

DIFFERENCES IN STUDENT COLLEGE READINESS IN READING, IN
MATHEMATICS, AND IN BOTH SUBJECTS BY ETHNICITY/RACE AND
GENDER: A MULTIYEAR STATEWIDE STUDY

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DEDICATION

This dissertation is dedicated to my Lord and Savior, Jesus Christ. Only through You do all blessings flow. The strength, the wisdom, the time, and the words all came from You. I will always remember that in the middle of this journey, You stopped me to reintroduce Yourself. I have not been the same ever since. “All glory to the only wise God, through Jesus Christ, forever. Amen” (Romans 16:27).

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ABSTRACT

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Purpose

The purpose of this journal-ready dissertation study was to examine the extent to which differences were present in college readiness in reading, mathematics, and in both subjects for Texas high school students by their demographic characteristics. In the first investigation, the degree to which ethnic/racial (i.e., Black and White) differences were present in college readiness in reading, in mathematics, and in both subjects was determined. Concerning the second investigation, the extent to which differences existed in college readiness in reading, in mathematics, and in both subjects between Hispanic and White students was addressed. Regarding the third investigation, the degree to which gender differences was present exist in college readiness in reading, in mathematics, and in both subjects was ascertained. In each of these three investigations, data for five school years (i.e., 2012-2013, 2013-2014, 2013-2015, 2015-2016, and 2016-2017) were analyzed.

Method

A non-experimental, causal comparative research design was used in this study in which Texas archival data were analyzed for the 2012-2013 through the 2016-2017 school years. Inferential statistical procedures were calculated to determine the differences in college readiness in reading, in mathematics, and in both subjects by ethnicity/race (i.e., Black and White students in study one and Hispanic and White students in study two) and gender in study three.

Findings

In the first investigation, White students were statistically significantly more college ready in reading, in mathematics, and in both subjects than were Black students in each of the five school years. In the second study, White students were statistically significantly more college ready in reading, in mathematics, and in both subjects than were Hispanic students in all five school years. In the third investigation, results were mixed as girls were statistically significantly more college ready in reading in three school years; boys were more college ready in mathematics in four school years; and girls were more college ready in both subjects in three school years. Effect sizes for the first two studies were moderate to large, whereas the effect sizes for the gender differences study were small.

KEY WORDS: College Readiness, Reading, Mathematics, Ethnicity/Race, Black Students, White Students, Hispanic Students, Gender, Boys, Girls, Texas

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CHAPTER I

Introduction

Many policies have influenced education over the past 50 years. In the beginning, civil rights activists in the United States fought for equal access to education for all students, and as a result, the Elementary and Secondary Education Act (ESEA, 1965) was enacted with the intent of improving educational equity for all disadvantaged students (Kantor, 1991). Since the first implementation in 1965, the ESEA has been reauthorized (1978, 1981, 1994, 2001, 2015), and with each reauthorization, new focuses in education have been established (e.g., Title I, learning objectives, rigorous learning standards, curriculum, accountability measured from standardized assessments, and college and career readiness). Throughout the changes to the ESEA, the focus has always been to increase equity in learning for all U.S. students (Bush, 2001; Elementary and Secondary Education Act, 1965; Every Student Succeeds Act, n.d.; Gardner et al., 1983).

In 2001, The Bush legislation reauthorized the ESEA and established The No Child Left Behind (NCLB) Act. Renewed attention to ethnic achievement gaps in the United States by quantifying achievement levels for subgroups within and between schools was a result of the enactment of the NCLB Act (Lubienski & Crocket, 2007). Furthermore, provisions emerged to ensure students receive access to full educational opportunities and increased outcomes.

As a result of the mandates of the NCLB Act (2001, 2002), annual assessments in reading and in mathematics were used to determine whether educational performance for U.S. students improved. Essentially, standardized test scores in reading and in mathematics began to serve as two of the main measures of student learning (Barnes &

Slate, 2013; Hoffman, Assaf, & Paris, 2001). Therefore, educators and policymakers were able to determine whether students mastered grade-level learning standards (Hoffman et al., 2001). More importantly, educators and policymakers were better able to determine whether students were prepared for the next level of learning—post secondary education (Hossler & Vesper, 1993; Kuh, 2007; Stage, 1988; Wyatt & Mattern, 2011).

In recent decades, the number of students in the United States pursuing higher education has increased; however, inequities exist among students entering and completing post-secondary education (Long, 2013; Martinez & Klopott, 2005). Educational inequity, by way of socio-structural inequity (e.g., poverty, racial segregation; and unequitable access to high-quality schools) are barriers that must be addressed by policymakers and educational leaders to increase the overall educational attainment and college readiness for historically, underserved populations (Castro, 2013; Rumberger & Palardy, 2005). Moreover, the academic successes of underserved populations depend on educators comprehending the conceptual differences between college eligibility and college readiness (Zulmara, Bissell, Hafner, & Katz, 2007).

Conley (2007a) operationally defined college readiness as “the level of preparation a student needs to enroll and to succeed, without remediation, in an entry-level, credit bearing college course” (p. 5). Therefore, to be considered college ready, students must acquire skills, content knowledge, and behaviors before leaving high school (Gigliotti, 2012). Essentially, all schools must prepare all students for success in college (Every Student Succeeds Act, 2015; Houser & An, 2015).

Because of state and federal legislations, U.S. students have experienced academically advanced curriculum and higher accountability measures (Barnes, Slate, & Rojas-LeBouef, 2010). Policymakers intended for the more rigorous curriculum and increased accountability measures to improve not only high school graduation rates, but also college readiness rates. Nevertheless, across the United States college readiness rates remain low (Barnes et al., 2010). Additional researchers (e.g., Cabrera et al., 2006; Wimberly & Noeth, 2005) indicated students' academic achievement level by the end of Grade 8 had an even greater influence on college readiness than high school achievement. Thus, for students to be college-ready upon high school graduation they not only need to achieve academic success in high school through a rigorous curriculum, knowledge of college expectations, and higher-level learning standards, but students should also achieve academic success by the end of Grade 8 (ACT, 2005; Conley, 2005, 2007a, 2007b; Horn, 1997; Roderick, Nagaoka, & Coco, 2009).

Importantly, more students aspired to attend college. However, college enrollment has not translated into substantial increases in the share of Black students who earn 4-year college degrees (Harris, Hines, & Hipolito-Delgado, 2016; Roderick et al., 2009). Further, in spite of the best efforts and intentions of policymakers and educators, substantial disparities in college readiness and college enrollment among groups of students remain.

Review of Relevant Literature

Roderick et al. (2009) focused on improving college access and readiness for low-income and ethnic/racial minority students in urban high schools. Roderick et al. examined the most common ways of assessing college readiness: (a) coursework required

for college admission, (b) achievement test scores, and (c) grade point averages.

Statistically significant ethnic/racial disparities were present on all three indicators of college readiness. Specifically, Roderick et al. reported only about one third of 2002 graduates met minimum college readiness criteria, and less than 23% of Black graduates compared with 40% of White graduates. Moreover, Black students needed high schools that stressed the importance of (a) content knowledge and basic skills; (b) core academic skills; (c) non-cognitive, or behavioral skills; and (d) college knowledge—the ability to search effectively for and apply to college (Harris et al., 2016; Roderick et al., 2009).

Even with greater requirements for high school graduation, Long, Latarola, Conger (2009) reported nearly one third of U.S. college freshmen are unprepared for college-level math. Long et al. further suggested that Black students from economically disadvantaged backgrounds needed more remedial coursework in college. To ascertain how much the gaps in mathematics are determined by high school level coursework, Long et al. analyzed data on students in Florida public postsecondary institutions by examining “the contribution of the highest mathematics course taken in high school to racial, socioeconomic, and gender gaps in readiness for college-level math” (p. 2). The analysis showed that high school mathematics courses that students take contribute significantly to their college readiness. The researchers determined that the differences in the highest mathematics course taken among college-going students explained 28% to 35% of the gaps in mathematics college readiness between Black and Hispanic students. Also, Black students who were from families of poverty received lower grades in mathematics courses, suggesting differential educational quality (Long et al., 2009). Therefore, Long et al. suggested leveling race and poverty gaps in courses being taken

may have deep effects on narrowing gaps in college readiness. The researchers suggested that if Black students took the same mathematics courses as White students, college readiness gaps could lower between Black and White students by 28%.

Kowski (2013) investigated whether high school performance predicted college mathematics placement. In his study, he reviewed college readiness literature related to high school mathematics requirements and college placement testing. Kowski analyzed high school transcripts (e.g., overall GPA, mathematics GPA, the number of mathematics classes taken, the number of years of mathematics, the highest level of mathematics) to assess mathematics college readiness. The researcher examined student data from a college mathematics placement test to determine mathematics college readiness for 659 first-time, full-time students in a New Jersey suburban community college. Through descriptive statistics, Kowski learned that many of the students were placed in either elementary college algebra (e.g., 45%) or intermediate college algebra (e.g., 31%) courses. Of entering college students, 76% were placed into remedial mathematics revealing a gap between preparation for college in high school and college expectations. The researcher uncovered that the state assessment partially signaled college readiness.

Researchers (e.g., Conger, 2009; Harris et al., 2016; Kowski 2013; Roderick et al., 2009) show that it is important for educators to align high school learning outcomes with college standards. In an effort to increase the number of Texas high school graduates who are college and career ready, legislators passed the bill, Advancement of College Readiness in Curriculum (Texas Higher Education Coordinating Board & Texas Education Agency, 2009). The Texas Education Agency and the Texas Higher Education Coordinating Board developed College and Career Readiness Standards (CCRS) in the

areas of English/Language Arts, mathematics, science, and social studies. These standards made up the knowledge and skills students needed to complete entry level courses at college in Texas.

In a study using data from the Texas Education Agency's Academic Excellence Indicator System, Moore et al. (2011) analyzed scores for all students and each ethnic/racial subgroup in reading, mathematics, and both subjects combined to determine college-ready graduate rates. Because only one third of the students in their study were determined to be college ready in both subjects, and because statistically significant differences were present in reading, mathematics, and both subjects between Black and White students, they suggested that educational policies regarding college readiness be re-examined. Moore et al. further noted more students had to take remedial courses because of the lack of preparedness for college.

A key factor in college readiness is preparation for the rigorous coursework (Tierney & Sablan, 2014; Martinez, Baker, & Young, 2017). A central goal for educators in education has been to promote and to support skill development and academic achievement for all students (Schiller & Muller, 2003). Hart (2005) asked high school graduates and college students to evaluate their own level of college preparation. Approximately 30% of college students reported gaps in reading skills and approximately 42% of college students reported gaps in mathematics skills. Unfortunately, many students believe they are inadequately prepared for college.

To examine college readiness rates, Barnes and Slate (2014) conducted research to ascertain the differences in academic achievement gaps among Black, Hispanic, and White high school graduates in Texas for the 2006-2007, 2007-2008, and 2008-2009

school years. Utilizing archival data from the Texas Education Agency Academic Excellence Indicator System, the researchers examined the college readiness rates of Black, Hispanic, and White Texas public high school graduates. Statistically significant differences were present. White students achieved higher college readiness rates in reading, mathematics, and for both students as compared to Black students.

For each year of the study, the following percentage of Black students were college-ready in mathematics: 2006-2007, 29.15%; 2007-2008, 32.38%; and 2008-2009, 38.41%. Mathematics college-ready rates for White students were: 2006-2007, 58.72%; 2007-2008, 58.72%; and 2008-2009, 62.71%. Reading college-ready rates for Black students were as follows: 2006-2007, 33.97%; 2007-2008, 34.56%; and 2008-2009, 44.48%. Reading college-ready rates for White students were: 2006-2007, 53.21%; 2007-2008, 49.96%; and 2008-2009, 61.89%. For both subjects combined, White students achieved the following percentages of college-ready graduates: 40.73% in 2006-2007, 38.89% in 2007-2008, and 49.60% in 2008-2009. For both subjects combined, Black students achieved the following percentages of college-ready graduates: 17.20% in 2006-2007, 18.73% in 2007-2008, and 27.30% in 2008-2009. Although both White and Black students increased their college readiness rates over the three years, higher percentages of White students were college ready in each of the three school years.

Academic underperformance is a major concern among Hispanic students (Olivos & Quintana de Valladolid, 2005; U.S Department of Education, 2010). Compared to White students, Hispanic students tend to arrive to school with underdeveloped skills (Crosnoe, 2005). Additionally, Hispanic students tend to score lower than White students in reading and in mathematics (Potter & Morris, 2017). When Swail, Cabrera, and Lee

(2004) analyzed data from the latest installment of the National Educational Longitudinal Study begun in 1988 with Grade 8 students and followed up several times, 41% of White students and 59% of Latino students were determined not to be college-ready.

Because higher expectations and higher levels of academic achievement are required, students in the United States need to be prepared for postsecondary success (Conley, 2008; Houser & An, 2015; U.S. Department of Education, 2003). To date, almost all policymakers have increased (a) the amount of academic credits required for graduation, (b) made more rigorous academic standards, (c) established curriculum-based and other high-stakes examinations connected to high school graduation, and (d) sponsored choice programs that offer students larger access to a more rigorous curriculum (Balfanz, 2009; Balfanz, DePaoli, Ingram, Bridgeland, & Fox, 2016; Bush, 2001; Department of Education, 1991; Gardner et al., 1983; Schiller, & Muller, 2003; U.S. Department of Education, 2003). Yet, with stagnant test scores and increasing high school dropout rates, many question the consistency in the quality of the curriculum and the instruction across high schools in the United States (Blagg & Chingos, 2016; Caves & Balestra, 2018; O'Day & Smith, 2016; U.S. Department of Education, 2003).

Despite difficulties in the U.S. public education system, education reform works to help students stand in the gap (Bush, 2001; Every Student Succeeds Act, n.d.; Klein, 2015; Gardner, 1983). However, the gap in achievement between students still exists regarding college readiness. Greene and Forster (2003) documented only 32% of all high school graduates are college-ready in the areas of reading, writing, and mathematics. Even more, Hispanic students graduate at lower rates than White students (Greene & Forster, 2003). Across the United States, Greene and Forster reported 37% of all White

students, and 16% of all Hispanic students leave high school college-ready. The drop in postsecondary success is linked to the inadequate preparation of students in high school (Rothman, 2012); for students, precollege academic preparation is strongly related to their postsecondary success (Kuh, 2007).

College-ready students should not need remediation before they can be successful in college-level coursework (Wiley, Wyatt, & Camera, 2011), but many first-year students take remedial coursework in public institutions of higher learning. Sparks and Malkus (2013) reported that approximately 20% of White students and 29% Hispanic students take remedial coursework in college. According to Kuh (2007), for students to be college-ready at the end of high school, students must attain grade-level proficiencies in mathematics and in reading by the end of Grade 8. Furthermore, Kuh posited if students do not do well in English and in advanced mathematics classes (i.e., Algebra II, precalculus, trigonometry, and calculus) while in high school, later interventions for mathematics typically have little effects on the students' chances to complete the college coursework necessary to attain a bachelor's degree. Essentially, preparing students to be college-ready starts before students enter high school.

College readiness has been defined in many ways. The College and Career Ready Working Group (2015) of the National Center for Education Statistics suggested that to be college ready, students attained the knowledge, skills, and disposition needed to succeed in credit-bearing, non-remedial postsecondary coursework. Green and Forster (2003) defined a student as college ready when he or she took specific courses to acquire necessary skills (e.g., college preparatory courses); demonstrated basic literacy skills (i.e., reading, writing, mathematics); and graduated from high school. Similarly, Roderick,

Nagaoka, and Coca (2009) identified college readiness as students possessing four different skills:

- content knowledge and basic skills;
- core academic skills;
- non-cognitive, or behavioral, skills; and
- college knowledge skills (i.e., the ability to effectively search for and apply to college; p. 185).

Interestingly, utilizing coursework required for college admission, achievement test scores, and grade point averages, the three most common indicators educators use to assess college readiness, Roderick et al. (2009) reported less than 25% of Hispanic graduates met the college readiness benchmarks, compared with approximately one half of the White graduates. Although Conley (2007a) supplied the definition Roderick et al. used for college readiness, Conley (2007a) and Conley et al., (2010) identified, more specifically, the four skill areas that make up college readiness: (a) cognitive strategies (i.e., intentional behaviors used to learn intellectual openness and problem solving); (b) content knowledge needed comprehend academic disciplines (i.e., in reading, writing, mathematics, and other core subjects); (c) academic behaviors (i.e., attitude, management and habits promoting self-awareness and self-monitoring); and (d) contextual awareness skills to navigate college environment and culture needed to be successful in school. College ready students will possess the knowledge and skills in reading and in mathematics needed to be successful in higher learning.

Accountability in education is determined by learning standards and assessments. (Brown & Conley, 2007). The establishment of college readiness standards was only the

first step toward understanding what students need to know in high school (e.g., knowledge, skills, habits and expectations) to be ready for coursework in postsecondary school (Davis, 2010). Since the 1980s, colleges have required placement testing to determine college readiness (King, Rasool, & Judge, 1994). Therefore, educators use high school standardized assessments to uncover students' level of higher education readiness (Byrd & Mac Donald, 2005).

Before President Obama resolved U.S. students would lead the world in college completion by 2020 (Kanter, 2011), "efforts to define the knowledge and skills in mathematics and English that high school graduates needed for success in credit-bearing college courses and high-growth jobs began in 2001" (College and Career Ready Working Group, 2015, p. 3). Nongovernmental organizations (e.g., The American Diploma Project and Common Core State Standards) led the primary initiatives in creating standards (Cohen, 2008; College and Career Ready Working Group, 2015). Texas was part of the project and, in 2008, was the first state to adopt college readiness standards (Texas Education Agency, 2010). Additionally, by the 2019-2020 school year, Texas legislatures and educators desire to become one of the top 10 states for graduating college-ready students (Texas Education Agency, 2010).

Essentially, high school students who graduate prepared to attend college gain more access to our country's economic, political, and social opportunities (Greene & Forster, 2003). Greene and Forester (2003) retrieved data from the U.S. Department of Education for students in the graduation class of 2001 to reveal the percentages of students who graduated high school ready for a 4-year college education. In the study, Greene and Forster noted the following determinations for students to be considered

college-ready graduates: (a) students must have graduated high school; (b) students must have taken required courses for the acquisition of necessary skills; and (c) students must have demonstrated basic literacy skills. The researchers produced estimates by racial and ethnic groups and found that of the 70% of students who graduated high school in 2001, 37% of White students and 16% of Hispanic students left high school college-ready. In all, 32% of all students left high school qualified to attend a four-year college or university. Ironically, more students attended college than students who were determined to be college-ready. Greene and Forster concluded that education reform is needed for students in Grade K through Grade 12, especially for Hispanic students, if students are to acquire skills and knowledge needed to be ready for college upon high school graduation.

In a similar study, Greene and Winters (2005) reproduced the minimum standards of various four-year colleges to determine the percentages of students from 1991 to 2002 in the United States who left high school eligible for college. The criteria of the minimum standards included (a) students must have graduated and received a diploma; (b) students must have completed a minimum set of course requirements; and (c) students should be able to read at a basic reading level. To perform the analysis, the researchers used graduation rate calculations, data from various years of the NAEP High School Transcript Study, and a survey of a large representative sample of students at both the national and regional levels.

The national high school graduation rate for all public school students decreased from 72% in 1991 to 71% in 2002. Nationally, the percentage of all students who left high school with the skills and qualifications necessary to attend college increased from 25% in 1991 to 34% in 2002. The increased standards and accountability programs over

the last decade are likely the reason for the flat high school graduation rates—large gap between the graduation rates of White students and students of color. In the class of 2002, 52% of Hispanic students graduated from high school with a regular diploma, compared to 78% of White students. A large disparity among racial and ethnic groups exists in the percentage of students who leave high school eligible for college admission. In 2002, approximately 40% of White students and 20% of Hispanic students graduated college-ready. However, little difference occurs between the number of students who graduated from high school college-ready and the number of students who enrolled in college for the first time. Therefore, a large group of students have the skills needed to attend college but do not attend college because they lack resources or other non-academic factors.

Nationally, Brown and Conley (2007) identified the knowledge and skills needed for success in entry-level courses at U.S. research universities. They examined state tests' content in relation to the Knowledge and Skills for University Success standards, the most comprehensive standards in the nation. By analyzing 60 mathematics and English exams from 20 states using an alignment analysis methodology, the researchers discovered the exams moderately yet unevenly aligned with a subset of university standards. Thus, Brown and Conley suggested high school exams cover only a portion of what is necessary for college readiness, and high school exams and college readiness aligned in more areas considered basic cognitive functioning.

Kim and Bragg (2008) explored, in their quantitative research, how dual credits and articulated college credit hours influenced college outcomes. Students who successfully complete dual credit class (e.g., college-level class) in high school receive

both high school and college credit for the class (Kim, Barnett, & Bragg, 2003). Students who take an articulation course in high school will not have to retake the course in college because the course in high school matches the course requirements in college. Kim et al. took note to control for student gender and educational background characteristics. Additionally, Kim et al. used existing Ohio, Texas, Florida, and Oregon consortia datasets from the Community College and Beyond study. In Community College and Beyond high school graduates were tracked over a 4-year period and participants who earned dual credit or articulated credit hours in the Tech Prep and nonparticipant groups were identified. “Articulated credit hours earned had a significant positive relationship with being college ready in reading and writing; whereas, academic dual credit hours earned had a significant positive relationship with college readiness in mathematics” (Kim & Bragg, 2008, p. 142). Overall, the researchers documented that dual credit courses positively influenced college readiness. Additionally, in the area of articulated college credit courses, the researchers identified that the articulated credit course-taking enhanced college retention. However, students labeled college ready in reading, writing, and mathematics varied among the four consortia.

Moore et al. (2010) analyzed scores for all students and each ethnic/racial subgroup in reading, mathematics, and both subjects combined to determine their college-ready graduate rates. Specifically, approximately 37% of Hispanic students were college ready in mathematics and 39% of Hispanic students were college-ready in reading. For the 2006-2007 academic school year, approximately 20% of graduating Hispanic students were college-ready in both subjects. Moore et al. further noted that with lack of preparedness for college and the presence of strong achievement differing

across ethnic groups; it can be perceived that more students will have to take remedial courses in college. Moreover, Moore et al. determined that current educational policies should be reexamined because only one third of the students were college ready in both subjects, and statistically significant differences were present in reading, math, and both subjects among Hispanic and White students.

Using a multilevel model of students within states, Musoba (2011) investigated college readiness by examining the effect of several accountability reforms on low-income students as a function of ethnicity. Overall, Musoba analyzed the relationships of the following (a) high-stakes high school exit exams; (b) implementation of standards-based reform; and (c) high school graduation requirements in mathematics with readiness for college as measured by SAT scores of low-income White, Black, and Hispanic high school students. From this quantitative methodology, the researcher reported that high school exit exams and standards-based reforms were not statistically significantly related to readiness for college as measured by the SAT.

Literacy skills are fundamental for overall academic success (Whitehurst & Lonigan, 2001). Students' interim reading assessments results may predict college readiness in reading and success in mathematics (Dorans, 2000; Koon & Petscher, 2016; Thurber, Shinn, & Smolkowski, 2002). Koon and Petscher (2016) investigated college readiness in two Florida school districts. During the 2013-2014 school year, the two school districts sought to develop an early warning system to identify Grades 11 or 12 students at risk of low achievement on college readiness measures. The researchers investigated to what extent the students' Grade 9 scores on the Florida Assessment for Instruction in Reading predict performance on the Preliminary SAT/National Merit

Scholarship Qualifying Test and the ACT Plan in grade 10. The researchers determined that the students' scores on the Florida Assessment for Instruction in Reading can predict performance, with acceptable sensitivity, on college readiness assessments.

Barnes and Slate (2013) addressed the issue of college readiness rates for students in Texas. In their study, they examined the differences in college readiness among Black, Hispanic, and White public high school graduates in Texas for the years 2006-2007 through the 2008-2009 school years. The investigators found that White students had higher college readiness rates in reading, mathematics, and in both subjects than did their Black and Hispanic peers. Although White, Black and Hispanic students increased their college readiness rates over the three years, White students achieved at a higher rate in college readiness among the three groups.

In a similar study, Barnes and Slate (2014) examined the college readiness rates of Black, Hispanic, and White Texas public high school graduates to determine whether academic achievement gaps in among the groups either increased, decreased, or remained steady. From the 2006-2007 through the 2008-2009 school years, the college readiness rates of White students in reading, mathematics, and both subjects, were higher than the college readiness rates of Black and Hispanic students. Statistically significant findings were present. In 19 out of the 27 statistical analyses conducted, large effect sizes were present. It is important to note that during the 2006-2007 through the 2008-2009 school years of the study, Black and Hispanic students improved their college readiness rates; however, also during each school year of the study, college readiness for White students increased. Overall, White students continue to maintain the status quo for college readiness, student achievement.

The relationship between academic performance and ethnicity/race is known and documented (Coleman et al., 1966). Large gaps in learning are still evident between students who are Black, Hispanic, and White (Duncan & Magnuson, 2005). Therefore, continuing to understand racial and ethnic differences in educational achievement in the United States is important as the population grows more diverse (Kao & Thompson, 2003).

Academic Performance of Boys and Girls

Rigorous academic preparation will help prepare students for college (Barnes & Slate, 2013; Martinez et al., 2017) because relationships exist between academic achievement in high school and college success (Barnes, Slate, & Rojas-LeBouef, 2010). Yet, many high school graduates do not gain the skills to be prepared for college (Moore et al., 2010). Compared to females, males complete college at lower rates and earn lower grades (Conger & Long, 2010; King, 2006). For years, girls have scored higher on reading assessments than boys and boys scored higher on mathematics assessments than girls (Baker & Jones, 1993; Beller & Gafni, 1996; Gallagher & Kaufman, 2005; Marks, 2008; Nowell & Hedges, 1998). The overall female advantage in college performance, persistence, and completion shows that males may not be obtaining the education they desire upon high school graduation (DiPrete & Buchmann, 2006; Fortin, Oreopoulos, & Phipps, 2015; Jaeger & Page, 1996).

Gender gaps in student achievement at the secondary level have some effect on gender gaps in educational achievement outcomes in college (Marks, 2008). For many years, gender differences in test scores have been the topic of much research (Buchmann, DiPrete, & McDaniel, 2008) with researchers (e.g., Hedges & Nowell, 1995; Marks,

2008; Williams, 2011) concluding the gaps have narrowed and some investigations showing the gaps have remained the same. Essentially, at different points in the educational pipeline, academic achievement gaps have been documented between males and females (Bridgeman & Wendler, 1991; Cook, 2006; Glenn & Van Wert, 2010; Young, 2001).

Mathematics and reading skills are two of the strongest predictors of later achievement (Duncan et al., 2007). The lack of mathematics and reading skills are reasons for academic underpreparedness at the postsecondary level (Houser & An, 2015; McCormick & Lucas, 2011; Perin, 2013). Trevino and Slate (2013), in an investigation, examined the degree to which boys and girls differed in their college-readiness skills. They specifically analyzed college-readiness rates in reading, in mathematics, and in both subjects for the 2006-2007 and 2011-2012 school years. For reading, the investigators yielded statistically significant results, a small effect size. Girls were 11.97% more college-ready than boys in reading in 2006-2007. Concerning mathematics, boys were 8.16% more college-ready than were girls. In both subjects combined, girls were 2.11% (i.e., a trivial effect size) more college-ready than were boys. In the 2011-2012 school year, girls were 8.55% more college-ready than were boys. Boys were 2.17% more college-ready than girls in mathematics. In both subjects combined, girls were 3.66% more college-ready than were boys.

Combs et al. (2010) examined existing reading, mathematics, Scholastic Assessment Test (SAT), and the American College Test (ACT) data to determine high school boys' and girls' college-ready performance. Using a quantitative method, Combs et al. analyzed rates of college readiness using several indicators: (a) the variations in

criterion scores, (b) student participation rate, (c) average exam scores in Advanced Placement and International Baccalaureate, (d) advanced course/dual enrollment completed, and (e) Texas Success Initiative. The researchers determined that 51.01% of girls were college-ready in reading, and 52.57% of boys were college-ready in math. Overall, after examining both subjects, the researchers discovered that less than one third of the participants were college-ready graduates according to the reading and mathematics data. Also, according to the SAT and ACT data, boys achieved at higher rates; whereas, more girls took both tests. Therefore, Combs et al. suggested the achievement gap between boys and girls might be decreasing, and “it is possible that school and classroom efforts to provide equal opportunities for school-aged boys and girls have improved” (p. 454).

With respect to students’ educational outcomes, gender and ethnicity/race often interact (Heath, 1992; Kettler & Hurst, 2017). Moore et al. (2010) analyzed data from the Texas Education Agency’s Academic Excellence Indicator Systems for all students and each ethnic/racial subgroup in reading, mathematics, and both subjects combined to determine the college-ready graduate rates. Statistically significant differences were present in reading, mathematics, and both subjects among Hispanic, Black, and White students. Moore et al. suggested educational policies should be reexamined because only one third of the students were college ready in both subjects. Moore et al. further noted more students had to take remedial courses because of the lack of preparedness for college.

College Readiness and the ACT

College readiness is also analyzed when students take the ACT. The college readiness benchmarks on the ACT determine whether students will pass a credit-bearing college course. According to the ACT (2016) report on college and career readiness, 11% of Black students and 49% of White students met at least three or more of the ACT college readiness benchmarks. Most recently in 2017, ACT conducted a national report to look at how students are achieving in the college and career readiness ACT standard. The team analyzed data of more than 2 million U.S. high school students who took the ACT test in 2017 and found that 47% of the students were college-ready in reading and 41% of the students were college ready in math. Additionally, in 2017, 20% of African Americans students met the ACT college readiness benchmarks in reading and 13% of African American students met the ACT college readiness benchmarks in math. Concerning Hispanic students, in 2017, 33% of Hispanic students met the ACT college readiness benchmarks in reading and 26% of Hispanic students met the ACT college readiness benchmarks in math. Whereas 58% of White students met the ACT college readiness benchmarks in reading and 51% of White students met the ACT college readiness benchmarks in math.

To dig deeper into the relationship of the ACT and college readiness, Harwell, Moreno, and Post (2016) conducted a study to determine whether there is a relationship between the American College Testing (ACT) college mathematics readiness standard and college mathematics achievement. The researchers used a sample of students in 4-year postsecondary institutions in the US who took at least three years of ACT recommended mathematics high school coursework. Harwell et al. found that students

were three times more likely to earn at least a B in their first-year college mathematics course if they met the high school mathematics coursework standard.

College Readiness and High School Coursework

Because high school coursework contributes to students' college readiness, it is important to consider the types of coursework students take when determining college readiness. Using the test data from approximately 1,700 high school students from a Southern California urban district, Houser and An (2015) analyzed the effects that the academic (i.e., California Standards Test scores in mathematics, science, and ELA; and the California High School Exit Exam mathematics) and demographics factors (i.e., gender; race/ethnicity; language; socioeconomic status) may have on the Early Assessment Program test. In California, high school juniors take the California Standards Test and the California High School Exit Exam. The results of the test predict college-ready results on the Early Assessment Program test that determine whether students are college ready a California State University. Although most of the factors did not statistically significantly predict college readiness, the mathematics California Standards Test did contribute to predicting students who are college-ready.

Concerning reading and writing, McCormick and Hafner (2017) evaluated college freshmen perceptions of the gap between high school English coursework and college-level coursework. The investigators surveyed freshman students in various first-year English courses at seven California State University campuses. The researchers found that 74% of the students who took an AP course in high school believed they were more prepared for college level coursework. Students who wrote one or two essays per month in high school believed they were more prepared for college English. Overall,

McCormick and Hafner determined that the type of English courses taken and the amount of writing influenced students' readiness for college.

Bowers and Foley (2018) conducted a study to determine whether there is a relationship between students who enroll in college with Advanced Placement (AP) or dual enrollment credits and their college readiness and 1-year college retention. The researchers used data for the 2014 incoming class of college freshman who attended a Tennessee university. For the purpose of the study, college readiness was measured using students' American College Testing results. Students' sub scores in English, reading, and mathematics were analyzed for this study. Findings indicated the following. Students who enrolled with AP math credit were significantly more likely (i.e., 33.43%) to be college ready in math than students who did not enroll with AP math credit. Students who did not enroll with AP math credit were statistically significantly less likely (i.e., 66.57%) to be college ready in math. Students who did not enroll with AP English credit were statistically significantly less likely to be college ready in both English and reading. Overall, students who enrolled in college at a Tennessee University with AP or dual enrollment credit in English and in mathematics were statistically significantly more likely to reenroll than students who did not enroll with the aforementioned credits. The researchers determined that the type of mathematics and English courses taken in high school can impact college readiness and retention.

Concerning Hispanic students, Koch, Slate, and Moore (2016) utilized AP English exam data to compare the performance of Hispanic students from California, Texas, and Arizona. According to Ennis, Rios-Vargas, and Albert (2011), almost 66% of the U.S. Mexican Hispanic population, resides in the aforementioned states. In all 32

comparisons, Hispanic students in Texas has the lowest passing rate on the AP English exam.

College readiness deserves attention beyond high school academic achievement (Tierney & Sablan, 2014). Lorah and Ndum (2013) analyzed trends over time (i.e., 1998 through 2009) for students in first-year college courses. The courses include English Composition I, College Algebra, Biology, and social science courses. The researchers found that female students outperformed male students in each first-year college course with the largest differences in performance in English Composition I and in College Algebra. Lorah and Ndum further suggested continued efforts to close the college achievement gap.

A challenge for all students is becoming prepared academically for college coursework (Callan, Finney, Kirst, Usdan, & Venezia, 2006; Perin, 2018). However, differences in academic achievement between boys and girls persist. According to the National Center for Education Statistics, in 2015, approximately 26% of male students and 23% of female Grade 12 students scored at or above proficient in National Assessment of Educational Progress (NAEP) mathematics. Accordingly, on the NAEP reading, approximately 33% of male students and 42% of female Grade 12 students scored at or above proficient.

Under the Every Student Succeeds Act, President Obama called for all students to be ready for college and careers upon high school graduation (Darling-Hammond et al., 2016). However, a challenge for students is becoming prepared academically for college coursework (Callan, et al., 2006; Houser & An, 2015; Perin, 2018). Ultimately, students must hold more than a high school diploma when they walk across the stage.

Statement of the Problem

The majority of U.S. high school graduates are not academically prepared for the rigors of postsecondary education (Arnold, Lu, Armstrong, 2012; Conley, 2007a, 2007b; Flippo & Caverly, 2009; Hunt, Boyd, Gast, Mitchell, & Wilson, 2012; Martinez et al., 2017). Yet, all students need to be prepared for life after high school (Harris, Mayes, Vega, & Hines, 2016). Researchers (e.g., Barnes & Slate, 2013; Barnes & Slate, 2013; Combs et al., 2010; Gallagher & Kaufman, 2005; Trevino & Slate, 2013) have documented the presence of differences in achievement between students who are Black, Hispanic, and White and between male and female students. According to the National Assessment of Educational Progress (2015), approximately 66% of 12th grade students in the U.S. are not proficient readers, and 28% have very low reading skills. Similarly, about 75% of Grade 12 students are not proficient in mathematics, and 35% have low math skills. If differences are present in college readiness between Black, Hispanic and White students and between male and female students, researchers must uncover that and determine why the differences exist.

