are more involved in competitive sports have more locus of control and fewer discipline problems, along with higher grades, a better self-concept, and aspirations for higher education. Sports and education are entwined, and the participation in sports by students has a small but consistent relationship with participation and academic achievement (Jordan, 1999).

CHAPTER III

METHODS

A quantitative approach was utilized for this study to evaluate the impact of the implementation of the SGAHS football program on student behavioral and academic performance outcomes. Quantitative data supplies the researcher with data or evidence that can be tested using proven methods.

The following three research questions were proposed for this study:

- (1) Has student attendance changed since the football program was implemented?
- (2) Has discipline changed since the football program was implemented?
- (3) Have standardized test scores changed since the football program was implemented?

Data Sources

The quantitative data used for this study were extant student data from the 2006-07 and 2007-08 school years. This chapter presented student demographics, a description of the extant data, and the methodologies employed to analyze the data.

Former Student Demographics

In order to be included in the former student category, a student had to have been enrolled from the first day of school until the date standardized tests were administered to the student population for the 2006-07 school year, the 2007-08 school year, or both school years. Of the 228 former students that met study criteria, 121 were female and 107 were male. Of those 228 students, all but 92 qualified for free or reduced lunch

pricing. There were 30 students who received reduced priced lunches and 106 students who had free lunch status. Student ethnicity included 4 Asian/Pacific Islander students, 1 African-American student, 47 White students, and 176 Hispanic students.

Quantitative Data

The data for this study were extant data collected about the former students of SGAHS who were present during the transition to school football. The data used for analysis were student attendance, student discipline referrals for code of conduct violations, and student standardized test scores. Student attendance was reported in number of days absent, student behavior was reported as number of code of conduct violations recorded, and test scores were reported in raw score form.

Types of Data Collected

The three types of data were extracted from the student information management system owned by Santa Gertrudis ISD. This system is the Texas Enterprise Information System (TxEIS). This system interfaces with the Pupil Education Information Management System (PEIMS) database, which was a statewide database managed by the Texas Education Agency.

Student Attendance Data

Attendance data is collected daily at 9:50 a.m. Each teacher entered student attendance information into a computer program, which was then electronically transferred to the attendance clerk who verified the attendance record at the end of each day. Students were required to provide written documentation for the reason of their absence to the in order for an absence to be excused. Students who did not have written

documentation or who missed school with the permission of the school and their parents were considered to have an unexcused absence. There were three conditions under which a student can miss the designated attendance collection time and still have been considered present. The first was a medical appointment for which they had a note from a doctor and the student attended school at least some part of the school day. The second was for an appointment with a court and they had attended school at least some part of the school day. The third condition is that of extra-curricular absences. These absences were for school-sanctioned events such as contests or athletic events. For the purposes of this study, student attendance data were collected based on only excused and unexcused absences for whole school days and excluded these three conditions.

Student Discipline Data

A teacher and/or principal created discipline referrals to document an infraction of the Student Code of Conduct. Each discipline referral was coded by the type of infraction, the date of the infraction, and the type of consequence and assigned to the student who committed the act. These records were entered in the TxEIS system. For this study, the number of referrals per student was counted. The referrals were not designated by severity or type of infraction or consequence.

Standardized Test Data

High stakes testing was a component of the system used to rate schools and school districts in the state of Texas. Data collected for this study came directly from testing results for the Texas Assessment of Knowledge and Skills (TAKS). The tests for high school students in the state of Texas for the 2006-07 and 2007-08 school years

included a 9th grade reading test and mathematics test; 10th grade English language arts test, social studies test, science test, and math test; and exit level English language arts test, social studies test, science test, and math test. In order to graduate from high school, students had to pass the appropriate exit level test. Different forms of the test were available for students who met either a certain criteria for language deficiency or a qualification for special education due to a learning disability.

Validity and Reliability

The Texas Education Agency (TEA) was the governmental entity assigned with the task of developing, implementing, and overseeing the grading of the TAKSs in the state of Texas. The TEA contracted the Pearson Company to produce, distribute and grade the tests. State educators reviewed the TEKS to determine which expectations would be measured by the TAKS. These expectations were then divided into categories labeled as objectives. Testing maps, or blueprints, were developed that identified the number and types of questions that would be on each assessment. In 2001, item writer guidelines were developed and implemented for those who were employed to write the test questions. The State Board of Education (SBOE) adopted performance standards recommended in 2003 by panelists appointed by the TEA. Items for the test had been field tested from 2003-07, either as standalone field tests or as imbedded test questions in other assessments. The TAKSs were administered in a one-day format in accordance with a testing calendar set forth by TEA. Performance standards were set after the students had been administered the exams and were based on review of the content of the exam. Performance standards were set separately for each test and each grade level.

In order to ensure the tests' level of difficulty was maintained from year to year, pre and posttest equating was performed on each test (The Texas Education Agency , 2010).

A systematic approach was used to develop the tests to ensure that the results were valid and reliable. Validity refers to whether or not a question is correctly structured to reflect the content on which it was based and to illicit answers reflective of that content. Another aspect of validity was that there were not any groups of test takers that may have been unable to answer a question or disadvantaged in some way. To measure the validity of the TAKS, the state drew from several sources. The content process was verified that the questions being asked actually covered the correct content and aligned with the state curriculum. The response process analyzed the types of responses collected on field tests and tested items. Responses were collected on an on-going basis. Internal structure processes were used to determine the homogeneity of the test questions. Test responses of student groups were compared to see if all types of students could answer all the questions without a certain group scoring below the criterion. The questions and responses were also measured against other measures such as how Texas students did on other national norm-referenced tests. The last type of measure of validity was based on the consequences of testing. Surveys were used to help determine if the testing had an impact on instructional practices. Reliability was determined by using two separate mathematical formulas. For questions with only one possible answer the Kuder-Richardson 20 (KR20) test and for questions with partial credit or multiple answers the stratified coefficient alpha test was utilized.

Data Analysis

Quantitative data for this study were analyzed using descriptive statistics. Effect sizes were also calculated, characterizing the magnitude of the differences to describe the spread and estimate the center in order to better explain and explore the data. These statistical measurements were imperative to determine whether or not the sample diverged from the population in a meaningful way. For this this study Alpha was = .05.

Null hypothesis testing was used to test a hypothesis or test a predication. Since it was almost impossible to test multiple sources on multiple occasions, the null hypothesis predicts the impact or difference between two groups that received the same treatment or experienced the same phenomenon. If the null hypothesis failed to be rejected, there will be no change in the outcome other than that of chance. Paired *t*-tests were used to compare two related means and calculate effect size estimates were calculated to provide evidence of practical significance. There were several benefits of using effect size when analyzing data. Although the use of null hypothesis testing tells the researcher and his or her audience whether or not a treatment or phenomenon had an effect greater than chance, it does not measure the size of the effect. The use of effect size gave the researcher and the audience a greater understanding of the magnitude of the practical importance. The use of effect sizes in research allowed for more stringent testing of the theory that was being studied (Capraro, 2004). The researcher illustrates a greater understanding of the treatment between the two groups when both the statistical significance (*p* value) and effect size were reported in the results of the study (Sullivan & Feinn, 2012). Graphical interpretations of data did allow for more insightful analysis of confidence intervals instead of a more traditional methods of accepting or rejecting

the null hypothesis (Cumming, 2008).

For this study, effect sizes were calculated using Cohen's d . This method was used when comparing two groups such as the results of a sample t -test. The use of Cohen's d allowed the researcher to interpret the results of the data in a more specific manner, rather than just as a dichotomous decision of reject or fail to reject the null hypothesis. The researcher could identify the effect as being small, medium or large relative to other studies. In the formula $M1$ and $M2$ represent the mean for each group and SD represented the average of the two standard deviations, $SD1 + SD2/2$. This was only true if there was the same number of participants in each group. If the groups had a different number of participants, the formula would require a pooled standard deviation. The difference of the means was divided by the average of the standard deviations or the pooled standard deviation in order to calculate the effect size, which was d . After the effect size was determined the researcher could then draw conclusions regarding the effect of the treatment that was responsible for the effect size, whether it was small, medium, or large and in which direction. The magnitude of the effect could have been interpreted from the relative position based on a normal curve.

CHAPTER IV
ANALYSIS AND RESULTS

Introduction

This chapter contains the results of the analyses used to determine the impact of the football program's implementation on SGAHS in regard to student behavioral and academic outcomes. The following research questions were utilized in this research:

1. Has student attendance changed since the football program was implemented?
2. Has the number of code of conduct violations changed since the football program was implemented?
3. Have standardized test scores changed since the football program was implemented?

Attendance

In order to calculate the effect that the implementation of a football program had on attendance at SGAHS, the number of days of school missed per student was collected for each group for each of two distinct years: the 2006-07 school year and the 2007-08 school year. Using this data, the formula for calculating Cohen's d was applied. For the 2006-07 school year, the mean number of days was 5.421 days, which was less than the mean for the 2007-08 school year, which was 6.8 days. For the same two groups, the standard deviation was also calculated. The standard deviation for the 2006-07 school year was $SD = 6.9122$ days, which was less than the standard deviation for the 2007-08 school year, which was $SD = 10.298$ days.

A *t*-test was conducted in order to determine statistical significance of the adoption of the football program on student attendance. There was a statistically significant difference in attendance before and after the adoption of a football program at SGAHS. Unfortunately, truancy increased the year that football was adopted. There was a difference of the means of 1.5 more absences per student in 2007-08 than in 2006-07. The Cohen's *d* effect size was -.167, which indicated that there were more absences, and the result was an indication of practical significance. Data from the *t*-test are presented in Table 1.

Table 1

Contrast of Days Absent from School for the 2006-07 and 2007-08 School Years

Variable	2006-07		2007-08		<i>t</i>	<i>p</i>	95% CI		Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			LL	UL	
Absences	5.421	6.912	6.86	10.298	-2.052	.000	-2.811	-.0571	-.167

Note. M=Mean, SD-Standard Deviation, CI-Confidence Interval, LL-Lower Limit, UL-Upper Limit

To compare the total number of days missed from the 2006-07 school year to the 2007-08 school year, refer to Figures 1 and 2 (see pages 27 and 28).

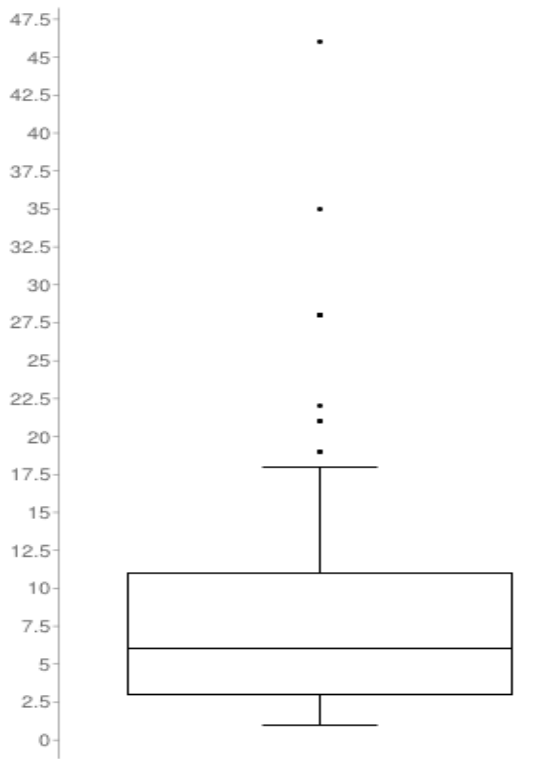


Figure 1. Number of days absent for 2006-07.

The box and whisker plot in Figure 1 illustrates the number of days missed by students who had at least one absence for the 2006-07 school year. Of the total number of records analyzed, there were 228 matched student records of which 157 had at least one absence. The mean number of absences was represented by the centerline of the box and whisker plot (Figure 1). The mean for this data set was six absences per student who missed at least one day of school. The protruding lines, or whiskers, represented the first and fourth quartiles. The median number of the first quartile was three absences per student who missed at least one day of school, and the median number of the third quartile was 11 absences per student who missed at least one day of school. The dots on the plot signify the outliers, which represented students with higher than normal

absences. The outliers for this plot were all located in the fourth quartile. In this case, there were 11 outliers with absences ranging from 19 to 46.

The box and whisker plot in Figure 2 presents the absences per student who had at least one absence for the year.

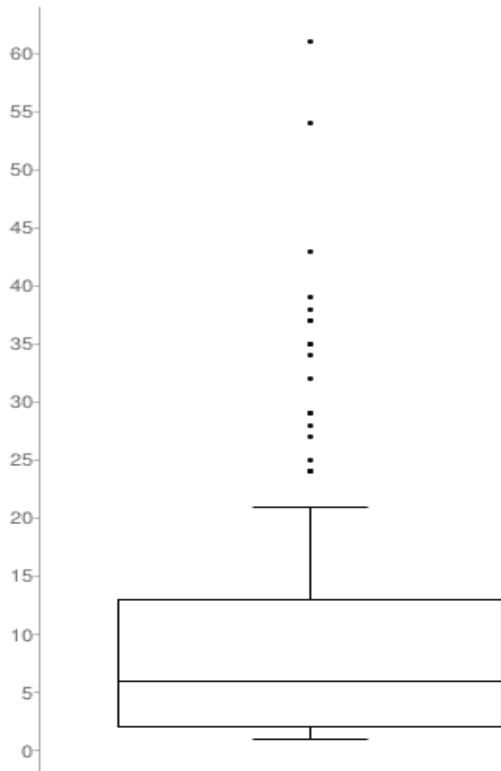


Figure 2. Number of days absent for 2007-08.

The box and whisker plot in Figure 2 illustrates the number of days missed by students with at least one absence for the 2007-08 school year. Of the total number of records analyzed, there were 228 matched student records of which 156 had at least one absence. The median number of absences was represented by the centerline of the box and whisker plot (Figure 2). The median number for this data set was six absences per student who missed at least one day of school. The whiskers represented the first and fourth quartiles. The median number for the first quartile was two absences per student who missed at least one day of school, and the median number of the third quartile was 13 absences per student who missed at least one day of school. The dots on the plot represented outliers. The outliers for this plot were all located in the fourth quartile. The outliers represented students with higher than normal absences. In this case, there were 19 outliers with absences ranging from 24 to 61. If the outliers were removed, the number of days missed would shift in a more positive direction.

From these figures, there were two observations related to the research question. The first observation was that there seemed to be a large number of instructional days that were missed by all of the students represented in these plots during both years. The second observation was that in the 2007-08 school year, there were more instances of students with a higher numbers of absences than there were during the prior year.

Four comparisons were used to examine the differences in absences between the year before the adoption of football (Year '07) and the year of adoption (Year '08). The number of days missed in Quartile 1 was three for Year '07 and two for Year '08. For Quartile 3, the median number of days missed for Year '07 was 11, and median number of days missed for Year '08 was 13. The median number for Year '07 was six, and the median number for Year '08 was six. There were 11 outliers for Year'07 ranging from 19 to 46 absences each. There were 19 outliers for Year'08 ranging from 24 to 61 absences each. The conclusion that can be drawn from these comparisons was that the majority of the students in Year'08 had fewer absences, which resulted in the drop in absences in Quartile 1. However, as illustrated by the outliers, there were more individuals with a greater number of absences, which caused the median number for the two years to stay the same.

