12-2023

The Effect Of Selected Demographic Factors On The Academic Achievement Of High School Students

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THE EFFECT OF SELECTED DEMOGRAPHIC FACTORS ON THE ACADEMIC ACHIEVEMENT OF HIGH SCHOOL STUDENTS

DISSERTATION

Presented in Partial Fulfillment of the Requirements for

the Degree of Doctor of Education in the Graduate School

of Texas Southern University

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The purpose of this study was to examine the effect of selected demographic factors on the academic achievement of high school students. More specifically, this study was concerned with the effects of the variables gender, ethnicity, and socioeconomic status on the State of Texas Assessments of Academic Readiness (STAAR) scores in Mathematics, Science, English, and Social Studies.

A quantitative causal-comparative or ex post facto research design was used in this study. The population for this study consists of high school students enrolled in a public school in the state of Texas during the 2019-2020 academic school year. The sample population for the current study consisted of 222 high school students enrolled in a suburban public school in the State of Texas during the 2021-2022 academic school year.

The State of Texas Assessments of Academic Readiness (STAAR) was the investigative instrument used to collect the data. The raw scores data was used to measure the academic achievement of high school students in math, English, science, and social studies.

The One-way Multivariate Analysis of Variance Statistical procedure was utilized to analyze the data for this study. All three null hypotheses were tested at the .05 level of significance or better.

From the results, this study concludes that gender did not affect the combined STAAR's Mathematics, Science, English, and History scores of high school students. Regarding ethnicity, White and Asian high school students scored significantly higher on the Mathematics and Science sections of the STAAR examination than Black and Hispanic high school students. High school students who received free or reduced lunch scored significantly higher on the STAAR's Mathematics, Science, English, and History sections than those high school students who did not receive free or reduced lunch.

Keywords: Demographic factors, Free or reduced lunch, Gender

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DEDICATION

There is always a Beginning and an End to every journey. Atthe heart of my journey stands my infinite faith in Allah. Believing in a higher purpose and placing my trust in Allah's wisdom and guidance has been my constant source of strength. Through the highs and lows of academic life, I found solace in my prayers, seeking guidance and blessings to navigate the complexities of research, coursework, and life in a foreign country. The connection with the divine gave me the patience to persevere and the resilience to overcome moments of self-doubt.

My mom is the embodiment of the woman I stand as today. Your guidance, love, and strength echo through my actionsand decisions. As I navigate life's journey, I carry your teachings and spirit with me, ensuring that your legacy is honored. Until we meet again, in that place of eternal peace, I hold you close in my heart. The loop of cherished memories plays vividly in my mind, reminding me of your enduring presence.

To my beloved older sister Seada and my dear brothers especially my younger brother Abdulrahman, words cannot encompass the depth of gratitude I feel for your support. Your motivations and selfless sacrifices have paved the way for my academic pursuits, and I am so grateful. Your belief in me has boosted my self-confidence, and I owe you all the world.

To my husband, you have been more than a partner; you have been my right hand, my confidant, and my constant source of encouragement. Your faith in me, even in the face of challenges, has been my driving force. With you by my side, there is no hurdle too high to overcome. To my children, you have taught me the true essence of love. Your presence has been a pillar of strength, reminding me of the reasons I strive for success.

Your unwavering belief in me has fueled my determination to overcome obstacles, I love you all.

As I reflect on this journey, I realize that your collective support has been the cornerstone of my achievements. Every step I have taken has been guided by your love, and I cherish every moment we have shared. You are my ultimate source of inspiration, my steadfast allies, and my heart's greatest treasures. There is nothing I long for more in this lifetime than to continue sharing every second with you all.

ACKNOWLEDGEMENTS

I would like to express my deepest gratitude to my committee who helped me through my journey. Each one of you, Dr. Ingrid Haynes, Dr. Ronnie Davis, Dr. Delilah Gonzales, and Dr. Emmanuel Nwagwu have all provided me with lots of support and encouragement, I wouldn't be where I am without their guidance. I am truly grateful for you all.

I would like to give my deepest appreciation to Dr. Ronnie Davis. Your commitment to my progress meant everything. The countless hours you gave up just to review my work. Providing me with constant feedback. Having you as a mentor did not just impact me during my academic year, but it has helped me on a day-to-day basis. You went above and beyond to ensure I got the help I needed for my academic studies. Your dedication shaped not just my intellect, but it also shaped my character; you left an impact that I will continue to carry out with pride.

Last but not least, my advisor, Dr. Ingrid Haynes, was like an older sister to me. Thank you so much for taking care of me when I needed help. You believed in my potential even when I did not believe in myself. You pushed me to be a better version of myself. You have influenced me to think outside of my comfort zone, which made me mentally ready for all the challenges ahead in life. Words cannot express my gratitude and appreciation towards you. You are about to make my dream become reality; I truly cannot thank you enough.

CHAPTER 1

INTRODUCTION

Academic achievement affects the lives of students to the full extent (Koç et al., 2018); for this reason, educational institutions all around the world consider it an important target to improve students' academic success. Studies have identified various demographic characteristics that can be responsible for disparities in achievement, such as gender, race, and socioeconomic status (Cheema et al., 2013). Von Seeker (2004) identified three characteristics that are highly linked to the academic achievement gap; (1) low socioeconomic status, (2) being a member of a racial ethnic minority group, and (3) being female.

In 2013, House Bill 5 was approved by the Texas legislation that reduced the number of STAAR EOC exams from 15 to the present number of five exams. The EOC STAAR tests are a requirement for graduation and include Algebra I, English I, English II, and U.S. History (TEA, 2016). High-stakes testing "has become the curriculum: The tests have, with increasing intensity, become the tool for structuring educational environments in ways that also shape both what knowledge is accessed and how that knowledge is accessed through pedagogic discourse" (Au, 2012, p. 45). Since social studies instruction has been reduced so much in many elementary schools due to accountability, when students do receive more social studies instruction in upper grades, they are often underprepared for rigorous instruction, lacking underlying knowledge and skills to make connections between concepts (De Oliveira, 2008, p. 367, 371). Neumann (2016) studied public Texas middle school teachers and found that mandated testing, teachers' knowledge and beliefs, and teachers' milieu or context form a web of influence

on their identity and instruction. For example, he found that when the school failed to meet AYP the administration got more active in altering curriculum decisions to ensure the school met AYP in the future (Neumann, 2016, p. 40).

Our educational institutions, teachers, and students are under pressure due to parents' expectations of high academic progress of the students. Indeed, the whole education system revolves around the academic achievement of the students. Therefore, more effort and time is spent on helping the student for better academic achievement Progress of the students at school is the most important issue for educators and psychologists. Many factors are related to academic achievement like gender, ethnicity, and socioeconomic. These elements strongly impact the student's performance, however, these factors differ from individual to individual and country to country. Literature on academic achievement shows that numerous factors affect the academic performance of high school students.

Ellison and Swanson (2018) further examined AMC 12 as well as AMC 10 scores. "The AMC 10 is open to students in grades 10 and below. The AMC 12 is open to students in grades 12 and below" (Ellison & Swanson, 2018, p. 5). Including the performance of younger students provided data to consider how high-achieving male and female mathematics students progress throughout high school. Ellison and Swanson (2018) found that more girls participated in the AMC in 10th grade than in 9th grade. This level of participation remained steady from 10th to 11th grade and then dropped between 11th and 12th grade. "At the end of high school, about 35 percent more 12th grade boys than 12th grade girls are taking the AMC12" (Ellison & Swanson, 2018, p. 8). Ellison and Swanson (2018) found that female students are 2.3% more likely than boys to

drop out of the AMC from one year to the next. Further, this dropout gap was found to be largest between 11th and 12th grades. Ellison and Swanson's (2018) study indicated that ". . . the gender gap in high math achievement widens substantially over the high school years" (p. 34).

Statement of the Problem

The purpose of this study was to examine the effect of selected demographic factors on the academic achievement of high school students. More specifically, this study was concerned with the effects of the variables gender, ethnicity, and socioeconomic status on the State of Texas Assessments of Academic Readiness (STAAR) scores in Mathematics, Science, English, and Social Studies.

Research Questions

Answers to the following questions were sought:

1. Does the demographic characteristic of gender have any effect on the combined academic achievement (STAAR's Mathematics, Science, English, and Social Studies) scores of high school students?
2. Does the demographic characteristic of ethnicity have any effect on the combined academic achievement (STAAR's Mathematics, Science, English, and Social Studies) scores of high school students?
3. Does the demographic characteristic of socioeconomic status have any effect on the combined academic achievement (STAAR's Mathematics, Science, English, and Social Studies) scores of high school students?

Significance of the Study

This research provides insights into the effects of the demographics of gender, ethnicity, and socioeconomic status on the State of Texas Assessments of Academic Readiness (STAAR) scores in Mathematics, Science, English, and Social Studies. Quality of education is mostly assessed based on academic performance, and achievement scores are considered to be its primary indicators. However, achievement scores alone neither provide sufficient understanding of the causes of student's success or failure nor suggest ways for improving achievement. There is a need to identify and analyze the factors that can affect academic performance. The understanding of these factors can suggest some measures for improving the quality of education.

This study could benefit school administrators, educators, curriculum leaders, parents, and school boards as well as education researchers in determining what impact, if any, selected demographic factors have on high school student achievement and how to best spend scarce resources. Teachers, district leaders, and administrators must acknowledge the irreversible potential harm of exclusively using state test results for high-stakes purposes and the misfortune this may inflict upon particular students of the community. The significance of the study was to provide counselors, school personnel, parents, and students with information related to high school students' achievement.

Research Hypotheses

The following research hypotheses were formulated for the present investigation:

H_1: There is a statistically significant difference between the mean combined academic achievement STAAR's Mathematics, Science, English, and Social Studies) scores of high school students by gender

H_2: There is a statistically significant difference between the mean combined academic achievement STAAR's Mathematics, Science, English, and Social Studies) scores of high school students by ethnicity

H_3: There is a statistically significant difference between the mean combined academic achievement STAAR's Mathematics, Science, English, and Social Studies) scores of high school students by socioeconomic status.

Theoretical Framework

Walberg's (1981) theory of educational productivity is used as the basis of this study. Waldberg's theory of educational productivity sought to determine how students' academic performance is affected by certain factors. Walberg explored the factors that influence a student's academic performance, using several methods to identify these factors. The theory of educational productivity introduced by Walberg in 1981 has been empirically tested, making it one of the very few theories of academic achievement. Based on the Walberg theory of academic achievement, individuals' psychological characteristics and surrounding psychological environments influence academic outcomes (cognitive, behavioral, and attitude) (Reynolds & Walberg, 1992). The following nine factors are identified by Walberg's research that have been shown to influence educational outcomes: student ability/prior achievement, motivation, age and developmental stage, classroom climate, a home environment, a peer group, and access to the media outside of school (Walberg et al., 1986). Educational process goals, according to Walberg's theory, include perceived social environment, creativity, self-concept, extra-curricular participation, and interest in the subject matter. Providing test scores as the sole measure of educational success will reduce motivation and, eventually, lower educational attainment. Because

educational experiments and psychological theories of education fail to identify, define, and measure the educational variables clearly, they do not produce desirable educational outcomes.

Assumptions

The following assumptions were made about the present study:

1. It is assumed that the STAAR examination reflects the performance of high school students in Mathematics, Science, English, and Social Studies.
2. It is assumed that the archival data gathered from the Texas Education Agency is accurate and unbiased.
3. It is assumed that the participants in the study are representative of the suburban high school student population in the target school district.
4. Finally, it is assumed that selected demographic variables do have some impact on the combined academic achievement (Mathematics, Science, English, and Social Studies) scores of high school students.

Limitations/Delimitations

The following limitations and delimitations were made for the current study.

1. The study is limited to 12th-grade high school students.
2. The study is limited to high school students enrolled in secondary educational institutions located within the suburban school district in the Southern Region of the United States.
3. The study is limited to pre-existing data collected during the 2019-2020 academic school year.
4. Finally, this study is limited to high school students' performance on four

sections of the STAAR examination – Mathematics, Science, English, and Social Studies.

Definitions of Variables/Terms

The following terms/variables are operationally defined for the present study.

1. Academic Performance – refers to high school students' performance on standardized tests in Mathematics, Science, English, and Social Studies.
2. Demographic Characteristics – refers to high school students' gender, ethnicity, and socioeconomic status.
3. English Scores – refers to the raw scores on the English II Section of the STAAR examination.
4. Ethnicity – refers to whether a high school student is Hispanic American, Anglo American, African American, or "other" American.
5. Gender – refers to whether a high school student is female or male.
6. High School – refers to an educational institution that provides academic instruction to students in grades 9^{th} through 12^{th}.
7. High School Student – refers to a student who is receiving academic instruction in grades 9^{th} through 12^{th}.
8. Mathematics Scores – refers to the raw scores on the Math Section of the STAAR examination.
9. Science Scores – refers to the raw scores on the Biology Section of the STAAR examination.
10. Social Studies Scores – refers to the raw scores on the History Section of the STAAR examination.

11. Socioeconomic Status – refers to a high school student's participation or not in the Federal fee or reduced-lunch program.
12. STAAR Examination – refers to the State of Texas Standardized Achievement Test administered to students in grades 3rd through 12th.
13. Urban School District – refers to an educational structure that oversees the academic instruction of students from 1st through 12th grade in an Urban Metropolitan area.

Organization of the Study

The current research study is organized into five chapters. Chapter 1 includes the Introduction of the Study, Statement of the Problem, Significance of the Study, Theoretical Framework, Hypotheses, Assumptions, Limitations and Delimitations, Definition of Terms and Variables, and Organization of the Study. Chapter 2 includes a review of selected literature related to the demographic characteristics of high school students and their influence on Student Achievement

Chapter 3 contains the research methodology, and the rationale for employing this type of research design, population, sampling procedure, instrumentation, validity and reliability, data collection procedures, independent and dependent variables, and statistical procedures.

Chapter 4 expands on the findings of the Study's Statistical Analysis by reviewing the data collection process. It also provides the data in tabular form with statistical interpretation. Finally, Chapter 5 confirms the summary of the overall present research study, findings, and conclusions. This Chapter also includes a discussion of the findings, implications, and recommendations.

CHAPTER 2

REVIEW OF RELATED LITERATURE

The purpose of this study was to examine the effect of selected demographic factors on the academic achievement of high school students. More specifically, this study was concerned with the effects of the variables gender, ethnicity, and socioeconomic status on the State of Texas Assessments of Academic Readiness (STAAR) scores in Mathematics, Science, English, and Social Studies.

This chapter includes a review of literature related to the History of the STAAR test. This section of the study outlines how the literature review was generally built. In the next section, the research focuses on the effects of gender on high school mathematics capability, the impact of ethnicity on high school mathematic scores, the influence of socioeconomic status and high school mathematics scores; high school students' science achievement and gender, science performance of high school students by ethnicity, socioeconomic status relationship on science high school scores; English/Writing performance and gender of high school students, high school students' performance in English Language Arts by ethnicity, English performance by socioeconomic status; social studies and gender performance, social studies and ethnicity of high school students, and social studies and socioeconomic. The final section consists of a summary.

History of the STAAR Test

Texas Assessments of Academic Readiness (STAAR), established by the 80th Legislature of Texas in 2007, were based on a rigorous curriculum aligned to high school coursework (Henricksen, 2013). In 2012, Texas switched to STAAR for its standardized

testing. More rigorous questions were included in the STAAR assessment. “The rigor of items has been increased by assessing skills at a greater depth and level of cognitive complexity” (Texas Education Agency, 2012, p. 1). There is a writing assessment for the fourth and seventh grades, as well as an extensive writing assessment that is part of English I and II. High school graduates must pass the English I and English II assessments. As students progress from grades three to 12, they are tested in reading, writing, mathematics, science, and social studies. From third to twelfth grade, students take mathematics and reading STAAR tests; however, students in fourth grade take writing, and students in fifth grade take science tests. Students were required to take and pass 12 EOC exams to graduate from high school after STAAR implementation in 2011-2012. The core curriculum for Texas school districts is the Texas Essential Knowledge and Skills, which is the state curriculum for school districts in Texas (TEA, 2014). According to Senate Bill 1031, the 12 EOC assessments included English I, English II, English III, algebra I, geometry, algebra II, biology, chemistry, physics, world geography, world history, and U.S. history (TCTA, 2011). According to the Texas Essential Knowledge and Skills, which is the curriculum for Texas school districts (TEA, 2014), STAAR tests are based on Texas essential knowledge and skills. There are eight core competencies (TCTA, 2011) that are applied in standardized tests. In addition to exams in grades 3-8, STAAR also includes end-of-course assessments for high school students (TBLC, 2012). A student's EOC grade counts for 15% of their overall course grade, according to the TCTA. Education Commissioner Rick Scott explained at a meeting of the Texas State Board of Education in 2012 that assessments had doubled over the past decade and the entire educational system was dependent on testing. During

a conference with superintendents, he explained that testing is important, however, the system created has changed from its original purpose (Akadjian, 2015).

Texas Business Leadership Council (2012) indicates there have been concerns expressed by parents and teachers about the state's overreliance on testing with the STAAR EOC. According to the Texas Business Leadership Council (TBLC), students and educators spend too much time preparing for tests, and school districts should be responsible for how they grade and evaluate students. The governor of Texas, Rick Perry, reduced the amount of EOC exams required to graduate from high school because of these concerns. With the elimination of the 15% rule (Klein, 2013), students are now required to pass five EOC assessments, which include English I, English II, Algebra I, Biology, and U.S. History. For all assessments, students are allowed four hours, except for the English I and English II assessments, which are provided an additional hour (TEA, 2014). With the STAAR, students can take the paper or online test and have four hours to complete each section. It is the first assessment of its kind to be timed. There are different tests each day. There is an alternative test for special education students. Each public school receives an accountability rating from A to F based on the results of its STAAR assessments.

Parents, students, educators, and school leaders have voiced their disagreement with the use of the STAAR assessment. According to Ravitch (2010), students' knowledge and skills are limited, scores do not accurately reflect students' comprehension, and multiple-choice questions are restricted to the assessment. Another criticism of STAAR is that it is challenging for students with economic disadvantages (McGown & Slate, 2019). The state's STAAR test has been criticized, but it is the only

assessment that is required of all Texas public school students and is used for accountability. In most research studies, researchers compare scores from standardized tests (Nicks et al., 2018). As a result, the STAAR was used to measure math and mathematics, English/Writing, science, and social studies achievement. Specifically, STAAR was used to evaluate the student achievement of high school students in this study.

The Effects of Gender on High School Mathematics Capability

Educators, policymakers, parents, and stakeholders have paid great attention to gender achievement gaps in science, math, and reading within the United States and Europe (Ngware et al., 2012). There is a large body of literature on gender and academic performance in mathematics with varying views and findings.

In Texas, math is a required subject at all grade levels from elementary to high school. The Texas Education Code describes the Texas Essential Knowledge and Skills (TEKS) for Math as a guide toward college and career readiness (Texas Administration Code, 2012). It was evident from elementary school onwards into middle school that the gender gap in mathematics achievement continued into high school (Ellison & Swanson, 2010; Ellison & Swanson, 2018).

On average, girls performed slightly better on the mathematics portion of the State of Texas Assessments of Academic Readiness (STAAR) than boys, according to Anderson's (2016) study of Texas students. The results of National Assessment of Educational Progress (Pope & Sydnor, 2010) data utilizing U.S. performance data have also indicated a male preference in mathematics in the right tail of the distribution.

An analysis of gender differences in math achievement and retention was conducted by Ajai and Imoko (2014) using Problem-Based Learning (PBL). The study participants were 428 students enrolled in senior secondary one (SS I) across ten government and grant-aided schools. The PBL method of instruction was used to teach algebra to 260 male and 167 female students. The researchers used the Algebra Achievement Test (AAT) to collect data. Study findings showed that students of both genders learned algebra using PBL in an insignificant amount of time, indicating that both genders are capable of competing and cooperating in Mathematics. As a result, the researchers concluded that academic achievement varies with learner orientation rather than gender.

Perez-Felkner, Nix, and Thomas (2017) examined ". . . the relationship between gender, growth mindset, and mathematics perceived ability under challenge" (p. 3). An examination of gender differences revealed that perceptions of one's own mathematics ability within challenging circumstances differed between genders. This difference is such that ". . . boys hold a growth mindset more often than girls and perceive their mathematics ability to be stronger than do girls. . ." (Perez-Felkner et al., 2017, p. 8).

Researchers Su and He (2020) found that gender was a significant predictor of students' math achievement. Girls scored significantly lower in mathematics than boys. Results by Ani et al. (2020) show that student achievement scores differed significantly when geometry was taught using an analogical teaching approach.

Impact of Ethnicity on High School Mathematic Scores

In empirical research, gender, ethnicity, generational status, native language, and socioeconomic status appear to influence Latina/o academic achievement. Except for

those who are testing in mathematics, the relationship between gender and academic achievement has few exceptions (Hong & You, 2012; Mosqueda & Maldonado, 2013), female gender is strongly associated with school readiness (Furlong & Quirk, 2011), grades (Cupito, Stein, & Gonzalez, 2015), and test scores (Lapayese, Huchting, & Grimalt, 2014).

Despite methodological challenges, there is limited research to back up the effect of high school course graduation requirements (CGR), including the difficulty of isolating the CGR effect from possible confounding factors with non-experimental data. Although a few studies have attempted to address these challenges, the findings are inconsistent (Jacob et al., 2016).

Koch, Slate, and Moore (2016) examined the mathematics and statistics AP exam performance of Hispanic students who attended high schools in California, Arizona, and Texas from 1997 to 2012. Students took mathematics and English AP exams and got grades ranging from 1 to 5. During the 15 years of the study, 7,002 secondary students from California, 3,601 from Texas, and 540 from Arizona took the test. Scores for Hispanic students in California were 2.5, Texas were 1.93, and Arizona were 2.23. There was a statistically significant difference in Hispanic scores by state of residence for AP exam scores. When comparing the AP Calculus AB exam scores earned by Hispanic students from California, Texas, and Arizona on each test administration from 1997 through 2011, statistically significant differences were found among the AP Calculus AB exam scores earned by Hispanic students from each state. In comparison with California and Texas, Arizona's Hispanic students earned a score of 3 or higher. During the 15-year period, there was an increase in the number of Hispanic students taking AP Calculus AB

exams in all three states. Specifically, 68 students were taking the AP Calculus AB exam in 1997, and 483 students were taking the exam in 2011. Arizona had the largest rate of increase at 610%. Likewise, in 2011, California had 6,547 students take the AP Calculus AB exam, up from 1,161 students in 1997. Lastly, 3,586 Hispanic students from Texas took the AP Calculus AB exam in 2011 compared to 742 students in 1997. Hispanic students from Arizona scored the highest on the AP Calculus AB exam compared to Hispanic students from California and Texas for each year from 1997 to 2011. Hispanic students from California performed better in 2007, 2008, and 2011 than those from Arizona and Texas. When compared to their peers in California and Arizona, Hispanic students from Texas earned the lowest average scores for AP Calculus AB exams in each of the last 15 years. Arizona did not administer the AP Statistics exam to any Hispanic students for the 1997 test administration. In AP Statistics, there was no statistically significant difference in scores earned by Hispanics from California, Texas, or Arizona. AP Calculus BC performed better than AP Calculus AB or AP Statistics for Hispanic students. In a future study, the researcher recommended that the results be compared with those of other ethnic groups from these states to determine if the results are similar.