Purpose of this Journal-Ready Dissertation

The purpose of this journal-ready dissertation was to examine the extent to which differences were present in college readiness in reading, mathematics, and in both subjects for Texas high school students by their demographic characteristics. In the first investigation, the degree to which ethnic/racial (i.e., Black and White) differences were present in college readiness in reading, in mathematics, and in both subjects was determined. Concerning the second investigation, the extent to which differences existed in college readiness in reading, in mathematics, and in both subjects between Hispanic

and White students was addressed. Regarding the third investigation, the degree to which gender differences were present in college readiness in reading, in mathematics, and in both subjects was ascertained. In each of these three investigations, data for five school years (i.e., 2012-2013, 2013-2014, 2013-2015, 2015-2016, and 2016-2017) were analyzed.

Significance of the Journal-Ready Dissertation

The majority of U.S. high school graduates are not academically prepared for the rigor of postsecondary education (Conley, 2007a, 2007b, 2012; Flippo, 2011; Houser & An, 2015; Hunt et al., 2012; Martinez et al., 2017). Yet, students need to be prepared for life after high school (Harris et al., 2016). Researchers (e.g., Barnes & Slate, 2014; Buchmann, DiPrete, & McDaniel, 2008; Glenn & Van Wert, 2010; Moore et al., 2011) have revealed differences in achievement between students who are Black, Hispanic, and White and between boys and girls. If differences exist in college readiness between Black students and White students, researchers must uncover that and determine why the differences exist.

Barnes (2010) conducted in his doctoral dissertation. Specifically, Barnes investigated the differences in college readiness among Black, Hispanic, and White public high school graduates in Texas for the 2006-2007, 2007-2008, and 2008-2009 school years. Barnes utilized archival data from the Texas Education Agency Academic Excellence Indicator System. During the aforementioned school years, students in Texas took the Texas Assessment of Knowledge and Skill (TAKS) assessment. To evaluate college readiness, the higher education readiness standards for exit level TAKS reading and mathematics were analyzed. Revealed in the analyses were that White students were

more college ready than Black and Hispanic students in reading and in mathematics in all three years of data examined. Revealed in this research are changes have been made in college readiness in Texas between Black and White students and between Hispanic and White students.

Monitoring college-ready progress allows teachers and administrators to identify students who are not on target and implement academic interventions to help close the learning and achievement gaps. Understanding college-readiness achievement rates, informs colleges and universities concerning student instructional needs. Students who are accurately placed in college courses that are appropriately matched to their achievement levels are more likely to succeed in their college coursework (Belfield & Crosta, 2012; Scott-Clayton, 2012).

Theoretical Framework

Student demographics are one way researchers have conceptualized college readiness (Arnold et al., 2012). According to Arnold et al. (2012), “the person-process-context-time (PPCT) theory accounts for the complexity of college readiness by modeling the interplay of an active, developing person, and his or her nested environments” (p. 93). Bronfenbrenner adapted the process-person-context-time model from the ecology of human development (Bronfenbrenner, 1979, 1994; Bronfenbrenner & Morris, 1998). Arnold et al. (2012) utilized the PPCT theory to develop the ecological model of college readiness. The ecological model of college readiness shows the interacting characteristics (i.e., chronosystem, macrosystem, exosystem, mesosystem, microsystem, and individual) that together establish college readiness. Some characteristics of the Individual include student race/ethnicity, gender, and academic

preparation. The microsystem (i.e., connect to an individual through one's ability to evoke or limit participation) includes characteristics like the school, family, neighborhood, and teacher. The mesosystem (i.e., an interaction of communication and experiences, how the student's life components fit together) includes elements such as social and cultural capital, high schools, and parents. The economy, school reform, and K through 12 system make up some of the characteristics of the exosystem. The exosystem establishes the foundational rules and is the formal and informal social structures. The macrosystem (i.e., beliefs and ideas that frame the structure of schooling, possibilities, and opportunities) includes elements such as the social stratification, capitalism, and racism. The chronosystem holds the historical context, pipelines and pathways, accountability movement, school reform, and recession. Multiple interacting influences affect the individual which in turns affects a student's college readiness. According to the authors, college ready students not only possess content knowledge but also college knowledge and aspirations. Essentially, a property of the individual is college readiness. In the ecological perspective of college readiness, predisposed characteristics of the individual account for a student's academic preparation.

Definition of Terms

The Texas Education Agency (2017b, 2017c, 2017-2018) detailed the following definitions that will establish a foundation for this journal-ready dissertation.

Academic Excellence Indicator System

The Academic Excellence Indicator System (AEIS) pulls together a wide range of information on the performance of students in each school and district in Texas every year. This information is put into the annual AEIS reports, which are available in the fall of each year. (Texas Education Agency, 2015, para 1)

Black Student

A Black or African American student is a person having origins in any of the black racial groups of Africa (Texas Education Agency, 2017b, p. 2).

College-Ready Graduates

College-ready graduates meet or exceed the college-ready criteria on the Texas Success Initiative Assessment (TSIA), the SAT test, or the ACT test. To meet the college-ready criteria for TSIA for English Language Arts, students must score at least a 351 on the Reading assessment. To determine the percentage of college-ready English Language Arts students, the number of graduates who scored at or above the college-ready criterion for English Language Arts must be divided by the number of annual graduates with English Language Arts results to evaluate. To meet the college-ready criteria for TSIA for mathematics, students must score at least a 350 on the Mathematics assessment. To determine the percentage of college-ready mathematics students, the number of graduates who scored at or above the college-ready criterion for mathematics must be divided by the number of annual graduates with mathematics results to evaluate. To determine the percentage of college-ready students for both subjects, the number of graduates who scored at or above the college-ready criterion on both the English Language Arts and mathematics assessments must be divided by the number of annual graduates with results in both subjects to evaluate (Texas Education Agency, 2017c, p. 8).

Hispanic Student

A Hispanic or Latino student is a person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race (Texas Education Agency, 2017b, p. 2).

State of Texas Assessments of Academic Readiness

The State of Texas Assessments of Academic Readiness (STAAR) is a comprehensive testing program for public school students in grades 3–8 or high school courses with end-of course (EOC) assessments. The STAAR program is designed to measure to what extent a student has learned, understood, and is able to apply the concepts and skills expected at each grade level or after completing each course for which an EOC assessment exists. Each STAAR test is linked directly to the Texas Essential Knowledge and Skills (TEKS). The TEKS are the state-mandated content standards that describe what a student should know and be able to do upon completion of a course (Texas Education Agency, 2017c, p. 26).

Texas Academic Performance Report

The Texas Academic Performance Reports (TAPR), a collection of a wide range of information related to the performance of students in each school and district in Texas. Extensive information is available on staff, programs, and demographics for each school and district (Texas Education Agency, 2017-2018).

Texas Success Initiative Assessment

The Texas Success Initiative Assessment (TSIA) is the percentage of annual graduates who met the TSI criteria on the TSIA. Percentages are calculated and shown for English and mathematics separately. The number of 2014-15 annual

graduates who met the TSI criteria on the TSIA divided by the number of 2014-15 annual graduates (Texas Education Agency, 2017c, p. 32).

White Student

A White student is a person having origins in any of the original peoples of Europe, the Middle East, or North Africa (Texas Education Agency, 2017b, p. 2).

Delimitations

Delimitations regarding (a) location, (b) timeframe, (c) research participants, and (d) instrumentation were present for each research study. In this journal-ready dissertation, studies one, two, and three were delimited to traditional public schools (i.e., not including charter schools, private schools, or alternative placement schools) in Texas. Archival data, analyzed for studies one, two, and three were delimited to five school years (i.e., 2012-2013, 2013-2014, 2014-2015, 2015-2016, and 2016-2017) for Texas traditional public schools. Only the data for college-readiness in reading, mathematics, and in both subjects were examined in these five school years. This investigation was delimited to three ethnic/racial groups (i.e., Black, Hispanic, and White) because these three ethnic groups are the largest ethnic/racial groups in Texas (Ennis et al., 2011; United States Census Bureau, 2012). Lastly, data collected solely from the TEA TAPR database were included in these studies.

Limitations

Onwuegbuzie (2003) noted threats to internal and external validity can occur at any point during the research process (i.e., research design and data collection, data analysis, or data interpretation). Limitations exist in this research study because according to Onwuegbuzie (2003) threats to internal validity (i.e., results obtained by manipulating only the independent variable) and external validity (i.e., generalizability of

results outside of the research settings) happen for every study in the field of education. For example, instrumentation can never be completely removed as a possible threat to internal validity because outcome measures can never produce scores that are completely reliable or valid (Onwuegbuzie, 2003). Therefore, the assessment data retrieved from the TEA PEIMS database constituted a limitation for this study.

Because all samples are subject to sampling error, population validity and ecological validity (i.e., generalizability of findings among settings, conditions, variables, and contexts) will be always a threat to external validity in quantitative research (Onwuegbuzie, 2003). Therefore, the ability to generalize the results of this study to other states was a limitation because variables differ between socioeconomic status, academic achievement standards, and higher education readiness indicators. Temporal validity (Onwuegbuzie, 2003) was another limitation for this study because variables will differ over time concerning academic achievement standards and higher education readiness standards.

Assumptions

In Texas, the TEA collects and scores student state assessment data. Assessment data are accessible to the public via the TEA PEIMS and TAPR databases. The assumption was made that the TAPR data reflected an accurate indication of college readiness in reading, mathematics, and in both subjects for Texas public high school students. Although the level of accuracy in the dataset retrieved from the TEA database is assumed to be high, minimal errors were expected.

Reliability of Data

Because the state assessment presents an estimate of achievement levels, the scores contain a certain amount of error (Texas Education Agency & Pearson, 2009). Test reliability, the consistency and stability of assessment scores (Johnson & Christensen 2012), “was estimated using statistical measures such as internal consistency, classical standard error of measurement, conditional standard error of measurement, and classification accuracy” (Texas Education Agency, 2015-2016). For the Texas Education Agency (2015-2016) to determine the reliability for the STAAR, internal consistency (i.e., how well the items on a test measure a single concept; Johnson & Christensen, 2012) was measured. The internal consistency for the STAAR English assessment ranged from .80 to .93 (Texas Education Agency, 2015-2016).

Validity of Data

The STAAR measures students’ understandings of the Texas Essential Knowledge and Skills (TEKS). Results from the STAAR assessment are used to make inferences about students’ learning, understanding, and readiness. According to the TEA (2012), to link empirically student performance on STAAR EOC assessments in the same content area, STAAR EOC Linking Studies were designed. Score results from the linking studies inform the alignment of performance standards across STAAR EOC assessments. All data for the STAAR EOC Linking Studies derive from low-stakes test administrations in 2009 through 2011. The Algebra links are based on a single group of students and rely on low-stakes scores from operational administrations in 2009 (Algebra I) and 2011 (Algebra II). Standalone field tests taken in 2011 support the English II link.

Procedures

To facilitate this journal-ready dissertation, the following provisions occurred. The dissertation committee approved the research proposal for this investigation in the summer of 2018. After receiving approval from the committee, an application was submitted to the Sam Houston State University Institutional Review Board. Once granted permission from the Institutional Review Board to conduct the research (See APPENDIX), data were downloaded from the TEA TAPR database. These data were then converted into the Statistical Package for the Social Sciences (SPSS) for statistical analyses.

Summary

The majority of U.S. high school graduates are not academically prepared for the rigor of postsecondary education (Conley, 2007a, 2007b, 2012; Hunt et al., 2012; Flippo, 2011; Martinez et al., 2017). Yet, all students need to be prepared for life after high school (Harris et al., 2016). Therefore, the purpose of this journal-ready dissertation study was to examine the differences present in college readiness in reading, mathematics, and in both subjects for Texas high school students by their demographic characteristics. In the first article, ethnic/racial (i.e., Black and White) differences present in reading, mathematics, and both subjects college readiness was determined. In the second article, the extent to which differences existed in reading, mathematics, and both subjects college readiness between Hispanic and White students was addressed. In the third investigation, gender differences were in reading, mathematics, and both subjects college readiness was ascertained. In each of these three articles, data for five school years (i.e., 2012-2013, 2013-2014, 2013-2015, 2015-2016, and 2016-2017) were analyzed.

Organization of the Study

The college readiness rates for Texas students were analyzed in this investigation. In the first investigation, differences present in college readiness in reading, in mathematics, and in both subjects between Black students and White students was examined. In the second study, differences in college readiness in reading, in mathematics, and in both subjects between Hispanic students and White students was examined. In the third study, differences present in college readiness in reading, in mathematics, and in both subjects by gender was analyzed. The final step of this journal-ready dissertation was to analyze the presence of any trends in these results across a 5-year time period.

This journal-ready dissertation contains five chapters. Chapter I includes the background of the study; review of the literature for Article One, Article Two, and Article Three; statement of the problem; purpose of this study; significance of the study; theoretical framework; definition of terms; delimitations; limitations; assumptions; and the organization of the study. Chapter II (i.e., Article One), Chapter III (i.e., Article Two), and Chapter IV (i.e., Article III) contains an abstract, introduction, background, statement of the problem, purpose of the study, significance of the study, research questions, method, research design, participants, instrumentation, and data analysis. Chapter V contains the discussion of the three articles findings in context of the larger literature, implications for policy and for practice of the combined three articles, recommendations for future research as a result of the collective three articles, and conclusions across the three articles.

CHAPTER II**DIFFERENCES IN COLLEGE READINESS IN READING AND IN MATHEMATICS
AND IN BOTH SUBJECTS BETWEEN BLACK AND WHITE STUDENTS: A
TEXAS, MULTIYEAR STUDY**

This dissertation follows the style and format of *Research in the Schools (RITS)*.

Abstract

Analyzed in this investigation were the differences present in college readiness in reading, in mathematics, and in both subjects between Black and White students. Texas, statewide data were analyzed for five school years (i.e., 2012-2013, 2013-2014, 2014-2015, 2015-2016, and 2016-2017) to determine whether trends were present in the reading, mathematics, and both subjects college readiness rates of Black and White students. In all five school years, White students were statistically significantly more college ready in reading, in mathematics, and in both subjects than were Black students. Effect sizes for these differences were all in the large range, indicating large practical differences in the college readiness skills of these two groups of students. Implications for policy and practice, as well as recommendations for future research, are provided.

Keywords: College Readiness, Reading, Mathematics, Ethnicity/Race, Black, White, Texas

DIFFERENCES IN COLLEGE READINESS IN READING AND IN MATHEMATICS
AND IN BOTH SUBJECTS BETWEEN BLACK AND WHITE STUDENTS: A
TEXAS, MULTIYEAR STUDY

Many policies have influenced education over the past 50 years. In the beginning, Civil Rights Activists in the United States fought for equal access to education for all students, and as a result, the Elementary and Secondary Education Act (ESEA, 1965) was enacted with the intent of improving educational equity for all disadvantaged students (Kantor, 1991; Malin, Bragg, & Hackmann, 2017). Since the first implementation in 1965, the ESEA has been reauthorized (1978, 1981, 1994, 2001, 2015), and with each reauthorization, new a focus in education has been established (e.g., Title I, learning objectives, rigorous learning standards, curriculum, accountability measured from standardized assessments, and college and career readiness). Throughout the changes to ESEA, the focus has always been to increase equity in learning for all U.S. students (Bush, 2001; ESEA, 1965; Every Student Succeeds Act, n.d.; Gardner et al., 1983).

In 2001, The Bush legislation reauthorized the ESEA and established The No Child Left Behind (NCLB) Act. Renewed attention to ethnic achievement gaps in the United States by quantifying achievement levels for subgroups within and between schools was a result of the enactment of the NCLB Act (Lubienski & Crocket, 2007). Furthermore, provisions emerged to ensure students receive access to full educational opportunities and increased outcomes.

As a result of the mandates of the NCLB Act, annual assessments in reading and in mathematics were used to determine whether educational performance for U.S. students improved (NCLB, 2001, 2002). Essentially, standardized test scores in reading

and in mathematics began to serve as two of the main measures of student learning (Barnes & Slate, 2013; Hoffman, Assaf, & Paris, 2001). Therefore, educators and policymakers were able to determine whether students mastered grade-level learning standards (Hoffman et al., 2001). More importantly, educators and policymakers were better able to determine whether students' preparation for the next level of learning, higher education (Hossler & Vesper, 1993; Kuh, 2007; Malin et al., 2017; Stage, 1988; Wyatt & Mattern, 2011).

College Readiness

In recent decades, the number of students in the United States pursuing higher education has increased; however, inequalities exist among students entering and completing post-secondary education (Long, 2013; Martinez & Klopott, 2005). Educational inequity, by way of socio-structural inequity (e.g., poverty, racial segregation, and unequitable access to high-quality schools) are barriers that must be addressed by policymakers and educational leaders to increase the overall educational attainment and college readiness for historically, underserved populations (Castro, 2013; Rumberger & Palardy, 2005). Moreover, the academic successes of underserved populations depend on educators comprehending the conceptual differences between college eligibility and college readiness (Zulmara, Bissell, Hafner, & Katz, 2007).

Conley (2007a, 2012) defined college readiness as the level of preparation or training a student needs to qualify for and succeed, in a credit bearing, entry-level college course; the college course cannot be a remedial college course. Therefore, to be considered college ready, students must acquire skills, content knowledge, and behaviors

before leaving high school (Gigliotti, 2012). Essentially, all schools must prepare all students for success in college (Every Student Succeeds Act, 2015).

Because of state and federal legislation, students in the United States have experienced academically advanced curriculum and higher accountability measures (Barnes, Slate, & Rojas-LeBouef, 2010; Malin et al., 2017). Policymakers intended for the more rigorous curriculum and increased accountability measures to improve not only high school graduation rates, but also, college readiness rates, yet across the country, college readiness rates remain low (Barnes et al., 2010). Additional researchers (e.g., Cabrera et al., 2006; Wimberly & Noeth, 2005) indicated students' academic achievement attainment by the end of Grade 8 had an even greater influence on college readiness than high school achievement. Thus, for students to be college ready upon high school graduation they not only need to achieve academic success in high school through a rigorous curriculum, knowledge of college expectations, and higher-level learning standards, but students should also achieve academic success by the end of Grade 8 (ACT, 2005; Conley, 2005, 2007a, 2007b; Horn, 1997; Roderick, Nagaoka, & Coco, et al., 2009).

Importantly, more students aspire to attend college, but college enrollment has not translated into substantial increases in the share of Black students who earn 4-year college degrees (Harris, Hines, Hipolito-Delgado, 2016; Roderick et al., 2009). Further, in spite of the best efforts and intentions of policymakers and educators, significant disparities in college readiness and college enrollment among groups of students remain. Roderick et al. (2009) focused on improving college access and readiness for low-income and ethnic/racial minority students in urban high schools. Roderick et al. examined the

most common ways of assessing college readiness: (a) coursework required for college admission, (b) achievement test scores, and (c) grade point averages. Student performance on all three indicators of college readiness revealed statistically significant ethnic/racial disparities. Specifically, Roderick et al. (2009) reported only about one third of 2002 graduates met minimum college readiness criteria, and less than 23% of Black graduates compared with 40% of White graduates. Moreover, Black students needed high schools that stressed the importance of (a) content knowledge and basic skills; (b) core academic skills; (c) non-cognitive, or behavioral skills; and (d) college knowledge—the ability to search effectively for and apply to college (Roderick et al., 2009).

Even with greater requirements for high school graduation, Long, Latarola, Conger (2009), reported nearly one third of U.S. college freshmen are unprepared for college-level math. Long et al. further suggested that Black students who were economically disadvantaged needed more remedial coursework in college. To ascertain how much the gaps in mathematics were determined by high school level coursework, Long et al. analyzed data regarding students in Florida public postsecondary institutions by examining “the contribution of the highest mathematics course taken in high school to racial, socioeconomic, and gender gaps in readiness for college-level math” (p. 2). Differences among college-going students in the highest mathematics course taken explain 28% to 35% of Black, Hispanic, and poverty gaps in readiness and over 75% of the Asian advantage. Also, Black students who are low-income received lower returns to mathematics courses, suggesting differential educational quality (Long et al., 2009). Therefore, Long et al. suggested leveling race and poverty gaps in courses being taken

may have deep effects on narrowing gaps in college readiness. Revealed in the analysis was that ensuring Black students take the same mathematics courses as White students could lower college readiness between Black and White students by 28%.

Kowski (2013) investigated whether high school performance predicted college mathematics placement. He reviewed college readiness literature related to high school mathematics requirements and college placement testing. Kowski analyzed parts of the high school transcript to assess mathematics college readiness (e.g., overall GPA, mathematics GPA, the number of mathematics classes taken, the number of years of mathematics, the highest level of mathematics). Moreover, Kowski examined student data from a college mathematics placement test to determine mathematics college readiness for 659 first-time, full-time students in a New Jersey suburban community college. Kowski discovered students' mathematics college readiness was influenced by the level of math classes taken in high school, grade point average, and the socioeconomic status of the high school community. College readiness was partially influenced by the mathematics state exam. As such, Kowski (2013) suggested that high school students need to take more rigorous mathematics courses in high school to be better prepared for college.

In a similar study, using the test data from approximately 1,700 high school students from a Southern California urban district, Houser and An (2015) analyzed the effects that the academic (i.e., California Standards Test scores in mathematics, science, and ELA; and the California High School Exit Exam mathematics) and demographics factors (i.e., gender; race/ethnicity; language; socioeconomic status) may have on the Early Assessment Program test. In California, high school juniors take the California

Standards Test and the California High School Exit Exam. The results of the test predict college ready results on the Early Assessment Program test that determine whether students are college ready a California State University. Although most of the factors were not statistically significant predictors of college readiness, the mathematics California Standards Test did contribute to predicting students who are college ready.

Concerning reading and writing, McCormick and Hafner (2017) evaluated college freshmen perceptions of the gap between high school English coursework and college-level coursework. The investigators surveyed freshman students in various first-year English courses at seven California State University campuses. McCormick and Hafner (2017) established that 74% of the students who took an AP course in high school believed they were more prepared for college level coursework. Students who wrote one or two essays per month in high school believed they were more prepared for college English. Overall, McCormick and Hafner determined that the type of English courses taken and the amount of writing influenced students' readiness for college.

Preparing students for life beyond high school is important (Bowers & Foley, 2018; Kowski, 2013; Long et al., 2009). To increase the number of Texas high school graduates who are college and career ready, legislators passed the bill, Advancement of College Readiness in Curriculum (Texas Higher Education Coordinating Board & Texas Education Agency, 2009). The Texas Education Agency and the Texas Higher Education Coordinating Board developed College and Career Readiness Standards (CCRS) in the areas of English/Language Arts, mathematics, science, and social studies. These standards made up the knowledge and skills students needed to complete entry level courses at college in Texas.

In an analysis of data from the Texas Education Agency's Academic Excellence Indicator System, Moore et al. (2011) examined scores for all students and each ethnic/racial subgroup in reading, mathematics, and both subjects combined to determine college ready graduate rates. In their study, only one third of the students were college ready in both subjects, and statistically significant differences were present in reading, mathematics, and both subjects among Black and White students. Strong achievement differences were present across ethnic groups. As a result, they suggested educational policies should be reexamined.

A key factor in college readiness is preparation for the rigorous coursework (Martinez, Baker, & Young, 2017; Tierney & Sablan, 2014). A central goal of schooling has been to promote and support skill development and academic achievement for all students (Schiller & Muller, 2003). Hart (2005) asked high school graduates and college students to evaluate their own level of college preparation. Approximately 30% of college students reported gaps in reading skills and approximately 42% of college students reported gaps in mathematics skills.

In a Texas statewide, multiyear investigation, Barnes and Slate (2014) examined the whether academic achievement gaps were present in college readiness among Black, Hispanic, and White Texas public high school graduates for the 2006-2007, 2007-2008, and 2008-2009 school years. In their study in all three school years, statistically significant differences were present among all three ethnic/racial groups. White students, as compared to Black students, achieved higher college readiness rates in reading, mathematics, and in both students.

For each year of the study, the following percentage of Black students were college-ready in mathematics: 2006-2007, 29.15%; 2007-2008, 32.38%; and 2008-2009, 38.41%. Mathematics college-ready rates for White students were: 2006-2007, 58.72%; 2007-2008, 58.72%; and 2008-2009, 62.71%. Reading college-ready rates for Black students were: 2006-2007, 33.97%; 2007-2008, 34.56%; and 2008-2009, 44.48%. Reading college-ready rates for White students were: 2006-2007, 53.21%; 2007-2008, 49.96%; and 2008-2009, 61.89%. For both subjects combined, White students achieved the following percentages of college-ready graduates: 40.73% in 2006-2007, 38.89% in 2007-2008, and 49.60% in 2008-2009. For both subjects combined, Black students achieved the following percentages of college-ready graduates: 17.20% in 2006-2007, 18.73% in 2007-2008, and 27.30% in 2008-2009. Although both White and Black students increased their college-readiness rates over the three years, White students achieved higher levels of student academic achievement in college readiness each school year.

College readiness is also analyzed when students take the ACT. The college readiness benchmarks on the ACT determine whether students will pass a credit-bearing college course. According to the ACT (2016) report on college and career readiness, 11% of Black students and 49% of White students met at least three or more of the ACT college readiness benchmarks. Most recently in 2017, the ACT conducted a national report to look at how students are achieving in the college and career readiness ACT standard. Data of more than 2 million U.S. high school students who took the ACT test in 2017 were analyzed. Results were that 47% of the students were college-ready in reading and 41% of the students were college ready in math. Additionally, in 2017, 20%

of Black students met the ACT college readiness benchmarks in reading and 13% of Black students met the ACT college readiness benchmarks in math. In contrast, 58% of White students met the ACT college readiness benchmarks in reading and 51% of White students met the ACT college readiness benchmarks in math.

To delve deeper into the relationship of the ACT and college readiness, Harwell, Moreno, and Post (2016) examined the relationship between the ACT college mathematics readiness standard and college mathematics achievement. They used a sample of students in 4-year postsecondary institutions in the US who took at least three years of ACT recommended mathematics high school coursework. In their investigation, students were three times more likely to earn at least a B in their first-year college mathematics course if they met the high school mathematics coursework standard.

Statement of the Problem

Upon entering school, Black students underperform academically when compared to their White peers (Lee & Burkham, 2002; Yeung & Pfeiffer 2009) with the gap usually widening over time (Entwisle, Alexander, & Olson 2005; Fryer & Levitt 2004). Historically, White students tend to score higher than Black students in multiple academic domains such as reading and math (Potter & Morris, 2017). The National Association of Educational Progress (2015) reported that 17% of Grade 12 Black students and 46% of Grade 12 White students scored at or above the proficient level in reading. Concerning mathematics, 7% of Grade 12 Black students and 32% of Grade 12 White students scored at or above the proficient level. Each year almost one third of graduating students from secondary public schools are not prepared for rigorous college level coursework (Arnold, Lu, & Armstrong, 2012; Barnes & Slate, 2010; Bettinger & Long,

2005). Since the passing of the NCLB Act, Black students still do not perform as well as White students in mathematics assessments (Plucker, Burroughs, & Song, 2010; Venzant, Chambers, & Huggins, 2014).

Closing the achievement gap is an issue continuing to affect the educational system (Chapa, Galvan-De Leon, Solis, & Mundy, 2014). Lotkowski et al. (2004) contended the strongest predictors of college persistence and degree attainment are prior academic achievement and course selection. However, nonacademic factors (e.g., race/ethnicity) can influence academic performance (Hearn, 1991; Lotkowski et al., 2004; Pritchard & Wilson, 2007; Welton & Martinez, 2013). Although developments have been made to improve college access and success rates across groups of students, Long (2013) noted that students from ethnic/racial groups remain underprepared for college-level coursework.

Purpose of the Study

The first purpose of this study was to examine the differences present in reading college readiness between Black and White students. A second purpose was to determine the differences that existed in mathematics college readiness between Black and White students. A third purpose was to ascertain the differences present in college readiness in both subjects between Black and White students. Texas, statewide data were analyzed for five school years (i.e., 2012-2013, 2013-2014, 2014-2015, 2015-2016, and 2016-2017) to determine the degree to which trends were present in the reading, mathematics, and both subjects college readiness rates of Black and White students.

Significance of the Study

The majority of high school graduates in the United States are not academically prepared for the rigor of postsecondary education (Conley, 2007a, 2007b; Flippo, 2011; Hunt, Boyd, Gast, Mitchell, & Wilson, 2012; Martinez et al., 2017). Yet, all students need to be prepared for life after high school (Harris, Mayes, Vega, & Hines, 2016). Researchers (e.g., Barnes & Slate, 2014; Moore et al., 2011) have revealed differences in achievement between Black and White students. If differences exist in college readiness between Black students and White students, researchers must uncover that and determine why the differences exist.

Barnes (2010), in a doctoral dissertation, investigated the differences present in college readiness among Black, Hispanic, and White public high school graduates in Texas for the 2006-2007, 2007-2008, and 2008-2009 school years. The investigator determined for all three school years of the study that White students were more college ready than Black students in reading and in mathematics.

Monitoring college ready progress allows teachers and administrators to identify students who are not on target and implement academic interventions to help close the learning and achievement gaps. Understanding college readiness achievement rates informs colleges and universities concerning student instructional needs. Students who are accurately placed in college courses that are appropriately matched to their achievement levels are more likely to succeed in college coursework (Belfield & Crosta, 2012; Scott-Clayton, 2012).

Research Questions

The following research questions were investigated in this study: (a) What is the difference in reading college readiness rates between Black and White students?; (b) What is the difference in mathematics college readiness between Black and White students?; (c) What is the difference in both subjects college readiness between Black and White students?; (d) What trend is present in reading college readiness for Black and White students over the five school years of data analyzed?; (e) What trend is present in mathematics college readiness rates for Black and White students over the five school years of data analyzed?; and (f) What trend is present in both subjects college readiness rates for Black and White students over the five school years of data analyzed? The first three research questions were repeated for the 2012-2013, 2013-2014, 2014-2015, 2015-2016, and 2016-2017 school years; whereas, the last three research questions constituted comparisons across all five school years. Accordingly, 18 research questions were addressed in this study.

Method

Research Design

A non-experimental, causal comparative research design (Johnson & Christensen, 2012) was used in this study. In this investigation, the independent and dependent variables had already occurred; therefore, the independent variable could not be manipulated. Furthermore, extraneous variables were not controlled. In this investigation, the independent variable was the ethnicity/race (i.e., Black and White) of students. The dependent variables were college readiness rates in reading, in mathematics, and in both subjects.

Participants and Instrumentation

Test questions on the State of Texas Assessments of Academic Readiness (STAAR) End of Course (EOC) Algebra I and English II assessments gauge the understanding of key concepts required for success at the next level. All test questions on the STAAR exams count toward determining whether a student has met the passing standard as well as the college and career readiness standard (Texas Education Agency, 2017a). Students on track to meet the college readiness standard, score at the Masters level meaning that students demonstrated mastery of and have strong knowledge of the coursework (i.e., Index 4; Texas Education Agency, 2017a; 2017b). Students who meet the Final Level II Satisfactory Academic Performance on STAAR meet grade level passing standards and are considered college ready (Texas Education Agency, 2017a). Data were obtained from the Texas Education Agency Texas Academic Performance Report database in an Excel format. To conduct statistical analyses, the data were converted and recoded into a Statistical Package for the Social Sciences (SPSS) data file.

Results

Prior to conducting inferential statistics to determine whether differences were present in college readiness in reading, in mathematics, and in both subjects between Black and White students, checks were conducted to determine the extent to which these data were normally distributed (Onwuegbuzie & Daniel, 2002). Although some of the values were indicative of non-normally distributed data, a decision was made to use parametric dependent samples *t*-tests to answer the research questions. Statistical results will now be presented by school year, in order of the research questions previously delineated.

Results for Research Question 1 Across All Five School Years

For the 2012-2013 school year, the parametric dependent samples *t*-test revealed a statistically significant difference, $t(596) = -26.89, p < .001$, Cohen's $d = 1.23$, in reading college readiness between Black and White students. The effect size for this difference was large (Cohen, 1988). A statistically significantly higher percentage of White students, 75.64%, were college ready in reading than Black students, 57.50%. Readers are directed to Table 2.1 for the descriptive statistics for this analysis.

 Insert Table 2.1 about here

Concerning the 2013-2014 school year, the parametric dependent samples *t*-test yielded a statistically significant difference, $t(621) = -24.73, p < .001$, Cohen's $d = 1.01$, in reading college readiness between Black and White students. The effect size for this difference was large (Cohen, 1988). A statistically significant higher percentage, 70.79%, of White students were college ready in reading than were Black students, 54.50%. Descriptive statistics for this analysis are contained in Table 2.1.

With respect to the 2014-2015 school year, a statistically significant difference, $t(618) = -24.75, p < .001$, Cohen's $d = 1.02$, was revealed in reading college readiness between Black and White students. The effect size for this difference was large (Cohen, 1988). Again, a statistically significant higher percentage, 70.87%, of White students were college-ready in reading than were Black students, 54.33%. Delineated in Table 2.1 are the descriptive statistics for this analysis.

Regarding the 2015-2016 school year, a statistically significant difference, $t(544) = -38.61, p < .001$, Cohen's $d = 1.55$, was again yielded in reading college readiness between Black and White students. The effect size for this difference was large (Cohen, 1988). Similar to the previous four school years, a statistically significantly higher percentage, 54.26%, of White students were college-ready in reading than were Black students, 26.73%. Table 2.1 contains the descriptive statistics for this analysis.

For the 2016-2017 school year, the parametric dependent samples t -test revealed a statistically significant difference, $t(543) = -38.61, p < .001$, Cohen's $d = 1.55$, in reading college readiness between Black and White students. The effect size for this difference was large (Cohen, 1988). Similar to the previous four school years, a statistically significant higher percentage, 54.32%, of White students were college-ready in reading than were Black students, 26.76%. Revealed in Table 2.1 are the descriptive statistics for this school year.

Results for Research Question 2 Across All Five School Years

Concerning the 2012-2013 school year, the parametric dependent samples t -test procedure yielded a statistically significant difference between Black and White students in their mathematics college readiness, $t(592) = -32.63, p < .001$, Cohen's $d = 1.47$. The effect size for this difference was large (Cohen, 1988). A statistically significantly higher percentage of White students, 75.43%, were college ready in mathematics than Black students, 52.73%. Table 2.2 contains the descriptive statistics for this analysis.

Insert Table 2.2 about here

Regarding the 2013-2014 school year, a statistically significant difference, $t(619) = -32.98, p < .001$, Cohen's $d = 1.36$, was revealed in mathematics college readiness between Black and White students. The effect size for this difference was large (Cohen, 1988). A statistically significantly higher percentage, 79.13%, of White students were college-ready in mathematics than were Black students, 58.18%. Delineated in Table 2.2 are the descriptive statistics for this analysis.

With respect to the 2014-2015 school year, a statistically significant difference, $t(617) = -32.85, p < .001$, Cohen's $d = 1.65$, was yielded in mathematics college readiness between Black and White students. The effect size for this difference was large (Cohen, 1988). Congruent with the previous two school years, a statistically significant higher percentage, 79.16%, of White students were college-ready in mathematics than were Black students, 58.25%. Descriptive statistics for this analysis are contained in Table 2.2.

Concerning the 2015-2016 school year, a statistically significant difference, $t(543) = -38.36, p < .001$, Cohen's $d = 1.51$, was again present in mathematics college readiness between Black and White students. The effect size for this difference was large (Cohen, 1988). A statistically significantly higher percentage, 48.32%, of White students were college-ready in mathematics than were Black students, 21.26%. Readers are referred to Table 2.2 for the descriptive statistics for this analysis.

For the 2016-2017 school year, the parametric dependent samples t -test procedure yielded a statistically significant difference, $t(542) = -38.35, p < .001$, Cohen's $d = 1.52$, in mathematics college readiness between Black and White students. The effect size for this difference was large (Cohen, 1988). Similar to the previous four school years, a statistically significant higher percentage, 48.37%, of White students were college-ready

in mathematics than were Black students, 21.29%. Table 2.2 contains the descriptive statistics for this analysis.

Results for Research Question 3 Across All Five School Years

With respect to the 2012-2013 school year, the parametric dependent samples t -test revealed a statistically significant difference, $t(580) = -27.95, p < .001$, Cohen's $d = 1.36$, in college-readiness in both subjects between Black and White students. The effect size for this difference was large (Cohen, 1988). A statistically significant higher percentage, 63.99%, of White students were college-ready in both subjects than were Black students, 41.52%. Revealed in Table 2.3 are the descriptive statistics for this analysis.

 Insert Table 2.3 about here

Concerning the 2013-2014 school year, a statistically significant difference, $t(615) = -33.01, p < .001$, Cohen's $d = 1.29$, was yielded in college-readiness in both subjects between Black and White students. The effect size for this difference was large (Cohen, 1988). A statistically significant higher percentage, 63.25%, of White students were college-ready in both subjects than were Black students, 40.71%. Descriptive statistics for this analysis are contained in Table 2.3.

Regarding the 2014-2015 school year, a statistically significant difference, $t(1575) = -12.45, p < .001$, Cohen's $d = 2.44$, was again yielded in college-readiness in both subjects between Black and White students. The effect size for this difference was large (Cohen, 1988). Again, a statistically significant higher percentage, 63.30%, of

White students were college-ready in both subjects than were Black students, 40.75%. Delineated in Table 2.3 are the descriptive statistics for this analysis.

For the 2015-2016 school year, a statistically significant difference, $t(543) = -40.32, p < .001$, Cohen's $d = 1.53$, was revealed in college-readiness in both subjects between Black and White students. The effect size for this difference was large (Cohen, 1988). Similar to the previous three school years, a statistically higher percentage, more than twice as high, 46.03%, of White students were college-ready in both subjects than were Black students, 18.86%. Contained in Table 2.3 for the descriptive statistics for this analysis.

With respect to the 2016-2017 school year, a statistically significant difference, $t(542) = -40.30, p < .001$, Cohen's $d = 1.53$, was yielded in college-readiness in both subjects between Black and White students. The effect size for this difference was large (Cohen, 1988). Congruent with the previous four school years, the percentage of White students who were college-ready in both subjects, 46.08%, was more than twice as high as the percentage of Black students who were college-ready in both subjects, 18.88%. Descriptive statistics for this analysis are presented in Table 2.3.

Research Question for Trends Across All School Years

The final research questions regarding the analysis of college readiness in reading, in mathematics, and in both subjects between Black and White students for all five school years of data will now be addressed. Trends were present in college readiness rates in reading, in mathematics, and in both subjects between Black and White students. White students were statistically significantly more college ready in reading, in mathematics, and in both subjects in all five school years of the study. In each year of the study in

college readiness in reading, in mathematics, and in both subjects, a consistent gap in achievement between Black and White students was evident.

The gap in college readiness in reading increased by approximately 9.00 percentage points from the first year of the study to the last year of the study. In the 2012-2013 school year of the study the gap in college readiness in reading was 18.14%. In the 2016-2017 school year of the study, the gap in college readiness in reading was 27.56%. In the 2013-2014 and in the 2014-2015 school years, the gap was consistent (i.e., 16.29% and 16.34%). Also, in the last two school years of the study (i.e., 2015-2016 and 2016-2017), the gap in college readiness in reading was consistent (i.e., 27.50% and 27.56% respectively). In the first school year of the study (i.e., 2012-2013) compared to the last school year of the study (i.e., 2016-2017), the gap between Black and White students in college readiness in reading increased by approximately 9.00 percentage points. Figure 2.1 is a graphical representation of this trend.

Insert Figure 2.1 about here

Concerning mathematics, the gap in college readiness remained consistent in the first three school years of the study (i.e., 22.70% in 2012-2013, 20.95% in 2013-2014, and 20.91% in 2014-2015). However, in the 2015-2016 school year, the gap increased by approximately 6.00%. In the last two school years of the study, the gap remained consistent (27.06% in 2015-2016 and 27.08% in 2016-2017). Overall, the gap in college readiness in mathematics increased by approximately 4.00 percentage points from the

first school year of the study (i.e., 2012-2013) to the last school year of the study (i.e., 2016-2017). The five school year trend is represented in Figure 2.2.

Insert Figure 2.2 about here

In college readiness in both subjects, the gap between Black and White students remained consistent for the first three school years of the study. In the 2012-2013 school year, the gap was 22.47%. The following year the gap was 22.54%. In the 2014-2015 school year, the gap between Black and White students was 22.55%. In the 2015-2016 school year, the gap increased by almost 5.00%. Overall, the gap in college readiness in both subjects increased by 4.73 percentage points from the first school year of the study (i.e., 2012-2013) to the last school year of the study (i.e., 2016-2017). Readers are directed to Figure 2.3, a graphical representation of this trend.

Insert Figure 2.3 about here

The performance standards for the STAAR have scheduled, yearly increases (Texas Education Agency, 2017c). The standard to meet grade level performance increased from the 2014-2015 school year to the 2015-2016 school year. In the 2012-2013 through the 2014-2015 school years, to meet satisfactory performance in reading students had to score at least 3750; to meet satisfactory performance in mathematics, students had to score at least 3500 (Texas Education Agency, 2017c). In the 2015-2016 school year, to meet grade level performance standards, students had to meet the scale

score of 4000 in reading and in mathematics (Texas Education Agency, 2017c). The increase in the passing standard can affect the college readiness of students, for if less students meet the passing standard then less students will inevitably meet the college readiness standard. As readers can see from Figures 2.1, 2.2, and 2.3, college readiness in all subjects for both Black and White students dropped from the 2014-2015 school year to the 2015-2016 school year.

Discussion

In this investigation, differences in college readiness in reading, in mathematics, and in both subjects between Black and White students in Texas public schools was investigated. Archival data from the Texas Academic Performance Reports were obtained and analyzed. College readiness data in reading, in mathematics, and in both subjects were analyzed for the 2012-2013, 2013-2014, 2014-2015, 2015-2016, and 2016-2017 school years. In all five school years, White students were statistically significantly more college ready than were Black students in reading, in mathematics, and in both subjects. Based upon the results of this investigation, too few Black students, compared to White students, are college ready in reading, in mathematics, and in both subjects. Table 2.4 contains a summary of the results for the effect sizes for the college readiness differences between Black and White students in reading, in mathematics, and in both subjects for the five school years.

Insert Table 2.4 about here

Statistically significant differences were present in reading college readiness between Black and White students in all five school years. White students were statistically significantly more college ready in reading than were Black students. The size of the difference was large in reading college readiness between Black and White students in each school year of the study. In the first three school years of the study (i.e., 2012-2013, 2013-2014, and 2014-2015), at least 50.00% of Black students were college ready in reading: 57.50% in 2012-2013, 54.50% in 2013-2014, and 54.53% in 2014-2015. In the 2015-2016 school year and in the 2016-2017 school year, only 26.73% and 26.76% of Black students were college ready in reading.

In all five school years, White students were more college ready in mathematics than Black students. Effect sizes for the mathematics college-readiness differences were large in all five school years. Similar to the reading results, in the first three school years of the study, at least 50.00% of Black students were college ready in mathematics: 52.73% in 2012-2013, 58.18% in 2013-2014, and 58.25% in 2014-2015. However, in the last two school years, the average percentage of Black students who were college ready in mathematics decreased: 21.26% were college ready in the 2015-2016 school year and 21.29% were college ready in the 2016-2017 school year.

Concerning college readiness in both subjects, Black students were statistically significantly less college ready than were White students in all five school years. Effect sizes for the both subjects college readiness differences were large in all five school years. In no year of the study were at least 50% of Black students college ready in both subjects: 41.52% in 2012-2013, 40.71% in 2013-2014, 40.75% in 2014-2015, 18.86% in 2015-2016, and 18.88% in 2016-2017.

Connections with Existing Literature

Similar to previous researchers (e.g., ACT, 2016; Barnes, 2010; Barnes & Slate, 2014; Barton & Coley, 2010; Vanneman et al., 2009), White students continue to have higher levels of college readiness than do Black students. Using archival data from the Texas Education Agency Academic Excellence Indicator System, Barnes and Slate (2014) examined the college readiness rates in reading, in mathematics, and in both subjects of Black, Hispanic, and White students in Texas. Barnes and Slate examined data for the 2006-2007, 2007-2008, and 2008-2009 school years. For all years of the data, the college readiness rates in reading, in mathematics, and in both subjects for White students were higher than the college readiness rates in reading, in mathematics, and in both subjects for the Black students. For five consistent school years (i.e., 2012-2013, 2013-2014, 2014-2015, 2015-2016, and 2016-2017) these results were consistent with Barnes and Slate (2014).

Barnes (2010) conducted research to determine the differences in college readiness between Black, Hispanic, and White public high school graduates in Texas for the 2006-2007, 2007-2008, and 2008-2009 school years. During the aforementioned school years, students in Texas took the Texas Assessment of Knowledge and Skill (TAKS) assessment. To evaluate college readiness, the Higher Education Readiness Standard for exit level TAKS English language arts and mathematics was analyzed. Concerning the differences in college readiness between Black and White students, in all three school years (i.e., 2006-2007, 2007-2008, and 2008-2009) of Barnes' study, he reported White students, compared to Black students, were more college ready in reading, in mathematics, and in both subjects. Findings of the Barnes study are similar to

the findings of this study as more White students compared to Black students met the college readiness standards in reading, in mathematics, and in both subjects.

Implications for Policy and Practice

Based upon the results of this multiyear, statewide investigation, several implications for policy and for practice can be made. First, given the low percentages of students who were determined to be college ready, educators and policymakers need to examine the rigor in middle schools (Allensworth, Gwynne, Moore, & de la Torre, 2014) and in high schools. The results of this investigation are not supportive that rigor, sufficient for preparing students to be college ready, is present currently in either middle schools or in high schools. Additionally, higher education leaders will need to determine the resources students will need to succeed in college and continue to work with high schools to align academic expectations and standards (Cline, Bissell, Hafner, & Katz, 2007; Perin, 2018). A barrier to academic success between Black and White students is the achievement gap (Texas Higher Education Coordinating Board, 2006). When determining academic outcomes, many factors need to be considered, from the role of the family and economic resources to the quality of schools attended (Duncan & Murnane, 2011; Halpern-Manner, Warren, & Brand, 2009; Potter & Morris, 2017).

Recommendations for Future Research

Several recommendations for future research can be made. First, because this study was based entirely on Texas student data, the degree to which the results delineated herein would be generalizable to students in other states is not known. As such, researchers are encouraged to replicate this investigation in other states. Second, the sole focus in this investigation was on Black and White students. The college-readiness, or

lack thereof, of other major ethnic/racial groups of students such as Hispanic and Asian warrants examination. Researchers are encouraged to investigate the degree to which other ethnic/racial groups of students and underrepresented groups such as English Language Learners are college ready.

A third recommendation would be to address whether gender differences are present in college readiness. To what degree are high school boys and girls similar or dissimilar in their college readiness skills? Determining the college readiness differences in reading and in mathematics between boys and girls will allow researchers to see not only how ready boys and girls are for college but to also determine whether gaps in reading and in mathematics achievement between boys and girls are decreasing.

Conclusion

The purpose of this research study was to investigate the differences present in college readiness in reading, in mathematics, and in both subjects between Black and White students. Texas, statewide data were analyzed for five school years (i.e., 2012-2013 through 2016-2017) to determine the degree to which trends were present in the reading, in mathematics, and in both subjects college readiness of Black and White students. Inferential statistical procedures revealed the presence of statistically significant differences between White and Black students in their college readiness in reading, in mathematics, and in both subjects. In all five school years, White students were statistically significantly more college ready in reading, in mathematics, and in both subjects than were Black students. Large effect sizes were present in all instances and were reflective of large degrees of practical relevance with respect to a lack of college readiness for Black students.

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Table 2.1

*Descriptive Statistics for College Readiness in Reading of Black Students and White**Students for the 2012-2013 Through the 2016-2017 School Years*

School Year and Ethnicity	<i>n</i> of schools	<i>M</i>	<i>SD</i>
2012-2013			
Black	597	57.50	16.48
White	597	75.64	12.88
2013-2014			
Black	622	54.50	17.71
White	622	70.79	14.20
2014-2015			
Black	619	54.53	17.74
White	619	70.87	14.18
2015-2016			
Black	545	26.73	16.96
White	545	54.26	18.58
2016-2017			
Black	544	26.76	17.00
White	544	54.32	18.54

Table 2.2

Descriptive Statistics for College Readiness in Mathematics of Black Students and White Students for the 2012-2013 Through the 2016-2017 School Years

School Year and Ethnicity	<i>n</i> of schools	<i>M</i>	<i>SD</i>
2012-2013			
Black	593	52.73	16.71
White	593	75.43	14.10
2013-2014			
Black	620	58.18	17.94
White	620	79.13	12.43
2014-2015			
Black	618	58.25	17.93
White	618	79.16	12.43
2015-2016			
Black	544	21.26	16.45
White	544	48.32	19.17
2016-2017			
Black	543	21.29	16.46
White	543	48.37	19.15

Table 2.3

Descriptive Statistics for College Readiness in Both Subjects of Black Students and White Students for the 2012-2013 Through the 2016-2017 School Years

School Year and Ethnicity	<i>n</i> of schools	<i>M</i>	<i>SD</i>
2012-2013			
Black	581	41.52	16.64
White	581	63.99	16.38
2013-2014			
Black	616	40.71	18.55
White	616	63.25	16.26
2014-2015			
Black	614	40.75	18.56
White	614	63.30	16.26
2015-2016			
Black	544	18.86	16.02
White	544	46.03	19.32
2016-2017			
Black	543	18.88	16.02
White	543	46.08	19.31

Table 2.4

Summary of Results for the Effect Sizes for the College-Readiness Differences in Reading, Mathematics, and in Both Subjects Between Black and White Students in Their College Readiness

College Readiness and School Year	Effect Size	Lower Achieving Group
Reading		
2012-2013	Large	Black
2013-2014	Large	Black
2014-2015	Large	Black
2015-2016	Large	Black
2016-2017	Large	Black
Mathematics		
2012-2013	Large	Black
2013-2014	Large	Black
2014-2015	Large	Black
2015-2016	Large	Black
2016-2017	Large	Black
Both Subjects		
2012-2013	Large	Black
2013-2014	Large	Black
2014-2015	Large	Black
2015-2016	Large	Black
2016-2017	Large	Black

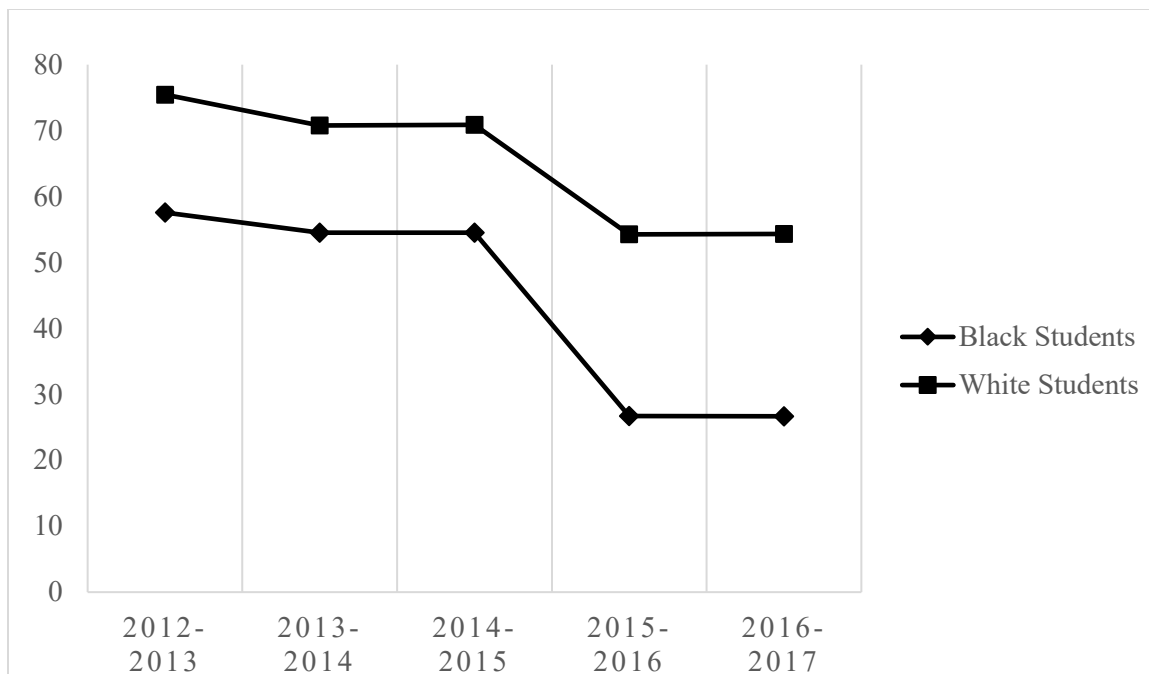


Figure 2.1. Average reading college readiness for Black students and White students for the 2012-2013 through the 2016-2017 school years.

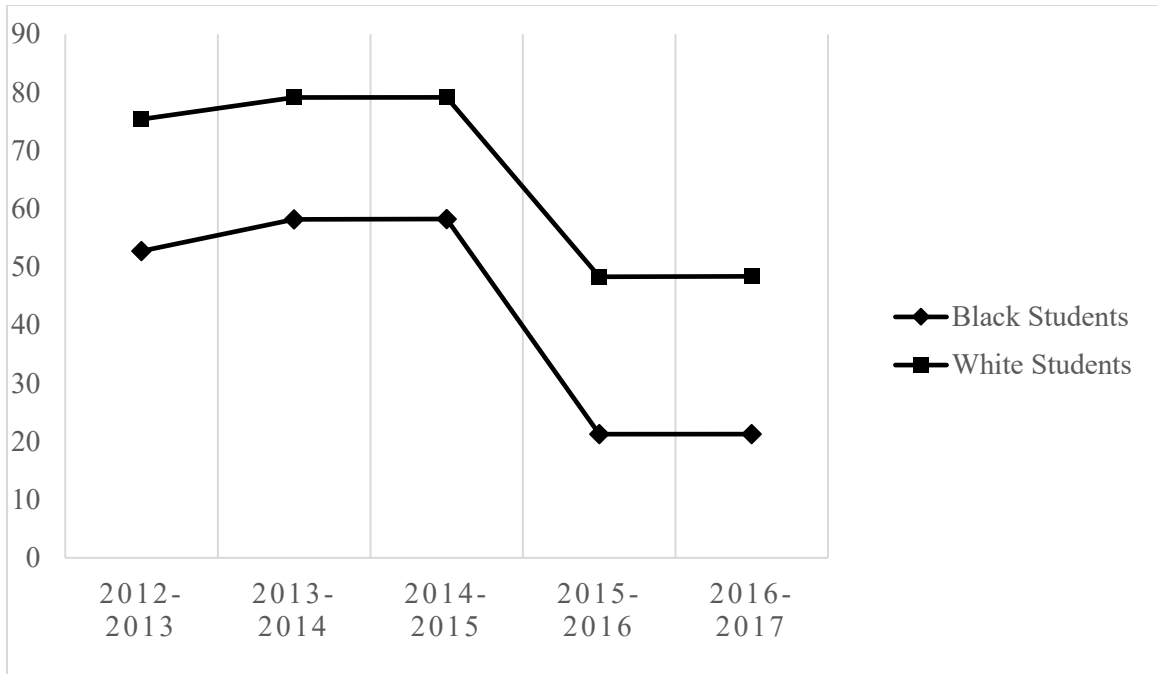


Figure 2.2. Average mathematics college readiness for Black students and White students for the 2012-2013 through the 2016-2017 school years.

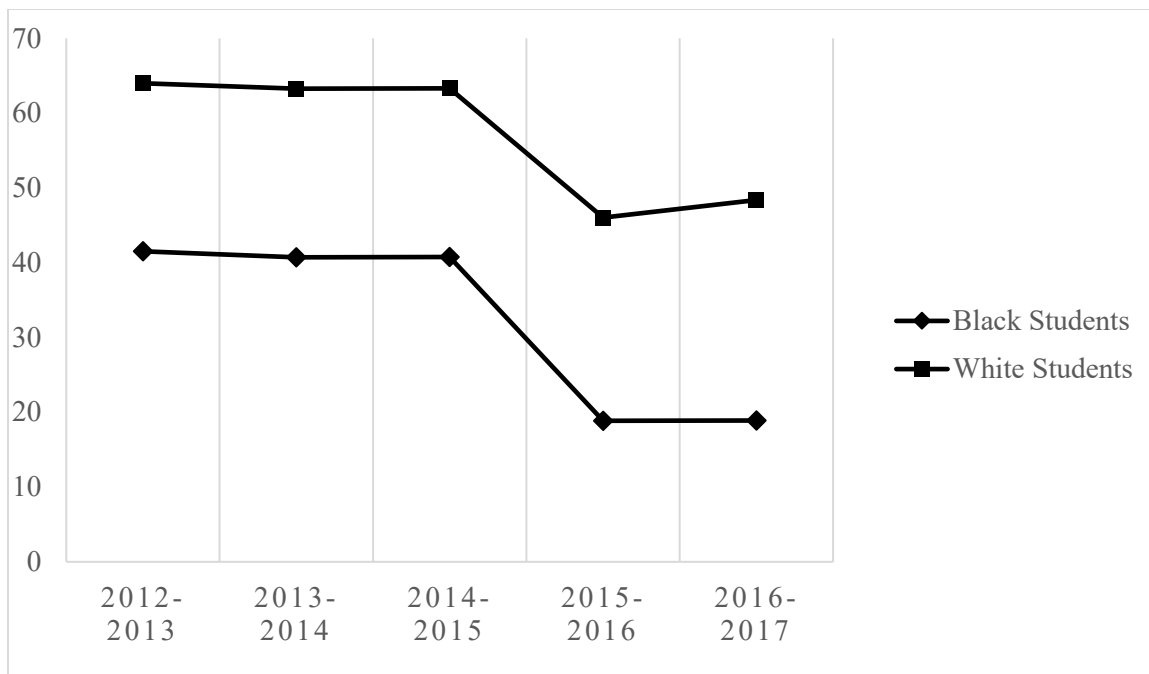


Figure 2.3. Average college readiness in both subjects for Black Students and White students for the 2012-2013 through the 2016-2017 school years.

CHAPTER III**DIFFERENCES IN COLLEGE READINESS IN READING AND IN MATHEMATICS
AND IN BOTH SUBJECTS BETWEEN HISPANIC AND WHITE STUDENTS IN
TEXAS: A MULTIYEAR ANALYSIS**

This dissertation follows the style and format of *Research in the Schools (RITS)*.

Abstract

Differences present in college readiness in reading, in mathematics, and in both subjects between Hispanic and White students were analyzed in this investigation. Texas, statewide data were analyzed for five school years (i.e., 2012-2013, 2013-2014, 2014-2015, 2015-2016, and 2016-2017) to determine whether trends were present in the reading, mathematics, and both subjects college readiness rates of Hispanic and White students. In all five school years, White students were statistically significantly more college ready in reading, in mathematics, and in both subjects than were Hispanic students. Implications for policy and practice, as well as recommendations for future research, are provided.

Keywords: College Readiness, Reading, Mathematics, Ethnicity/Race, Hispanic, White, Texas

DIFFERENCES IN COLLEGE READINESS IN READING AND IN MATHEMATICS
AND IN BOTH SUBJECTS BETWEEN HISPANIC AND WHITE STUDENTS IN
TEXAS: A MULTIYEAR ANALYSIS

From Grade K to Grade 12, educators seek to prepare students for higher education, for preparing students for higher education is one determinate of student success (Every Student Succeeds Act, n.d.). When students graduate high school, they want to not only receive a diploma, but they want to also have the knowledge, skills, and strategies necessary to be successful in postsecondary learning (Barnes & Slate, 2013). To achieve this postsecondary success, students need a challenging curriculum in high school to help them stay focused, form academic skills, and develop study habits (Wimberly & Noeth, 2005). However, hurdles are present that students cross in their attempts to gain the academic qualifications necessary to be considered college-ready.

The relationship between academic performance and ethnicity/race is known and documented (Coleman et al., 1966). Large gaps in learning are still evident between students who are Hispanic and White (Duncan & Magnuson, 2005). Therefore, continuing to understand race and ethnic differences in educational achievement in the United States is important as the population grows more diverse (Kao & Thompson, 2003).

Academic underperformance is a major concern among Hispanic students (Olivos & Quintana de Valladolid, 2005; U.S Department of Education, 2010). Compared to White students, Hispanic students tend to arrive to school with underdeveloped skills (Crosnoe, 2005). Additionally, Hispanic students tend to score lower than White students in reading and in mathematics (Potter & Morris, 2017). When Swail, Cabrera, and Lee

(2004) analyzed data from the latest installment of the National Educational Longitudinal Study begun in 1988 with Grade 8 students and followed up several times, 41% of White students and 59% of Latino students were not college ready.

In 2016, Koch, Slate, and Moore utilized AP English exam data to compare the performance of Hispanic students from California, Texas, and Arizona. According to Ennis, Rios-Vargas, and Albert (2011), almost 66% of the U.S. Mexican Hispanic population, resides in the aforementioned states. In all 32 comparisons, Hispanic students in Texas has the lowest passing rate on the AP English exam.

Because today higher expectations and higher levels of academic achievement are required, students in the United States need to be prepared for postsecondary success (Conley, 2008; Malin, Bragg, & Hackmann, 2017; U.S. Department of Education, 2003). To date, almost all states have increased (a) the amount of academic credits required for graduation, (b) made more rigorous academic standards, (c) established curriculum-based and other high-stakes examinations connected to high school graduation, and (d) sponsored choice programs that offer students larger access to a more rigorous curriculum (Balfanz, 2009; Balfanz, DePaoli, Ingram, Bridgeland, & Fox, 2016; Bush, 2001; Department of Education, 1991; Gardner et al., 1983; Schiller, & Muller, 2003; U.S. Department of Education, 2003). Yet, with stagnant test scores and increasing high school dropout rates, many in society question the consistency in the quality of the curriculum and the instruction across high schools in the United States (Flores, Park, Baker, 2017; U.S. Department of Education, 2003).

Despite difficulties in the U.S. public education system, education reform works to help students stand in the gap (Bush, 2001; Every Student Succeeds Act, n.d.; Klein,

2015; Gardner, 1983). However, the gap in achievement between students still exists regarding college readiness. Greene and Forster (2003) documented only 32% of all high school graduates were college-ready in the areas of reading, writing, and mathematics. Even more, Hispanic students graduate at lower rates than White students (Greene & Forster, 2003). Across the United States, Greene and Forster reported 37% of all White students, and 16% of all Hispanic students leave high school college-ready. The drop in postsecondary success is linked to the inadequate preparation of students in high school (Rothman, 2012). For students, precollege academic preparation is strongly related to their postsecondary success (Kuh, 2007).

Murphy and Murphy (2018) sought to identify factors that impact success for Latino college students. The two academic factors that contributed most to Latino college success were high school grade point average and being the first in the family to attend college. Coincidentally, high school grade point average is determined through high school coursework.

College-ready students should not need remediation before they can be successful in college-level coursework (Wiley, Wyatt, & Camera, 2011), but many first-year students take remedial coursework in public institutions of higher learning (Scott-Clayton, Crosta, & Belfield, 2014; Page & Scott-Clayton, 2016). Approximately 20% of White students and 29% Hispanic students take remedial coursework in college (Sparks & Malkus, 2013). According to Kuh (2007), for students to be college-ready at the end of high school, students must attain grade-level proficiencies in mathematics and in reading by the end of Grade 8. Furthermore, Kuh posited if students do not do well in English and in advanced mathematics classes (i.e., Algebra II, precalculus, trigonometry,

and calculus) while in high school, later interventions for mathematics typically have little effects on the students' chances to complete the college coursework necessary to attain a bachelor's degree. Essentially, preparing students to be college-ready starts before students enter high school.

Authors define college readiness in many ways. The College and Career Ready Working Group (2015) of the National Center for Education Statistics suggested that to be college ready, students attained the knowledge, skills, and disposition needed to succeed in credit-bearing, non-remedial postsecondary coursework. Green and Forster (2003) defined a student as college ready when he or she took specific courses to acquire necessary skills (e.g., college preparatory courses); demonstrated basic literacy skills (i.e., reading, writing, mathematics); and graduated from high school. Similarly, Roderick, Nagaoka, and Coca (2009) identified college readiness as students possessing four different skills: (a) content knowledge and basic skills; (b) core academic skills; (c) non-cognitive, or behavioral, skills; and (d) college knowledge skills (i.e., the ability to effectively search for and apply to college; p. 185).

Interestingly, utilizing coursework required for college admission, achievement test scores, and grade point averages, the three most common indicators educators use to assess college readiness, Roderick et al. reported less than 25% of Latino graduates met the college readiness benchmarks, compared with approximately one half of the White graduates. Although Conley (2007a, 2012) supplied the definition Roderick et al. used for college readiness, Conley (2007a) and Conley et al. (2010) identified, more specifically, the four skill areas that make up college readiness: (a) cognitive strategies (i.e., intentional behaviors used to learn intellectual openness and problem solving); (b)

content knowledge needed comprehend academic disciplines (i.e., in reading, writing, mathematics, and other core subjects); (c) academic behaviors (i.e., attitude, management and habits promoting self-awareness and self-monitoring); and (d) contextual awareness skills to navigate college environment and culture needed to be successful in school. College ready students will possess the knowledge and skills in reading and in mathematics needed to be successful in higher learning.

Accountability in education is determined by learning standards and assessments. (Brown & Conley, 2007). The establishment of college readiness standards was only the first step toward understanding what students need to know in high school (e.g., knowledge, skills, habits and expectations) to be ready for coursework in postsecondary school (Davis, 2010). Since the 1980s, colleges have required placement testing to determine college readiness (King, Rasool, & Judge, 1994). Therefore, educators use high school standardized assessments to uncover students' level of higher education readiness (Byrd & Mac Donald, 2005).

Before President Obama resolved U.S. students would lead the world in college completion by 2020 (Kanter, 2011), "efforts to define the knowledge and skills in mathematics and English that high school graduates needed for success in credit-bearing college courses and high-growth jobs began in 2001" (College and Career Ready Working Group, 2015, p. 3). Nongovernmental organizations (e.g., The American Diploma Project and Common Core State Standards) led the primary initiatives in creating standards (Cohen, 2008; College and Career Ready Working Group, 2015). Texas was part of the project and, in 2008, was the first state to adopt college readiness standards (Texas Education Agency, 2010). Additionally, by the 2019-2020 school year,

Texas legislatures and educators had wanted to become one of the top 10 states for graduating college-ready students (Texas Education Agency, 2010).

Essentially, high school students who graduate prepared to attend college gain more access to our country's economic, political, and social opportunities (Greene & Forster, 2003; Malin et al., 2017). Greene and Forester (2003) retrieved data from the U.S. Department of Education for students in the graduation class of 2001 to reveal the percentages of students who graduated high school ready for a four-year college education. In the study, Greene and Forster noted the following determinations for students to be considered college-ready graduates: (a) students must have graduated high school; (b) students must have taken required courses for the acquisition of necessary skills; and (c) students must have demonstrated basic literacy skills. The researchers produced estimates by racial and ethnic groups and found that of the 70% of students who graduated high school in 2001, 37% of White students and 16% of Hispanic students left high school college-ready. In all, 32% of all students left high school qualified to attend a 4-year college or university. Ironically, more students attended college than students who were determined to be college-ready. Greene and Forster concluded that education reform is needed for students in Grade K through Grade 12, especially for Hispanic students, if students are to acquire skills and knowledge needed to be ready for college upon high school graduation.

Greene and Winters (2005) reproduced the minimum standards of various four-year colleges to determine the percentages of students from 1991 to 2002 in the United States who left high school eligible for college. The criteria of the minimum standards included (a) students must have graduated and received a diploma; (b) students must have

completed a minimum set of course requirements; and (c) students should be able to read at a basic reading level. To perform the analysis, the researchers used graduation rate calculations, data from various years of the NAEP High School Transcript Study, and a survey of a large representative sample of students at both the national and regional levels.

The national high school graduation rate for all public school students went from 72% in 1991 to 71% in 2002. Nationally, the percentage of all students who left high school with the skills and qualifications necessary to attend college increased from 25% in 1991 to 34% in 2002. The increased standards and accountability programs over the last decade are likely the reason for the flat high school graduation rates—large gap between the graduation rates of White students and students of color. In the class of 2002, 52% of Hispanic students graduated from high school with a regular diploma, compared to 78% of White students. A large disparity among racial/ethnic groups exists in the percentage of students who leave high school eligible for college admission. In 2002, approximately 40% of White students and 20% of Hispanic students graduated college-ready. However, little difference occurs between the number of students who graduated from high school college-ready and the number of students who enrolled in college for the first time. Therefore, a large group of students have the skills needed to attend college but do not attend college because they lack resources or other non-academic factors.

Nationally, Brown and Conley (2007) identified the knowledge and skills needed for success in entry-level courses at U.S. research universities. They examined state tests' content in relation to the Knowledge and Skills for University Success (KSUS)

standards, the most comprehensive standards in the nation. By analyzing 60 mathematics and English exams from 20 states using an alignment analysis methodology, the researchers discovered the exams moderately yet unevenly aligned with a subset of university standards. Thus, Brown and Conley suggested high school exams cover only a portion of what is necessary for college readiness, and high school exams and college-readiness aligned in more areas considered basic cognitive functioning.

Kim and Bragg (2008) explored, in their quantitative research, how dual credits and articulated college credit hours influenced college outcomes. Students who successfully complete dual credit class (e.g., college-level class) in high school receive both high school and college credit for the class (Kim, Barnett, & Bragg, 2003). Students who take an articulation course in high school will not have to retake the course in college because the course in high school matches the course requirements in college. Kim et al. took note to control for student gender and educational background characteristics. Additionally, Kim et al. used existing Ohio, Texas, Florida, and Oregon consortia datasets from the Community College and Beyond study. In Community College and Beyond high school graduates were tracked over a 4-year period and participants who earned dual credit or articulated credit hours in the Tech Prep and nonparticipant groups were identified. “Articulated credit hours earned had a significant positive relationship with being college ready in reading and writing; whereas, academic dual credit hours earned had a significant positive relationship with college readiness in mathematics” (Kim & Bragg, 2008, p. 142). Overall, the researchers documented that dual credit courses positively influenced college readiness. Additionally, in the area of articulated college credit courses, the researchers identified that the articulated credit

course-taking enhanced college retention. However, students being college ready in reading, writing, and mathematics varied among the four consortia.