Further examination of the data involved removing the outliers from the attendance data for both years. Figures 3 and 4 represent the data without the outliers for comparison purposes (see pages 31 and 32).

The box and whisker plot in Figure 3 illustrates the number of days missed by students with at least one absence for the 2006-07 school year with the outliers removed. The outliers that were removed were 11 outliers with absences ranging from 19 to 46.

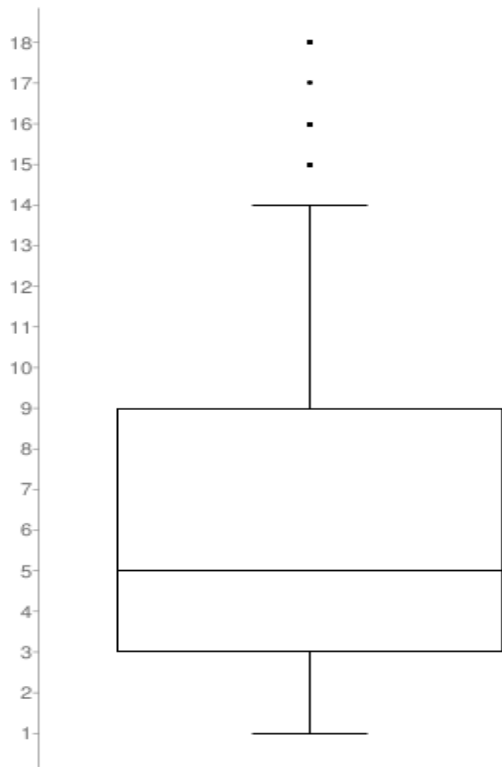


Figure 3. Number of days absent for 2006-07 without outliers.

Of the total number of records analyzed, there were 228 matched student records of which 146 were analyzed in this figure. The number of absences was represented by the centerline of the box and whisker plot (Figure 3). The median number for this data set was five absences per student who missed at least one day of school. The whiskers represented the first and fourth quartiles. The median number for the first quartile was three absences per student who missed at least one day of school, and the median number of the third quartile was 9 absences per student who missed at least one day of school. The dots on the plot represented the new outliers. The outliers for this plot were all located in the fourth quartile. The outliers represented students with higher than normal absences. In this case, there were 13 outliers with absences ranging from 15 to

18. The result was reduction in absences in the first and fourth quartile as compared to the data including the original outliers.

The same process was repeated for the 2007-08 school year. The data were re-examined without the original outliers. This data were represented in Figure 4.

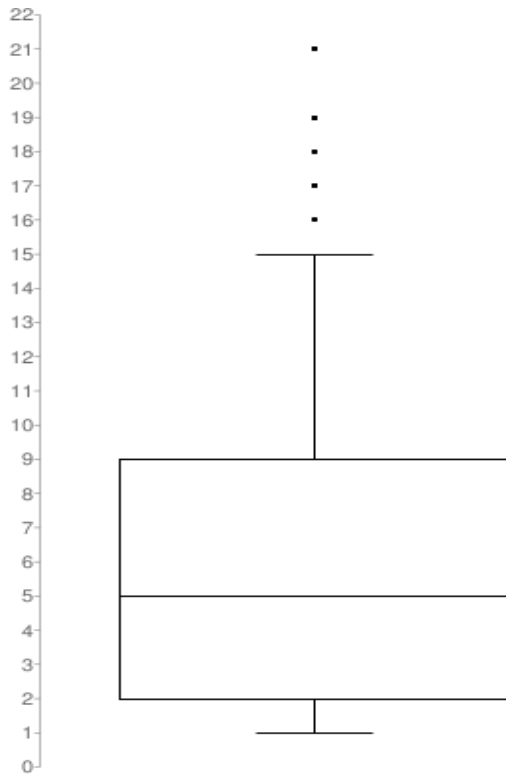


Figure 4. Number of days absent for 2007-08 without outliers.

The box and whisker plot in Figure 4 illustrates the number of days missed by students with at least one absence for the 2007-08 school year with the outliers removed. There were 19 outliers that were removed with absences ranging from 24 to 61. Of the total number of records analyzed, there were 228 matched student records of which 142 were analyzed in this figure with the outliers removed. The median number of absences

was represented by the centerline of the box and whisker plot (Figure 3). The median number for this data set was five absences per student who missed at least one day of school. The whiskers represented the first and fourth quartiles. The median number for the first quartile was two absences per student who missed at least one day of school, and the median number of the third quartile was 9 absences per student who missed at least one day of school. The dots on the plot represented the new outliers. The outliers for this plot were all located in the fourth quartile. The outliers represented students with higher than normal absences. In this case, there were 14 outliers with absences ranging from 16 to 21. The result was reduction in absences in the first and fourth quartile as compared to the data including the original outliers.

Several observations were made based on the adjusted data. Without the outliers, the difference in absences between the two years was minimal. In the first quartile there were actually fewer absences in the year in which football was adopted as compared to the year before the adoption of football. In the third quartile, the number of absences was the same at 9. It was interesting to note that only one of the original outliers was a football player. This young man missed a great number of days due to a medical condition that he developed that was not related to football. The other outliers were not football players; most were females with a few males. Some of the females were receiving pregnancy related services. The conclusions from the adjusted data were that football had a minimal impact on attendance with some slight positive impact.

Referrals for Code of Conduct Violations

In order to calculate the effect of the adoption of football on student behavior, the number of referrals for code of conduct violations was collected. These referrals were not ranked or disaggregated by offense or consequence. The referrals ranged from tardies to fighting on campus and other offenses. For the 2006-07 school year, the mean was .724 referrals, which was less than the mean of the 2007-08 school year, which was .956 referrals. For the same two groups, the standard deviation was also calculated. The standard deviation for the 2006-07 school year was $SD = 1.8627$ referrals, which was less than the standard deviation for the 2007-08 school year, which was $SD = 2.1828$ referrals.

In order to determine statistical significance of the impact of the adoption of football on discipline, a t -test was conducted. There was a small but statistically significant difference in the number of discipline referrals before and after the adoption of football. Unfortunately, discipline referrals increased slightly the year that football was adopted. The difference of the two means was -.232 more referrals per student in 2007-08 than 2006-07. The effect size was $d = -.1147$, which indicated that there were more discipline referrals, and the result was an indication of practical significance. Data from the t -test are presented in Table 2.

Table 2

Contrast of Number of Code of Conduct Violations for the 2006-07 and 2007-08 School Years

Variable	2006-07		2007-08		<i>t</i>	<i>p</i>	95% CI		Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			LL	UL	
Discipline	.724	1.8627	.956	2.1828	1.393	.165	-.5612	.0963	-.1147

Note: M=Mean, SD-Standard Deviation, CI-Confidence Interval, LL-Lower Limit, UL-Upper Limit.

To compare the total number of referrals for code of conduct violations from the 2006-07 school year to the 2007-08 school year, refer to Figures 5 and 6.

The box and whisker plot in Figure 5 illustrates the number of referrals for student code of conduct violations issued to students who had at least one absence in the 2006-07 year. Of the total number of records analyzed, there were 228 matched student records of which 58 had at least one referral. The median number of code of conduct violations was represented by the centerline of the box and whisker plot (Figure 5). The median number for this data set was two referrals for code of conduct violations per student. The whiskers represented the first and fourth quartiles.

