# THE PREDICTIVE VALIDITY OF STAAR ALGEBRA 1 SCORES

## ON SAT MATH SCORES

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## THE PREDICTIVE VALIDITY OF STAAR ALGEBRA 1 SCORES

### ON SAT MATH SCORES

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### ABSTRACT

# THE PREDICTIVE VALIDITY OF STAAR ALGEBRA 1 SCORES ON SAT MATH SCORES

by

### Lesley D. Edwards

The purpose of this predictive correlational research was to test if a predictive relationship exists between Algebra 1 STAAR and SAT math scores. The moderator effect of race, gender, and socio-economic status were also tested. Archival data were collected from 250 students, at a medium sized urban high school in Texas, who graduated in May of 2015 or anticipated to graduate in May 2016. To determine the predictive relationship between STAAR Algebra 1 and SAT math scores, a linear regression analysis was conducted. To determine the effect of the moderator variables of ethnicity, gender, and socio-economic status, a moderated multiple regression (MMR) was calculated for each category using SPSS software. Results of the study indicated there is a strong, positive correlation between Algebra 1 STAAR scores and SAT math scores. However, ethnicity, gender, and socio-economic status were not statistically significant moderators of the relationship between Algebra 1 STAAR and SAT math scores. For students and educators, these findings suggest the following implications: necessary curriculum development and modifications, guide for professional development topics for educators, need for early intervention strategies, and guidance for counselors advising students on post-secondary decision making.

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### **Chapter I**

#### **Introduction to the Study**

As accountability measures increase for districts in the state of Texas, educators are exploring ways to identify students in need of intervention as early as possible to implement remediation strategies (Panjaburee, Triampo, Hwang, Chuedoung, & Triampo, 2013; Rakes, Valentine, McGatha, & Ronau, 2010). Accountability measures now cover additional indices such as college readiness rather than only core subject areas creating additional strategies of identification (Texas Education Agency [TEA], 2012). This chapter contains the background, statement of the problem, theoretical foundation, research questions, rationale of the study, assumptions and limitations, as well as relevant definitions.

### Background

Standardized testing plays an important role in education, and its power over policy makers, educators, and students has become a hot topic in today's society (Koretz, 2008). Standardized testing is a public issue, but the topic is rarely researched or reported objectively (Phelps, 2007). Koretz (2008) asserted the purpose of testing was to monitor performance of both schools and students over a period of time. Furthermore, testing was designed to determine relative strengths and weaknesses in students, instruction, and curriculum. Assessment is also used for identifying gaps in learning and teaching, and is frequently used for accountability purposes (Earl, 2013). Standardized testing can lead to increases in learning and curriculum development through feedback, evaluation of data, and conversations between the teacher and learner (Mao & Peck, 2013).

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Assessment, both formative and summative, is a necessary part of the educational process to identify strengths and weaknesses of students and to detect a student's level of mastery of the curriculum (Earl, 2013). The learning process cannot be bifurcated from the assessment process (Patton, 2012). Assessment is a lived experience and must be a continual process to enhance learning and self-confidence of the learner (Earl, 2013). However, a student's performance on an assessment is not a direct effect of merely seeing the curriculum (Pershey, 2011). Assessments should be about more than receiving a grade and should align what is taught with what the student is expected to learn (Earl, 2013).

Algebra is considered a backbone course that can determine if a student will be successful in future advanced mathematics courses and college (Eddy et al., 2015; Gningue, Menil, & Fuchs, 2014; Panjaburee et al., 2013). Likewise, the SAT has been shown to have predictive validity of future educational outcomes (Mattern, Shaw, & Kobrin, 2011; Shen et al., 2012). Because of this, most states require algebra as a graduation requirement (Powell & Fuchs, 2014), and colleges require SAT scores as admission criteria (Kim, Kim, DesJardins, & McCall, 2015).