Research conducted by Saw (2017) investigated the number of coursework years required for math as well as science. Researchers analyzed data on CGR of high school students in several academic subjects at the school level and rich survey data on students, teachers, and schools from the High School Longitudinal Study of 2009 (HSLS,2009). All respondents were first-year ninth graders in the fall of 2009 and participated in both the 2009 base-year survey and the follow-up survey in 2012, along with valid high school CGR information. Researchers found that students from multiracial, low- and high-

achieving backgrounds benefited most from attending math and science CGRs higher than those from high-middle SES families who attended higher math and science schools.

Researchers Su and He (2020) examined factors related to student and school achievement in mathematics among minority seniors in China. The questionnaire survey and mathematics test were completed online by all Xinjiang 12th-grade students at the sample schools; there were 1873 students in total. Proposition experts prepared a mathematics test paper in strict accordance with the "Mathematics Curriculum Standard for Senior High School in China", and followed the proposition process. It consisted of 20 items, including ten multiple-choice questions and six fill-in questions as well as four problem-solving questions. The full score was 100. An analysis of 932 teachers and 1873 students in 31 ethnic boarding schools across 14 Chinese provinces found that gender, class structure, learning strategies, and self-efficacy are important predictors of mathematics achievement among students. In ethnic minority schools, math achievement differed significantly. The researchers concluded based on the findings that ethnic minority students would improve their academic success if they were assisted to better integrate into the new environment.

Influence of Socioeconomic Status and High School Mathematics Achievement

Students' school mathematics achievement is widely recognized to be affected by socio-economic status (SES) factors. Students and schools with low-SES backgrounds suffer significantly when SES and academic achievement are correlated around the world (National Center for Education Statistics, 2013). A study by Wang, Xiaoqing, and Li (2014) examined the relationship between SES and mathematics achievement in Chinese students. Specifically, parents of high-income and educational backgrounds engage more

in mathematics activities with their children and are more apt to present mathematics in a fun way by using scaffolding dialogues, demonstrations, and games (Huang & Cheng, 2011). The researchers found that Chinese students' socioeconomic status influences their mathematics achievements and that several important components of SES are largely responsible for this effect, such as the education of parents and family income. Among Georgia high school seniors, Folds and Tanner (2014) analyzed the relationship among socioeconomic status, highest-level mathematics courses, absenteeism, student mobility, and measures of work readiness. Four hundred and seventy-six high school seniors in a Georgia County participated in the study. Study results show that the study county had a higher percentage of economically disadvantaged high school seniors than the rest of the Regional Education Service Agency (RESA) districts or the state at the end of the 2010–2011 school year. Statistically, socioeconomically disadvantaged students and students who took higher-level mathematics courses score higher statistically than their peers who took lower-level mathematics courses.

The study of Kalaycioğlu (2015) investigated relationships among socioeconomic status, math self-efficacy, anxiety, and math achievement. The researcher investigated relationships between SES, math self-efficacy, math anxiety, and mathematics achievement by using a correlational research model. The Educational, Social, and Cultural Status (ESCS) index was used to assess students' socioeconomic status. This index is made up of three different indices: parents' highest educational level, parents' highest occupations, and cultural economic resources. Study results showed that socioeconomic status makes a significant difference in mathematics ability. Findings

indicated that mathematics achievement and socioeconomic status are most closely associated in the Netherlands and least in Hong Kong.

High School Students' Science Achievement and Gender

The differential performance of males and females in STEM courses and assessments has been studied by many researchers. The achievement gap between males and females continues to be reported in other studies, particularly in mathematics and science fields (U.S. Department of Education, 2015). A study by Lauren (2012) found that gender plays an important role in the learning environment since teachers react to boys and girls differently within the same classroom. Teachers thus tend to affirm the traditional gender roles inherited from society. Girls, on the other hand, are often praised for their obedience, while boys are more often praised for their knowledge. The study concluded that teachers should minimize gender stereotyping in the classroom by reducing stereotypical views that students may hold from home. A study conducted by Berk (2006) found that in mixed classes, teachers interacted more often with boys than girls during discussions, and girls were more likely to be interrupted.

In a study conducted by O'Reilly and McNamara (2007), they investigated the degree to which cognitive abilities can predict high school students' science achievement. During the study, 1,651 students from four high schools were included from Norfolk, Virginia; Americus, Georgia; Prestonsburg, Kentucky; and Williamsburg, Virginia. The grade levels of the students ranged from 9-12. In addition to science knowledge, students were assessed on reading skills and in-depth reading strategies. The content-based science achievement of students was measured by their comprehension of science passages, their grades in science courses, and their performance on state science tests.

There were significant gender differences in science achievement, as well as reliable correlations between cognitive variables and science achievement. For example, measures of science achievement, their relationship with cognitive abilities, and the achievement of science were analyzed in terms of gender differences. A significant difference was found based on gender. Measures of science knowledge, the state science test, and passage comprehension all showed that males scored significantly higher than females. Despite shrinking or even reversed gender differences in academic achievement in recent years (Myers, 2002), several studies still reveal gender differences. Research shows that males achieve more in science than females (Kahle, 2004) and that males excel in science and mathematics more often (Reis & Park, 2001). To reduce stereotypical attitudes and behaviors that support gender differences, researchers recommend working together with teachers and parents. This recommendation is important because socialization has been shown to contribute to gender differences, according to research.

As Okeke (2007) argues. the Nigerian school curriculum is not gender-neutral, as its contents mostly reflect the concerns of male students; science careers are portrayed with masculine images; and more importantly, female students are discriminated against both overtly and covertly, knowingly and unknowingly. Due to these actions, the girls have a disadvantage in classroom interaction, especially in mathematics and science. In their observations in 2004, Lie and Syoberg observed that invisible social rules have defined what is feminine and masculine. It can also be observed in social studies classrooms, where male students dominate female students in all sorts of classroom activities.

According to PISA data, the gender gap in science performance was smaller than that in mathematics (Tsai et al., 2018). Some of the research focuses on racial disparities in STEM course taking and STEM course offerings in schools, while others address the impact of self-concept and self-efficacy on student performance.

The Mann and DiPrete (2016) study also examined students' self-assessment of their mathematics and science performance about a country's GGI and Gender Empowerment Measure (GEM). According to self-assessment data, female students rated themselves less highly than male students. In higher-performing countries, the gender gap in self-evaluation widened. However, male and female students in higher-performing countries exhibited a greater degree of STEM orientation.

Researchers Ajayi and Ogbeba (2017) investigated whether gender affects students' performance in Chemistry stoichiometry during their senior secondary education. The results of a study using hands-on activities in teaching stoichiometry to male and female students revealed no significant differences in average achievement scores. Additionally, it was discovered that the techniques and gender of the average achievement score of learners in stoichiometry were significantly correlated. The study recommended that, since hands-on activities are not gender-sensitive, both genders of students should participate in the activity to improve learners' academic performance in stoichiometry.

As a comparison, Almut (2017) examined gender differences in students' motivation in physical science: Do implicit cognitive representations of teachers play a role? As the researcher noted, learners are more motivated by teachers who have the same gender as them since they can serve as role models for them. Furthermore, it was

noted that educators prefer to present tasks in contexts that favor same-sex students and are associated with the same gender. According to Almut (2017), the stereotype that science is for men is positively associated with self-perceptions of men but negatively associated with the motivational beliefs of women. Across the genders, teachers' stereotypes were found to contribute to differences in motivational beliefs that may have also resulted from gendered educational policies. Further results showed that boys are more likely to choose science-oriented courses than girls. Gender may affect the academic performance of learners in different subjects based on beliefs about gender.

Stoet and Geary (2018) used GGI and PISA scores, as well as students' answers about science attitudes, to conduct a cross-national study. As part of Stoet and Geary's (2018) study, students' academic strengths based on PISA results were identified. This data set included 519,334 students from 72 countries and regions. To prevent duplicate counting, only regions for which national data are available (Massachusetts and North Carolina, several Spanish regions, Buenos Aires) were counted because data from the United States, Spain, and Argentina were compiled. Based on this exclusion, 472,242 students in 67 nations or regions were included in the sample. In all 67 participating countries, one-fourth of the female students scored science as their academic strength, another quarter scored mathematics as their academic strength, and the other half scored reading as their relative strength. According to the PISA results, only 38% of male students exhibited science as an academic strength, while 42% displayed math, and 20% exhibited reading as their relative academic strength. Male students performed well in STEM studies according to PISA data. Based on the analysis, most boys scored higher in science than the all-subject average, while most girls scored higher in reading than in all

other subject areas. Consequently, even when girls outperformed boys in science, as was the case in Finland, they generally outperformed boys in reading, showing that reading was their strength instead of boys'. Among female students, Stoet and Geary (2018) observed that fewer women go on to study STEM and later pursue STEM careers than those with high strength in STEM-related subjects. Paradoxically, ". . . more gender-equal countries were more likely than less gender-equal countries to lose those girls from an academic STEM track who were most likely to choose it based on personal academic strengths" (Stoet & Geary, 2018, p. 585). Research does not claim sex differences in academic strengths or wider economic and life-risk factors are the only factors contributing to the sex differences in STEM pipelines. The study confirms the importance of the former (Wang et al., 2013) while showing that the impact of these sex differences on wider social factors, such as life satisfaction and gender equality, varies consistently with demographic factors.

Mukti et al. (2019) assessed the scientific literacy skills of male and female senior high school students using a survey method. In this study, samples of eleventh graders from 23 public senior high schools were collected. A comprehensive essay test covering topics concerning Bacteria was used to assess the participants' scientific literacy skills. Science literacy competencies were developed based on three competencies: explaining phenomena scientifically, designing and evaluating scientific investigations, and interpreting data and evidence scientifically. Students' poor performance in science literacy skills might be caused by several factors, including an inadequate understanding of the concepts of science and technology, and a less effective science learning process, according to Ibe et al. (2016). Furthermore, it was also found that the inability of the

students to express their opinions in dealing with the problems presented was linked to their lack of language skills. The analysis revealed that female students' skills in scientific literacy differed significantly from those of male students. Mukti and colleagues argue that students' scientific literacy could be enhanced by utilizing innovative learning approaches such as constructivism, contextual learning, and inquiry-based learning.

The influence of gender interaction on the academic achievement of learners was studied by Irungu, Nyagah, and Mercy (2019). The study focused on chemistry in secondary public schools in Murang'a County, Kenya. The study employed both quantitative and qualitative methods. To collect data, Lesson Observational Checklist (LOC) and Chemistry Achievement Test (CAT) were used. In this study, the gender of students in mixed secondary schools may negatively affect their academic achievement. The results of this study suggest that there is a change in the stereotype regarding which topics are associated with females or males and that girls were found to be more interactive than boys. Additionally, the study determined that gender interaction is not statistically significant for predicting learners' academic ability, so academic achievement is determined more by orientation than by gender. Finally, even though many studies demonstrate consistent results with the present study, several others reveal inconsistent findings, making further research essential.

The study by Ani et al. (2021) examined how gender affects the academic achievement of Basic Science students in high school. The research was conducted using a pre-test, post-test, nonequivalent, control group, and quasi-experimental design. The students were randomly selected from two intact classes of 72 students (30 males and 42

females) in public secondary schools in the state of Nigeria and assigned to the experimental group or control group. To collect data, researchers designed a 25-item validated instrument titled Basic Science Achievement Test (BSAT). Students in the experimental and controlled groups were taught content areas with lesson notes infused with instructional modes and normal lesson notes for six weeks. To determine the equivalence and ability level of the students in the two groups, the researchers administered pre-tests to each group before teaching. At the end of the six (6) weeks of instruction, a post-test was given to both groups. Post-test results indicated that male students retained their learning more than their female peers. In both the experimental and control groups, there were some gender differences in the pre-test. However, this difference reduced drastically in the experimental groups after treatment. In contrast to their counterparts, the students exposed to treatment performed better on tests. Statistically significant differences were not found at the 0.05 level, but the mean difference was in favor of the male students. Students' performance in Basic Science was significantly unaffected by gender, according to the study. As a result, Ani and colleagues asserted that gender has little impact on the effectiveness of any treatment employed, regardless of whether they were male or female.