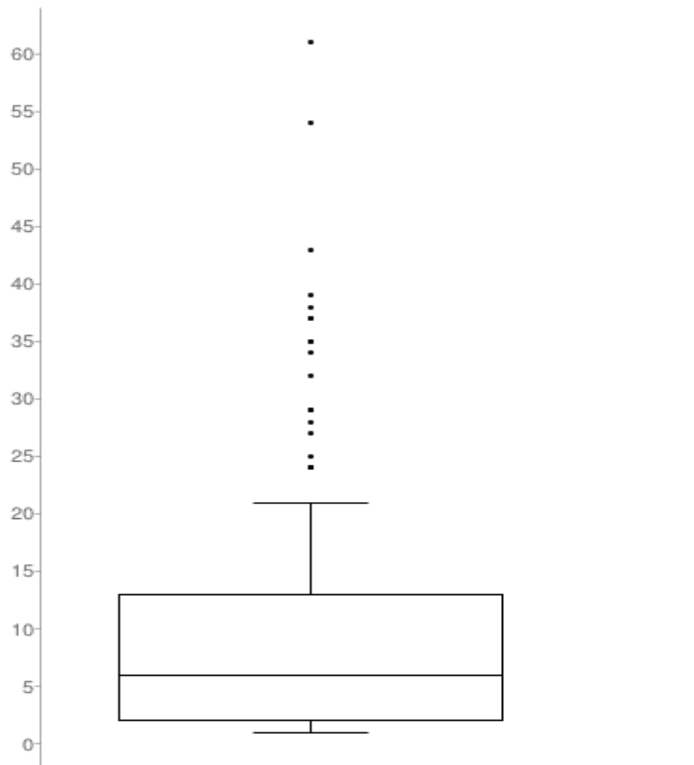


Figure 5. Number of referrals for student code of conduct violations for 2006-07.

The median number of the first quartile was one referral for code of conduct violation per student who had at least one referral, and the median number of the third quartile was 4.25 referrals for code of conduct violations per student who had at least one referral. The dots on the plot represented the outliers. All five of the outliers for this plot were located in the fourth quartile. The outliers represented the students with an above average number of referrals. In this case, the outliers ranged from seven referrals to 16 referrals.

The box and whisker plot in Figure 6 represented the referrals for code of conduct violations per student for students who had at least one referral for the year for 2007-08.

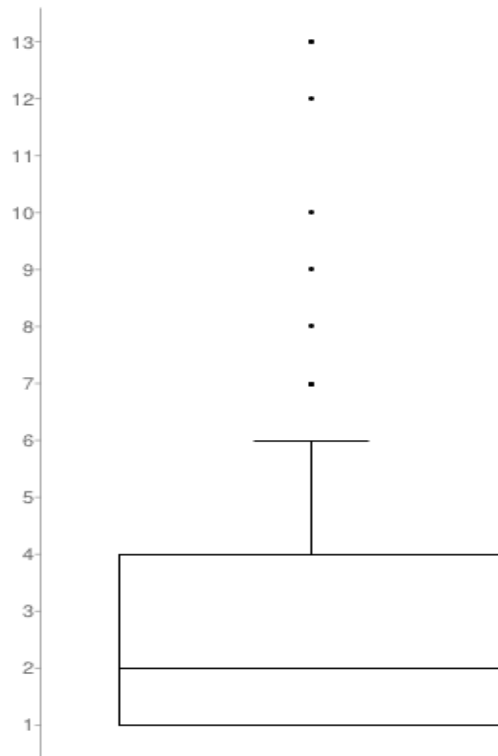


Figure 6. Number of referrals for student code of conduct violations for 2007-08.

The box and whisker plot in Figure 6 illustrates the number of referrals for code of conduct violations per student who had at least one referral. Of the total number of records analyzed, there were 228 matched student records of which 70 had at least one referral for code of conduct violation. The median number of code of conduct violations was represented by the centerline of the box and whisker plot (Figure 6). The median number for this data set was two referrals. The whiskers represented the first and fourth

quartiles. The median number for the first quartile was one referral, and the median number of the third quartile was four referrals. The dots on the plot represented the outliers; there were nine outliers ranging from seven referrals to 13 referrals. With the outliers removed, the number of referrals for the code of conduct violations shifted in a more positive direction.

There are two observations that can be made from the graphs illustrating the number of referrals for code of conduct violations for 2006-07 and 2007-08. The first observation is that there were very low numbers of discipline referrals for the school for both years. The second observation was that in the 2007-08 school year, there were more students with a higher frequency of discipline referrals than there were during the previous year.

Four comparisons were used to examine the differences between the year before the adoption of football (Year '07) and the year of the adoption of football (Year '08). The number of referrals for code of conduct violations in Quartile 1 was one for Year '07 and one for Year '08. For Quartile 3, the number of referrals for code of conduct violations was 4.25 for Year '07 and four for Year '08. The median number of referrals for both Year '07 and Year '08 was two referrals for each student who had at least one referral for a code of conduct violation. There were five outliers for Year 2007, ranging from seven to 16 referrals for code of conduct violations. For Year '08, there were nine outliers ranging from seven to 13. The conclusion that can be drawn from these comparisons is that the two years were very similar in the number of referrals for code of

conduct violations. If the outliers were removed, it was possible that the two years would be almost identical.

Test Scores

The standardized scores for the Texas Assessment of Knowledge and Skills (TAKS) was given on an annual basis to students in Grades 3 through 12 beginning in 2003 in the state of Texas. For the purpose of this study, raw scores on the mathematics, reading/English language Arts (ELA), social studies, and science tests were collected. The data were grouped by test and by year for comparison. The formula for calculating Cohen's d was applied and compared for each set of tests. A t -test was also performed to compare and contrast the data as well as a graphical representation in a box and whisker plot for each set of data.

Mathematics

The mathematics test was given to ninth, tenth, and eleventh grade students. The test given to the eleventh grade students was known as the exit level test. All students had to pass this test in order to graduate unless they were allowed to bypass the test as a result of a decision by a special education committee and the student was receiving special education services. The raw scores for students who were enrolled at the snapshot date at the beginning of the year through the test date were used for this study. This timeframe was the same timeframe used by the state for accountability purposes.

In order to calculate the effect that the implementation of the football program had on the mathematics TAKS scores, the raw scores per student who met the timeframe for state accountability were collected in groups, each representing the two distinct

years: the 2006-07 school year and the 2007-08 school year. The formula for calculating Cohen's d was applied to the data. For the 2006-07 school year, the mean score was 35.26, which was less than the mean score of 40.95 for the 2007-08 school year. For the same two groups, the standard deviation was also calculated. The standard deviation for the 2006-07 school year was $SD = 9.858$ raw score points. The standard deviation for the 2007-08 school year was $SD = 10.3390$ raw score points.

A t -test was conducted in order to determine statistical significance. There was a statistically significant difference in the raw scores for the mathematics TAKS before and after the adoption of the football program. In the year in which football was adopted, there was a rise in raw scores. There was a difference of the two means of 5.695, which indicated a rise in test scores in mathematics. Cohen's d effect size was .564, which indicated practical significance. Data from the t -test is presented in Table 3.

Table 3

Contrast of Raw Scores on the Mathematics TAKS for the 2006-07 and 2007-08 School Years

Variable	2006-07		2007-08		t	p	95% CI		Cohen's d
	M	SD	M	SD			LL	UL	
Mathematics	35.26	9.858	40.955	10.3390	7.891	<.001	7.1271	4.252	.564

Note: M=Mean, SD-Standard Deviation, CI-Confidence Interval, LL-Lower Limit, UL-Upper Limit.

To compare the raw scores for mathematics from the 2006-07 to the 2007-08 school years, refer to figures 7 and 8.

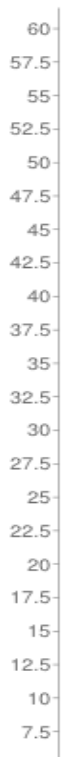


Figure 7. Raw scores for the mathematics TAKS 2006-07.

The box and whisker plot in Figure 7 illustrates the raw scores for the mathematics TAKS for the year 2006-07. Of the total number of records analyzed, there were 228 matched student records of which 127 contained raw scores for the 2006-07 mathematics TAKS. The median raw score was represented by the centerline of the box and whisker plot (Figure 7). The median score for this data set was 37. The whiskers represented the first and fourth quartiles. The median score of the first quartile was a raw score of 29, and the median score of the third quartile was a raw score of 46. The dots on the plot represented the outliers. The only outlier on the plot, which was located below the first quartile, was a raw score of 8.

The box and whisker plot in Figure 8 represented the raw scores for the mathematics TAKS for the 2007-08 school year.

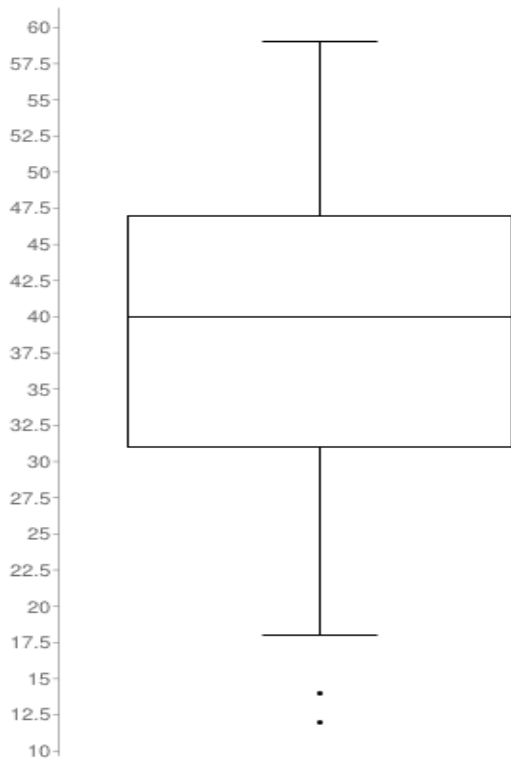


Figure 8. Raw scores for the mathematics TAKS 2007-08.

The box and whisker plot in Figure 8 illustrates the raw scores earned on the mathematics TAKS for the 2007-08 school year. Of the total number of records analyzed, there were 228 matched student records of which 137 contained raw scores for the mathematics taken in 2007-08. The median raw score was represented by the centerline of the box and whisker plot (Figure 8). The median score for this data set was 40. The whiskers represent the first and fourth quartiles. The median score for the first quartile was 31, and the median score for the third quartile was 47. The dots on the plot

represent the outliers. There were two outliers on the plot below quartile one; the outliers were 12 and 14. If the outliers were removed, the scores would have shifted in a more positive direction.

There were two observations from these figures related to the research questions. The first observation was that there were not a large number of outliers for each year. The second observation was that the scores shifted in a more positive direction in the second year.

Four observations were used to examine the difference between the year before the adoption of football (Year '07) and the year of the adoption of football (Year '08). The median raw score for first quartile was 29 for Year '07 and 31 for Year '08. For Quartile 3, the median raw score was 46 for Year '07 and 47 for Year '08. The median score for Year '07 was a raw score of 37 and a raw score of 40 for Year '08. There were very few outliers for both years. The conclusion that can be drawn from these comparisons was that there was a rise in raw scores for those years. The greatest increase was in Quartile 1 with an increase of two points and an overall increase of three points for the median.

Reading/ELA

The Reading/ELA test was given to ninth, tenth, and eleventh grade students. The reading test was only for ninth graders, while the tenth and eleventh graders took the ELA test. The test given to eleventh graders was also known as the exit level test. Students had to pass this test in order to graduate from high school unless they were allowed to bypass the test as a result of a decision by a special education committee and

the student was receiving special education services. The raw scores for students who were enrolled at the snapshot date at the beginning of year through the test date were used for this study unless they were allowed to bypass the test as a result of a decision by a special education committee and the student was receiving special education services. This snapshot date timeframe was the same timeframe used by the state for accountability purposes.

In order to calculate the effect that the implementation of the football program had on the reading/ELA TAKS scores, the raw scores per student who met the timeframe for state accountability were collected in two groups in two distinct years: the 2006-07 school year and the 2007-08 school year. Using this data, the formula for calculating Cohen's d was applied. For the 2006-07 school year, the mean was 37.51, which was less than the mean of 45.718 for the 2007-08 school. For the same two groups, the standard deviation was also calculated. The standard deviation for the 2006-07 school year was $SD = 8.25$ raw score points. The standard deviation for the 2007-08 school year was $SD = 6.1835$ raw score points.

To determine statistical significance, a t -test was used. There was a statistically significant difference in the raw scores for the Reading/ELA TAKS before and after the adoption of the football program. In the year in which football was adopted, there was a rise in raw scores. There was a difference of 8.208, which indicated a rise in test scores in reading/ELA. Cohen's d effect size of 1.14 indicated practical significance. Data from the t -test is presented in Table 4 (see page 45).

Table 4

Contrast of Raw Scores on the TAKS Reading/ELA TAKS for the 2006-07 and 2007-08

School Years

Variable	2006-07		2007-08		<i>t</i>	<i>p</i>	95% CI		Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			LL	UL	
Reading/ELA	37.51	8.25	45.718	6.1835	-10.134	<.001	-9.8232	-6.6004	1.14

Note. M=Mean, SD-Standard Deviation, CI-Confidence Interval, LL-Lower Limit, UL-Upper Limit.

To compare the raw scores from the 2006-07 school year and the 2007-08 school year please refer to Figures 9 and 10.

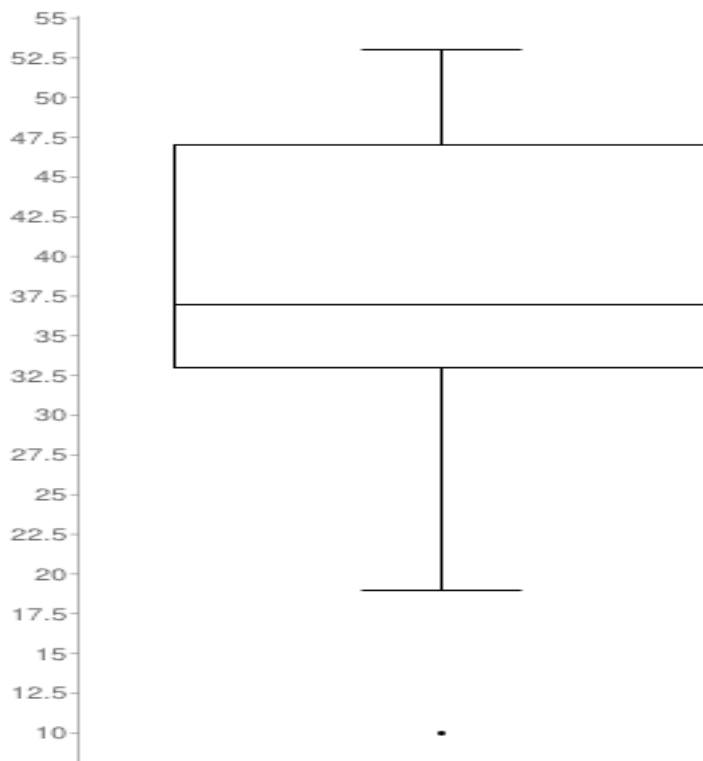


Figure 9. Raw scores for the reading/ELA TAKS for 2006-07.

The box and whisker plot in Figure 9 illustrates the raw scores on the reading/ELA test. There were 228 matched student records, and 126 of those records had a reading/ELA test score. The median raw score was represented by the centerline of the box and whisker plot (Figure 9). The median score for this data set was 37. The whiskers represented the first and fourth quartiles. The median score of the first quartile was a raw score of 33, and the median score of the third quartile was a raw score of 47. The dots on the plot represented the outliers. There was only one outlier, a raw score of 10, on the plot, and it was located below the first quartile.