Improving the teaching and learning in algebra courses has become a focus for most secondary schools (Rakes et al., 2010). Increasing math curriculum in high school has received public attention as a means to strengthen the rigor and raise expectations of what is expected to be successful after high school (Kim et al., 2015). Students who are not successful in basic algebra must be identified to determine needed interventions to prepare them for post-secondary opportunities (Eddy et al., 2015; Panjaburee et al., 2013).

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### **Problem Statement**

Research has consistently shown that standardized tests, specifically the SAT, are valid predictors of student performance in college (Kobrin & Patterson, 2011; Shen et al., 2012). Due to this predictability, colleges frequently use SAT scores as a portion of admission criteria to select students who are the most prepared for the rigor of college coursework (Mattern et al., 2011). Unfortunately, only 42.6% of the 1.6 million students who took the SAT in 2014 scored high enough to be considered college ready (College Board, 2013).

According to TEA (2012), Texas was the first state to incorporate college and career readiness standards into their state adopted curriculum with the passage of House Bill 3 in 2008. However, only 41% of students are considered college ready based on scores on the State of Texas Assessment of Academic Readiness (STAAR) exam. The college and career readiness standards were evaluated through the Algebra II and English III curriculum and measured using scores from the STAAR exam. However, the Algebra II and English III STAAR assessments were only given as field tests and a one-time low stakes administration to juniors that would not be used toward graduation requirements.

The Texas Education Agency (2014) conducted a field test with a group of students to determine if Algebra II scores were valid predictors of SAT scores. Their findings indicated there was a direct, moderately strong correlation between STAAR Algebra II scores and SAT mathematics scores. Unfortunately, this correlational research was only conducted with a group of students who participated in a field test administration of the Algebra II STAAR exam, and the Algebra II STAAR exam is no longer given to students as a graduation requirement. No correlation studies have been conducting using the Algebra I STAAR exam.

### **Statement of the Purpose and Research Questions**

The purpose of this predictive correlational research was to test if a predictive relationship exists between Algebra 1 STAAR and SAT math scores for students at a medium sized urban high school in Texas.

The following research questions guided this correlational research:

- 1. What is the predictive relationship between Algebra 1 STAAR and SAT math scores for students at a medium sized urban high school in Texas?
- 2. How does ethnicity moderate the predictive relationship between Algebra 1 STAAR and SAT math scores for students at a medium sized urban high school in Texas?
- 3. How does gender moderate the predictive relationship between Algebra 1 STAAR and SAT math scores for students at a medium sized urban high school in Texas?
- 4. How does socio-economic status moderate the predictive relationship between Algebra 1 STAAR and SAT math scores for students at a medium sized urban high school in Texas?

### **Rationale and Significance of the Study**

Algebra 1 is a course that determines whether a student has access to advanced educational and career opportunities (Eddy et al., 2015). Algebra is the next step beyond basic arithmetic and can determine success in higher level math courses (Powell & Fuchs, 2014). Furthermore, mastery in algebra has been shown to be an indicator of college success (Gningue et al., 2014). If a student's SAT score can be predicted from their Algebra 1 STAAR score, early intervention strategies can be implemented to assist students who are not likely to score well enough on the SAT (Eddy et al., 2015; Mireles, Offer, Ward, & Dochen, 2011).

This study adds to literature related to standardized testing, SAT, and STAAR testing. The findings contribute to possible ways that administrators, teachers, and counselors can identify early support needs and strategies to encourage student success. Additionally, this study reviews the predictive ability of SAT and Algebra 1 on future academic perfomance.

### Assumptions

Assumptions are items that cannot be controlled, but must exist in order to validate the study (Simon, 2011). For regression analysis the following assumptions were tested:

- There is a linear relationship between SAT math scores and Algebra 1 STAAR scores.
- Data from both the SAT scores and Algebra 1 STAAR scores are normally distributed.
- SAT math scores and Algebra 1 STAAR scores are independent of each other.
- Homoscedasticity existed.

### Limitations

Limitations are potential weaknesses encountered by the researcher during the research process outside of the control of the researcher (Creswell, 2012). The following limitations occurred in this research: