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THE EFFECTS OF COLLEGE-BOUND HIGH SCHOOL STUDENTS MENTORING AT-RISK ELEMENTARY STUDENTS

By

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A DISSERTATION IN PRACTICE

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Abstract

In the economically depressed regions of San Jose, California, nearly 30% of children never finish high school. At-risk children who have their lives affected by poverty, single parent homes, abuse, and gang influence make up a large percentage of these children. To reach these children early, in 2007 the leadership at Valley Christian High, a local private school, challenged college-bound high school students from the school to help implement a program called “Junior University” offering 1-on-1 mentoring of nominated at-risk elementary age children. The program required a one-year commitment from the high school student. Further, they were given the title of “Junior Professor” to create a belief in the mentored children that college could be in their future. With the time commitment, the number of students, and the financial investment, it is critical to measure the effects the program is having. The State of California required every child from grades 2 through 11 to take the CST (California Standardized Test) every year until the test was discontinued in 2013. The CST is part of the STAR (Standardized Testing and Reporting) program used throughout the entire public school system in the state until its discontinuance. The study contains data from this standardized testing for a control group and a test group numbering approximately 50 records for each group and statistical analysis was performed to draw conclusions regarding the effectiveness of the program. The findings were conclusive that mentored students increased their scores much more frequently and with higher reliability than did the control group. The implication is that the program is working but more emphasis must be placed on students with scores that declined year to year. The cause of the falling scores could be an indicator of other causal factors in students’ lives. The program should be expanded with other college-bound high
school students from local schools joining with the single school now involved to mentor more children.

Keywords: Mentoring, Valley Christian, Junior University
Dedication

This dissertation is dedicated to my partner in this journey, my wife Michelle, who selflessly gave up hundreds of hours of time with me to allow the completion of this program as well as my five children – Scott, Brian, Christina, Kevin, and Nicole who while grown, never stopped encouraging me to continue forward with this task. I also dedicate this to my deceased parents, Wiley and Mary McMinn, who instilled in myself and my five brothers and sisters a lifelong desire to learn and to never underestimate the value of an education. To the visionary and creator of the Junior University program, my supervisor and friend of over 20 years, Dr. Clifford Daugherty who found a way for a private Christian school to reach into the at-risk elementary public school system in San Jose and make a difference in the lives of hundreds of children.
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CHAPTER ONE: INTRODUCTION

Background

This study focused on how the mentoring of at-risk public elementary school children by college-bound students from Valley Christian High School, a San Jose California-based private high school, impacted standardized test scores. The impact was calculated from standardized test data obtained from the school and based on statistical analysis of these data. The analysis determined the effectiveness of the mentoring when compared to a control group of students from the same school that had not participated in the mentoring program. Because nearly 30% of high school students in economically disadvantaged households in California never graduate (CSBA, 2013), it is critical to develop and implement programs that build positive learning experiences for young children. Analysis of the data was performed to determine if mentored students showed significant gains in test scores from year-to-year compared to the control group of non-mentored students. If this were to be true, the program may be expanded into other schools based on statistical significance of its efficacy.

The problem presented is to develop an effective approach to reach these at-risk children early in their educational process and positively influence their desire to learn. The result will be more productive students and eventually citizens as they progress through the primary education system. Most school systems cannot provide the function of counselor, parent, mentor, and intervention specialist. One on one mentoring supplements the work teachers do at the classroom level. Other solutions need to be developed to instill into children a desire to not only learn, but to excel. They must
believe they can break through the cycle of poverty and family issues that many experience.

The purpose of the study was to examine the following research question: Is there a statistically significant, positive difference in year-to-year test scores of mentored students when compared to a control group of similar students not involved in the mentoring program? While the mentoring is academic in nature, it differs from tutoring in that all of the high school students are required to commit to one year with each mentored student, ensuring that not only will tutoring occur, but also that the elementary at-risk students will develop a nurturing relationship with a college-bound high school role model.

The study was conducted using historical scores from the California state-mandated CST (California Standardized Test), given every year to public students in the second through 11th grade. The CST is part of the STAR (Standardized Testing and Reporting) program used throughout California to assess the academic progress of public school students. The program was discontinued in 2013 due to preparation for the new Common Core curricula, but the data are still valid for analysis. All students in grades 2 through 5 take an assessment test in English/language arts and mathematics. These scores were obtained year-to-year for approximately 50 students from both the mentored students and a control group that did not participate in the program. Statistical analysis was performed on the data to determine if there was a statistically significant difference in test score improvement between the two groups.
Background of Researcher

The researcher has over 20 years of experience as a member and one-time Chair of the Board of Directors for Valley Christian Schools, the largest interdenominational Christian school in the country. With a student population numbering over 2500 from kindergarten through twelfth grade, Valley Christian Schools has experienced incredible growth in facilities, programs, and student population. The researcher has been actively involved in setting policies and procedures for the school as well as arranging debt instruments to finance the school building projects. The school reached into the neighboring public elementary school district in 2007 and formed the Junior University, of which the researcher is an involved member. Junior University is a unique one-on-one mentoring program where college-bound high school students from Valley Christian pair up with at-risk elementary school students and commit to mentor their students at least once a week for a full school year. Concurrent with being a member of the board of directors for the school, the researcher spent 35 years in the electronics industry in positions ranging from engineering, marketing, sales, and as the Chief Executive Officer of two start-up companies.

Introduction and Statement of the Problem

This dissertation focused on the mentoring of at-risk public elementary school children by college-bound students from local high schools and determined the impact this mentoring has on raising California standardized test scores for these students compared to similar students that received no mentoring.

From the literature reviewed, for mentoring to have an effect, it must be dyadic, held frequently, and develop a connectedness between the mentor and mentee. The
central argument of this project is that the mentoring does have a significant long-term positive effect on the student and that the mentoring itself is only a portion of the reason for the improvement. The hypothesis posed the following question: Will students participating in the mentoring program show increased scores year-to-year in the California state-mandated CST (California State Testing) as compared to non-mentored students? Should there be no statistically significant improvement year-to-year between the mentored students and the control group consisting of students that did not participate in the mentoring program, it would bring into question the necessity for the program.

The data collected were via a quantitative study consisting of year-to-year test results for students that have been part of the mentoring program and students that have not been part of the program (control group). Using the data, \( t \)-tests were performed, standard deviations calculated, and the likelihood calculated that random data would have produced the same results.

At-risk children are defined as those having a greater likelihood of becoming educationally disabled because of conditions surrounding their births or home environments (McDonald, 2002). This definition has been extended to include a variety of different indicators, including limited reading proficiency, having experienced abuse or trauma, having a disability or illness, or having exhibited behavior problems (Rak & Patterson, 1996; Randolph, Fraser, & Orthner, 2004)

The issue is endemic in the economically disadvantaged areas of San Jose, California, where the dropout rate in some districts exceeds 20% (PICO National Network, 2009). Children who enter school are often overwhelmed by problems at home which might include existence at the poverty level, a single parent home, parents/siblings...
that are incarcerated, the lack of role models to emulate, and even abuse. It is critical to reach these children early while they are still malleable and introduce stability into their lives.

The problem statement is how to effectively reach these at-risk children early and have a positive impact on their desire to learn, thereby resulting in productive students once they complete their basic education. Solutions need to be developed to instill into the children a desire to not only learn, but to excel. They must believe they can break through the cycle of poverty and family issues that many experience.

**Purpose of the Study**

The purpose of this empirical deductive study was to determine the influence one-on-one mentoring by college-bound high school students has on at-risk elementary school students. Existing standardized test data were analyzed to determine if statistical differences were present between the year-to-year test scores of mentored students as compared to a like number of students at the same school that did not participate in the mentoring program.

**Research Question**

The study analyzed results from three years of CST data taken from students that had participated in the mentoring program as well as students that had not participated. The CST testing consists of two parts—English/language arts and mathematics. Depending on grade, a student may also be tested in science and history, but for the purpose of this study, only the two subject areas above were analyzed. If a student participated in the mentoring program for more than one year, separate records were created for that student. The first record compared test scores before and after year one
in the program and the second record compared scores before and after year two. Similarly, if test scores were available for multiple years for a control group student, multiple records were created.

The data collected and analyzed did not attempt to take into account the teaching skills of the faculty at the school. It was solely based on the improvement in test scores of the students tested.

The primary research question was to determine if test scores increased for students participating in the mentoring program versus those that did not. Scores for the CST range from 200 to 1000 at the school level and a consolidated score for each school is calculated. Schools that fall below a base level of 800 are considered to be non-proficient and are susceptible to state intervention. The following hypothesis was proposed in this study:

Therefore the research question was stated as: Would students participating in the Junior University mentoring program show increased test scores year-to-year in the California state-mandated CST compared to students in the same school who did not participate in the program?

Data collection included de-identified student scores for up to three years and were broken into the categories as follows: a) gender, b) ethnic group, c) English/language arts score, d) Mathematics score, and e) control or test group.

Significance of the Study

The title of this dissertation is “The Effects Of College-Bound High School Students Mentoring At-Risk Elementary Students.” The topic, however, is more complex because at-risk students primarily live in households where college attendance by any
member is rare and thus the child has never had a role model urging them to contemplate attending college. Therefore, the mentors are called “Junior Professors” to begin to associate the connection between learning, achievement, and ultimately acceptance into a college and graduation.

A quantitative study was done to analyze test scores from students participating in the mentoring program compared to students from the same school who did not participate. The study is important because literature suggests very little work has been done on the effects of mentoring at-risk students other than mentoring done by adults. High school students are much closer in age to elementary students; thus a high school student is one with which mentored students can readily identify and who has had success they may never have dreamed of in the past. The goal of the program is to build a belief in at-risk children that a college education will be part of their future.

In this study, quantitative data was analyzed to determine the difference in academic progress over a one-year period for at-risk elementary students enrolled in the mentoring program as compared to at-risk students that are not enrolled. Should the data be statistically significant, the program may be expanded to other at-risk schools aided by high school students from neighboring public schools.

Aim of the Study

The primary aim of the study was to determine the effects of the mentoring of at-risk elementary school students by college-bound high school students. Further steps were to make recommendations about the continuance of the program or to suggest improvements based on the statistical analysis of the data.
Methodology Overview

The data analysis was conducted with approximately 50 data points collected from both mentored (treatment group) and non-mentored students (control group). The students ranged from ages 7 (second grade) through approximately 10 years old (fifth grade). All participants come from a similar socio-economic background and were primarily from Asian and Hispanic ethnic groups although there were several data points for African-American and Caucasian children. The school currently has 433 students.

The data was de-identified by the principal of the school prior to receipt, assuring that no student names were associated with the data. The data contained ethnic background, gender, and an indicator as to whether or not the individual student is in the mentored group or the control group. Further, if a student spent two years in the mentoring program, two records were created. If a student spent three years in the program, three records were created. The first record for such a student is the change in English/language arts and math scores from year zero to year one, the second record is the change in language arts scores from year one to year two. In cases where a student has been in the program for three years, the third data record is the change in English/language arts and math scores from year two to year three. Thus, the same student could have two or possibly three records in the database, although the instance of three data records was rare.