The box and whisker plot in Figure 10 represented the raw scores for the reading/ELA TAKS for the 2007-08 school year. The box and whisker plot in Figure 10 illustrates the raw scores earned on the reading/ELA TAKS for the 2007-08 school year. Of the total number of records analyzed, there were 228 matched student records of which 132 contained raw scores for the reading/ELA TAKS taken in 2007-08.

The median raw score was represented by the centerline of the box and whisker plot (Figure 10). The median score for this data set was 43. The whiskers represented the first and fourth quartiles. The median score for the first quartile was 34, and the median score for the third quartile was 49. The dots on the plot represented the outliers. There were two outliers on the plot below quartile one, and the outliers were 4 and 17. If the outliers were removed, the scores would have shifted in a more positive direction.

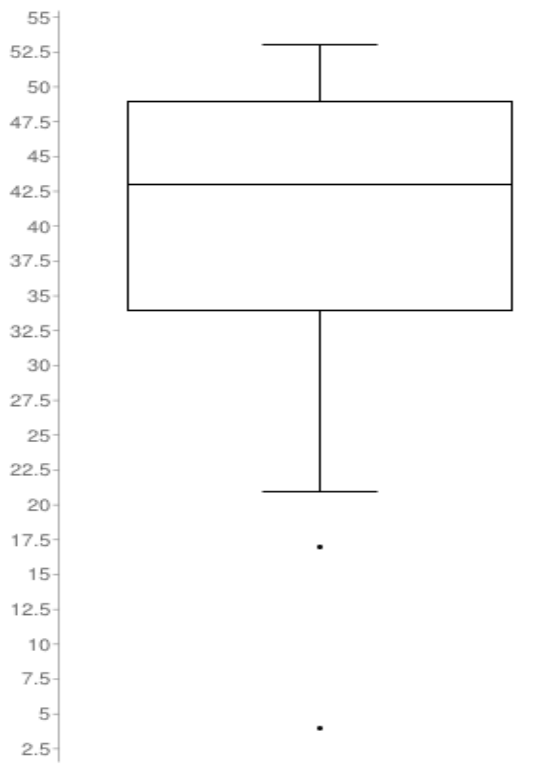


Figure 10. Raw scores for the reading/ELA TAKS 2007-08.

There were two observations from these figures related to the research questions. The first observation was that there were not a large number of outliers for each year. The second observation was that the scores shifted in a more positive direction in the second year.

Four observations were used to examine the difference between the year before the adoption of football (Year '07) and the year of the adoption of football (Year '08). The median raw score for first quartile was 33 for Year '07 and 34 for Year '08. For Quartile 3, the median raw score was 47 for Year '07 and 49 for Year '08. The median score for Year '07 was a raw score of 37 and a raw score of 43 for Year '08. There were

very few outliers for both years. The conclusion that can be drawn from these comparisons was that there was a rise in raw scores for reading/ELA TAKS scores. There was an increase of one point in the first quartile. There was an increase in scores in Quartile 3 with an increase of two points and an overall increase of six for the median score.

Social Studies

The social studies test was given to tenth and eleventh grade students. The test given to eleventh graders was also known as the exit level test. It was required that all students pass this test in order to graduate unless they were allowed to bypass the test as a result of a decision by a special education committee and the student was receiving special education services. The raw scores for students who were enrolled at the snapshot date at the beginning of year through the test date were used for this study. This snapshot date timeframe was the same timeframe used by the state for accountability purposes.

In order to calculate the effect that the implementation of the football program had on the social studies TAKS scores, the raw scores per student who met the timeframe for state accountability were collected in for each group in two distinct years: the 2006-07 school year and the 2007-08 school year. Using this data, the formula for calculating Cohen's d was applied. For the 2006-07 school year, the mean was 35.46, which was less than the mean for 2007-08 school year, which was a 41.488. For the same two groups, the standard deviation was also calculated. The standard deviation for

the 2006-07 school year was 8.692 raw score points. The standard deviation for the 2007-08 school year was $SD = 7.1803$ raw score points.

A *t*-test was conducted in order to determine statistical significance. There was a statistically significant difference in the raw scores for the social studies TAKS before and after the adoption of the football program. In the year in which football was adopted, there was a rise in raw scores. There was a difference in the two means of 6.42 points, which indicated a rise in test scores in social studies. Cohen's *d* effect size of .812 indicated practical significance. Data from the *t*-test is presented in Table 5.

Table 5

Contrast of Raw Scores on the Social Studies TAKS for the 2006-07 and 2007-08

School Years

Variable	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>	LL	UL	Cohen's <i>d</i>
Social Studies	35.46	8.692	41.88	7.1803	-6.405	<.001	-7.9254	-4.1234	.812

Note. M=Mean, SD-Standard Deviation, CI-Confidence Interval, LL-Lower Limit, UL-Upper Limit

To compare the raw scores for social studies from the 2006-07 and the 2007-08 school years, refer to figures 11 and 12.

The box and whisker plot in Figure 11 illustrates the raw scores for the social studies TAKS for the 2006-07 school year. Of the total number of records analyzed, there were 228 matched records with 81 student records that contained raw scores for the social studies TAKS.

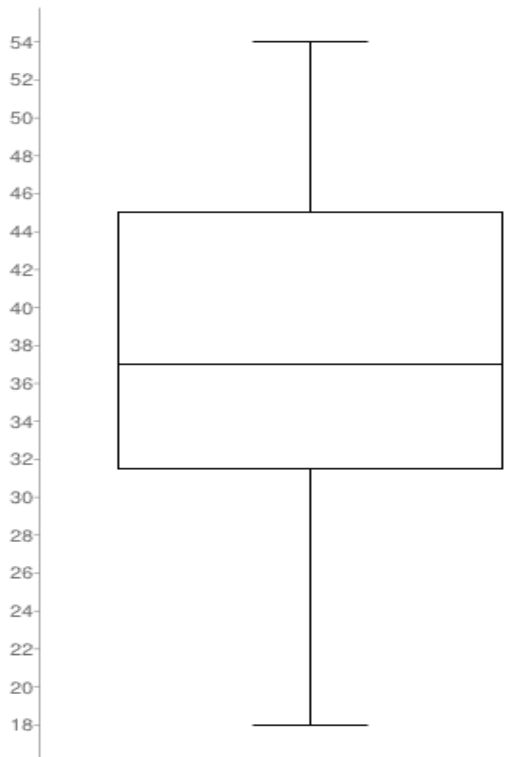


Figure 11. Raw scores for the social studies TAKS 2006-07.

The median raw score was represented by the centerline of the box and whisker plot (Figure 11). The median score for this data set was 37. The protruding lines or whiskers represent the first and fourth quartiles. The media of the first quartile was a raw score of 31.5, and the median score of the third quartile was a raw score of 45. There were no outliers on this plot.

The box and whisker plot in Figure 12 represents the raw scores for the social studies TAKS for the 2007-08 school year.