Science Performance of High School Students by Ethnicity

The probability of passing high-stakes standardized tests is lower among schools with a predominantly minority and low-income population (Krieg, 2011). There is an 89 times higher chance of passing high-stakes tests in schools that have fewer minority students and lower poverty rates (Klenowski, & Wyatt-Smith, 2012). Students from low-income families and minorities are often less able to afford school supplies and resources,

which makes improving their learning even more difficult. Using Inclusive STEM high schools (HISs) (STEM stands for science, technology, engineering, and mathematics), Means et al. (2017) examined whether the schools admitted students based on their interests instead of competitive exams. Designed to measure constructs emphasized in SCCT (i.e., self-efficacy, interest, expectations, and identity), the Grade 12 Student Survey was designed to collect data. Texas Education Research Center (ERC) at the University of Texas at Austin collected data on student demographics as well as results from the Texas Assessment of Knowledge and Skills (TAKS) mathematics and science tests taken by Grade 11 students. As a result of the Texas Grade 12 Student Survey, a higher proportion of students reported taking calculus or precalculus, more advanced science and mathematics courses, one or more technology courses, and engineering courses. There was a statistically significant advantage among Hispanic students in Texas ISHSs in all variables except those of calculus and precalculus, compared with those in large comprehensive high schools. African American students in Texas comprehensive high schools and ISHSs showed somewhat fewer statistically significant differences. African American students who attended an ISHS in the sample showed statistically significant advantages in completion of calculus or precalculus, getting As and Bs in mathematics, and taking one or more engineering courses. In Texas, test score differences did not achieve statistical significance except in the case of African Americans' science achievement scores. It was suggested that future research should examine in depth the nature of mathematics education in these high schools and investigate the knowledge that exists among these students on mathematics instruction but did not score highly on standardized tests.

Researchers LaForce et al. (2019) explored whether gender identity and race/ethnicity affected the outcomes of STEM subjects and whether these associations differed among students in inclusive STEM schools. Twenty inclusive STEM high schools from seven states participated in the study. In this study, students in 9th through 12th grades were examined. A total of 12 of the 17 schools were primarily populated by White students; the remaining five were primarily Hispanic/Latino. According to this study, African-American and Hispanic/Latino students still perform worse than White students in STEM high schools. The results also indicate that White students benefit from completing problem-solving projects less than their Hispanic or Latino counterparts. The intrinsic motivation scores of Black students were significantly lower than those of White students. Compared to 9th graders, 12th graders reported significantly lower intrinsic motivation scores for science, as well as significantly lower interest in future STEM careers. Similarly, 10th graders rated interest in future STEM careers significantly lower than 9th graders. The researchers suggested that future studies continue to explore the 'black box' of inclusive STEM schools to find out what strategies and characteristics prove most beneficial to underrepresented groups. Lastly, additional research is needed to investigate the success indicators of STEM school including postsecondary transition, persistence in STEM majors, and entry into STEM careers directly after high school.

Socioeconomic Status Relationship on Science High School Scores

Educational attainment, earnings, and occupation are often used to determine socioeconomic status (SES). Ultimately, low socio-economic status and its consequences, such as lower education, poverty, and poor health, affect the entire society. There is evidence that children from low socioeconomic status (SES) households and

communities develop academic skills at a slower rate compared to children from higher socioeconomic status groups. By counting students who are receiving free or reduced lunch (Segool et al., 2013), schools determine how many students live in poverty.

In a study based on the findings of 41 countries, Chiu (2007) investigated how family socio-economic status affects 15-year-olds' academic achievement in science. That research indicated that the socioeconomic status of the family and educational resources (family structure, educational level of the parents, and educational attainment of siblings) can greatly influence the academic performances of students.

Studies that have documented socioeconomic gaps in science achievement have mostly concentrated on high school, and little attention has been paid to the emergence of these gaps in elementary and middle school (Quinn & Cooc, 2015; Morgan et al., 2016). The focus on high school may pose a problem, since in the early years, large socio-economic (SES) disparities emerge in academic domains (Duncan et al., 2011). Access to high-quality education is associated with high school science achievement (Byrnes & Miller, 2007).

The disparity between children living in socioeconomically disadvantaged households and their advantaged counterparts is becoming more and more concerning (Riegle-Crumb & King, 2010). Since employment in science-related professions will increase more than in other occupations soon, science achievement has become more important in recent years (Hanson & Slaughter, 2016).

The study by Reardon (2013) indicates how students from high-income families are performing better than those from low-income families. The study was conducted in the United States. In his study, he shows that families' incomes are affected by timing.

Students' learning can be affected by income in the early stages of their studies. In turn, this can lead to better academic achievement. Additionally, high-income students are more likely to qualify for admission to any college or university.

Researchers Akintoye and Saliu (2020) investigated the effect of sociocultural factors on students' performance in Physics in senior secondary school. A lower self-efficacy rate is observed in female students and students with a low socioeconomic status (SES). The study involved a cohort of over 200 students from the UK attending a physics workshop that was intensive, active learning, as well as pre-and post-assessments to measure students' self-efficacy and physics abilities. Based on the results of this study, parental educational background had the greatest impact on a student's achievement of all the socio-cultural factors included in the study, including student attitude, parental education background, and peer group membership. A significant relationship was found between sociocultural factors and students' achievement in Physics according to the study. The study concluded that socio-cultural factors, including sex and student attitude, parental educational background, and peer group, can impact students' achievement in physics. Teachers should therefore take these into account when teaching this subject.

Durk et al. (2020) examined interventions that have been shown to alleviate gender and socioeconomic gaps in attainment and self-efficacy. The pre-and post-assessments, as well as certain demographics' performance before and after the program, were analyzed for approximately 150 students. Students were given a pre-assessment upon arrival at Bootcamp, and a post-assessment was given at the end of the weekend after physics sessions, workshops, and activities. Pre- and post-tests on physics ability were completed by 81 students. In this study, 61 students (13 Free School Meal (FSM)

recipients and 48 non-FSM recipients) completed physics tests and consented to their scores being matched to their demographic information. Overall, the gap between FSM students and non-FSM students was statistically significant for all pretest questions, with FSM students doing much worse than non-FSM students. The physics skills of female students and students with low socioeconomic status improved more than those of male students and students with high socioeconomic status. The workshop was particularly beneficial for students from a mildly underperforming demographic who attempted the hardest questions or for students from a significantly underperforming group who attempted intermediate questions, but not the hardest ones. As well as having a lower mean pretest score than their male peers, low SES students had a lower mean pretest score than their high SES peers, but only the latter was statistically significant. It is evident from the results that the Bootcamp had a greater effect on low SES students' posttest scores, as well as the female students' than on male students. Ethnicity plays a role in the educational achievement of students, as well as gender and socioeconomic status. In terms of ethnic groups, Indians and Chinese perform above average, while Black Caribbeans, mixed White, and Black Caribbeans, and Pakistanis perform below average (Parsons, 2019), as well as White low SES when socioeconomic factors are considered (Strand, 2014).

English/Writing Performance and Gender of High School Students

Math and English are among the areas where STAAR scores indicate students are struggling. An English I writing assessment for ninth graders was passed by 48% of students, and an English II writing assessment was passed by 52% of tenth graders (Bryan, 2013). A struggle with STAAR is not limited to English. Writing effectively is

essential for academic success. The National Commission on Writing (2003) states that achieving academic success requires appropriate writing skills. Despite these challenges, students still struggle with writing and need writing assistance. As with any complex task, writing requires knowledge, time, and a combination of several intellectual abilities (Myhill & Fisher, 2010).

The Department for Education Research Team (2012) stated, "Overall, the evidence indicates that although there has been an improvement in pupils' achievement in writing, it is the subject where pupils perform less…compared to reading, mathematics and science" (p. 7). Mackenzie, Scull, and Munsie (2013) added that "while reading and mathematics have been prioritized in programs designed to lift standards, writing has been neglected and remains a lower priority than reading…" (para. 3).

Although writing is a lifelong skill, students struggle to obtain the tools they need to succeed in their writing (Graham, Early, & Wilcox, 2014). For high school graduation in Texas, students must pass five end-of-course exams, and two of them include extensive writing components. As to gender performance, Mutar and Nimehchisalem (2017) examined the extent to which Iraqi high school students use writing strategies; 1) identify whether proficiency level contributes to the use of writing strategies; and 2) compare male and female students' use of writing strategies. A total of 132 high school students from the Karkh district of Baghdad were randomly selected for the quantitative study. The study used Petrić and Czárl's (2003) questionnaire on writing strategy use adapted into a 30-item 3-point Likert scale. It was found that the student strategy used by females differed significantly from that of males. Male students used fewer writing strategies than female students did. According to Liu (2015), female students scored

significantly higher than male students on writing strategy. Various writing strategies were used by female students in his study.

In their study, Reilly et al. (2019) examined the levels of reading and writing achievement by U.S. students from the National Assessment of Educational Progress to measure changes over time in gender differences. According to Caplan and Caplan (2016), gender differences in cognitive ability are decreasing over time, so researchers hypothesized that there would be a significant negative relationship between the year of assessment and effect size. Using data from the NAEP, which tracks student achievement across the U.S. in fourth, eighth, and 12th grades, the study examined the trend in student achievement over time. A variety of subjects are measured, including reading, math, science, and others. Based on student responses, a nationally representative estimate is derived that reflects scholastic characteristics, ethnicities, rural versus urban locations, and genders. In the writing assessment, students write persuasive, informative, and narrative responses to stimulus materials. There was a large gender gap in writing between males and females, but the study did not provide an estimate of how large the gap was. Across all grade levels and assessment waves, girls were argued to outperform boys in writing ability.

Aydin and Demirel (2019) used a quantitative research method to discover how high school students' perceptions of self-efficacy in writing differed based on their gender, grade level, high school type, and number of books they read annually. The study involved 585 students (270 females and 315 males) enrolled in ninth and tenth-grade classes from different kinds of high schools. In this study, ninth and tenth-grade students were selected because the writing curriculum of these grade levels includes planning,

drafting, rewriting, and revision. Data were collected using the "Writing Self-Efficacy Perception Scale" (Pajares et al., 2007). In contrast to tenth graders, the results showed that ninth graders had higher self-esteem about their writing abilities. As a result, this led to different beliefs about writing self-efficacy based on the gender, grade level, type of school, and reading habits of high school students. Furthermore, there was a similar difference in the students' views of their ability to write independently during the various stages of their writing process (i.e. planning, drafting, reviewing, and revising). As a consequence of these findings, self-efficacy perceptions of high school students decreased with increasing grade levels. Aydin and Demirel suggested that studies on writing should consider gender when testing writing self-efficacy since it is a determinant of self-efficacy. The researchers recommended that students' writing self-efficacy can be enhanced through gender-specific studies.

High School Students' Performance in English Language Arts by Ethnicity

The relationship between socioeconomic status (SES), racial/ethnic background, and academic achievement has been extensively examined (Diaz, 2008; Scafidi et al., 2007), but the full extent of the relationship has not been uncovered. Since the advent of Common Core (Common Core State Standards Initiative, 2010) standards in English language arts and mathematics, it is clear that poor and minority children will not have the opportunity to meaningfully experience equity based on current conceptualizations and operationalizations of standardized test scores (Gaddis & Lauen, 2014).

A study conducted by the Institute of Education Sciences (IES) in 2002 recruited 750 schools in the United States and sampled students randomly within those schools (Ingels et al., 2004). Data were collected from students in the 10th grade. Grade 10 was

the only grade in which English tests were administered. According to Ingels et al. (2004), test takers were required to read passages about literary material, natural sciences, and social sciences, and to answer three to six questions on each passage measuring their ability to reproduce detail, comprehend, explain, and evaluate information.

Seo et al. (2019) investigated whether the relationship between value and self-concept differed by race/ethnicity so that the positive correlation between value and self-concept would be weaker among Black and Latinx students than among White students. Data from Black and Latino participants in the 10th and 12th grades for the first two waves. Using standardized test scores in English and mathematics, the researchers examined two common psychological explanations for the paradox of positive self-concept and low achievement. Study results indicate that Black and Latinx students scored higher on all three academic dimensions (general academic, English, and mathematics) than White students. In addition, it was found that, when racial/ethnic differences were examined in the relationship between value and self-concept, there were no statistically significant differences across groups in any of the three domains. Latinx versus white perceptions of school fairness had no significant interaction effect. The value placed by Latinx students on English was not significantly different from that of White students.

English Performance by Socioeconomic Status

Hamid (2011) investigated the relationship between secondary school students' family socio-economic characteristics and their academic achievement in English in Bangladesh's rural sub-districts. Researchers found that rural students had low levels of academic achievement in English, but there was a pattern of relationship between family

income and parental education and academic achievement. The students who had higher levels of parental education and family income achieved higher scores on the proficiency test and received higher grades in English.

Using the latest public examination results, Shamim (2017) examined learners' socio-economic status alongside their English language scores. Students in the higher-income bracket consistently outperformed their lower-income counterparts. In his view, the positive correlation between wealthy families and students' English proficiency may be caused by early education in private English medium schools compared to students from lower-income families.

Social Studies and Gender Performance

The ideals of social studies curriculum and instruction are controversial, but scholars of different camps agree that high-stakes testing undermines the subject (Levstik, 2008). According to this qualitative study, which was conducted in five California classrooms located in relatively high-performing and higher-income schools, two claims are supported. Accountability first intensifies pre-existing curricular trends that marginalize social studies, and second, it imposes greater restrictions on social studies teaching at lower-performing schools, thus contributing to educational inequality. However, it found mixed results (Sloan, 2006).

The average academic achievement score of boys' learners in post-primary school was lower than the average academic achievement score of girls' learners according to a study carried out by Nnamani and Oyibe (2016). In the study, the authors investigated the effect of gender on students' academic performance of secondary school students in Social Studies., and the effect of teachers' gender on students' academic achievement.

Study results showed that post-primary school students taught social studies by male teachers in the lab had higher mean scores than post-primary school students taught social studies by female teachers in the lab, and that male students taught social studies by female teachers performed better than female students. The study found that women achieve significantly higher levels of academic achievement in social studies than men in post-primary school. Furthermore, the study showed significant gender differences in mean SST achievement among secondary school students. A study carried out by Dania (2014) on students' academic achievement in social studies at secondary school provided empirical evidence that a student's achievement was determined by the teaching methodology, not their gender. From the results of this study, it is concluded that the gender of the students does not affect the effectiveness of the teaching methods.

Social Studies and Ethnicity of High School Students

Using a nonequivalent comparison-group design, Maina (2015) explored the impact of taking Advanced Grade 8 U.S. and AP social studies courses in Grade 9. A total of 31,253 students from Grade 9 high school were included in this study. These students were in Grade 8 during school years 2009–2010 (10,520 students), 2010–2011 (10,372 students), and 2011–2012 (10,361 students). This study compares grades and performance in AP U.S. History or AP U.S. Government in Grade 9 for students who took Advanced Grade 8 U.S. History between 2009–2010 and 2011–2012 with peers who did not. Study findings indicated that students who completed Advanced Grade 8 U.S. History were twice as likely to take AP social studies in Grade 9 than peers who did not take the course. The large effects indicated that having taken Advanced Grade 8 United States History significantly increased the likelihood that Black or African American

students and Hispanic/Latino students would enroll in AP social studies courses compared to their peers without the course. Sixty percent of Black and Latino students in Cohort 1 who enrolled in AP social studies courses in Grade 9 had taken Advanced Grade 8 U.S. History. The majority of Black or African American students (84%) and Hispanic/Latino students (88%) from Cohort 2 had taken Advanced Grade 8 U.S. History, and 96% of Black or African American (96%) and Hispanic/Latino (96%) students from Cohort 3 have advanced study of U.S. History. The study found that students with Advanced Grade 8 U.S. History were as likely as their peers without Advanced Grade 8 U.S. History to earn AP social studies scores that could lead to college entrance.

Over three years, the overall enrollment in AP social studies in grade 9 rose from 7% to about 11%. The data showed differences in the proportion of students of different races and ethnicities and their eligibility for services. Within each cohort, a larger proportion of Asian students; White students; and students without a history of participation in Free and Reduced-priced Meals System (FARMS), English for Speakers of Other Languages (ESOL), or special education services; as well as students who placed at the Advanced level on Grade 8 MSA Reading comprised the group of students who took AP social studies courses in Grade 9. In contrast, students who did not take AP social studies in Grade 9 were more likely to be Black or African American; Hispanic or Latino; and students who obtained FARMS, ESOL, or special education services previously.

The latest study by Cornelius-Ukpepi et al. (2019), investigated the relationship between socio-cultural diversity and academic performance in the Calabar Education

Zone in Cross River State. The sample was selected by simple random selection from 5,039 students using a survey research design. Data were collected using a questionnaire. The researchers found that social and cultural diversity has a significant impact on the academic performance of social studies students in the Calabar Education Zone. To ensure that every learner benefits from instruction, it was recommended that sociocultural diversity be considered while teaching.

In Ogoja Education Zone, Odey (2019) studied sociocultural practices and students' academic performances in Social Studies. Among 20,022 Social Studies students, 2000 students were selected at random. A questionnaire was used as an instrument to gather data in a survey design. Odey (2019) found social-cultural practices to be responsible for poor performance in Social Studies.

Social Studies and Socioeconomic Status

A phenomenological study was conducted by Frank (2020) to learn: (a) how parents view their ability to support their children at home and how this impacts their child's academic success; and (b) how children view their home life and how it impacts their success. In this study, three parents and nine children completed the Global History and Geography Regents curriculum in 10th grade, which culminated in passing the state examination on Global History and Geography. A semi-structured interview was conducted with parents and children who completed the global history and geography exam for 10th grade and the global geography exam for 10th grade. Furthermore, there was an artifact collection, which contained final grades in the course and students' grades on the Global Regents exam. Two former students who completed the Global History and Geography course and who passed the Global History and Geography Regents exam

were interviewed separately. To obtain students' perspectives on the role of their parents and home life in helping them achieve academic success in their courses, the researcher gathered a focus group of four students who had just completed the Global History and Geography course and the Global History and Geography Regents. The role of parents in student academic success was investigated through interviews with two Global History and Geography teachers. The results of Frank's study reveal that a majority of the students felt that their parents or other home resources contributed to their success in Global History and Geography classes. Most of the parents were also of the opinion that their participation in their child's home life directly affected their child's success in Global History and Geography classes.

Academic success is strongly influenced by a student's home life. Several authors noted that there is evidence that children who are living in homes with adversity are less likely to achieve academically than those whose parents are not struggling (Häfner et al., 2018; Skilbred, Iversen, & Moldestad, 2017). In his book, Marjoribanks (2017) outlines the importance of family and learning environments, as well as the impact they have on a child's academic success. Based on an analysis of family environments and children's academic performance in Australia, Canada, and England, the author identified that there are several factors influencing children's success in their home environment (Marjoribanks, 2017). Factors such as home environments, siblings, and social standing are associated with these factors (Marjoribanks, 2017).

The findings of Park et al. (2017) suggest that low socioeconomic status students respond more positively to school-based parental involvement than their high socioeconomic status counterparts. The authors further noted that measures such as

parent-teacher conferences and social networks can support positive learning environments in schools (Park et al., 2017). According to Benner et al. (2016), this body of findings could provide an initial context regarding how academic support differs by socioeconomic status, as well as which types of academic support influence students' academic levels. In addition, this body of literature could provide empirical evidence regarding the socioeconomic status of students, and how it is an important factor when considering various types of parental involvement (whether school-based or home-based) (Benner et al., 2016; Park et al., 2017).

Fischer et al. (2019) note that parents should participate actively in the education of their children, especially those from low socioeconomic backgrounds. Based on a meta-analysis of qualitative research on parent involvement in child education, Kim (2018) stated similar conclusions. Based on a review of 16 developing countries, Kim (2018) synthesized publications from 2000 studying parental involvement and child academic success. In his study, it was affirmed that collaborations among families, schools, and communities are vital to positive child development outcomes, which indicates that schools and communities should support parents in actively engaging their children in their education (Jeynes, 2017; Kim, 2018). The importance of this was found to be most apparent in developing and underprivileged environments (Kim, 2018).

Using students from a variety of socioeconomic backgrounds, Benner et al. (2016) conducted a study. The study investigated the associations between school-based involvement and parental expectations and adolescents' cumulative high school grades and educational attainment (Benner et al., 2016) by looking at 15,240 students in 10th grade. The study found that school-based involvement is more beneficial for students

from low socioeconomic status or who are disadvantaged (Benner et al., 2016). Alternatively, parents' participation in academic activities increases student achievement levels in high socioeconomic status students (Benner et al., 2016). Considering the socioeconomic status of students, these findings could reveal how parental involvement can affect student achievement outcomes.

Summary

This literature review covered relevant experiences and studies on gender, ethnicity, and socioeconomic status of high school students in the subject areas of mathematics, English/Writing, science, and social studies. Empirical findings indicate that several demographic variables influence academic achievement, including gender, ethnicity, and socioeconomic status. Demographic variables have been shown in research to have a strong correlation with student success. The current study showed that the socioeconomic status of students is an important predictor of achievement. Students from low socioeconomic backgrounds struggled to achieve in class. Regarding the relationship between gender and academic achievement, being female is overwhelmingly associated with the academic success outcomes of school readiness, grades, and test scores. A large body of literature exists documenting race as a significant factor in predicting test scores among students. Studies have shown that students from African-American and Latino backgrounds receive significantly lower test scores than Caucasian students. Results showed that within high schools, Black and Hispanic/Latino students still fall below White students. Researchers throughout the world have found a significant correlation between SES and academic achievement, to the detriment of students and schools with lower SES backgrounds.

CHAPTER 3

DESIGN OF THE STUDY

The purpose of the current study was to examine the impact of demographic factors on the academic achievement of high school students on a state standardized examination. This chapter is divided into the following eleven (11) areas: (1) Type of research design; (2) Population and Research setting; (3) Sampling Procedure; (4) Instrumentation; (5) Validity of the Instrument; (6) Reliability of the Instrument; (7) Data Collection Procedure; (8) Identification of the Independent and Dependent Variables; (9) Statistical Hypotheses; (10) Statistical Analysis, and (11) Examination of Statistical Assumptions.

Type of Research Design

A quantitative causal-comparative or ex post facto research design was used in this study (See Figure 1). This type of research design is one in which the researcher attempts to determine the cause or reason for existing differences in the behavior or status of a group of individuals (Gay, Milles & Airasian, 2012). Additionally, in this type of research design, both the effect and the alleged cause(s) have already occurred, and they are studied by the research in retrospect as well as in a prospective manner (Gay, Milles & Airasian, 2012).

Moreover, the causal-comparative research design permits a researcher to observe groups that are different on some variable and allows him or her the opportunity to identify those factors that lead to this difference (Mertler, 2021). Further, Kerlinger and Lee (2000) opined that causal-comparative research is a systematic empirical inquiry in

which researchers do not have direct control of the independent variable because their manifestations have already occurred or because they are inherently not manipulable (Kerlinger & Lee, 2000).

Figure 1

Basic Causal Comparative Research Design

Group	Dependent Variable
$Group_1$	0
$Group_2$	0

GRP_1, GRP_2 = Different Groups

0 = Observation or Measurement

Population and Research Setting

The population for this study consists of high school students enrolled in a public school in the state of Texas during the 2019-2020 academic school year. The target school district is a suburban district located in the southwest region of Texas.

Additionally, the target school district has a student population of 78,252 students of the student population, 26.68 percent of the students are Hispanic, 2718 percent are African American, 15.66 percent are white, 26.52 percent are Asian, and 3.95 percent are other. Further, 45.24 of the students are economically disadvantaged. There are 82 schools housed in the target school district which eleven (11) are high schools (FBISD, 2019-2020).

Sampling Procedure

A probability sample, procedure was used in the current study. The probability sampling procedure to be employed in this study is the systematic sampling technique. This type of sampling procedure involves selecting every "nth" person from a list of high school students who have taken all four of the following STAAR examinations –Math, English, Science, and Social Studies (Gay, Mills, & Airasian, 2012).

Moreover, systematic sampling ensures that the sample of high school students will be chosen by selecting a starting point at random and then choosing every 5th high school student. In other words, the research identified the first high school student to be included in the sample. Then, every 5th high school student on the list from the Texas Education Agency (past the first one) was selected until the sample size of 250 was reached (Gay, Mills, &Airasian, 2012).

Instrumentation

The State of Texas Assessments of Academic Readiness (STAAR) was the investigative instrument used to collect the data. The STAAR examination was created by the Texas Education Agency (TEA) in 2012. This test was developed to increase the overall vigor and relevance of both the taught standards and the given assessments.

Moreover, under the auspice of House Bill 5 passed by the Texas Legislative in 2013, high school students in Texas are required to pass five end-of-course exams (Algebra, English I, English II, Biology, and U.S. History) to receive a high school diploma. Scoring on the STAAR assessment consisted of the number of items answered correctly (raw scores) as well as the scale for this investigation, The raw scores data was

used to measure the academic achievement of high school students in math, English, Science, and Social Studies during the 2019-2020 academic school year.

Validity of the Instrument

Content validity and concurrent validity were both established on the State of Texas Assessments of Academic Readiness (STAAR) examination. To establish content validity, the Texas Technical Advisory Committee met and reviewed all the items on the STAAR test and confirmed that each item appropriately measured what it was supposed to measure. In addition, the content validation committees reported that they gathered theoretical and empirical evidence that items on the STAAR did not add constant – irrelevant variance among them.

Furthermore, concurrent validity was established in the investigative instrument by examining the relationship between STAAR and performance on other similar assessment examinations. The STAAR test was found to be moderately related to the ACT and SAT examinations (TEA, 2012).

Reliability of the Instrument

Instrument consistency reliability was established on the STAAR examination. This type of reliability measures the degree to which items on the test are consistent among themselves and with the test as a whole. Kuder-Richardson 20 and Alpha coefficient were used to calculate the reliability coefficients for STARR examination. The reliability coefficients ranged from .81 to .93. In addition, internal consistency estimates with similar across all grades and contest areas (TEA, 2013).

Data Collection Procedure

During the Spring Semester of 2022, the researcher by phone contacted the Texas Education Agency requesting their participation in the current investigation. The researcher provided TEA with a summary of the study including the statement of the problem, as well as the theoretical framework. Also, the researcher provided the methodological procedure for conducting the study.

Once approval was given by TEA, the researcher requested the link for the TEA's website to examine and download the necessary data for the study. The academic data along with the demographic characteristics associated with the High School Students are classified as public records. All of the tests can be found on the Texas Higher Education Coordinating Board accountability interactive system website.

After the data were identified by the researcher, data was downloaded and placed into a computerized calculated system. During this process, the data was clean and recorded for analysis purposes. To analyze the data, the Statistical Package for the Social Sciences (SPSS) was used.

Independent and Dependent Variables

The independent variables in the current investigation are gender, ethnicity, and socioeconomic status. The three independent variables are assumed to have some influence on the dependent variable academic achievement. This variable was measured by the four dependent indicators of the STAAR's examination which are Mathematics, English, Science, and Social Studies.

Null Hypotheses

The following three statistical hypotheses were formulated and tested in the current investigation:

Ho_1: There is no statistically significant difference between the mean combined academic achievement (STAAR's Mathematics, Science, English and Social Studies) scope of High School Students by gender.

Ho_2: There is no statistically significant difference between the mean combined academic achievement (STAAR's Mathematics, Science, English and Social Studies) scores of High School Students by ethnicity.

: Ho_3: There is no statistically significant difference between the mean combined academic achievement (STAAR's Mathematics, Science, English and Social Studies) scores of High School Students by socioeconomic status.

Statistical Analysis

The One-Way Multivariate Analysis of Variance (MANOVA) was employed in the current investigation. The one-way multivariate analysis of variance is a statistical procedure used to examine the impact of one independent variable on two or more dependent variables (Aron, Aron, & Coups, 2006). The MANOVA is used to test whether mean differences, among several groups on a combination of dependent variables are likely to have occurred by change (Mertler & Vannatta, 2021).

Additionally, the Multivariate Analysis of Variance Statistical procedure requires that the dependent measures be correlated, theoretically as well as empirically (Mertler & Vannatta, 2021). In addition, if a significant multivariate effect is found, Univariate

ANOVAs for each of the dependent variables will be performed (Mertler &Vannatta, 2021).

Evaluation of Statistical Assumption

The following assumptions associated with the MANOVA are as follows:

1. Independence of Observation – refers to a participant's scores on the dependent measures that are not influenced by the other participants in his or her group. This is a design issue in which each participant will be exposed individually for each independent variable.
2. Each dependent variable should be given quantitative and normally distributed. This assumption will be tested with the Shapiro-Wilks Test.
3. Homogeneity of variance and covariance matrices – refers to the variance for all dependent variables being equal across populations and the variance shared between two variables for all pairs of dependent measures being equal for all groups. This assumption will be tested by the Box's M-Test.
4. Associations between pairs of dependent variables should be linear. This assumption will be tested with a matrix of scatter plots.
5. Multivariate normality – refers to the scores on the independent variable being normally distributed for each group defined by the independent variables (Metler & Vannatta, 2021).

CHAPTER 4

DATA ANALYSIS

The purpose of this study was to examine the effect of selected demographic factors on the academic achievement of high school students. More specifically, this study was concerned with the effects of the variables gender, ethnicity, and socioeconomic status on the State of Texas Assessments of Academic Readiness (STAAR) scores in Mathematics, Science, English, and Social Studies. Answers to the following questions were sought:

1. Does the demographic characteristics of gender have any effect on the combined academic achievement (STAAR's Mathematics, Science, English, and Social Studies) scores of high school students?
2. Does the demographic characteristics of ethnicity have any effect on the combined academic achievement (STAAR's Mathematics, Science, English, and Social Studies) scores of high school students?
3. Does the demographic characteristics of socioeconomic status have any effect on the combined academic achievement (STAAR's Mathematics, Science, English, and Social Studies) scores of high school students?

The sample population for the current study consisted of 222 high school students enrolled in a suburban public school in the State of Texas during the 2021-2022 academic school year. The results of this study were categorized into two major areas. The first area of this chapter consisted of the demographic characteristics of the high school students participating in the study. The second area of this chapter contained the testing

of the three null hypotheses formulated for this study. The One-way Multivariate Analysis of Variance Statistical procedure was utilized to analyze the data for this study. All three null hypotheses were tested at the .05 level of significance or better.

Demographic Characteristics of the High School Students in the Study

There were 222 high school students who participated in this study. The high school students were described descriptively in this study according to their gender, ethnicity, and socioeconomic status.

Gender. One hundred nineteen or 53.6 percent of the high school students who participated in this study were males. By contrast, 103 or 46.4 percent of them were females. See Table 1 for these analyses.

Table 1

Frequency Distribution of the High School Participants by Gender

Variable	Number	Percent
Gender		
Male	119	53.6
Female	103	46.4
Total	222	100.0

Ethnicity. Regarding the variable ethnicity, this variable was categorized into five distinct groups for this study. There were 59 or 26.6 percent of the high schools who identified their ethnic identity as Black American and 29 or 13.1 percent of them revealed

their ethnic status as White American. In addition, 59 or 26.6 percent of the high school students reported their ethnic background as Hispanic, and 47, or 21.2 percent acknowledged their ethnicity as Asian American. Finally, 28 or 12.6 percent of the high school students expressed their ethnic identity as Other Americans. See Table 2 for these findings.

Table 2

Frequency Distribution of Participants by Ethnicity

Variable	Number	Percent
Ethnicity		
Black	59	26.6
Hispanic	59	26.6
White	29	13.1
Asian	47	21.2
Other	28	12.6
Total	222	100.0

Socioeconomic Status. The variable socioeconomic status was measured in two categories. There were 128 or 57.7 percent of the high school students who reported they had free or reduced lunch. On the other hand, 94 or 42.3 percent of the high school students indicated they paid for their lunch. See Table 3 for these results.

Table 3

Frequency Distribution of the High School Participants by Socioeconomic Status

Variable	Number	Percent
Socioeconomic Status		
Low (Free)	128	57.7
High (Non-Free)	94	42.3
Total	222	100.0

Testing of the Null Hypotheses

Ho_1: There is no statistically significant difference between the mean combined academic achievement (STAAR's Mathematics, Science, English and History) scores of high school students by gender.

Presented in Table 4 is the One-Way Multivariate Analysis of Variance findings on the effect of the variable gender on the combined STAAR's Mathematics, Science, English, and History scores of high school students. The MANOVA results reported that the variable gender was found to have no statistically significant effect on the academic achievement scores (STAAR's Mathematics, Science, English, and History) among high school students (Wilks' = .987, F (4, 217) = .708, P > .05) at the .05 level.

Table 4

MANOVA Results Regarding the Effects of the Variable Gender on the Academic Achievement of High School Students

Effect	Value	F	Hypothesis df	Error df	P
Wilks' Lambda	.987	.708	4	217	.587

Additionally, the Univariate Analysis of Variance Analyses (See Table 5) indicated the STAAR's Math (F (1, 220) = 1.531, P > .05), Science (F (1, 220) = .902, P > .05), English (F (1, 220) = .288, P > .05) and History (F (1, 220) = 2.38, P > .05) scores did not differ significantly across gender groups. Thus, hypothesis 1 was not rejected.

Table 5

Univariate ANOVA Results Regarding the Effects of the Variable Gender on the Academic Achievements of High School Students

Source	Dependent Variable	Sum of Squares	df	MS	F	P
Gender	Math	231.735	1	231.735	1.531	.217
	Science	82.270	1	82.270	.402	.343
	English	53.460	1	53.460	.288	.592
	History	387.560	1	387.560	.238	.124
Error	Math	33301.964	220	151.373		
	Science	20058.685	220	91.176		
	English	40901.157	220	185.914		
	History	33031.557	220	150.143		
Total	Math	33533.698	221			
	Science	20140.985	221			
	English	40954.617	221			
	History	33389.117	221			

Ho_2: There is no statistically significant difference between the mean combined academic achievement (STAAR's Mathematics, Science, English, and Social Studies) scores of high school students by ethnicity.

Reported in Table 6 is the One-Way Multivariate Analysis of Variance results regarding the influence of the variable ethnicity on the combined STAAR's Mathematics, Science, English, and History scores of high school students. As shown in this table, the MANOVA analyses indicated that the variable ethnicity did, however, significantly impact the combined STAAR's Mathematics, Science, English, and History scores of high school students at the .001 level (Pillai's Trace = .357, F (16, 868) = 5.315, P < .001).

Table 6

MANOVA Results Regarding the Effects of the Variable Ethnicity on the Academic Achievement of High School Students

Effect	Value	F	Hypothesis df	Error df	P
Pillai's Trace	.357	5.315	16	868	.000***

***Significant at the .001 level

Moreover, Univariate Analysis of Variance analyses (See Table 7) reported that STAAR's Math (F (4, 214) = 15.627, P < .001) and Science (F (4, 217) = 11.874, P < .001) scores were significantly influenced by the variable ethnicity at the .001 level. In addition, the Analysis of Variance results revealed that the STAAR's English (F (4,217) = 15.935, P < .001) and the STAAR's History (F (4, 217) = 11.026, P < .001) scores were

significantly affected by the demographic variable ethnicity. Therefore, hypothesis 2 was rejected.

Table 7

Univariate ANOVA Results Regarding the Effects of the Variable Ethnicity on the Academic Achievements of High School Students

Source	Dependent Variable	Sum of Squares	df	MS	F	P
Ethnicity	Math	7499.992	4	1874.998	15.629	.001***
	Science	3616.660	4	904.165	11.874	.001***
	English	9298.383	4	2324.596	15.935	.001***
	History	5639.910	4	1409.977	11.026	.001***
Error	Math	26033.706	217	119.971		
	Science	16524.295	217	76.149		
	English	31656.234	217	145.881		
	History	27749.208	217	127.877		
Total	Math	33533.698	221			
	Science	20140.955	221			
	English	40954.617	221			
	History	33389.117	221			

***Significant at the .001 level

Furthermore, further data analysis utilizing the Scheffe' as a post hoc test (See Table 8) revealed that White and Asian high school students scored significantly higher on the STAAR's Math test than Black and Hispanic high school students. Also, Asian high school students scored significantly higher on the STAAR's math test than Other high school students.

Table 8

Scheffé Results Regarding STAAR's Math Scores by Ethnicity

Black	Hispanic	White	Asian	Other	P
31.51	30.97				.999
31.51		41.89			.002**
31.51			44.91		.000***
31.51				35.92	.858
	30.97	41.89			.001***
	30.97		44.91		.000***
	30.97			35.92	.762
		41.89	44.91		.850
		41.89		35.92	.158
			44.91	35.92	.003**

**Significant at the .01 level
***Significant at the .001 level

Additionally, the Scheffe' as a follow-up test (See Table 9) indicated that White and Asian high school students had significantly higher Science scores on the STAAR's examination than their Black, Hispanic, and Other counterparts.

Table 9

Scheffé Results Regarding STAAR's Science Scores by Ethnicity

Black	Hispanic	White	Asian	Other	P
35.41	35.76				1.000
35.41		42.93			.007*
35.41			44.66		.000***
35.41				35.46	1.000
	35.76	42.93			.012*
	35.76		44.66		.000***
	35.76			35.46	1.000
		42.93	44.66		.951
		42.93		35.46	.037*
			44.66	35.46	.001***

*Significant at the .05 level
**Significant at the .01 level
***Significant at the .001 level

In addition, the Scheffé results (See Table 10) revealed that White and Asian high school students did significantly better on the STAAR's English test than Black, Hispanic, and Other high school students.

Table 10

Scheffé Results Regarding STAAR's English Scores by Ethnicity

Black	Hispanic	White	Asian	Other	P
41.86	38.17				.599
41.86		51.41			.018*
41.86			53.21		.000***
41.86				36.82	.509
	38.17	51.41			000***
	38.17		53.21		.000***
	30.97			36.82	.993
		51.41	53.21		.983
		51.41		36.82	001***
			53.21	36.82	.000***

*Significant at the .05 level
***Significant at the .001 level

Finally, the Scheffé as a multiple comparison test (See Table 11) indicated that White and Asian high school students scored significantly higher on the STAAR History examination than their Black and Hispanic peers. In addition, Asian high school students scored significantly higher on the STAAR History test than Other high school students.

Table 11

Scheffé Results Regarding STAAR's History Scores by Ethnicity

Black	Hispanic	White	Asian	Other	P
46.68	45.90				.998
46.68		55.31			.026*
46.68			57.79		.000***
46.68				46.57	1.000
	45.90	55.31			.011*
	45.90		57.79		.000***
	45.90			46.57	.999
		55.31	57.79		.930
		55.31		46.57	.079
			57.79	46.57	.002**

*Significant at the .05 level
**Significant at the .01 level
***Significant at the .001 level

Ho_3: There is no statistically significant difference between the mean combined academic achievement (STAAR's Mathematics, Science, English, and Social Studies) scores of high school students by socioeconomic status.

Shown in Table 12 is the One-Way Multivariate Analysis of Variance results regarding the impact of the variable socioeconomic status on the combined STAAR's

academic achievement (Math, Science, English, and History) scores of high school students. The MANOVA results indicated that high school students' combined STAAR's Math, Science, English, and History scores were significantly impacted by their socioeconomic status (Pillai's Trace = .132, F (4, 217) = 8.264, P < .001) at the .001 level.

Table 12

MANOVA Results Regarding the Effects of the Variable Socioeconomic Status on the Academic Achievement of High School Students

Effect	Value	F	Hypothesis df	Error df	P
Pillai's Trace	.132	8.264	4	217	.001***

***Significant at the .001 level

Further, the Univariate Analysis of Variance (ANOVA) results (See Table 13) revealed that the STAAR's Math (F (1, 220) = 22.761, P < .05), Science (F (1,220) = 13.514, P < .05), English (F (1, 220)) = 14.482, P < .05), and History (F (1,220) = 25.965, P < .05) scores of high school students did differ significantly across levels of socioeconomic status at the .001 level. Accordingly, hypothesis 3 was rejected.

Table 13

Univariate ANOVA Results Regarding the Effects of the Variable SES on the Academic Achievements of High School Students

Source	Dependent Variable	Sum of Squares	df	MS	F	P
SES	Math	3144.114	1	3144.114	22.761	.000***
	Science	1165.592	1	1165.592	13.514	.000***
	English	2529.483	1	2529.483	14.482	.000***
	History	3524.693	1	3524.693	25.965	.000***
Error	Math	30389.584	220	138.134		
	Science	18975.363	220	86.252		
	English	38425.134	220	174.660		
	History	29864.424	220	135.747		
Total	Math	33533.698	221			
	Science	20140.955	221			
	English	40954.617	221			
	History	33389.117	221			

***Significant at the .001 level

Additionally, further data analysis employing the mean results revealed that high school students who received free or reduced lunch have significantly higher mean scores in Mathematics and Science on the STAAR examination than those high school students who did not receive free or reduced lunch. See Table 14.

Table 14

Mean Results Pertaining to the Influence of Socioeconomic Status On the STAAR's Mathematics and Science Scores

	Math		Science	
SES	Mean	SD	Mean	SD
Free or Reduced	39.14	10.98*	40.41	8.46*
Not Free or Reduced	31.53	12.73	35.78	10.31

*Highest Mean

Likewise, the mean results (Table 15) indicated that high school students who received free or reduced lunch possessed significantly higher STAAR English and History scores than those high school students who did not receive free or reduced lunch.

Table 15

Mean Results Pertaining to the Influence of Socioeconomic Status On the STAAR's Mathematics and Science Scores

	English		History	
SES	Mean	SD	Mean	SD
Free or Reduced	46.79	12.17*	53.35	9.80*
Not Free or Reduced	39.96	14.52	45.29	13.79

*Highest Mean

Summary of Hypotheses Tested

Three null hypotheses were tested in this study as reported in Table 16. All three null hypotheses were tested for differences among variables. Two of the three null hypotheses were found to be significant at the .001 level.

Regarding hypothesis one, the variable gender was found to have no significant effect on the combined STAAR's Mathematics, Science, English, and History scores among high school students. Also, gender was found not to have a statistically significant influence on STAAR's Mathematics, Science, English, and History independently.

Moreover, regarding hypothesis two, the variable ethnicity was found to have a significant influence on the combined STAAR's academic achievement scores (Mathematics, Science, English, and History) among high school students. Specifically, White and Hispanic high school students scored significantly higher on the STAAR's Math, Science, English, and History examinations.

Finally, concerning hypothesis three, the variable socioeconomic status had a significant impact on the STAAR's Math, Science, English, and History scores among high school students. The data revealed that high school students who received free or reduced lunch exhibited significantly higher STAAR's Mathematics, Science, English, and History scores than those high school students who did not receive free or reduced lunch.

Table 16

Summary of Hypotheses Tested

Hypotheses	F	DF	P	Conclusion
Ho_1	.708	4, 217	.587	Non-Significant
Ho_2	5.315	16, 868	.000*	Significant***
Ho_3	8.264	4, 217	.001	Significant***

***Significant at the .001 level

CHAPTER 5

SUMMARY, FINDINGS, DISCUSSION, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

Summary

The purpose of this study was to examine the effect of selected demographic factors on the academic achievement of high school students. More specifically, this study was concerned with the effects of the variables gender, ethnicity, and socioeconomic status on the State of Texas Assessments of Academic Readiness (STAAR) scores in Mathematics, Science, English, and History.

A predictive correlational research design was employed in the study. Two hundred twenty-two (222) high school students were selected employing the judgmental procedure to participate in the study. Archival (pre-existing) data were collected from the Texas Education Agency's website.

Furthermore, the data were analyzed in the study by using the Binary Logistic Regression technique. The following three null hypotheses were formulated and tested at the .05 level of significance or better in this investigation:

Ho_1: There is no statistically significant difference between the mean combined academic achievement (STAAR's Mathematics, Science, English, and History) scores of high school students by gender.

Ho_2: There is no statistically significant difference between the mean combined academic achievement (STAAR's Mathematics, Science, English, and Social Studies) scores of high school students by ethnicity.

H_{O3}: There is no statistically significant difference between the mean combined academic achievement (STAAR's Mathematics, Science, English, and Social Studies) scores of high school students by socioeconomic status.

Findings

The following findings were obtained from the results of the study:

1. The combined STAAR Mathematics, Science, English, and History scores of high school students were not significantly affected by their gender.
2. The variable ethnicity did produce a significant effect on the combined STAAR's Mathematics, Science, English, and History scores among high school students.
3. The STAAR's Mathematics, scores of high school students were independently affected by their ethnicity.
4. The variable ethnicity did produce a significant effect on the STAAR's Science scores of high school students.
5. High school students' ethnicity did produce a significant impact on the STAAR's English scores.
6. The STAAR's History scores of high school students were significantly impacted by their ethnicity.
7. The variable Socioeconomic status did produce a significant influence on the combined STAAR's Mathematics, Science, English, and History scores of high school students.
8. High school students' Socioeconomic Status did produce a significant effect on their STAAR Mathematics scores.

9. The variable Socioeconomic Status did produce a significant influence on the STAAR's Science scores of high school students.
10. The STAAR's English scores of high school students were independently affected by their Socioeconomic Status.
11. The STAAR's History scores of high school students were significantly impacted by their Socioeconomic Status.

Discussion

One of the most interesting findings of the current study was the non-significant influence of the variable gender on the combined STAAR's Mathematics, Science, English, and History achievement scores of high school students. The findings were not consistent with those of Anderson (2016), Perez-Felkner, Nix, and Thomas (2017), Su and He (2020), and Stoet and Georg (2018). All of the above researchers found that the variable gender had a significant impact on the math performance of high school students.

However, the findings regarding the relationship between gender and math academic scores were favorable to those of Ajai and Imoko (2014). In their research, these researchers did not find a significant difference between the math scores of male and female high school students.

Likewise, the findings on the differences in the science achievement scores of male and female high school students did not correspond to those by O'Reilly and McNamara (2007), Okeke (2007), Mann and Dipete (2016), Mukti et al. (2019), Thomas (2017), and Tsai et al. (2018). The aforementioned researchers also found significant differences between the science scores of male and female high school students.

Nevertheless, the present findings concerning the variable gender and the science performance of high school students were supported by the works of Ajayi and Ogbeba, (2017) and Ani et al. (2021). The previous researchers found that the variable gender did not statistically impact the science scores among high school students.

A plausible explanation for the current findings regarding the influence of the variable gender on the math and science scores of high school students may be that male and female high school students both seem to possess a greater degree of STEM orientation. Because of similar self-assessments in STEM courses, male and female high school students tend to perform on the same levels in math and science.

Moreover, the analyses regarding the effect of the variable gender on the English scores among high school students parallel those of MacKenzie, Scull, and Munsie (2013). The findings by these researchers were consistent with the present findings. They found that a significant difference did not exist between the English scores of male and female high school students. An explanation for these findings may be that both male and female high school students seem to have difficulties in writing effectiveness. The problem they have in writing seems to have a direct effect on their English test scores which could explain their performance on the STAAR's English examination.

Also, the present findings concerning the variable gender and the History or Social Studies scores of high school students were not favorable to those of Nnamani and Oyibe (2016), Lie and Syoberg (2004), and Dania (2014). In their studies, they found that the gender of high school students did have a significant impact on their History test scores. A reasonable explanation for these findings in the present study may be that both

male and female high school students seem to learn similarly based on the teaching methodology utilized in History courses.

Additionally, another significant finding of the current study pertained to the impact of the variable ethnicity on the academic performance of high school students. To be sure, the variable ethnicity was found to have a significant impact on the Math, Science, English, and History scores of the STAAR examination among high school students.

The present findings regarding the influence of ethnicity on the Math scores of high school students were consistent with those of Koch, Slate, and Moore (2016) and Su and He (2020). These researchers found that the variable ethnicity did impact the Math performance of high school students. Similarly, in the present study, the variable ethnicity did produce a significant impact on the Science scores of high school students. These findings were favorable to those of Klenowski and Wyatt-Smith (2012), Means et al. (2017), and LaForce et al. (2019). All of these researchers found that high school students' ethnicity had a significant effect on their Science achievement scores on standardized examinations.

In the current research study, as well as in previous, research studies about the impact of ethnicity on the Math and Science scores, White and Asian students were found to have significantly higher Math and Science scores than their Black and Hispanic counterparts. A reasonable explanation for the present findings may be that White and Asian high school students seem to exhibit a higher degree of intrinsic motivation toward STEM courses than their Black and Hispanic peers. In other words, White and Asian students tend to show more interest in STEM courses than Black and Hispanic students.

Furthermore, the variable ethnicity also produced a significant effect on the English and History STAAR scores among high school students. These findings were supported by research conducted by Maina (2015), Odey (2019), and Cornelius-Ukpepi et al. (2019) for History and by research done by Diaz (2008), Scafidi et al. (2007) and the Institute of Educational Sciences (2002) for English. The above researchers found that White and Asian students seem to outperform their Black and Hispanic counterparts in both English and History.

An explanation for the present findings in History may be that White and Asian students were more likely to take AP courses in History and Social Studies than their Black and Hispanic peers. Because of this advanced exposure to History and Social Studies, White and Hispanic students had significantly higher History scores than Black and White students. In addition, a reasonable explanation for the current findings in English may be that White and Asian high school students are the ones whose parents have obtained a higher level of education and can provide them with more resources which would help them to be better prepared in English proficiency.

Finally, another notable finding but somewhat surprising is the significant impact that SES had on the combined STAAR's Math, Science, English, and History examination scores. The surprising aspects of these findings were that high school students who received a free or reduced lunch performed better in the above academic areas than those who did not receive free or reduced lunch.

These findings were not consistent with research studies where SES is measured by family income, professional occupation, or educational level. Research studies conducted by Hamid (2011), Durk et al. (2020), Parsons (2019), Hanson and Slaughter

(2016), Huang and Cheng (2011), Kalaycioğlu (2015), and Marjoribanks (2017) found that when the aforementioned Socioeconomic factors were used, high school students from high SES households performed statistically better than those from low SES households.

Nonetheless, in studies conducted where SES was measured as free or reduced lunch or non-free lunch, the current findings were found to be consistent. Research conducted by Park et al. (2017), Benner et al. (2016), Folds and Tanner (2014), and Saw (2017), found that socioeconomically disadvantaged students performed better in some academic areas than those from high SES households. A subjective explanation for these findings may be that high school students from low socioeconomic households exhibited more positive attitudes toward their academic coursework, due to a large extent, to the level of support from parents they received within the home environment. Home-based involvement by parents within low SES households has been found to provide empirical evidence of its impact on the academic performance of high school students from these households.

Conclusions

The following conclusions were drawn from the findings of this study:

1. In general, the variable gender did not affect the combined STAAR's Mathematics, Science, English, and History scores of high school students.
2. White and Asian high school students scored significantly higher on the Mathematics and Science sections of the STAAR examination than Black and Hispanic high school students.
3. White and Asian high school students exhibited significantly higher STAAR's English and History scores than their Black and Hispanic counterparts.
4. Asian high school students possessed significantly higher STAAR Mathematics and History scores than other ethnic groups of high school students.
5. High school students who received free or reduced lunch scored significantly higher on the STAAR's Mathematics and Science sections than those high school students who did not receive free or reduced lunch.
6. High school students who received free or reduced lunch possessed significantly higher English and History scores on the STAAR examination than those high school students who did not receive free or reduced lunch.

Implications

From the results of the study, the following implications were drawn:

1. The findings associated with gender and academic achievement suggest that public school administrators should pay close attention to those factors that impact the performance level of male and female high school students on standardized examinations. An understanding of these factors will go a long

way in enhancing the total educational experience of both male and female students.

2. A second implication of the current study is based on the significant influence of the variable ethnicity on the academic performance of high school students. The overall effect of the variable ethnicity on the various academic areas among high school students, particularly, on standardized examinations, suggests that instructional interventions need to be developed and implemented to take into account the influence of this factor on the learning process.
3. Finally, a third implication of the current study is geared toward the relationship between Socioeconomic Status and the academic achievement of high school students. It is suggested that when using SES as a factor in understanding the achievement gap among high school students, it is imperative to take into account how this variable is measured or defined. The operation of this variable is vital to interpreting its influence on the achievement level of all students regardless of their demographic characteristics.

Recommendations for Further Research

Based on the findings of this study, the following are suggestions for further research:

1. A study be conducted to match the ethnicity of the students with the ethnicity of teachers and examine the impact this matching would have on their academic achievement, particularly in Math and Science courses.

2. A study be designed which would measure and compare the perceptions of administrators, parents, students, and teachers regarding the impact of demographic factors on the academic achievement of high school students on standardized examinations.
3. A follow-up study be conducted which would utilize a large global population. Such a study, if conducted, would provide additional data to explain better the influence of certain demographic factors on the academic achievement of high school students on standardized examinations.
4. Finally, a study needs to be conducted to examine the impact of various instruction methodologies on the academic performance of high school students, especially among Black and Hispanic students.

APPENDIX A

IRB APPROVAL LETTER

June 16, 2022

Good day, Nuwayyir Alenezi!

This is to inform you that your protocol #**ES080**, *"The Effect of Selected Demographic Factors on the Academic Achievement of High School Students"*, is exempt from Texas Southern University's Institutional Review Board (IRB) full committee review. Based on the information provided in the research summary and other information submitted, your research procedures meet the exemption category set forth by the federal regulation 45CFR 46.104(d)(4):

Secondary research for which consent is not required

The Federal Wide Assurance (FWA) number assigned to Texas Southern University is FWA00003570.

If you have questions, you may contact the Research Compliance Administrator for the Office of Research at 713-313-4301.

PLEASE NOTE: (1) All subjects must receive a copy of the informed consent document, if applicable. If you are using a consent document that requires participants' signatures, signed copies can be retained for a minimum of 3 years of 5 years for external supported projects. Signed consents from student projects will be retained by the faculty advisor. Faculty is responsible for retaining signed consents for their own projects, however, if the faculty leaves the university, access must be made available to TSU CPHS in the event of an agency audit. (2) Documents submitted to the Office of Research indicate that information obtained is recorded in such a manner that human subjects cannot be identified directly or through identifiers linked to the subject; and the identities of the subjects will not be obtained or published; and any disclosures of the human subjects' responses outside the research will not reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation. The exempt status is based on this information. If any part of this understanding is incorrect, the PI is obligated to submit the protocol for review by the CPHS before beginning the respective research project. (3) Research investigators will promptly report to the CPHS any injuries or other unanticipated problems involving risks to subjects and others.

This protocol will expire June 16, 2025

Sincerely,

Institutional Review Board (IRB)

APPENDIX B

RELEASE OF STAAR DOCUMENTS

From: **Nuwayyir Alanazi** <nuwayyirnuwayyir@gmail.com>
Date: Tue, Jun 6, 2023 at 2:34 PM
Subject: Fwd: PIR # 59077 Release Documents with Invoice
To: متعب العنزي <metab.f.s@hotmail.com>

أُرسلت من الـ iPhone

بداية الرسالة المحولة:

من: Nuwayyir Alanazi <nuwayyirnuwayyir@gmail.com>
التاريخ: ٢٤ مايو، ٢٠٢٣، ٣:٤٠:٣١ م غرينتش-٥
إلى: Ronnie.Davis@tsu.edu
الموضوع: تحويل: **PIR # 59077 Release Documents with Invoice**

---------- Forwarded message ---------
From: **PIR** <PIR@tea.texas.gov>
Date: Tue, May 9, 2023 at 1:46 PM
Subject: PIR # 59077 Release Documents with Invoice
To: nuwayyirnuwayyir@gmail.com <nuwayyirnuwayyir@gmail.com>

Public Information Request
Release Documents with Invoice
May 9, 2023

Nuwayyir Alenezi

TEA PIR #59077

Dear Nuwayyir Alenezi:

On May 2, 2023, you responded to the Cost Estimate Statement sent to you by the Texas Education Agency (TEA). In your response, you agreed to accept the estimated cost associated with providing you the information.

The attached files include information masked in compliance with the federal Family Educational Rights and Privacy Act (FERPA), 20 U.S.C. Section 1232g. TEA is required to withhold from public disclosure personally identifiable, non-directory information in education records. Additionally, FERPA does not permit state and local educational authorities to disclose to the Office of the Attorney General (OAG) personally identifiable information contained in education records for the purpose of review in the open records ruling process under the Texas Public Information Act. The United States Department of Education has

ruled FERPA determinations must be made by the educational authority in possession of the education records. Consequently, it is impermissible for TEA to seek an OAG opinion concerning the applicability of FERPA to records responsive to a public information request. https://www.texasattorneygeneral.gov/sites/default/files/files/divisions/open-government/20060725-USDept-Education.pdf

So that we may provide you with the requested information promptly, the records/data are released to you with this letter. Your final **Invoice Statement is enclosed** and includes any adjustments.

Please remit your full payment to the **Texas Education Agency** and write **ORR-TEA # 59077** on the check/money order.

Mail Payment to:	**TEA - PIR# 59077** P.O Box 13717 Austin, Texas 78711-3717
In Person Deliver to:	TEA Cashier Accounting Room 2-115A Texas Education Agency, WB Travis Bldg. 1701 North Congress Avenue Austin, Texas 78701

Accepted payment methods by mail are money orders and checks; please make payable to "Texas Education Agency- PIR". We do not accept credit card or online payments at this time. Please include your PIR number with your payment; the payment address is listed above. In person payments are currently accepted by the TEA Accounting office on weekdays between 8:00 am -10:00 am. If you would like to make a payment during business hours outside this timeframe, please contact the PIR office to arrange an appointment.

If you have any questions or wish to discuss this matter further, please contact me at (512) 463-3464 or by email at PIR@tea.texas.gov.

Sincerely,

Jenny Eaton
Public Information Coordinator

Enclosures: Responsive Documents
Invoice Statement

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