The quantitative data was obtained from the public school where the mentoring program takes place and was then forwarded to the IRB (Institutional Review Board) for approval of an exempt review. The data encompassed a significant sample size of the children that participated in Junior University for at least one year. It examined their test
results prior to joining the Junior University initiative and then scores once they had completed a year. Moreover, a control group of students that did not participate in the Junior University group was analyzed and compared against the treatment group.

**Definition of Terms**

The following terms are used throughout this document and are either specific to the study done and therefore not widely known, or are used in a context that may be ambiguous depending upon the intent of the author.

*One-on-one mentoring* – The pairing of a college-bound high school student with an at-risk elementary school child for a minimum of one year to provide academic tutoring services as well as relationship development, to the point where the elementary student views the mentor as a role model.

*At-risk* – Students having a greater likelihood of becoming educationally disabled because of conditions surrounding their births or home environments (McDonald, 2002).

*Control group* – Students in the data set that had no participation in the mentoring program as conducted by Valley Christian High School students.

*CST* – California State Testing, a standardized test given to every public school student in California once a year to assess statewide student achievement from the second through the eleventh grades. The CST was discontinued in 2013.

*De-identified* – Student data obtained containing test score information, gender, and ethnic group, with all student names eliminated prior to receipt.

*Deductive* – Theory-tested research linked with quantitative experiments or surveys.
Dropout rate – As defined by the U.S. Department of Education, the percentage of 16- through 24-year-olds who are not enrolled in school and have not earned a high school credential (either a diploma or an equivalency credential such as a General Educational Development certificate) (National Center for Education Statistics, 2014).

Dyadic – Pertaining to the number two, or in the case of this study, the pairing of a high school student with an at-risk elementary school student.

Economically-depressed – The criterion that designates an area as economically distressed is one of the following conditions:

1. The unemployment rate average over the 24 month period is 1% or more above the national average, or;
2. The per capita or personal income is 80% or less than the national average.

Empirical – Capable of being verified or disproved by observation or experiment (Merriam-Webster, 1976).

IRB – Institutional Review Board – a committee formally designated to approve, monitor, and review biomedical and behavioral research involving humans.

Junior Professors – High school students chosen to mentor at-risk elementary school children for a minimum of one year.

Junior University – Program developed by Valley Christian Schools to provide twice-a-week mentoring services to at-risk elementary school children.

STAR (Standardized Testing And Reporting) program – Used to assess the performance of every child and school in the California public school system from grade 2 to grade 11. The STAR program was discontinued in 2013.
**t-test** – A test to calculate the probability that two sets of data are different due solely to chance rather than a statistically relevant difference.

**Delimitations and Limitations**

A specific delimiter of the study was the exclusion of special education students from the analysis. This resulted in the groups being more homogeneous. These are students that are defined as having identified learning disabilities such as Asperger syndrome, Autism, or Attention Deficit Disorder. Another delimiter is that data was obtained a singular school and therefore “is a factor that prevented the study from concluding the findings would be true for all people in all times and places” (Bryant, 2011, p. 57).

A significant limitation of the study is the discontinuance of the CST in 2013 with the discontinuance of the STAR program. The test was discontinued in order to develop a new test consistent with the “Common Core” curricula. Therefore, it will be impossible to use the same data source for additional studies on the effects of mentoring. All of the data was obtained from students that attended the Junior University program and have at least two years of California state STAR data compiled for them.

The study did not exclude “underachieving” students; in fact, the study was more biased towards lower achieving students as more of them enrolled in Junior University, but as indicated above, did exclude special needs students. Based on student test scores, each is placed in one of five categories that define the level at which they are functioning. These levels are standards used by the State of California system. While it is interesting to consider test score gains by category, this was beyond the scope of the study. It is important however to note that there was a significant range in scholarship among those
who took the test with all falling into one of the categories. Children testing in the Advanced category as defined below were occasionally recommended by their teacher for the program and as such, while the study contains fewer at the Advanced and Proficient levels, all levels were represented in the data. The levels are as defined below (California Department of Education, 2010):

- **Advanced:** This category represents a superior performance. Students demonstrate a comprehensive and complex understanding of the knowledge and skills measured by this assessment, at this grade, in this content area.
- **Proficient:** This category represents a solid performance. Students demonstrate a competent and adequate understanding of the knowledge and skills measured by this assessment, at this grade, in this content area.
- **Basic:** This category represents a limited performance. Students demonstrate a partial and rudimentary understanding of the knowledge and skills measured by this assessment, at this grade, in this content area.
- **Far Below / Below Basic:** This category represents a serious lack of performance. Students demonstrate little or a flawed understanding of the knowledge and skills measured by this assessment, at this grade, in this content area.

This range of students created a limiter in that each student participating in mentoring was chosen by his/her teacher based on lagging in some academic indices. While students from all categories were represented, many were below proficient level, the target level set by the state for all students.
Leader’s Role and Responsibility in Relation to the Problem

Leadership is a crucial item in the research and reporting of data, especially in a program such as this where program results are not institutionally reported. In the case of this research, the principal of the elementary school supplying at-risk elementary school students to the Junior University program as well as year-to-year CST scores of each de-identified student closely cooperated with the necessary data and follow-up questions. The principal also volunteered to arrange qualitative studies with families whose lives have been touched by the presence of the Junior University program but this was deemed to be beyond the scope of this project.

The Junior University program itself has required unique leadership skills to be implemented. The biggest obstacle facing the founders of the program was how to get Christian school students involved in a meaningful way at a public elementary school without violating the Establishment Clause. The Establishment Clause is part of the first amendment and says, in part, “Congress shall make no law respecting an establishment of religion” (U.S. Const. amend. I). A novel approach was used in having the Declaration of Independence serve as the guiding document for the program. Specifically, the clause “We hold these truths to be self evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty, and the pursuit of Happiness” (U.S. Declaration of Independence (1776), Paragraph 2). Very little resistance has been met using this approach as even the most skeptical person has very little issue with a foundational document of the United States.

In using this approach however, it is important to practice authentic leadership. In this context, authentic leadership means transparency. It must be clear to the people with
whom one is working that there are no ulterior motives. The motive is simply to help students improve their test scores and instill a desire to attend college. Authentic Leadership Theory (ALT) is a normative theory that emphasizes a specific approach and authenticity is a behavioral trait that reflects trust, self-awareness and ethical values that the leader practices (Johnson, 2012). The leader who practices authenticity is perceived as real and transparent by followers and is a powerful role model that followers can be inspired by in their actions and behaviors (Evans, 2007). Words that people may associate with such authentic leadership include integrity, sincerity, genuineness, and transparency (Johnson, 2012). This describes the type of leadership necessary and warranted by those who work in the private school in their dealings with the public school officials. Over a period of years, trust has been built via this practice of authentic leadership.

Authentic leadership is not positional. It is built at all levels and is based on the building of sound relationships as well as cura personalis—care for the entire person. It requires that each student be embraced as well as the leadership of the school. Thus far, the program has thrived via the leadership displayed by the teams at both the private and public schools.

**Summary**

The crisis of at-risk children in the United States is one that cannot be ignored. Calman and Tair-Whelan (2005) noted that

*Investments in quality childcare and early childhood education do more than pay significant returns to children—our future citizens. They also benefit taxpayers and enhance economic vitality. Economic research—by Nobel Prize-winners and Federal*
Reserve economists, in economic studies in dozens of states and counties, and in longitudinal studies spanning 40 years—demonstrate the return on public investment in high quality childhood education is substantial (2005).

It is through this prism that the involvement of private schools with public education must be addressed. Private schools have long been a purview of the elitist and entitled, with children separated from the reality of low-income, poverty stricken, and disadvantaged children and families. These very students can provide inspiration and hope to a group of children that, as of yet, are untainted, unbiased, and unaware of the upcoming challenges facing them as they traverse through middle and high school. Some will be successful, but many will not, as evidenced by NCCP.org (2014), which stated the primary risk factors of children not being successful in school:

- **Households without English speakers:** Children in households where all members over age 14 years speak a non-English language and are not proficient in English.
- **Large family:** Children in families with four or more children.
- **Low parental education:** Children whose parents both lack a high school degree.
- **Residential mobility:** Children in families who have changed residences one or more times in the last 12 months.
- **Single-parent:** Children in families with one unmarried parent in the household.
- **Teen mother:** Children whose mothers were teenagers when the child was born.
- **Non-employed parent(s):** Children whose parents had no employment in the previous year.
The Junior University program seeks to identify these individual students and insert them into a one-on-one mentoring program with successful college-bound high school students that can serve to be role models for them as they traverse the primary education system. The students that take advantage of the mentoring program will be shown to improve both their test scores and their overall view towards college as a viable option.
CHAPTER TWO: LITERATURE REVIEW

Introduction

The objective of the literature review was to discover previous publishing on the subject of mentoring at-risk elementary students, especially when performed by college bound high school students. This distinction between adult mentors and high school mentors is important, as a child in elementary school can much more easily project himself or herself as a 10th or 11th-grade student than they can a grown adult.

This project was born out of a collaborative program that began in 2007 between Valley Christian Schools in San Jose, California and a local at-risk public school, Hellyer Elementary. The program is known as the Junior University and was conceived by the principal at the elementary school. The principal was concerned that her student CST (California State Testing) scores had fallen well below acceptable California standards. A minimum score of 800 (with 200-1000 being the range) was needed to remain in good standing, and her school stood at a disappointing 736 in 2007.

With very few resources and falling scores, the principal asked nearby Valley Christian High School for help. The assistance consisted of partnering high school students with elementary students to tutor them in subject areas where the students experienced problems. The high school students were given the title of “Junior Professors” to begin to have their mentees dream they could someday realize the step of attending college. The program began at the start of the 2007-08 school year and after one year, test scores had risen to 790, an increase of over 7%. Administrators were excited by the progress, and the program has since expanded to include more than 300 student trips per week and a redefining of the high school students as mentors rather than
tutors. The difference is subtle, but has required each high school student to commit to a minimum one-year one-on-one relationship with an assigned child and become a surrogate role model for what the at-risk child might be missing at home.

With the program now in effect for six years, test scores have risen to a level undreamed of back in 2007. The 2013 score for the school came in at 849 and placed Hellyer at the top of all at-risk, non-chartered public elementary schools in Santa Clara County, the county for public schools in San Jose.

![Figure 1. Top 10 elementary schools for English Language Learner Students API 2013 Santa Clara and San Mateo Counties. Note: Percent of students who are English Language Learners (ESL) is indicated in parentheses next to the school’s name.](image)

As the data indicate, Hellyer Elementary increased its scores by 15% over a six year time frame to 849, placing it behind only three charter schools and one additional school that does not fall into the at-risk category.
These results were vitally important as these children are now excelling where they were previously failing. And the feeling extends beyond the students; teachers are now more motivated to teach as they have students eager to receive instruction. The culture at the school has become one of pride and achievement. That being said, it is important to understand how much the mentoring program specifically contributed to the increase in test scores. If it is clearly demonstrated that the mentored students had significantly higher increases in test scores, efforts should be made to expand the Junior University program outside of the singular school where the study was performed. Moreover, it is important to understand some of the underlying reasons that have been studied in the past for improving scores of students. This literature review investigated not only prior studies of year-to-year test score changes, but also some of the possible causes behind the changes beyond merely being mentored.

The first step in the literature review was to conduct an extensive literature search. Given the number of scientific journal articles, the Web of Science and JSTOR resources from the Reinhart Library at Creighton University were utilized. Key topic words were identified, including at-risk students, high school mentors, elementary students, and elementary students living in poverty. Combinations of these key topic words yielded many articles—some more useful than others. References of each of those articles were checked for a possible continuation of the study of at-risk mentoring by high school students.

The initial search yielded approximately 20 relevant articles, with further investigation in the reference sections of those articles yielding an additional 60 sources for investigation. Articles that addressed the mentoring of normal (as opposed to at-risk)
elementary school students were discarded. To be considered for inclusion, the article had to address at least one of the following items:

- Mentoring done with at-risk students
- Mentoring done over an extended period of time (at minimum, one school year)
- College-bound high school students performed the mentoring
- Any results that were objective in nature and comparative over a period of one year.

One shortcoming noted in the literature review was the lack of literature that studied primarily high school students as the mentors. Many articles surfaced that used adults as mentors, but one of the hypotheses developed was that at-risk elementary school children more readily identified with students closer in age to themselves and would thus be more likely to view those students as role models.

The research in this case will study de-identified student scores and use a control matched-comparison group (similar students not involved with Junior University) to measure the academic performance difference between the two groups.

**Purpose Statement**

The purpose of this empirical deductive study was to determine the impact of one-on-one mentoring of at-risk elementary school students by college-bound high school students. Existing standardized test data was analyzed to determine if statistical differences were present between the year-to-year test scores of mentored students as compared to a like number of students at the same school that did not participate in the mentoring program.
Aim of the Study

The primary aim of the study was to determine the effects of the mentoring of at-risk elementary school students by college-bound high school students and to make recommendations about the continuance of the program or to suggest improvements based on the statistical analysis of the data.

Theme Discussion

Commitment

Commitment is a theme running throughout the review of literature associated with a mentor/mentee experience. Frels et al. (2013), Wright and Borland (1992) and Rhodes and Dubois (2006) all point out the importance of prospective mentors understanding the level of commitment necessary to take on the task of mentoring a child. While Karcher (2005) and Frels et al. (2013) among others center research around adults as mentors instead of high school students, nearly all literature points out the importance of a rigid training program for mentors, with much of it aimed at having the prospective mentors understand the level of commitment necessary to take on the task of mentoring or even tutoring a child. As a core component, this training needs to include a thorough understanding of the level of commitment and an understanding of why this commitment is critical. Karcher (2005) contrasts tutoring with mentoring by noting that the primary goal of cross-age tutoring is to help children develop specific academic skills, whereas cross-age mentoring focuses on the mentoring relationship, which is viewed as the main mechanism by which mentees develop in the areas of self-esteem and connectedness. In developmental mentoring, mentors are trained and supervised, and their roles, boundaries, and commitment are the focus of monthly mentor supervision.
Frels et al. (2013) found commitment to be one of the foremost priorities of adult mentors. Adults are particularly concerned about the inability to meet their commitments, whether caused by a child moving to another school, being gone for the summer, or perhaps losing interest in the program. Frels et al. (2013) went on to use the example of a mentor that was so distressed that a child she was mentoring had switched schools that she was considering going down to the new school to work with the student. In a similar fashion, a male adult mentor noticed that his mentee was struggling to concentrate on his spelling words. At the conclusion of his one-hour mentoring session, the mentor excused himself to cancel an appointment so he could stay longer. Karcher (2005) commented that it is possible that interpersonal processes, such as the empathy and attention received from a consistently present mentor, better explain program outcomes than do the content of the curriculum used to structure the program.

In discussing a special program aimed at matching gifted at-risk children with mentors, as part of their training program for mentors, Wright and Borland (1992) required that a mentor be with his or her child part-time during the summer, part-time during weekends, and after school one day per week during the school year. Furthermore, the mentor was required to accompany the child on all field trips. Clearly, commitment to the child was of paramount importance for this program.

In addition, Rhodes and Dubois (2006) identified thirteen program practices that predict positive youth outcomes. One of these was that mentoring relationships are most likely to promote positive outcomes and avoid harm when they are close, consistent, and enduring.
Commitment continues to emerge as the most important of the three supported by each literature review. Many at-risk children lack continuity in their lives. According to Rector (2012), marriage in the United States drops the probability of child poverty by 82%. Correspondingly, according to the Ounce of Prevention organization, the following occurs in at-risk children who do not receive high quality early childhood education:

- 25% are more likely to drop out of school
- 40% are more likely to become a teen parent
- 50% are more likely to be placed in special education
- 60% are more likely to never attend college
- 70% are more likely to be arrested for a violent crime

**Role-Modeling**

Role-modeling—while not as prevalent in the literature as commitment—is still vitally important, especially when the mentor is a high school student. As pointed out by Wright and Borland (1992), an older student is an indisputable living example of an intelligent young person who has achieved academic success. One possible explanation is that elementary at-risk school children as mentees cannot identify and thus establish a true connection with an adult person, especially someone significantly older. The adult mentor’s stage in life is simply too distant in the future for them to contemplate. However, a fourth or fifth grader can picture themselves as an 11th grader, and the better role model that person is, the better chance the young child has of formulating his or her own educational aspirations through that mentor. As stated earlier, it is the reason the high school students are called “Junior Professors” and are instructed in their mentoring training to frequently talk about college. This reinforces in the young children that they
can go to college even if no one in their family has ever done so. The foundational document for the program lies in the simplicity of the Declaration of Independence. Children are taught to sing the “Declaration Song” which instills in them the belief “that all men are created equal and that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty, and the Pursuit of Happiness” (U.S. Declaration of Independence (1776), Paragraph 2). If children are taught and begin to believe in this equality at such a malleable age, then the role model can play an important role in building and sustaining that belief in the young student.

Motivation

Motivation is a key theme in improving test scores and helping remove children from poverty. In his book Transformation (Silvoso, 2007), four kinds of poverty are noted:

1. Spiritual poverty afflicts those who do not know that God is their father.
2. Relational poverty encompasses those whose focus is on themselves at the expense of the community they are part of.
3. Motivational poverty is a state of hopelessness that engulfs those who have no adequate way or means (or the confidence) to tackle tomorrow’s challenges.
4. Material poverty impacts those who lack the basic necessities to sustain themselves.

This concept of motivational poverty drives to the heart of the weak test scores of at-risk children. As defined earlier, at-risk children are those having a greater likelihood of becoming educationally disabled because of conditions surrounding their births or
home environments (McDonald, 2002). These conditions can lead to a feeling of hopelessness that grows over time as children watch marriages break up, parents or siblings become incarcerated, gang violence erupt, poverty level living conditions, and other difficulties. They simply lose the motivation to succeed in life and resign themselves to a life similar to the one they witnessed unfold around them by their siblings and parents. Cohen, Kulik, and Kulik (1982) and Mathes and Fuchs (1994) stated that students who were tutored by their classmates or by older students made greater academic gains than did untutored students. This tutoring can create not only a relational bond, but also a motivational spark in children as they realize their capacity to learn.

**Summary**

The literature review for this study centered on prior publishing related to the mentoring of at-risk elementary school children by college bound high school students. Several authors emerged during the literature review as multiple contributors to the subject and aligned with the objectives and research associated with this study. Therefore, they were cited several times in the literature review.

The literature review resulted in several key themes emerging as related to the study of the mentoring of at-risk elementary school children by college bound high school students. The primary themes were as follows:

**Commitment** – Nearly every study as discussed stressed the importance of long-term commitment to differentiate true mentoring from tutoring. This is consistent with the data analyzed for this study, as a one school year commitment is required from each high school student. According to Elias (2009), one of the shortcomings of our educational structure is that relationships with teachers, especially in secondary school,
may be caring, but they are not easy to sustain. Yet at-risk youth need relationships that are both caring and stable. They need to build a sense of trust and have the time to communicate the complexity, frustrations, and positive aspects of their lives in and out of school. Only after creating a strong relational base will a person have the platform to be a source of enduring and cherished advice to a student. Students won't confer trust to an older person based on his or her role as a counselor, psychologist, or social worker. They have to earn it by building a relationship.

**Role-Modeling** – The literature review revealed sparse information in regards to the mentors being slightly older than the elementary school students and thus able to establish a more peer-to-peer or perhaps big brother/sister-little brother/sister relationship between the mentor and mentee. As mentioned, each high school student is given the title of Junior Professor and encouraged to reinforce the belief that if the at-risk elementary student studies hard, he or she can go to college and succeed. This breaks the cycle of characteristics resulting in his or her labeling as an “at-risk” student. Fortunately, some published literature did include information regarding high school student mentors.

**Motivation** – While not as prevalent, the Silvoso (2007) reference disclosed a very interesting and unique perspective on poverty. Many people equate poverty as the absence of material wealth, but in his book *Transformation*, Silvoso (2007) argues that prior to material wealth, the issues of spiritual, relational, and motivational poverty must be overcome, which will result in being pulled out of material poverty.

In summary, the analysis of test score data helped to ascertain if the themes as brought out in the literature review resulted in higher test scores for students.
CHAPTER THREE: METHODOLOGY

Introduction

The data for this research paper was collected via a quantitative study consisting of analyzing year-to-year test score changes for at-risk students that have been part of the mentoring program as well as a control group of students that did not participate in the program. Standard deviations were calculated, t-tests were performed and the likelihood was statistically determined whether or not random data would have produced the same results.

As mentioned, at-risk children have a greater likelihood of becoming educationally disabled because of issues surrounding their birth or their home environment (McDonald, 2002). This definition has been extended to include a variety of different indicators, including having limited reading proficiency, having experienced abuse or trauma, having a disability or illness, or having exhibited behavior problems (Rak & Patterson, 1996; Randolph, Fraser, & Orthner, 2004).

Purpose of the Study

The purpose of this study was to determine the effects of one-on-one mentoring of at-risk elementary school students by college-bound high school students. The study examined the progress made by at-risk children in test scores and postulated on further reasons for those increasing test scores. Those reasons should be studied in follow-up research to discover causal effects for test score increases should the data support the hypothesis.
Aim of Study

The primary aim of the study was to determine the effects of the mentoring and to make recommendations about the continuance of the program or to suggest revisions to the program based on the data.

Baseline Assessment Information

The cooperative mentoring program between the high school and elementary school began in 2007. Because California tests students in grades two through eleven each year as part of the CSR (California State Reporting), data was available for enough students to set up a treatment group and compare it with a control group. If a student was in the program for more than one year and therefore three data points were available for a test group student, then two records were created. One record was the beginning test score as the student entered the program for the first year combined with the testing after one year of the program was completed. The second record used the first year completion record as the beginning score for the second year and after year two was completed, another test was given which served as the ending test score for record two. Similar logic applied for the very few students that took the program for three years in that their data would be split into three records. The first step in collection of data consisted of a discussion with the principal of the elementary school to explain the data analysis approach and hypothesis and then examined with the principal what data was available. The best available data was the year-to-year test scores for the California STAR (Standardized Testing And Reporting) test administered every year for second through 11th graders. Although the test was discontinued in 2013 due to a new test being developed to adapt to common core standards, the data available is more than sufficient
for this study. The principal of the school and the researcher collaboratively decided to collect de-identified data on students that took part in the mentoring program as well as de-identified data for students that did not participate in the program. This second set of scores represented the control group. The data had pre-mentoring and post-mentoring scores for over 50 students in each group (treatment and control) and as mentioned, was delivered in a de-identified state (Student 1, Student 2, etc.).

**Research Question**

Would students participating in the Junior University mentoring program show increased test scores year-to-year in the California state-mandated CST compared to students in the same school who did not participate in the program?

**Methodology Choice**

Regarding instruments and procedures, the first quantitative study data instruments were readily available due to the state mandated testing. The data was drawn from these existing test results of at-risk children, year-to-year that did and did not participate in the Junior University program. The study resulted in a four-corner study with test scores from the following (all de-identified):

1. Test scores of children prior to their participation in a one year mentoring program
2. Test scores of those same children subsequent to completing the one year mentoring program
3. Test scores of children in year one that did not participate in the program
4. Test scores of the same children in year two that did not participate in the program
The test scores were broken into two parts. The first was language arts scores and the second was math scores. Possible scores range from a low of 150 to a high of 600. The minimum and maximum test score for each group of students in the treatment and control data is listed below.

Table 1

*Minimum and Maximum Test Scores by Subject Matter and Grouping*

<table>
<thead>
<tr>
<th></th>
<th>Control Group</th>
<th>Test Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language Arts</td>
<td>249</td>
<td>217</td>
</tr>
<tr>
<td>Math</td>
<td>288</td>
<td>208</td>
</tr>
<tr>
<td>Min Score</td>
<td>600</td>
<td>490</td>
</tr>
<tr>
<td>Max Score</td>
<td>600</td>
<td>565</td>
</tr>
</tbody>
</table>

The data was forwarded to the author by the principal of the subject school upon approval from the Institutional Review Board (IRB) and all data was de-identified. The quantitative data is important in determining progress made by the treatment (mentored) group as compared to the control group. Hall, Ward, and Comer (1988) note that the consistency of the methodology and data-gathering procedures increases the quality of research. There was some thought given to a mixed methods approach aimed at interviewing the teachers, administrators and parents to determine if causal effects may have contributed to the increase in test scores. A decision was made to forego that study until it was determined that indeed test scores did increase for students participating in the Junior University program. This methodology is sufficient in that it contains a large sample size and contains data for both the treatment group and the control group, allowing for statistically relevant conclusions to be drawn regarding the efficacy of the Junior University program.
Participants in the Study

The participants for the study were gathered from two groups of elementary age students from a San Jose, California at-risk school residing in the Franklin-McKinley school district. The first group consisted of 53 records for at-risk students that had participated for a minimum of one year in the Junior University program. The second group consisted of 54 records for students that had not spent any time in the program yet attended the same school and came from similar ethnic and socio-economic backgrounds. The sample size is large in that it includes over 40% of the participants in the Junior University program and approximately 15% of the total students in the school in the control group. The quantitative study used existing STAR score test data and was forwarded to the author by the principal upon IRB (Institutional Review Board) approval. As background, the STAR test was first given to California students in 1998 and was administered between mid-March and mid-June each spring until the program was discontinued in 2013. The STAR test was then replaced by a new test that better reflected the Common Core curriculum. The STAR testing consisted of standards-based tests developed to demonstrate how well California students were mastering grade level content standards. These standards were set by the state Board of Education. The tests are administered by the individual campuses and then test scores forwarded to the state Board of Education. In grades 2 through 11, the CST (California Standards Test) covers English/language arts and mathematics. Individual scores can range from a low of 150 to a high of 600 for each subject area while school performance can range from a low of 200 to a high of 1000. California sets the minimum standard for a school at 800. (J. Merza, personal conversation, March 20, 2015).
The treatment group needed to have been mentored for a minimum of one year and also needed to have California STAR test scores available before and after the mentoring program. The second group (control group) also required test data be available for the prior year as well as one year later to be included in the study. The initial test scores for both groups were taken beginning in school year 2008/2009 with the last set of scores being from the 2012/2013 school year. This is the timeframe the Junior University program has been in existence and California standard test data available. It should be noted that the California STAR testing should provide consistent scores grade to grade due to the test increasing in difficulty commensurate with the expected learning progress for the student. Therefore, as an example, a third grader scoring 400 on the literature test would be expected to score 400 in the fourth grade assuming normal progress in the classroom. A higher score indicates success beyond that expected while a lower score indicates there are factors causing the student to learn at a less than acceptable level. The factors could be many including problems at home, lack of parental encouragement, learning disabilities, substandard teachers or simply the lack of student motivation. Access to those groups was via the principal of the elementary school where the at-risk children attend. No student names were revealed to the researcher, only the ethnic class, gender, and grade. The primary data was de-identified California standardized test scores for the spring preceding and the spring following the mentoring year for the mentored students and the spring of the school year for control students compared with the testing administered in the spring following the first year of testing.
Instrumentation

Data Collection Tools

With the primary hypothesis being a supposition that students participating in the Junior University program saw increased test scores compared to their counterparts that did not participate in the program, it was clear the year-to-year data needed to be collected for both sets of students. The data received contained the following information for each student:

- Gender
- Ethnic Group
- Language arts score for each school year
- Math scores for each year
- Placement in one of five groups ranging from advanced to far below basic level.

Upon receiving the de-identified data, the statistical analysis did not involve individual students, but rather the test group and control group as a whole. In order to ensure the data was statistically relevant, standard deviations and standard error calculations were performed on each set of data (test and control) to ensure that a valid sample was taken. Data was then compared for the test group against the control group to establish the hypothesis that increased test scores year-to-year would result from participation in the Junior University program as compared to those children not in the program.

As previously indicated, the data was available via the CSR (California State Reporting) portion of the STAR (Statewide Testing and Reporting) scores that was given
to every student from the second through the 11th grade in California State High Schools until 2013. Therefore the data represents an unbiased, long-term measurement mechanism for judging the efficacy of the Junior University program.

The data has far-reaching implications on the public education system, not only in California, but nationwide. In a study by Rumberger and Palardy (2005) they found that the average socioeconomic level of students' schools had as much impact on their achievement growth as their own socioeconomic status, net of other background factors. This is a sobering finding in that even students who come from affluent backgrounds and affluent parents will suffer if they attend a school that has a substandard socioeconomic standing.

Data Analysis Plan

Upon collection of the data from the school principal, decisions needed to be made as to the best way to statistically validate the hypothesis. It was determined that doing analysis on a student-by-student basis would not be conclusive or relevant as looking at the test group and the control group as two classes of data to be analyzed. The critical issue being analyzed is whether or not as a group, there was a clear indication that test scores year to year improved more for students involved in the Junior University program than for those that did not take advantage of the program.

For the data analysis, 54 records were available for the mentored students (treatment group) and 53 records were available for the control group (students not involved in Junior University). While the number of records was nearly identical, the percentage of student scores available for the mentored students far exceeded that of the
control group. However, 53 control group students still represented a statistically significant number as described later in this document.

The first step in the data analysis was to develop a count, minimum score, mean score, and maximum score for each set of data. While these data are critical to the study, the critical data is the difference in the scores from year to year. The minimum and maximum scores assisted in understanding the difference between the academic performance of the two groups, the mean illustrated the gap between the averages of the two groups and the standard deviation was calculated to demonstrate just how spread out the numbers were. But the primary goal was to examine if the improvements year to year were statistically higher for the treatment group and therefore special attention was paid to the improvements in scores rather than the scores themselves. For example, if a student scored 250 on his/her math score one year in the test group and 285 the next year after participating in Junior University, this would be deemed as a superior record to a student in the control group that had a math score of 400 in year one and 410 in year two. The primary consideration was the magnitude of the improvement, not the base score of each student.

For each group, a standard deviation was calculated for the sum total of the score difference from year to year for the treatment group and the control group. Standard deviation is merely a measure of how spread out were the numbers. High standard deviations assume that there is a very large differential in test score improvements or decline while smaller standard deviations tend to suggest that the score improvements or declines are relatively similar. The primary goal was to ascertain that the standard deviations were explainable between the treatment group and the control group. The
standard deviations for each group in regards to score improvement or decline amongst the two groups were as follows:

Table 2

*Standard Deviation by Score Delta by Subject Matter for Control and Test Group*

<table>
<thead>
<tr>
<th></th>
<th>Control Group</th>
<th></th>
<th>Test Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language</td>
<td>46.86</td>
<td>Math</td>
<td>41.57</td>
</tr>
<tr>
<td>Acts</td>
<td>80.90</td>
<td>Math</td>
<td>65.72</td>
</tr>
</tbody>
</table>

This demonstrates that the standard deviations between the two groups were relatively similar, thus validating that the cross section of student scores analyzed were consistent with the student body as a whole.

Another critical statistical calculation was that of the standard error between the data for each group. Standard error gives a measure of how well a sample represents the population. When the sample is representative, the standard error will be small. Taking the standard deviation and dividing it by the square root of the sample size calculates the standard error. This gives a good indication of just how valid the sample is.

There are two other important calculations. The first is a *t*-test which asks whether a difference between two groups’ averages is unlikely to have occurred because of random chance in sample selection. The data as presented in Chapter 4 will cover that. Overall, the data will demonstrate that statistically, the difference in the scores year-to-year for test group and the control group was not caused by chance alone.

**Legal and Ethical Considerations**

The study in this case involved children, primarily from ages 7 through 11 (second through fifth grade). It was imperative the researcher protect the identity of the
children throughout the process. Therefore, an IRB application was completed and approved. The process used involved obtaining the permission from the elementary school principal to submit scores for all students that had participated in the Junior University for at least one year as well as a control group of like students from a gender and ethnic point of view. The primary requirement was that all data be de-identified with no discernable way to identify specific students. While individual teachers may be able to identify students via their interaction with the students in the classroom, the researcher would have no parallel way in which to identify individuals.

Additionally, the researcher is an employee of the school where the high school students attend and thus there was an opportunity to potentially bias the study. The researcher was aware of this possible conflict and made every effort to remain unbiased throughout the data collection and analysis.

**Financial Considerations**

The financial considerations for this study were minimal. Although the private school incurs substantial cost associated with transporting the high school student mentors to the elementary school and back, there were no additional costs incurred by the researcher in obtaining this data and none that would have influenced data collection.

**Summary**

The purpose of this study was to determine the effects of one-on-one mentoring of at-risk elementary school students by college-bound high school students. The study examined the progress made by at-risk children in test scores that participated in the Junior University program and compare those changes to those of a control group of students that did not participate in the study.
The primary aim of the study was to determine the effects of the mentoring program and to make recommendations about the continuance of the program or to suggest revisions to the program based on the data.

In order to collect data to substantiate the hypothesis, a quantitative study was conducted using data from California state-mandated testing. The study consisted of a statistical analysis of data spanning five years from both a test group of students that attended Junior University and a control group of students that did not. The data was then analyzed to ascertain if the mentored students increased their tests scores at a level higher than non-mentored students.

The primary hypothesis was that students participating in the Junior University mentoring program will show increased scores year-to-year in the California state-mandated CST compared to students in the same school who did not participate in the program.

Having de-identified data as comprehensive as the school provided allowed for a four corner test to be done, that is pre and post test score differences for both mentored and non-mentored students. The data obtained was from the school years 2008/2009 through to 2012/2013.

The participants in the study were randomly chosen by the principal of the school and consisted of approximately 50 students from each group analyzed.

Data analysis consisted of consolidating the data for each group and then performing t-tests, a standard error calculation, standard deviations and a cumulative probability which provides a percentage score regarding the possibility that random data may have produced the result. The probability scores were very low, indicating a high
correlation for the data. In other words, the statistical probability that the results could
have been dramatically different with a different sample size was very low.

The next chapter will discuss the results of the data and will illustrate a very
positive result emanates from the implementation of the Junior University.
CHAPTER FOUR: FINDINGS

Introduction

As stated earlier in Chapter 1, nearly 30% of high school students in economically disadvantaged households in California never graduate (CSBA, 2013). The reasons for this are many and have been discussed throughout this paper, but one overriding need has emerged—the essential necessity to develop and implement programs that build positive learning experiences for young children.

Children in elementary school are malleable, as they rarely have been tainted with the realities of their at-risk household. At-risk children are defined as those having a greater likelihood of becoming educationally disabled because of conditions surrounding their births or home environments (McDonald, 2002). This definition has been extended to include a variety of different indicators, including limited reading proficiency, having experienced abuse or trauma, having a disability or illness, or having exhibited behavior problems (Rak & Patterson, 1996; Randolph, Fraser, & Orthner, 2004). To increase the probability of creating within children a desire to excel and ultimately graduate from college, a partnership was formed between an at-risk elementary school in San Jose, California and Valley Christian High School, a private school where over 99% of the graduates attend college. During the school year, over 300 student trips are made to the public elementary school each week to tutor them in subjects of their choice. These high school students are required to commit to a minimum of one year with a child and act as more than just a tutor, but as a role model and mentor as well. The high school mentors are given the name “Junior Professors” and the program is termed “Junior University” to further support the belief to these mentored children that they can indeed go to college.
This chapter is organized to analyze data collected from a treatment group (the mentored students) and a control group (non-mentored students) separately and then combine the two groups into an analysis to understand the fruit being borne by the Junior University. The intention is to first discover if the children in each group are substantially similar and once that is established, compare standardized California test data year-to-year between each of the groups to ascertain if there is a statistically significant improvement with the mentored children as compared to the control group.

**Purpose of the Study**

The purpose of the study was to determine the influence one-on-one mentoring by college-bound high school students has on at-risk elementary school students. Existing state-mandated standardized test data were analyzed to determine if statistical differences were present between the year-to-year test scores of mentored students as compared to a like number of students at the same school that did not participate in the mentoring program.

**Aim of the Study**

The primary aim of the study was to determine the effects of the mentoring of at-risk elementary school students by college-bound high school students. Further steps were to make recommendations about the continuance of the program or to suggest improvements based on the statistical analysis of the data.

**Research Question**

Would students participating in the Junior University mentoring program show increased test scores year-to-year in the California state-mandated CST (California State Testing) compared to students in the same school who did not participate in the program?
Findings of Mentored Group

The mentored group consisted of 54 records of students that had spent at least one year in the mentoring program. As discussed earlier, a student could have two records if they spent more than one year in the program. Record one was comprised of beginning and ending of their first year in the program whereas record two would be comprised of their score at the beginning of year two and the end of year two. Using this data, records were compiled for approximately 30% of the students in the mentoring program (54 of 183). The data was de-identified and presented with gender, ethnic group, first year scores in English/language arts, second year scores in English/language arts, first year scores in mathematics and second year scores in mathematics. In analyzing the data from the treatment group (those that had gone through the training), the data revealed that the scores for the students fit into a natural bell-shaped curve for this particular dataset. Also, it was apparent that with the exception of a few outliers, the scores had improved significantly from year 1 to year 2. Table 3 lists the critical statistical data for the mentored students.

Table 3

| Statistical Data for Treatment (Mentored) Students |
|----------------------------------|--|---|---|---|---|---|
| Mentored (Treatment) Group of Students | Language | Math | |
| Count | Year 1 | Year 2 | Change | Year 1 | Year 2 | Change |
| Min Score | 54 | 54 | -52 | 54 | 54 | -91 |
| Mean Score | 217 | 223 | 24.33 | 208 | 229 | 35.04 |
| Max Score | 286.07 | 310.41 | 41.57 | 303.46 | 338.50 | 173 |
| SD | 48.63 | 473 | 64.87 | 57.01 | 66.70 | 65.72 |
| Std Error | 6.68 | 8.91 | 3.88 | 7.83 | 9.16 | |
| T-Score | 42.82 | 39.64 | 4.26 | 34.06 | 36.95 | |
| p Score | 0.000041 | .000144 | |
The data contained in Table 3 encompasses a total of 54 records for students that spent at least one year in the mentoring program. Looking deeper into the language score changes, with the $SD = 41.57$ and a mean score improvement of 24.33, approximately $68\%$ of the treatment group fell within the range of a decrease in test scores of 17.24 points to an increase of 65.90 points. For the math scores, the $SD = 65.72$ was observed indicating that for one standard deviation the range in scores was 65.72 points on either side of the mean or a decrease of 30.68 points and an increase of 100.76 points encompassing $68\%$ of scores.

Narrowing in on the language scores for the mentored group, the T-score indicates how statistically relevant the sample is that was chosen. The data show that a different random selection of scores would have had an infinitesimally small chance of resulting in statistically different results. With a T-score of 4.26, the chances of other data chosen at random from the sample yielding different results is remarkably small. This indicates that the data supports the chances of another random sample resulting in different conclusions are $4.26 SD$ or statistically in excess of a $0.1\%$ chance of occurrence. In fact, the very low p-score of .00004 demonstrates there is less than 1 in 25,000 chance that another sample would have produced statistically significant different data. Therefore, we can safely conclude that the random sample of data accurately reflects the population.

In examining the language data a different way, the test results were “binned” into a series of 16 different classes, each representing a score change of 20 points. For instance, one bin would include all students whose score change was between 1 and 20
points. In this way, a bar graph was constructed to illustrate the data distribution for both the language change and math change for the mentored students. The data for the language change year-to-year for mentored language students is shown in Figure 2.

The findings illustrate a classic Gaussian distribution curve with the bin representing score changes between 0 and 20 points being more prevalent than others, having 11 data instances. Likewise, the trend line closely approximates the binning approach being slightly to the right of the binning results.

Switching to the math score changes, as previously pointed out, a standard deviation of 65.72 and a mean score improvement of 35.04 ($M=35.04$) indicates that approximately 68% of the treatment group fell within the range of a decrease in test scores of 30.68 points to an increase of 100.76 points.

As with the language scores a T-score of 3.26 indicates how statistically relevant the sample is that was chosen. A different random selection of data would have had a
less than .0003 chance of resulting in statistically different results. With this T-score the chance of other data chosen at random from the sample yielding different results is remarkably small. The p-score of .0003 demonstrates there is less than a 1 in 300 chance that another sample would have produced statistically significant different data. Therefore, we can again safely conclude that the random sample of data accurately reflects the population.

As with the mentored language test score difference, the test improvements for the math scores changes year-to-year were binned into a series of 16 different classes, each again representing a score change of 20 points. The data for the math scores changes differed significantly from the language score changes in that the math scores changes were bi-modal. Peak raw change numbers were interestingly at -40 point changes (a decrease year-to-year in math) and a second peak at the bin representing improvements from 61-80 points year-to-year. The data for the math change year-to-year for mentored math students are shown in Figure 3.

![Mentored Math Change](image)

*Figure 3. Mentored math change year-to-year.*
The findings illustrate a bi-modal distribution with the bin representing maximum number of score changes between -59 and -40 with 7 instantiations and between a 61 and 80-point improvement with 8 instances being most prevalent. The trend line appears to be skewed towards an overall improvement in scores as most scores clearly lie to the right of the zero line, indicating year-to-year improvement.

Findings of Control Group

The control group consisted of 53 records of students that had spent time at the at-risk elementary school, but either had not been chosen by their teacher or had not elected to participate in the Junior University program. With 53 records and 433 students enrolled in the school in the 2012/13 school year, the number of samples was approximately 12% of total students enrolled. The data were de-identified and consisted of gender, ethnic group, first year scores in English/language arts, second year scores in English/language arts, first year scores in mathematics and second year scores in mathematics. In analyzing the data from the control group, the data revealed that the scores for the students deviated from a natural bell-shaped curve for this particular dataset. Also, it was apparent that the data were much more random than that of the mentored students and subject to further study.
Table 4

Statistical Data for Control Students

<table>
<thead>
<tr>
<th></th>
<th>Language</th>
<th></th>
<th>Math</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Year 1</td>
<td>Year 2</td>
<td>Change</td>
</tr>
<tr>
<td>Min Score</td>
<td>249</td>
<td>256</td>
<td>-136</td>
<td></td>
</tr>
<tr>
<td>Mean Score</td>
<td>377.53</td>
<td>361.89</td>
<td>-15.64</td>
<td></td>
</tr>
<tr>
<td>Max Score</td>
<td>600</td>
<td>488</td>
<td>72</td>
<td></td>
</tr>
<tr>
<td>Std Deviation</td>
<td>60.72</td>
<td>52.14</td>
<td>46.86</td>
<td></td>
</tr>
<tr>
<td>Std Error</td>
<td>8.42</td>
<td>7.23</td>
<td>6.50</td>
<td></td>
</tr>
<tr>
<td>T-Score</td>
<td>44.83</td>
<td>50.05</td>
<td>-2.41</td>
<td></td>
</tr>
<tr>
<td>p Score</td>
<td>0.00098</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The data contained in Table 4 encompasses a total of 53 records for control students that attending the same school as the mentored students. In looking at the language score changes for the control group, with a standard deviation of 46.86 ($SD = 46.86$) and a mean score decline of -15.64, approximately 68% of the treatment group fell within the range of a decrease in test scores of 62.50 points to a rather small increase of 31.22 points. This is somewhat disconcerting as it indicates that even allowing for normalization, test scores fell for students not involved in an intervention program (Junior University) compared to those that were. For the math scores, a standard deviation of 80.90 ($SD = 80.90$) was observed indicating that for one standard deviation the range in scores was 80.90 points on either side of the mean or a decrease of 90.52 points and an increase of 70.28 points encompassing 68% of scores. Narrowing in on the language scores for the control group, the T-score indicates how statistically relevant the sample is that was chosen. The data show that a different random selection of scores would have had a very small chance of resulting in statistically different results. With a
T-score of -2.41, the chances of other data chosen at random from the sample yielding different results is small. A negative T-value simply indicates a reversal in the directionality of the effect, which has no bearing on the significance of the difference between groups.

In fact, the p-score of .0098 demonstrates this, as there is approximately a 1% chance that another random sample from the same data would have produced a different result. This statistic, while still somewhat unlikely, does indicate that the scores are not as statistically relevant as scores for the mentored group.

In examining the language data a different way, the test differences, similar to the mentored group, were binned into a series of 16 different classes, each representing a score change of 20 points. In this way, a graph was constructed to illustrate the data distribution for both the language change and math change for the control group of students. The data for the language change year-to-year for control language students are shown in Figure 4. As can be seen from the data, it is much more dispersed than the data from the treatment group and as such, indicates a much higher level of variability between the mentored group and the control group of students.
Figure 4. Control group English/language arts change year-to-year.

The findings illustrate a relatively normal Gaussian distribution curve with the bin representing score changes between -40 and -20 points being more prevalent than others, having 10 data instances. Likewise, the trend line closely approximates the binning approach being slightly to the right of the binning results. The interesting thing to point out is that far more students in the control group showed declining test scores year-to-year as those compared with the treatment group.

Switching to the math score changes, a standard deviation of 80.90 and a mean score decline of -9.62 indicate that approximately 68% of the treatment group fell within the range of a decrease in test scores of 81.52 points to an increase of 71.28 points.

A T-score of -0.86 indicates how relevant the sample is that was chosen. With a p-score of .1975, a different random selection of data would have had a less than a 1 in 5 chance of resulting in statistically different results. This probability score contains far less certainty than the other p-scores, but it still significant in that only 1 in 5 random samples might have yielded statistically different results.
As with the control language group score difference, the test improvements for the math scores changes year-to-year were binned into a series of 16 different classes, each again representing a score change of 20 points. The data for the math scores changes differed significantly from the language score changes in that the math scores changes, while not being bi-modal, demonstrated erratic data accounting for the relatively high p-score of .1975. Peak raw change numbers were interestingly at the -120 to -100 point changes (a decrease year-to-year in math) and a second peak at the bin representing declines from -20-0 points year-to-year. The data for math changes year-to-year for control math students is shown in Figure 5.

Figure 5. Mentored math change year-to-year.

As mentioned, the findings illustrate a bi-modal distribution with the graph representing the score changes between -121 and -100 (6 instantiations) and between -20 and 0-point improvements with 9 instances being the incidences of that number. The trend line appears to be spread out over quite a wide range indicating that there is not a large correlation between test scores of one year and test scores of the following year.
The p-score for this group lies at 19.75% indicating that the data has an approximately 1 in 5 chance of being statistically different from another random sample. This is certainly higher than previously observed p-scores and points out the variability of the data and to an extent its unreliability.

The data presented for the control group is less statistically significant due to its variability within the sample size. The mentored language and math changes are distinctly significantly significant whereas the control group samples are less so. The implications of this are that the control group samples are less reliable, spread across a larger data group, and more random that the mentored group.

**Subjective Comparisons of Mentored Groups vs. Control Group**

In examining the data, a theme emerges from the statistical analysis of the data. The conclusion is that the mentored group data analysis is much more statistically significant than the control group. From a subjective manner, it is important to look at the data via a scatterplot from each source.

The scatterplot for score differences for the mentored group of students is shown in Figure 6. This data represent the difference between the test scores for English/language arts scores and math scores between the mentored and control groups. The graph is divided into four quadrants. The upper left quadrant represents students in the mentored group that showed improvement in math, but a decline in language. The lower left quadrant illustrates students with declines in both English/language arts and math year to year. The upper right hand quadrant is comprised of students that improved their test scores in both English/language arts and math and finally, the lower left hand
quadrant shows students that declined in math, but improved in English/language arts skills.

![Scatterplot of English/language arts and math score changes for mentored students.](image)

**Figure 6.** Scatterplot of English/language arts and math score changes for mentored students.

It is clear (subjectively) from the data presented above that there is a discernable increase in test scores for the mentored group of students as measured on a year-to-year basis. For example, only 6 students showed declines in both English/language arts during their before and after testing in the mentoring group whereas 26 showed improvement in both English/language arts AND math. 19 showed improvement in one of the two disciplines and the other 13 showed marginal or no improvement in either discipline.

Turning to the control group, the data show quite a different result. As can be expected from the statistical variation presented earlier, the numbers for the control group vary considerably. The scatterplot for the control group is shown in Figure 7.
As can be seen from Figure 7, the control group data show little or no pattern consistency. As contrasted with the mentored group, 18 of the 53 students had a decline in scores for BOTH English/language arts and math compared to only 6 for the treatment group (mentored students). Moreover, the data are widely scattered to indicate no discernable trend. This indicates the students show a remarkable independence in test scores, most likely due to their individual circumstances. While this will be explored in more detail in Chapter 5, it is evident that there are no factors within the school that result in test score changes other than perhaps the quality of the teachers each student had. The changes may also be explained by either individual student motivation or conditions at home or in school that result in learning being more difficult.

**Comparing the two groups – Mentored (treatment) and Control (non-mentored)**

While subjectively, it is rather easy to conclude that the mentored (treatment) group students improved their test scores more than the control group, a statistical
comparison between the two groups will conclusively demonstrate that assumption. In comparing the test score changes for the treatment group with the test score changes from the control group, data were generated for the English/language arts section as illustrated in Table 5.

Table 5

*Statistical Comparison between Test Score Changes for Mentored and Control Groups for English/Language Arts*

<table>
<thead>
<tr>
<th></th>
<th>Language Change (Mentored)</th>
<th>Language Change (Control)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>24.33</td>
<td>-15.64</td>
</tr>
<tr>
<td>Variance</td>
<td>1728.18</td>
<td>2196.31</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>41.57</td>
<td>46.86</td>
</tr>
<tr>
<td>Observations</td>
<td>54</td>
<td>53</td>
</tr>
<tr>
<td>t Stat</td>
<td>4.664558921</td>
<td></td>
</tr>
<tr>
<td>P(T&lt;=t) one-tail</td>
<td>4.66074E-06</td>
<td></td>
</tr>
<tr>
<td>t Critical one-tail</td>
<td>1.659782273 alpha=.05</td>
<td></td>
</tr>
</tbody>
</table>

95% Confidence Interval for Mean Language Change [22.975, 56.965]

As illustrated above, the mean language change year-to-year for mentored students was 24.33 ($M=24.33$) with a standard deviation of 41.57 ($SD = 41.57$). This would indicate that 68% (1 standard deviation) of the score deviations from the mean would fall between a decrease of -17.24 and an increase of 65.90 on the CST (California Standards Test). Conversely, the control group shows a mean DROP in test scores of -15.64 ($M=-15.64$). Therefore, statistically, 68% of the scores (1 standard deviation) would be in a range between a 65.5 decrease and an improvement of 31.22 points. With a
one-tail p value of 4.66074E-06, it is conclusive that the English/language arts test scores for the mentored group are significantly improved versus the control group.

In terms of the statistical relevancy of the math data, the scores, while not as conclusive statistically as the language scores, still provide a high degree of certainly that the treatment (mentored) student scores improved more than the control group math scores. The data are presented in Table 6 below.

Table 6

*Comparison between Test Score Changes for Mentored and Control Groups for Math*

<table>
<thead>
<tr>
<th>t-Test: Two-Sample Assuming Unequal Variances</th>
<th>Math Change (Mentored)</th>
<th>Math Change (Control)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>35.04</td>
<td>-9.62</td>
</tr>
<tr>
<td>Variance</td>
<td>4319.06</td>
<td>6584.55</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>65.72</td>
<td>80.90</td>
</tr>
<tr>
<td>Observations</td>
<td>54</td>
<td>53</td>
</tr>
<tr>
<td>t Stat</td>
<td>3.13087008</td>
<td></td>
</tr>
<tr>
<td>P(T&lt;=t) one-tail</td>
<td>0.00114271</td>
<td></td>
</tr>
<tr>
<td>t Critical one-tail</td>
<td>2.364217</td>
<td>alpha=.01 significance</td>
</tr>
</tbody>
</table>

95% Confidence Interval for Mean Math Change

[16.36, 72.96]

As noted above, the mean math change year-to-year for mentored students was 35.04 ($M = 35.04$) with a standard deviation of 65.72 ($SD = 65.72$). This would indicate that 68% (1 standard deviation) of the scores would fall between a decrease of -17.24 and an increase of 65.90 on the CST (California Standards Test). Conversely, the control group mean shows a mean DROP in test scores of -15.64 ($M = -15.64$). Therefore, statistically, 68% of the scores (1 standard deviation) would be in a range between a 65.5 decrease and an improvement of 31.22 points. With a one-tail p value of 0.00114271 ($p =$
.00), it is conclusive that the math test scores for the mentored group are significantly improved versus the control group.

**Summary of the Findings**

The data were compared initially for relevance within the distribution from which the data were chosen. For example, the data for the mentored (treatment) group was examined to determine if the sample size was large enough and relevant enough to result in p-scores that would indicate a statistical significance with the whole population. The same was done for the control group.

Upon analysis of the data, it was clear that the data and statistical analysis demonstrated from the sample sizes of the treatment (mentored) group and the control group sufficiently represented the population as a whole. The only data analysis that was somewhat questionable was the math scores from the control group and even those scores demonstrated a correlation that revealed there was only a 1 in 5 chance that a different selection of data would have revealed a different result.

Only when the data from the control group was compared against the data from the treatment group were truly meaningful results determined. It was evident from the t-test and p-scores that the data was statistically significant and overwhelming supported the hypothesis that students in the mentored program increased their scores more than those students in the control group. In looking at the mean test score increases for the treatment (mentored) group \((M=24.33)\) for mentored English/language arts testing and \((M=35.04)\) for mentored math scores, it is clear that the mentored group far surpassed the control group. The control group exhibited a mean of \(-15.64\) \((M=-15.64)\) for the English/language arts testing year-to-year and a mean of \(-9.62\) \((M=-9.62)\) for the math
testing. It is disheartening to realize that year-to-year scores for control students actually declined year-to-year, demonstrating the criticality of the Junior University program that showed significant mean increases in both English/language arts and math scores.

**Analysis and Synthesis of Findings**

As illustrated by the data analysis, there is a clear statistical evidence of an improvement between students that were in the mentored program versus students in the control group (non-mentored students). The findings were not only conclusive, but were overwhelming. A child in the mentored student group improved their scores in language arts by a mean of nearly 24 points versus a decrease year-to-year of over 15 points for the control group. Math students in the mentored group increased their scores by a mean of 24.33 ($M=24.33$) points year-to-year versus a decline of nearly 10 points year to year for the control group. The data supports the work of the Junior University and in fact, suggests that it be expanded further to include more students. The primary aim of the study was to determine the effects college bound high school students mentoring at-risk elementary school students and once those effects were understood, make recommendations about the continuance of the program or to suggest improvements based on the statistical analysis of the data.

The effects are that the mentored students enjoy far more success than their counterparts who did not participate in the Junior University program. Recommendations will be made in Chapter 5 as to changes that should be made to the program and how to scale it to a larger effort given its impact on students. It is clear that program expansion is the number one recommendation to come from the study and the most pressing question is how.
Support for the Solution from Data Collected

The study indicates conclusively that students participating in the mentoring program as offered via the Junior University significantly improve their English/language arts and math scores when compared to students from like socio-economic backgrounds. This is not to say that students not involved in the program cannot excel. What is does conclude is that far fewer students get “left behind” in their academic studies. The scatterplot data from Figures 6 and 7 illustrate how many students demonstrate improvement in at least one of the two subject areas year-to-year (English/language arts and math) for both mentored (treatment) group students and the control group students. 89% of students in the mentored group improved in at least one subject area while only 57% of the control group of students showed improvement in one subject area.

Policies Influenced/Influencing the Proposed Solution

The primary policy that could result in the end of this effective program is the contention by a person or group that it violates the Establishment Clause of the United States Constitution. Were someone to contend that Christianity was being proselytized, it could create issues that may be insurmountable. Not having the ability to send private Christian High School students to the at-risk elementary school on a weekly basis due to a challenge to the constitutionality of the program would certainly result in the death of the program. However, by using the Declaration of Independence as the guiding document for the program has allayed any fears of the principals at the involved schools. They realize that any challenge to the Declaration of Independence as a vehicle to bring religious persuasion into a school would be futile.
Potential Barriers and Obstacles to Proposed Solution

The biggest issue facing Junior University is scaling. As mentioned earlier in this document, the program currently results in over 300 student-trips per week for the Junior University (as well as an after-school program called Lighthouse) to the schools. In order to scale the program to other schools, it is critical that other schools, especially public high schools get involved. A partnership with a local public high school, which serves as the feeder school for the elementary school that is the subject of the study has been formed and students from that school are already involved in mentoring at-risk children at a different school in the same school district.

Financial Issues Related to Program Continuance

Currently, as mentioned previously, Valley Christian School buses approximately 300 student-trips to the campus of the at-risk elementary school involved in the mentoring program. To scale the program, it is critical that public high schools adopt a mission to help children adopt the mindset of attending college. A basic conviction of the program directors has been that every public high school, regardless of the socio-economic status, contains students that are enthused about volunteering to help elementary school students become more motivated and more willing to include college in their plans. However, the logistics may prove daunting. Busing students to the elementary schools costs money that schools do not have. Financing the fairly minimal costs of the program may be an issue for at-risk schools. This is the primary obstacle facing Valley Christian Schools as they attempt to scale the program.
Legal Issues Related to Junior University

As mentioned earlier, the primary exposure to the school comes in the threat of a parent or activist mounting an Establishment Clause claim against the school. The Establishment Clause prohibits the government from making any law “respecting an establishment of religion.” This clause not only forbids the government from establishing an official religion, but also prohibits government actions that unduly favor one religion over another. Were Valley Christian be accused of introducing religion into a public school, the government would have to answer to a charge that they were allowing a public body to unduly favor one religion over another.

Summary

Capturing the imagination of young students is a daunting, yet critical task to ensure that today’s children are motivated to become tomorrow’s scientists, doctors, and lawyers. This is especially true in the area of at-risk children who many times do not enjoy the socio-economic environment for education that many children of more successful parents are privileged to have. According to data introduced earlier in the study, at-risk children have higher incidences of single-parent families, parents that are incarcerated, lower economic incomes, and household members that have rarely gone to college. These situations come together to create a condition where the child has never considered college in his/her plans. What potentially await them are introductions to drugs, gangs, and sub-cultures that invite trouble for society.

The Junior University program was established to combat these very situations. The program strives to implant into every child the belief that they have value and can someday not only attend, but graduate from college given hard work and direction. The
study in this paper was designed to gather quantitative data for students in the Junior University program and compare that against students not in the Junior University program and conclusively determine if students in the program outperformed their peers that did not participate in the program. It has been statistically demonstrated that students participating in the Junior University program have higher scores year-to-year than students not in the program. While there may be other causal reasons for these improvements, the data clearly show that enrichment results from participating in the program. For that reason, the program should be extended to other at-risk elementary schools by tapping into the local public high schools for mentors. Many of these high school students have siblings or friends in these schools and are anxious to help given the chance. This was the case when Valley Christian Schools approached Andrew Hill High School regarding becoming involved at a second school in the district. Valley Christian faculty sponsors trained students and while the program is in its infancy as far as public school participation, the initial results are promising. It is only through the scaling of these programs will success become scalable.

The statistical analysis of the results of year-to-year test results demonstrates overwhelming evidence of the efficacy of the program. The biggest question is not whether to continue the program, but how is the program effectively and efficiently expanded to expose as many at-risk children to it as possible. This will require the cooperation of public school district superintendents as well as principals, teachers, and the mentoring population that will need to emerge from private and public high schools. The results are there, the program is defined, the students are willing and the only
question is whether or not school district officials and leadership at target schools can be convinced of the effectiveness of the program.
CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

Introduction

Improving public education in the United States is a daunting task. However, looking at the mission at the level of an individual school district makes the job appear more manageable. Still, the question remains as to the best way to accomplish one’s goals. Money does not seem to be the answer as the funding per student in the state of California has increased from $7,006 per student in 2011/2012 to $9,069 per student in 2014/2015, an increase of almost 30% in three short years (California Department of Education, 2014) and yet the dropout rate still exceeds 30%. These are only Proposition 98 funds and do not include other funding sources such as the Federal Government. Proposition 98, approved by the voters in 1988, provides a constitutionally guaranteed minimum level of funding to K–12 schools and community colleges (California Department of Education, 2014).

The real solution is to create within each student a desire to learn. If that can be rooted at an early age the issue of lack of success in schools becomes self-correcting. Students who care to learn will make better grades. The purpose of this study was to understand quantitatively the effectiveness of a one-to-one mentoring program by college-bound high school student to at-risk elementary school students. This study is important because while there is ample literature regarding the effectiveness of mentoring by adults, there has been very little work done to ascertain if mentoring done by people closer in age to the at-risk students would make a difference in their willingness to study hard and consequently make better grades.
In this chapter, conclusions were reached as a consequence of test score data obtained from the principal of the at-risk school for both mentored (treatment) students and a control group of non-mentored students. Moreover, the implications of this data will be discussed and recommendations for not only the current program, but for future areas of concentration will be outlined.

The outcome of research data was conclusive. One-on-one mentoring of at-risk elementary school students by college-bound high school students significantly improved their year-to-year CST scores when compared to a like group of students who had not participated in the mentoring. The recommendations will center around how to scales the program to reach more schools as well as further studies into the causal effects the mentoring may have on the students.

**Summary of the Study**

The study was developed to statistically quantify the efficacy of the mentoring of at-risk elementary school students by college-bound high school students. The only conclusive method to determine its effectiveness was to compare it to a control group of at-risk students at the same school with socio-economic status substantially comparable to the mentored (treatment) group of students. The purpose of this study was to understand quantitatively the effectiveness of a one-to-one mentoring program by college-bound high school students to at-risk elementary school students.

The primary aim of the study was to determine the effects of the mentoring of at-risk elementary school students by college-bound high school students and to make recommendations about the continuance of the program or to suggest improvements based on the statistical analysis of the data.
The methodology involved the collection of data of mentored (treatment) students and a group of control (non-mentored) students and then comparing improvements or declines year-to-year in state-mandated standardized testing scores known as CST. The participants for the study were gathered from two groups of elementary school-age students from a San Jose, California, at-risk school in the Franklin-McKinley school district. The first group was comprised of 53 records for at-risk students who had participated for a minimum of one year in the Junior University program. The second group consisted of 54 records for students who had not spent any time in the program but attended the same school and came from similar ethnic and socio-economic backgrounds. The sample size is adequately large in that it includes over 40% of the participants in the Junior University program and approximately 15% of the total students in the school in the control group. The quantitative study used existing CSR score test data that were forwarded to the researcher by the principal of the school upon IRB approval.

The mentored (treatment) group needed to have been mentored for a minimum of one year and also needed to have California test scores available before and after the mentoring program. The second group (control group) also required test data be available for the prior year as well as one year later to be included in the study. The initial test scores for both groups were taken beginning in school year 2008/2009 with the last set of scores being from the 2012/2013 school year. This is the timeframe the Junior University program has been in existence and California standard test data available. It should be noted that the California STAR testing should provide consistent scores grade-to-grade due to the test increasing in difficulty commensurate with the expected learning progress for the student. Therefore, as an example, a third grader scoring 400 on the
literature test would be expected to score 400 in the fourth grade assuming normal progress in the classroom. A higher score indicates success beyond that expected while a lower score indicates there are factors causing the student to learn at a less-than-acceptable level. Access to those groups was via the principal of the elementary school the at-risk children attend. No student names were revealed to the researcher, only the ethnic class, gender, and grade. The primary data were de-identified California standardized test scores for the spring preceding and the spring following the mentoring year for the mentored students and the spring of the school year for control students compared with the testing administered in the spring following the first year of testing.

**Implementation of Solution Processes and Considerations**

The program implementation was developed in 2007 as a request for help from a local San Jose-based at-risk elementary school. The principal was falling behind the minimum state-mandated standardized testing scores and, with no additional funding available, reached out to a nearby private, Christian high school with the anticipation of receiving some help in the form of tutoring for her struggling children. What emerged from this was a comprehensive program involving over 100 students from the at-risk elementary school and 300 weekly student trips from the private high school engaged in not only tutoring, but also mentoring these young children. The key difference between tutoring and mentoring is that in mentoring, the students develop a relationship with the child and commit to a minimum of one year of service with that child not only to tutor him/her in academic subjects, but also to serve as a surrogate “big brother/sister.” This involved developing a relationship with the student, attending key events in the student’s
life, and being available at other times to support him/her whether for academic or personal needs.

There are many considerations to examine when looking at the data. Most students entering the program were chosen due to some type of learning issue in one of their subject areas and were recommended by their teachers. Bear in mind that this mentoring used in-class time, time that is not normally given up easily by teachers. They clearly recognized the value of the mentoring. One might argue that a weakness in the study is that the students in the mentored group were skewed towards underperforming students. While there is some truth to this, it is evident by looking at individual data that a number of high-performing test students were selected for mentoring. This suggests there were other reasons, perhaps behavioral, for putting them in the class. Whatever the case, the primary purpose of the research was to examine student test score gains rather than focus on raw scores. It was the gains that moved the school from a near-probationary status to the highest-performing non-charter at-risk school in Santa Clara County.

**Roles and Responsibilities of Key Players in Junior University**

The key person in any program at the elementary level of a public school is the principal and, to a similar degree, the superintendent of the school district. If an outside entity is unable to get the support of both of those individuals, the program will have little chance of success. The key to the Junior University program was the initial contact was made to Valley Christian High School by the struggling public elementary school principal. It was done somewhat in desperation as her school was falling far below
acceptable California State Standards and had no funding available to address the problem. Other key players and their responsibilities are as follows:

**Community-relations director of the high school** – This person leads all community outreach for the high school and must see a compelling reason to commit her students’ resources to such a program. With many needs in the community, there no doubt were other places those resources could have been deployed. This person’s role is to develop the mentoring approach, recruit students, and coordinate transportation to the elementary school and back.