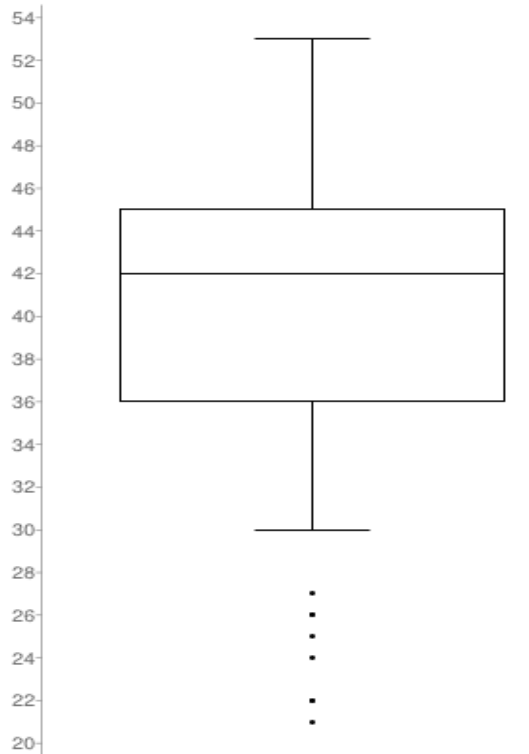


Figure 12. Raw scores for the social studies TAKS 2007-08.

The box and whisker plot in Figure 12 illustrates the raw scores earned on the reading/ELA TAKS for the 2007-08 school year. Of the total number of records analyzed, there were a total of 228 matched student records of which 89 contained raw scores for the social studies TAKS taken in 2007-08. The median raw scores were represented by the centerline of the box and whisker plot (Figure 12). The median score for this data set was 42. The whiskers represent the third and fourth quartiles. The median score for the first quartile was 36, and the median score for the third quartile was

45. The dots on the plot represent the outliers. There were eight outliers ranging from 21 to 27. All of the outliers were located below the first quartile. If the outliers were removed, the scores would shift in a more positive direction.

There were two observations from these figures related to the research questions. The first observation was that there were a larger number of outliers for this year compared to no outliers for the previous year. The second observation was that the scores shifted in a more positive direction in the second year.

Four observations were used to examine the difference between the year before the adoption of football (Year '07) and the year of the adoption of football (Year '08). The median raw scores for the first quartile were 31.5 for Year '07 and 36 for Year '08. For quartile 3, the median raw scores were 45 for Year '07 and 45 Year '08. The medians were calculated as raw scores of 37 and 42 for Years '07 and Year '08 respectively. Outliers were only present in the '08 school year. The conclusion that can be drawn from these comparisons was that there was a rise in scores for the social studies TAKS. The greatest increase was in the first quartile with an increase of 4.5 points with an overall increase of the median score of 5 points.

Science

The science test was given to tenth and eleventh grade students. The test that was given to the eleventh grade students was also known as the exit level test. Students were required to pass this test before being able to graduate unless they were allowed to bypass the test as a result of a decision by a special education committee and the student was receiving special education services. The raw scores for students who were enrolled

at the snapshot date at the beginning of year through the test date were used for this study. This timeframe was the same timeframe used by the state for accountability purposes.

In order to calculate the effect that the implementation of the football program had on the science TAKS scores, the raw scores per student who met the timeframe for state accountability were collected in two distinct years: the 2006-07 school year and the 2007-08 school year. Using this data, the formula for calculating Cohen's d was applied. For the 2006-07 school year, the mean was 35.29, which was less than the mean or the 2007-08 school year, which was 37.786. For the same two groups, the standard deviation was calculated. The standard deviation for the 2006-07 school year was $SD = 10.103$ raw score points. The standard deviation for the 2007-08 school year was $SD = 9.3144$ raw score points.

A t -test was conducted in order to determine the statistical significance. There was a statistically significant difference in the raw scores for the social studies TAKS before and after the adoption of the football program. In the year in which football was adopted, there was a rise in raw scores. There was a difference in the two means of 2.496, which indicated a rise in test scores in social studies. Cohen's d effect size of .257 indicated practical significance. Data from the t -test is presented in Table 6 page 54.

Table 6

Contrast of Raw Scores on the Science TAKS for the 2006-07 and 2007-08 School

Years

Variable	2006-07		2007-08		<i>t</i>	<i>p</i>	95% CI		Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			LL	UL	
Science	35.29	10.103	37.786	9.3144	-2.819	.007	-4.2911	-.7089	.257

Note. M=Mean, SD-Standard Deviation, CI-Confidence Interval, LL-Lower Limit, UL-Upper Limit.

To compare the raw scores for science from the 2006-07 to the 2007-08 school years, refer to Figures 13 and 14.

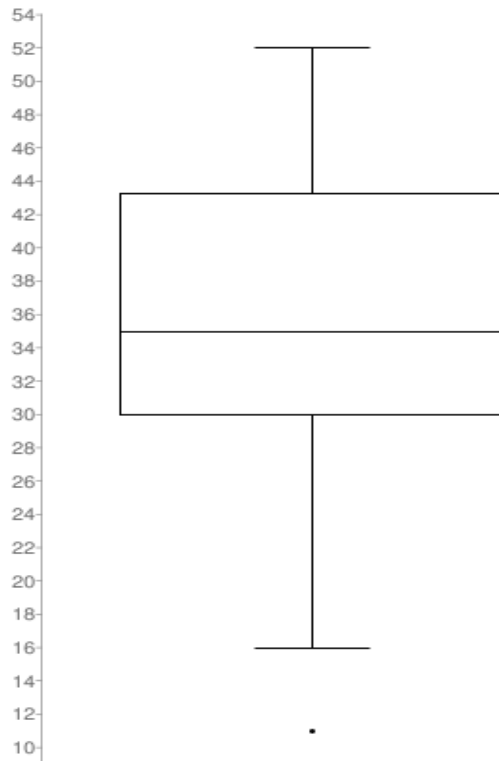


Figure 13. Raw scores for the science TAKS 2006-07.

The box and whisker plot in 13 illustrates the raw scores for the science TAKS for the 2006-07 school year. Of the total number of records analyzed, there were 228 matched student records, of which 82 contained raw scores for the 2006-07 science TAKS. The median raw score was represented by the centerline of the box and whisker plot (Figure 13). The median for this data set was 35. The whiskers represented the first and fourth quartiles. The median of the first quartile was a raw score of 30, and the median of the third quartile was a raw score of 43.25. The dot on the plot represented the one outlier with a raw score of 11.

The box and whisker plot in Figure 14 represented raw scores for the science TAKS for the 2007-08 school year.

The box and whisker plot in Figure 14 illustrates the raw scores earned on the science TAKS for the 2007-08 school year. Of the total number of records analyzed, there were 228 matched student records, of which 93 contained raw scores for the science TAKSs taken in 2007-08. The median raw score was represented by the centerline of the box and whisker plot (Figure 14).

The median score for the data set was 39. The whiskers represented the first and fourth quartiles. The median score for the first quartile was 30.75, and the median score for the third quartile was 45. There were no outliers on this plot.

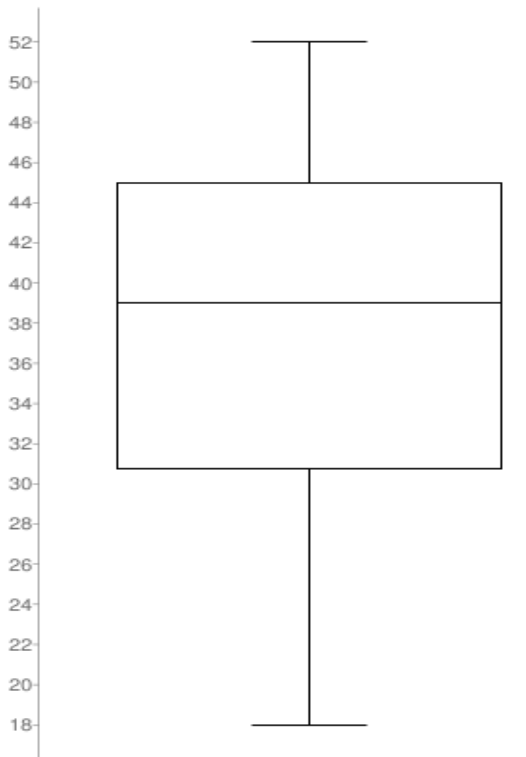


Figure 14. Raw scores for the science TAKS 2007-08.

There were two observations made from these figures related to the research questions. The first observation was that there was only one outlier for the first year and no outliers for the second year. The second observation was that the scores shifted in a more positive direction in the second year.

Four observations were used to examine the difference between the year before the adoption of football (Year '07) and the year of the adoption of football (Year '08). The median raw score for the first quartile was 30 for Year '07 and 30.75 for Year '08. For Quartile 3, the median raw score was 43.25 for Year '07 and 45 for Year '08. The median score for Year '07 was a raw score of 35 and a raw score of 39 for Year '08. There was only one outlier in the first year. The conclusion that was drawn from these

comparisons was that there was a rise in raw scores for science. The greatest increase was in the third quartile with a gain of 1.75 points, but the overall gain in the median raw score was 4 points.

Conclusion

Each data set was examined using a *t*-test and box and whisker plots. Data were compared for the year before and after the adoption of the football program. The number of days absent rose slightly after the adoption of football, but there were outliers that lead to additional analysis. After the removal of outliers, attendance improved after the adoption of football. The number of code of conduct violations increased after the adoption of the football program. Football had a statistically significant impact in the area of test scores as there were no other programs implemented that could have had an impact on scores. Raw scores improved for all scores with reading/ELA having the greatest gains with 8 points and science having the smallest gains with only two points. Math and social studies gained five raw score points.

CHAPTER V

DISCUSSION AND CONCLUSION

Introduction

In the summer of 2007, the SGISD Board of Trustees voted unanimously to add football to the list of extracurricular activities offered at SGAHS. The 2007-08 school year marked the inaugural year of the program. The purpose of this study is to explore the impacts of the adoption of the football program on the student behavioral and academic outcomes. This study did not solely examine the effects on the students who participated in the programs, but of all of the students who were enrolled in the school the year before and the year of the adoption.

Summary of Study

The study examined three areas that represented student behavioral and academic outcomes. These areas were attendance, discipline, and standardized test scores. The following three research questions were proposed for this study:

1. Has student attendance changed since the football program was implemented?
2. Has the number of code of conduct violations changed since the football program was implemented?
3. Have standardized test scores changed since the football program was implemented?

To answer these questions data, were extracted from the student data management system used by the district. The data were matched for students who had been enrolled in the school before the adoption of the football and student who were

enrolled the year of the adoption of football. The data were compared using a *t*-test and graphically with a box and whisker plot. The comparison of the data were used to determine whether or football had an impact on the three areas.

Findings

The first area of examination was that of attendance. The number of days that students were absent in the 2006-07 school year was compared to the number of days students were absent in 2007-08. Two different statistical comparisons were done. In the first set of comparisons, there was a slight increase in days missed after the adoption of football. Further analysis was done in order to remove the students who had a larger number of absences that were labeled outliers. For both years, only one of the outliers was a football player. This young man had a medical condition, unrelated to football that impacted his attendance at school. The majority of the outliers were female students. These females had previously received or were receiving pregnancy related services, therefore they either had young children or were pregnant. After the removal of the outliers, the differences in the two years become minimal and in fact shifted in a more positive direction for the year that football was adopted. It should be noted that of the records studied for attendance for each year, nearly one-half of the students did not have a single day absent from school. The median number of days absent for each year for the entire school fell well below the maximum number of days absent allowed by the state.

Secondly, codes of conduct violations were analyzed to determine the impact of the adoption of football on student behavior. A student who violated the code of

conduct receives a written referral. The referrals were collected and compared strictly by number and not by category of offense and compared. There was a slight increase in the average number of referrals per student in the year of the adoption of football. There were also more students who received at least one referral in 2007-08, with 18 more students receiving a referral. Although the referrals were not analyzed by type there were a few reasons that may have accounted for the increase. One reason may have been the later that students stayed at school to practice, the later they had to stay up to do homework and the more likely there were to be late to school. Students who were late to school were given code of conduct violations. Another reason may have been increased aggression of football players as encouraged by an aggressive attitude on the field. The students who received the greatest number of referrals, the outliers, were students who did not participate in football. For both years, less than one-third of the students received one referral, with two-thirds of the students not having a single code of conduct violation.

Test scores were analyzed in order to evaluate the impact of the adoption of football on student academic outcomes. There were four sets of tests that were used in the analysis-mathematics, reading/ELA, social studies and science. For each of the four areas, there were positive gains in test scores. The smallest gains were in science with an increase of about three raw score points. The largest gain was in reading/ELA with gains of over 8 raw score points. Math had a gain of over five raw score points and social studies with a gain over six raw score points.

Interpretations/Implications

Student behavior outcomes at SGAHS consisted of attendance and discipline. Attendance was very strong at SGAHS. The adoption of football had only minimal impact on the number of days that students missed in school. Attendance was an area of strength for the school; however, since attendance was tied to funding, it was always an area that should be considered when implementing new programs or services. Another area of strength was discipline. Overall, very few students receive discipline referrals. The year in which the adoption of football occurred there were more students receiving referrals, but without further study it cannot be determined the possible causes of the rise in the number of referrals cannot be determined.

Test score increases were from two points to over 8 points for each of the four areas. The raw scores were converted to scale scores to determine the Passing and Commended rates for the 9th and 10th grade tests. For the EXIT level test, there was also a standard for college readiness. The increase in raw scores was valuable in that the increase could allow students not only to move from Failing to Passing but also from Passing to Commended. For example, to move from Passing to College Ready on the EXIT level math test, the student would have to score ten more raw score points. The increase on the math test of over 5 raw score points would cover half of this difference between the two scoring levels. The same holds true for moving from College Ready to Commended, as the difference in these two scoring levels was also ten raw score points.

There were no other programs that were implemented at the same time as football that could have had an impact on test scores. In prior years, the mathematics

curriculum had been changed and students had more access to graphing calculators, but the rise in math test scores attributed to these two elements had already been noted.

While there were gains in mathematics, social studies, and science, the greatest gain was surprisingly in reading/ELA. The curriculum and support for reading had remained constant for each year that was studied so there would not have been another program that could have impacted the reading/ELA scores.

It would have made sense for there to be more significant changes in attendance and code of conduct violations but those remained relatively unchanged, perhaps because the number of absences and code of conduct violations are low in the first place. The students at SGAHS are generally very well behaved and have regular attendance. The reasons for academic gains could be based in the relationships that the football players developed with their coaches and teachers and that spread to other students in the school. The constant vigilance of the coaching staff to make sure the players stayed eligible under the no pass/no play rules could also have been a factor. Football also sparked other activities such as dances and pep rallies, which could also have positively impacted the overall environment of the school. Some of the boys that played that first year had never been involved in any activity at school before, so it would seem that their level of engagement in the school would increase. Excitement in general seemed to have a positive impact on all of the students.

Further Study

This study examined the impact of the adoption of football on three major areas- attendance, discipline and test scores. Although the data illustrates the impact on these

measurable areas, perhaps another question that should be proposed is the effect on the climate of the school. The data points to the positive impact of football on all of the students in the school, not just those that were actual participants in the football program. By examining the impact on the climate of the school, the link between the non-participants and the adoption of football might become more clearly defined.

Conclusion

The impact of football on the student behavioral and academic outcomes at SGAHS was examined in three areas. The overall conclusion of this study was that the adoption of football had a positive impact on SGAHS. While further study is needed, it stands to reason that extra-curricular programs such as football were ways to encourage students to engage in school and has a positive impact on test performance. In times of reduced school funding, these results should be taken into consideration when working within budget constraints. Especially programs such as football, which impacts not only participants but non-participants as well, should be preserved if not expanded.

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