**Teachers of at-risk students** – The role of the teachers of the students involved in Junior University is to select those most in need of 1-to-1 tutoring and recommend them for the class. These teachers are critical to the success of the program as they must nominate each child for the class. Continuing to nominate, of course, is highly dependent upon the results of the program.

**College-Bound high school students** – Students at Valley Christian require approximately 50 hours of community service each year. This service can be performed in a variety of ways and many organizations “market” their needs to the students in the hope of gaining valuable volunteer services. The Junior University program, in its infancy, had the same issues. However, the program has grown in popularity now that students have to “interview” for a spot on the Junior University mentoring team.

**Valley Christian administration** – The current administration is fully committed to the Junior University, its ideals, the resources required, and the expense associated with transportation. However, these resources will be critical in the future and, depending upon fluctuating priorities, may not be in the future.
Other school administrators – Thus far, Valley Christian has formed the Junior University consortium that consists of the principals of the three schools where mentoring takes place (even though only one was part of this study), the principal of the feeder junior high school, and the principal of the feeder senior high school. It is critical that these administrators stay involved and support the program. Without them, the program cannot grow organically within the public schools and that is the only way to be scalable. Furthermore, to reach the next level, it is critical that other school administrations adopt the program. The plan thus far is to focus on one school district. However, to truly have an impact, this program must extend to other school districts and larger jurisdictions. That may be difficult and thus must always be a goal of the group.

Leader’s Role in Implementing Proposed Solution

The leader in this case is the community relations director of any given school. The title may differ, but the job description is essentially community outreach, a program embedded in nearly every private school graduation requirement. They provide the most input, the primary recommendations, and the methodology via which the school will reach the community. Some directors feel the homeless are most important. Others believe cleaning up graffiti or helping churches is more important. For a program such as Junior University to be successful, it is important that the community relations director receive direction from the school leadership that helping at-risk elementary school children is paramount.

Convincing Others to Support the Proposed Solution

While this topic is somewhat “in the past” for the Junior University program, for the program to grow and flourish across other school districts, it is important the needs
are well understood and communicated. The resource requirement is huge in terms of student hours, transportation, and commitment from the at-risk school administration. Only by providing a proven model such as Junior University can this be accomplished. Critical to the success of the program was the early support and involvement of the superintendent of the school district as well as the principal of the targeted at-risk school.

**Critical Pieces Needed for Implementation and Assessment**

The program primarily needs a commitment of student, teacher, and transportation resources for the program to be successful. This takes a commitment not from the bottom, but from the top. It takes commitment from the management of both the mentoring school as well as the school system being mentored. But these are only the parts being assembled to make the mentoring successful. What is really needed is buy-in to the program and its associative relation to the Declaration of Independence. This governing document is the catalyst to allow a private Christian or Parochial school to partner with public school systems without intervention or hesitancy from those concerned with the Establishment Clause. The Declaration of Independence is an interesting “bridging” document. It most assuredly confirms the existence of a “creator,” yet is a document no public school administrator can object to. This explains why every child who goes through the Junior University program learns the “Declaration Song” to reinforce the beliefs of our founding fathers that ALL people have a right to life, liberty, and the pursuit of happiness.

**Internal and External Implications for Valley Christian Schools**

Since the inception of Junior University, it has been thought of as a “pilot” program, specifically created and crafted for a specific school district filled with at-risk
elementary schools and their accompanying issues. The one thing always contemplated was “how is this program scalable” and two “how will the resources be marshaled to extend it beyond its current function?” These are two very important questions and must be contemplated in any future implementation of the program. One school alone cannot scale this program beyond its current capacity. True, help has been received from the local public high school, Andrew Hill High School, which is also a feeder school for the elementary schools, but this is still something of a “drop in the bucket.” The key is to gain acceptance almost virally via word of mouth of principals, teachers, and administrators to the school districts that may have an interest.

**Implications and Considerations Facing Implementation of the Proposed Solutions by Leaders**

This plan is highly susceptible to an attack from the far left of the American political spectrum as it concerns the Establishment Clause as contained in the first amendment. While using the Declaration of Independence as a “shield” from the prospect of invasion by first amendment constitutionalists, it is equally clear that there are people who do not even see this as adequate protection from the first amendment rights of those opposed to the program. Why would one oppose such a program that obviously provides light, happiness, and joy for its participants? One can only wonder, but this will be a continual attack, exploited by those who hide behind the Constitution and ignore the good that is being done by the program.

**Summary of the Study**

This study of the effects of the mentoring of at-risk elementary school children by college-bound high school students is important because it contains data that without
question validate the hypothesis that children mentored under this program not only improve, but substantially improve their year-to-year test scores as measured by the California CST scores. These scores and the differences between the treatment and control groups are without controversy as they represent consistent, measured test data for all California students in grades two through eleven. The data illustrate that the difference in the improvement in the scores between the treatment and control group is statistically significant.

While the improvement in the scores is certainly encouraging, questions do arise as to the reasons why the data appear to suggest such an impact merely due to the mentoring of students. Might there be other causal effects of the mentoring program that reach beyond the act of college-bound students forming a bond with at-risk students? Whatever the case, it is clear that students engaged in the mentoring program demonstrated statistically significant gains in test scores year-to-year as compared to students not involved in the mentoring program.

**Implications for Action/Recommendations for Further Research**

This study has provided many benchmarks illustrating the base improvement of at-risk children being involved in the collaborative mentoring program, as taught by college-bound high school students, compared to a control group of students who did not participate in the mentoring. While the data are convincing and overwhelming that students’ scores for those involved in the mentoring program increased significantly more than the ones of those not involved, there are still interesting areas of research that need further examination.
The first is an inspection of the causal effects of the mentoring. Did the mentored children gain increased self-esteem as a result of the program? Did they gain in stature among their peers? Did they increase pride in the view of their parents, thus representing a higher degree of self-confidence? While it is clear that the test results increased for those mentored students, it is equally clear that there could be other factors impacting their test scores.

Students were also involved in the mentoring program who did not show improvement in their test scores and, in fact, showed declines in both the English/language arts as well as the math portions of the testing. While relatively few of the students showed decline in both subject areas, there was a disturbing number showing decline in one of the two subject areas. While not nearly as significant as the control group, it is nevertheless disconcerting that a fairly large percentage of students showed a decline in one subject area and an improvement in the other. Reasons can be varied, but while the fact remains that students in the mentored group overall showed statistically significant improvements compared to their counterparts in the control group, it is equally clear that there is room for improvement in both subject areas. This could certainly be an area for further research.

An additional area for study, one that may take longer to assess, would be to follow the mentees throughout their educational journeys. Did they become mentors themselves as they continued to realize the benefits of the program? Did they accomplish the primary goal of going to college or at the very least becoming productive citizens in their own right?
One final area of future research would be to assess the impact the mentoring had on the mentors themselves. What benefits did they derive from the mentoring as they entered and ultimately completed college? Were they more service-minded? Did they consider mission trips to either other countries or economically disadvantaged areas of the United States? In short, did they develop heightened senses of social conscience, compelling them to undertake more volunteer and community service work than they perhaps ordinarily may have?

**Summary**

This study proved to be impactful – impactful in that it illustrates that the Junior University program as envisioned by a public elementary school principal years ago did indeed result in significant improvements in test scores for students mentored in the Junior University program as compared to students not involved in the program. The improvements were quantified based on an empirical study of test scores analyzed from the CST given to every public school student in grades 2 through 11 through 2013. The increase in test scores was substantial, statistically significant, and an indicator that the program needs not only to be continued, but also expanded. The biggest question facing the program is the expansion methodology needed and the rate at which expansion can occur. It is apparent that the effort cannot be sustained by one high school. With over 300 student trips alone to one at-risk elementary school, the only avenue to expansion is an embracing of the program by not only other private high schools, but public high schools as well. The first step in this approach was to approach the public high school these students will ultimately feed into. This has proven successful, as Andrew Hill High School in San Jose has embraced an at-risk elementary school in the same district as the
initial elementary school. The next task is to recruit other private schools in the area and implement the program with them in other at-risk areas. Essentially, this becomes a block-by-block effort, training schools to adopt elementary schools until the model proves to be so successful that it moves into the viral stage. The key to this lies in the adoption of the Declaration of Independence as the governing document to eliminate the Establishment Clause issue and to gain a commitment of at least one year from the high school students, giving them an opportunity to develop a true mentoring relationship with the young students.

All great ideas start small. Therefore, the school is not predicting a widespread adoption of the program. The first goal is the adoption by the Franklin McKinley School District in San Jose. Results are encouraging as middle school principals are recognizing the quality of students being delivered to them by the mentored students and are supportive of the program. This, of course, is the finest example of the success of the program. The critical element is that while it was always suggested that mentored students improved their test scores in relation to non-mentored students, this study has proven with statistical significance that scores have indeed jumped far in advance of those students not involved in the program. As pointed out earlier, non-mentored students still showed improvement on an individual basis. The issue is that the improvements and declines in test scores for non-mentored students are so variable, that one can only conclude the students involved who are not mentored “fend for themselves” as far as progress is concerned. There will always be students who succeed in spite of the challenges faced, but at the same time, these challenges will bring many students to their collective knees by creating an atmosphere where they cannot easily succeed. Whether
via conditions at home, peer pressure, lack of motivation, or simply inadequate teaching, there is some reason that nearly 30% of non-mentored students experienced declines in both English/language arts and math scores year-to-year. This is an epidemic in American public schools and the Junior University program has proven that, at least at the micro level, gains can be made that are real, substantial, and sustainable.
Epilogue

While actively involved in the Junior University program and a witness to the incredible work being done by selfless volunteers at the at-risk schools, it was never apparent that test scores were being affected by the program.

This study proved conclusively that the increase in test scores of mentored students were, in fact, statistically superior to those students who had not participated in the program. The question is: Why? While the data are clear that mentored students demonstrated increased test scores, it is, in the opinion of the researcher, not due solely to the mentoring program itself. There are other causal effects that would be interesting subjects for further study. These causal effects include the increased motivation of the student to succeed, the increased status among peers, the increased pride by the families, and the increased self-esteem of the student himself/herself. The data analyzed in this study only looks to the empirical results of the scores themselves and ignores these subjective, qualitative factors. This would be an excellent area for additional research into the reasons for increased year-to-year scores. The data are conclusive that the data increase year-to-year. What are not so evident are the base reasons for that improvement. It may well be the impact of the mentors, but it may well be the contribution of the other elements listed above. Only by performing a qualitative study on parents, students, and teachers would it be possible to ascertain the true reasons for the increase in test scores. However, there is no doubt that students involved in the mentoring program experienced increased test scores compared to those not involved in the mentoring program.
References


U.S. Const. amend. I.