Moore et al. (2010) analyzed scores for all students and each ethnic/racial subgroup in reading, mathematics, and both subjects combined to determine their college-ready graduate rates. Specifically, approximately 37% of Hispanic students were college ready in mathematics and 39% of Hispanic students were college-ready in reading. For the 2006-2007 academic school year, approximately 20% of graduating Hispanic students were college-ready in both subjects. Moore et al. further noted that with lack of preparedness for college and the presence of strong achievement differing across ethnic groups; it can be perceived that more students will have to take remedial courses in college. Moreover, Moore et al. determined that current educational policies should be reexamined because only one third of the students were college ready in both subjects, and statistically significant differences were present in reading, math, and both subjects among Hispanic and White students.

Using a multilevel model of students within states, Musoba (2011) investigated college readiness by examining the effect of several accountability reforms on low-income students as a function of ethnicity. Overall, Musoba analyzed the relationships of the following (a) high-stakes high school exit exams; (b) implementation of standards-based reform; and (c) high school graduation requirements in mathematics with readiness for college as measured by SAT scores of low-income White, Black, and Hispanic high school students. From this quantitative methodology, the researcher reported that high school exit exams and standards-based reforms were not statistically significantly related to readiness for college as measured by the SAT.

Literacy skills are fundamental for overall academic success (Whitehurst & Lonigan, 2001). Interim reading assessments may predict college readiness in reading and success in mathematics (Dorans, 2000; Koon & Petscher, 2016; Thurber, Shinn, & Smolkowski, 2002). Koon and Petscher (2016) investigated college readiness in two Florida school districts. During the 2013-2014 school year, the two school districts sought to develop an early warning system to identify Grades 11 or 12 students at risk of low achievement on college readiness measures. Koon and Petscher (2016) investigated to what extent the students' Grade 9 scores on the Florida Assessment for Instruction in Reading predict performance on the Preliminary SAT/National Merit Scholarship Qualifying Test and the ACT Plan in grade 10. Students' scores on the Florida Assessment for Instruction in Reading could predict performance, with acceptable sensitivity, on college readiness assessments.

Barnes and Slate (2013) investigated the differences in college readiness among Black, Hispanic, and White high school graduates in Texas for the 2006-2007, 2007-2008, and 2008-2009 school years. Statistically significant results were present. White students had higher college readiness rates in reading, mathematics, and in both subjects than did their Black and Hispanic peers. Although White, Black and Hispanic students increased their college readiness rates over the three years, White students achieved higher levels of student academic achievement in college readiness over the three years.

In a similar study, Barnes and Slate (2014) utilized three years of data (i.e., 2006-2007 through 2008-2009), to examine the college readiness rates among Black, Hispanic, and White high school graduates in Texas. The investigators sought to determine whether academic achievement gaps among Black, Hispanic, and White students either

increased, decreased, or remained comparatively large and steady. From 2006 to 2009, the college readiness rates of White students in reading, mathematics, and both subjects were higher, by large margins, than the college readiness rates of Black and Hispanic students. Statistically significant findings included 19 large effect sizes—27 statistical analyses were conducted. Over the school years of the study, Black and Hispanic students improved their college readiness. However, college readiness rates for White students also increased. Therefore, the achievement gap was steadied.

In 2017, the ACT conducted a national report to look at how students are achieving in the college and career readiness ACT standard. The team analyzed data of more than 2 million U.S. high school students who took the ACT test in 2017 and determined that 47% of the students were college ready in reading and 41% of the students were college ready in math. Additionally, in 2017, 33% of Hispanic students met the ACT college readiness benchmarks in reading and 26% of Hispanic students met the ACT college readiness benchmarks in math. In contrast, 58% of White students met the ACT college readiness benchmarks in reading and 51% of White students met the ACT college readiness benchmarks in math.

Statement of the Problem

Hispanics are the fastest-growing group of people in the United States population (Hemphill & Vanneman, 2010). Yet, Hispanic students are among those groups of students who are least likely to attend college (Cates & Schaeffle, 2011; Lozano, Watt, & Huerta, 2009). Historically, Hispanic students do not perform as well as White students in standardized testing and in academic achievement (Schneider, Martinez, & Owens, 2006). The National Association of Educational Progress (2015) reported that 25% of

Grade 12 Hispanic students and 46% of Grade 12 White students scored at or above the proficient level in reading. Concerning mathematics, 12% of Grade 12 Hispanic students and 32% of Grade 12 White students scored at or above the proficient level. Vega, Moore, and Miranda (2015) suggested that the “gaps in academic achievement between Hispanic students and White students suggest that the public school system is one of many systems failing to meet their educational needs” (p. 37).

Purpose of the Study

The first purpose of this study was to examine the extent to which differences were present in the reading college-readiness between Hispanic and White students. A second purpose was to determine the degree to which differences existed in the mathematics college-readiness between Hispanic and White students. A third purpose was to ascertain the extent to which differences existed in college readiness in both subjects between Hispanic and White students. Texas, statewide data were analyzed for five school years (i.e., 2012-2013, 2013-2014, 2014-2015, 2015-2016, and 2016-2017) to determine the degree to which trends were present in the reading, mathematics, and both subjects college-readiness rates of Hispanic and White students.

Significance of the Study

The majority of U.S. high school graduates are not academically prepared for the rigor of college coursework (Conley, 2007a, 2007b; Hunt, Boyd, Gast, Mitchell, & Wilson, 2012; Flippo, 2011). Yet, all students need to be prepared for life after high school (Harris, Mayes, Vega, & Hines, 2016; Malin et al., 2017). Researchers (e.g., Barnes & Slate, 2014; Moore et al., 2011) have revealed differences in achievement between Hispanic students and White students. Through the results of this article, the

research conducted by Barnes (2010) in his doctoral dissertation will be updated. Specifically, Barnes investigated differences in college readiness among Black, Hispanic, and White public high school graduates in Texas for the 2006-2007, 2007-2008, and 2008-2009 school years. Archival data were analyzed from the Texas Education Agency Academic Excellence Indicator System. During the aforementioned school years, students in Texas took the Texas Assessment of Knowledge and Skill (TAKS) assessment. To evaluate college readiness, the higher education readiness standard for the TAKS Exit-level Reading and Mathematics were used. In all three school years of data that Barnes (2010) analyzed, White students were statistically significantly more college ready than were Hispanic students in reading and in mathematics.

Monitoring college-ready allows educators to identify students who are not achieving academically and implement interventions to help close the gaps. Understanding students' college-readiness, informs colleges and universities concerning student academic needs. To have a better opportunity to succeed in college coursework, students should be accurately placed in college courses that are appropriately matched to their achievement levels (Belfield & Crosta, 2012; Scott-Clayton, 2012).

Research Questions

The following research questions were investigated in this study: (a) What is the difference in reading college readiness between Hispanic and White students?; (b) What is the difference in mathematics college readiness between Hispanic and White students?; (c) What is the difference in both subjects college readiness between Hispanic and White students?; (d) What trend is present in reading college readiness for Hispanic and White students over the five school years of data analyzed?; (e) What trend is present in

mathematics college readiness for Hispanic and White students over the five school years of data analyzed?; and (f) What trend is present in both subjects college readiness for Hispanic and White students over the five school years of data analyzed? The first three research questions were repeated for the 2012-2013, 2013-2014, 2014-2015, 2015-2016, and 2016-2017 school years; whereas, the last three research questions constituted comparisons across all five school years. Accordingly, 18 research questions were addressed in this study.

Method

Research Design

A non-experimental, causal comparative research design (Johnson & Christensen, 2012) was utilized to determine the differences in college readiness between the Hispanic and White students. The independent variable could not be manipulated, for the independent and dependent variables had already occurred. Additionally, any extraneous variables that might influence the dependent variables were not controlled. In this investigation, the independent variable was ethnicity/race (i.e., Hispanic and White), and the dependent variables were college readiness in reading, mathematics, and in both subjects.

Participants and Instrumentation

High school State of Texas Assessments of Academic Readiness (STAAR) End of Course (EOC) data on the English II and Algebra I were obtained from the Texas Education Agency Texas Academic Performance Report database in an Excel format. To conduct statistical analyses, the data were converted and recoded into a Statistical Package for the Social Sciences (SPSS) data file. According to TEA (2017a), to

determine whether students meet the college readiness standard, all test questions count. When students score at the Masters level that means students are on track for college readiness (i.e., Index 4; Texas Education Agency, 2017a; 2017b). To be considered college ready, students meet the grade level passing standards and score Final Satisfactory Level II Satisfactory Academic Performance on STAAR (Texas Education Agency, 2017a). All public school students who took the STAAR EOC in English II and Algebra I from the 2012-2013 through the 2016-2017 school years data are included in this study.

Results

Prior to conducting inferential statistical procedures to determine whether differences were present in college readiness in reading, in mathematics, and in both subjects between Hispanic and White students, checks were conducted to determine the extent to which these data were normally distributed (Onwuegbuzie & Daniel, 2002). Although some of the values were indicative of non-normally distributed data, a decision was made to use parametric dependent samples *t*-tests to answer the research questions. Statistical results will now be presented by school year, in order of the research questions previously delineated.

Results for Research Question 1 Across All Five School Years

For the 2012-2013 school year, the parametric dependent samples *t*-test revealed a statistically significant difference, $t(996) = -24.38, p < .001$, Cohen's $d = 0.83$, in college readiness in reading between Hispanic and White students. The effect size for this difference was large (Cohen, 1988). A statistically significantly higher percentage of

White students, 74.54%, were college ready in reading than Hispanic students, 62.05%. Readers are directed to Table 3.1 for the descriptive statistics for this analysis.

 Insert Table 3.1 about here

Concerning the 2013-2014 school year, the parametric dependent samples t -test revealed a statistically significant difference, $t(1044) = -23.35, p < .001$, Cohen's $d = 0.70$, in college readiness in reading between Hispanic and White students. The effect size for this difference was moderate (Cohen, 1988). A statistically significantly higher percentage, 70.08%, of White students were college ready in reading than were Hispanic students, 59.05%. Table 3.1 contains the descriptive statistics for this analysis.

With respect to the 2014-2015 school year, a statistically significant difference, $t(1033) = -23.40, p < .001$, Cohen's $d = 0.71$, was revealed in reading college readiness between Hispanic and White students. The effect size for this difference was moderate (Cohen, 1988). Again, a statistically significantly higher percentage, 70.29%, of White students were college ready in reading than were Hispanic students, 59.21%. Descriptive statistics for this analysis are revealed in Table 3.1

Regarding the 2015-2016 school year, a statistically significant difference, $t(889) = -31.07, p < .001$, Cohen's $d = 0.93$, was yielded in college readiness in reading between Hispanic and White students. The effect size for this difference was large (Cohen, 1988). Similar to the previous four school years, a statistically significantly higher percentage, 52.52%, of White students were college ready in reading than were Hispanic students, 35.86%. Delineated in Table 3.1 are the descriptive statistics for this analysis.

For the 2016-2017 school year, the parametric dependent samples *t*-test revealed a statistically significant difference, $t(888) = -31.45, p < .001$, Cohen's $d = 0.94$, in reading college readiness between Hispanic and White students. The effect size for this difference was large (Cohen, 1988). Similar to the previous four school years, a statistically significantly higher percentage, 52.55%, of White students were college ready in reading than were Hispanic students, 35.83%. Revealed in Table 3.1 are the descriptive statistics for this analysis.

Results for Research Question 2 Across All Five School Years

Concerning the 2012-2013 school year, the parametric dependent samples *t*-test procedure yielded a statistically significant difference between Hispanic and White students in their mathematics college readiness, $t(988) = -22.84, p < .001$, Cohen's $d = 0.77$. The effect size for this difference was moderate (Cohen, 1988). A statistically significantly higher percentage of White students, 74.64%, were college ready in mathematics than were Hispanic students, 62.16%. Table 3.2 contains the descriptive statistics for this analysis.

 Insert Table 3.2 about here

Regarding the 2013-2014 school year, a statistically significant difference, $t(1424) = -3.13, p < .001$, Cohen's $d = 0.69$, was revealed in mathematics college readiness between Hispanic and White students. The effect size for this difference was moderate (Cohen, 1988). A statistically significantly higher percentage, 77.92%, of

White students were college ready in mathematics than were Hispanic students, 67.39%. Readers are directed to Table 3.2 for the descriptive statistics for this analysis.

With respect to the 2014-2015 school year, a statistically significant difference, $t(1029) = -22.65, p < .001$, Cohen's $d = 0.69$, was yielded in mathematics college readiness between Hispanic and White students. The effect size for this difference was moderate (Cohen, 1988). Congruent with the previous two school years, a statistically significantly higher percentage, 78.12%, of White students were college ready in mathematics than were Hispanic students, 67.63%. Descriptive statistics for this analysis are contained in Table 3.2.

Concerning the 2015-2016 school year, a statistically significant difference, $t(892) = -30.87, p < .001$, Cohen's $d = 0.93$, was again present in mathematics college readiness between Hispanic and White students. The effect size for this difference was large (Cohen, 1988). A statistically significantly higher percentage, 46.65%, of White students were college ready in mathematics than were Hispanic students, 30.16%. Delineated in Table 3.2 are the descriptive statistics for this analysis.

For the 2016-2017 school year, the parametric dependent samples t -test procedure yielded a statistically significant difference, $t(891) = -30.90, p < .001$, Cohen's $d = 0.93$, in mathematics college readiness between Hispanic and White students. The effect size for this difference was large (Cohen, 1988). Similar to the previous four school years, a statistically significantly higher percentage, 44.03%, of White students were college ready in mathematics than were Hispanic students, 26.77%. Readers are referred to Table 3.2 for the descriptive statistics for this analysis.

Results for Research Question 3 Across All Five School Years

With respect to the 2012-2013 school year, the parametric dependent samples t -test yielded a statistically significant difference, $t(977) = -24.10, p < .001$, Cohen's $d = 0.80$, in college readiness in both subjects between Hispanic and White students. The effect size for this difference was large (Cohen, 1988). A statistically significantly higher percentage, 62.35%, of White students were college ready in both subjects than were Hispanic students, 48.91%. Revealed in Table 3.3 are the descriptive statistics for this analysis.

 Insert Table 3.3 about here

Concerning the 2013-2014 school year, a statistically significant difference, $t(1037) = -27.19, p < .001$, Cohen's $d = 0.79$, was yielded in college readiness in both subjects between Hispanic and White students. The effect size for this difference was moderate (Cohen, 1988). A statistically significant higher percentage, 61.96%, of White students were college ready in both subjects than were Hispanic students, 48.08%. Descriptive statistics for this analysis are contained in Table 3.3.

Regarding the 2014-2015 school year, a statistically significant difference, $t(1026) = -27.13, p < .001$, Cohen's $d = 0.80$, was again yielded in college readiness in both subjects between Hispanic and White students. The effect size for this difference was large (Cohen, 1988). Again, a statistically significantly higher percentage, 63.30%, of White students were college ready in both subjects than were Hispanic students, 48.29%. Delineated in Table 3.3 are the descriptive statistics for this analysis.

For the 2015-2016 school year, a statistically significant difference, $t(889) = -33.72, p < .001$, Cohen's $d = 0.99$, was revealed in college readiness in both subjects between Hispanic and White students. The effect size for this difference was large (Cohen, 1988). Similar to the previous three school years, a statistically significantly higher percentage, 44.00%, of White students were college ready in both subjects than were Hispanic students, 26.77%. Contained in Table 3.3 for the descriptive statistics for this analysis.

With respect to the 2016-2017 school year, a statistically significant difference, $t(888) = -33.77, p < .001$, Cohen's $d = 0.99$, was yielded in college readiness in both subjects between Hispanic and White students. The effect size for this difference was large (Cohen, 1988). Congruent with the previous four school years, the percentage of White students who were college ready in both subjects, 44.03%, was statistically significantly higher than the percentage of Hispanic students who were college ready in both subjects, 26.77%. Descriptive statistics for this analysis are presented in Table 3.3.

Research Question for Trends Across All School Years

The final research questions regarding whether trends were present in the college readiness in reading, in mathematics, and in both subjects of Hispanic and White students for all five school years will now be addressed. Trends were present in college readiness rates in reading in mathematics and in both subjects between Hispanic and White students. Statistically significant results were present in each school year of the study. In each school year of the study, White students were statistically significantly more college ready in reading, in mathematics, and in both subjects than were Hispanic students. In each year of the study in college readiness in reading, in mathematics, and in both

subjects, a consistent gap in achievement was evident between Hispanic and White students.

The gap in college readiness in reading between Hispanic and White students increased by approximately 4.00 percentage points from the first school year of the study to the last school year of the study. In the 2012-2013 school year of the study the gap in college readiness in reading was 12.49%. In the 2016-2017 school year of the study, the gap in college readiness in reading was 16.72%. In the 2013-2014 and in the 2014-2015 school years, the gap was consistent (i.e., 11.03% and 11.08%). Also, in the last two school years of the study (i.e., 2015-2016 and 2016-2017), the gap in college readiness in reading was consistent (i.e., 16.66% and 16.72%). Figure 3.1 is a graphical representation of this trend.

Insert Figure 3.1 about here

Concerning mathematics, the gap in college readiness remained consistent in the first three school years of the study (i.e., 12.48% in 2012-2013, 10.53% in 2013-2014, and 10.49% in 2014-2015). However, in the 2015-2016 school year, the gap increased by approximately 6.00 percentage points. In the last two school years of the study, the gap remained consistent (16.49% in 2015-2016 and 16.51% in 2016-2017). Overall, the gap in college readiness in mathematics increased by approximately 4.00 percentage points from the first school year of the study (i.e., 2012-2013) to the last school year of the study (i.e., 2016-2017). This trend is represented in Figure 3.2.

Insert Figure 3.2 about here

In college readiness in both subjects, the gap between Hispanic and White increased from 0.30 percentage points in the 2012-2013 school year to 13.88 percentage points in the 2013-2014 school year. In the 2013-2014 and in the 2014-2015 school years, the gap remained consistent (i.e., 13.88% and 13.93%). In the 2015-2016 school year, the gap increased from approximately 3.00 percentage points to 17.24 percentage points. In the last two school years of the study, the gap in college readiness in both subjects remained relatively consistent (i.e., 17.24% and 17.26%). Overall, the gap in college readiness in both subjects between Hispanic and White students increased by 16.96 percentage points from the first school year of the study (i.e., 2012-2013) to the last school year of the study (i.e., 2016-2017). Figure 3.3 is a graphical representation of this trend.

Insert Figure 3.3 about here

Scheduled for the STAAR performance standards were yearly, incremental increases (Texas Education Agency, 2017c). From the 2014-2015 school year to the 2015-2016 school year, the standard to meet grade level performance increased. To meet satisfactory performance in reading and in mathematics in the 2012-2013 through the 2014-2015 school years, the scale score was 3750 and 3500, respectively (Texas Education Agency, 2017c). In the 2015-2016 school year, a scale score of 4000 was required in reading and in mathematics to meet grade level performance (Texas

Education Agency, 2017c). If students must perform better to pass the STAAR and less students meet the passing standard, then less students will inevitably meet the college readiness standard. As readers can see from Figures 3.1, 3.2, and 3.3, college readiness in reading, in mathematics, and in both subjects for both Hispanic and White students decreased from the 2014-2015 school year to the 2015-2016 school year.

Discussion

Presented in this investigation was the degree to which differences existed in the college readiness in reading, in mathematics, and in both subjects between Hispanic and White students in Texas public schools. To determine whether college readiness differed between Hispanic and White students, five school years of archival college readiness data in reading, in mathematics, and in both subjects were obtained from the Texas Academic Performance Reports.

For the five school years of data that were analyzed, statistically significant differences were present in all five school years. White students, compared to Hispanic students, were more college ready in reading, in mathematics, and in both subjects in each school year of the study. Based upon the results of this investigation, a smaller percentage of Hispanic students were college ready in reading, in mathematics, and in both subjects than were White students. Table 3.4 contains a summary of the results for the effect sizes for the college readiness differences in reading, in mathematics, and in both subjects between Hispanic and White students for the five school years.

Insert Table 3.4 about here

Statistically significant differences were present in college readiness in reading between Hispanic and White students in all five school years. White students were statistically significantly more college ready in reading than were Hispanic students. In the 2012-2013, 2015-2016, and 2016-2017 school years, the size of the difference was large. In the 2013-2014 and the 2014-2015 school years, the size of the difference was moderate. With an exception of one slight increase (i.e., 0.16 percentage points in the 2014-2015 school year), Hispanic students who were college ready decreased every school year: 62.05% in 2012-2013, 59.05% in 2013-2014, 59.21% in 2014-2015, 35.86% in 2015-2016, and 35.83% in 2016-2017 school year.

In all five school years of the study, White students were statistically significantly more college ready in mathematics than Hispanic students. The size of the difference was moderate in college readiness in mathematics between Hispanic and White students in the first three school years of the study (i.e., 2012-2013, 2013-2014, and 2014-2015). In the first three years of the study, more than 60.00% of Hispanic students were college ready in mathematics: 62.16% in the 2012-2013 school year; 67.39% in the 2013-2014 school year, and 67.63% in the 2014-2015 school year. The size of the difference was large in the last two school years of the study (i.e., 2015-2016 and 2016-2017). The average number of Hispanic students who were college ready in mathematics decreased: 30.16% were college ready in the 2015-2016 school year, and 30.17% were college ready in the 2016-2017 school year.

Concerning college readiness in both subjects, Hispanic students were statistically significantly less college ready than were White students in all five school years. The size of the difference was large in college readiness in both subjects between Hispanic

and White students in the 2012-2013, 2014-2015, 2015-2016, and 2016-2017 school years. Only in the 2013-2014 school year was the difference moderate. Only in the 2012-2013 school year were more than 50.00% of Hispanic students were college ready in both subjects: 62.05% in 2012-2013, 48.08% in 2013-2014, 48.29% in 2014-2015, 26.77% in 2015-2016, and 26.77% in 2016-2017.

Connections with Existing Literature

Barnes (2010) conducted research to determine the differences in college readiness between Black, Hispanic, and White public high school graduates in Texas for the 2006-2007, 2007-2008, and 2008-2009 school years. Barnes analyzed archival data from the Texas Education Agency Academic Excellence Indicator System. During the aforementioned school years, students in Texas took the Texas Assessment of Knowledge and Skill (TAKS) assessment. To evaluate college readiness, the Higher Education Readiness Standard on the TAKS Exit-level English Language Arts and Mathematics was used.

Concerning the college readiness of Hispanic and White students, in all three school years (i.e., 2006-2007, 2007-2008, and 2008-2009) of White students, compared to Hispanic students, were more college ready in reading, in mathematics, and in both subjects. Findings of the Barnes study were similar to the findings of this study, in that higher percentages of White students were college-ready in reading, in mathematics, and in both subjects than were Hispanic students.

Implication for Policy and Practice

In each year of data analyzed in this study, White students were statistically significantly more college ready in reading, in mathematics, and in both subjects than

were Hispanic students. Middle and high school professionals, based upon the data, need to evaluate the rigor in the academic curriculum (Allensworth, Gwynne, Moore, & de la Torre, 2014). Rigor, sufficient for preparing students to be college ready, was not supported in the results of this investigation. When considering college readiness, Perin (2018) suggested high schools and college align academic expectations and standards. Additionally, higher education leaders will need to determine the resources students will need to succeed in college. The achievement gap is a barrier to academic achievement and is evident before children enter school (Rojas-LeBouef & Slate, 2011). Researchers (e.g., Duncan & Murnane, 2011; Halpern-Manner, Warren, & Brand, 2009; Potter & Morris, 2017) suggested the role of the family and economic factors be considered when determining academic outcomes.

Recommendations for Future Research

Based upon the results of this statewide, multiyear investigation, several recommendations for future research can be made. First, because this study was based entirely on Texas student data, the degree to which the results delineated herein would be generalizable to students in other states is not known. As such, researchers are encouraged to replicate this investigation in other states. Second, the sole focus in this investigation was on Hispanic and White students. The college readiness, or lack thereof, of other major ethnic/racial groups of students such as Black and Asian warrants examination. Researchers are encouraged to investigate the degree to which other ethnic/racial groups of students and underrepresented groups such as English Language Learners are college ready. A third recommendation would be to address whether gender

differences are present in college readiness. To what degree are high school boys and girls similar or dissimilar in their college readiness skills?

Conclusion

In this research study, the differences in college readiness achievement in reading, in mathematics, and in both subjects between Hispanic and White students was addressed, along with the degree to which trends were present. Through analyses of Texas, statewide data in five school years (i.e., 2012-2013, 2013-2014, 2014-2015, 2015-2016, and 2016-2017), statistically significantly higher percentages of White students were college-ready in reading, mathematics, and in both subjects than were Hispanic students. Moderate to large gaps in college readiness attainment between Hispanic and White students may be interpreted to mean that policymakers and educators have yet to bridge the gap in racial/ethnicity equity in learning and educational achievement outcomes.

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Table 3.1

Descriptive Statistics for Reading College Readiness of Hispanic Students and White Students for the 2012-2013 Through the 2016-2017 School Years

School Year and Ethnicity	<i>n</i> of schools	<i>M</i>	<i>SD</i>
2012-2013			
Hispanic	997	62.05	16.06
White	997	74.54	14.01
2013-2014			
Hispanic	1,045	59.05	16.26
White	1,045	70.08	25.21
2014-2015			
Hispanic	1,034	59.21	16.08
White	1,034	70.29	15.03
2015-2016			
Hispanic	890	35.86	17.87
White	890	52.52	17.79
2016-2017			
Hispanic	889	35.83	17.85
White	889	52.55	17.76

Table 3.2

Descriptive Statistics for Mathematics College Readiness of Hispanic Students and White Students for the 2012-2013 Through the 2016-2017 School Years

School Year and Ethnicity	<i>n</i> of schools	<i>M</i>	<i>SD</i>
2012-2013			
Hispanic	989	62.16	17.06
White	989	74.64	15.17
2013-2014			
Hispanic	1,041	67.39	16.10
White	1,041	77.92	14.53
2014-2015			
Hispanic	1,030	67.63	15.82
White	1,030	78.12	14.37
2015-2016			
Hispanic	893	30.16	16.87
White	893	46.65	18.43
2016-2017			
Hispanic	892	30.17	16.88
White	892	46.68	18.42

Table 3.3

Descriptive Statistics for Both Subjects College Readiness of Hispanic Students and White Students for the 2012-2013 Through the 2016-2017 School Years

School Year and Ethnicity	<i>n</i> of schools	<i>M</i>	<i>SD</i>
2012-2013			
Hispanic	978	48.91	16.22
White	978	62.35	17.43
2013-2014			
Hispanic	1,038	48.08	17.57
White	1,038	61.96	17.78
2014-2015			
Hispanic	1,027	48.29	17.34
White	1,027	62.22	17.54
2015-2016			
Hispanic	890	26.77	16.20
White	890	44.01	18.48
2016-2017			
Hispanic	889	26.77	16.21
White	889	44.03	18.47

Table 3.4

Summary of Results for the Effect Sizes for the College-Readiness Differences Between Hispanic and White Students in Their College Readiness in Reading, Mathematics, and in Both Subjects

College Readiness and School Year	Effect Size	Lower Achieving Group
Reading		
2012-2013	Large	Hispanic
2013-2014	Moderate	Hispanic
2014-2015	Moderate	Hispanic
2015-2016	Large	Hispanic
2016-2017	Large	Hispanic
Mathematics		
2012-2013	Moderate	Hispanic
2013-2014	Moderate	Hispanic
2014-2015	Moderate	Hispanic
2015-2016	Large	Hispanic
2016-2017	Large	Hispanic
Both Subjects		
2012-2013	Large	Hispanic
2013-2014	Moderate	Hispanic
2014-2015	Large	Hispanic
2015-2016	Large	Hispanic
2016-2017	Large	Hispanic

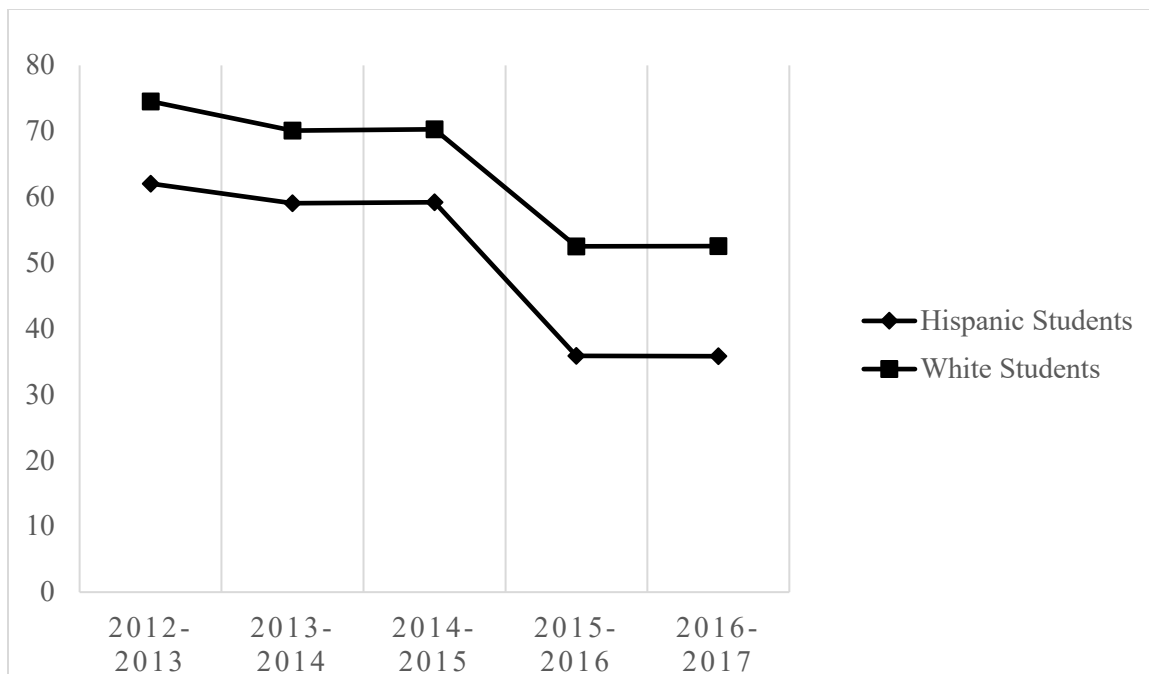


Figure 3.1. Average reading college readiness for Hispanic students and White students for the 2012-2013 through the 2016-2017 school years.

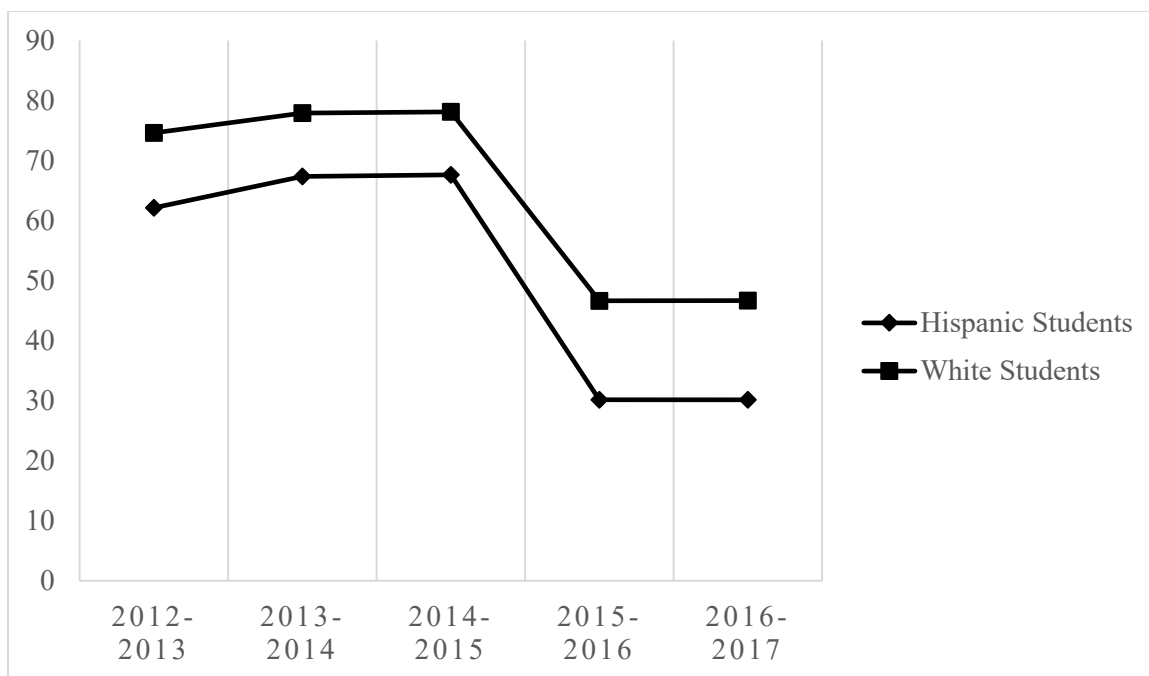


Figure 3.2. Average mathematics college readiness for Hispanic students and White students for the 2012-2013 through the 2016-2017 school years.

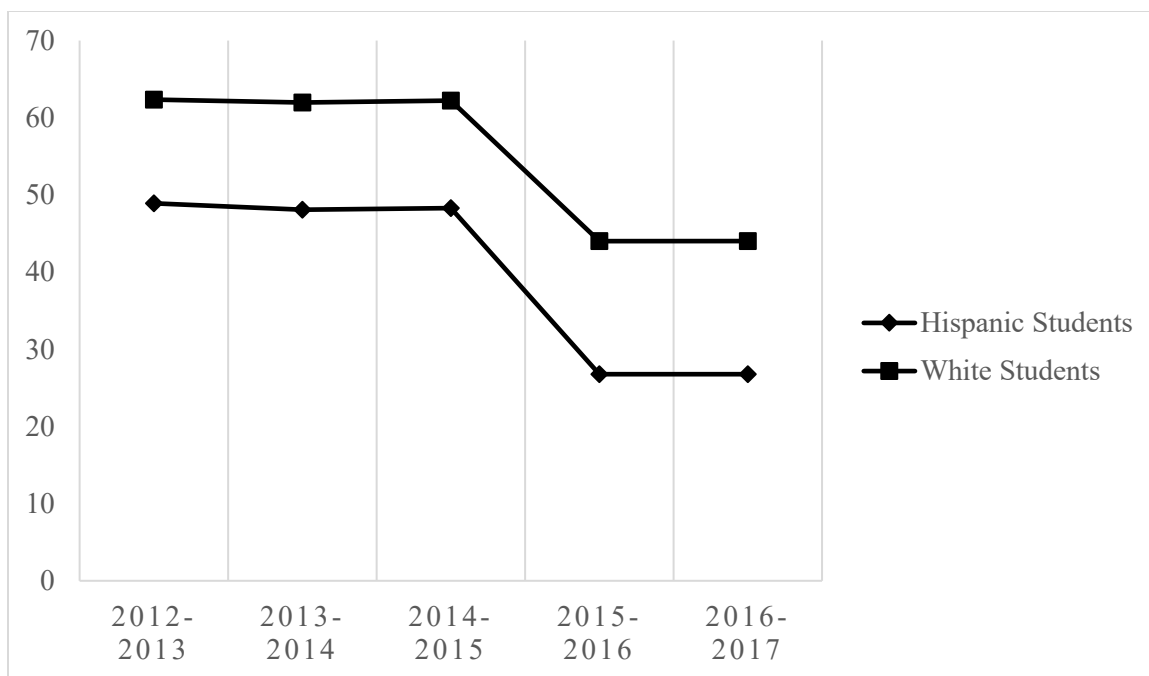


Figure 3.3. Average college readiness in both subjects for Hispanic students and White students for the 2012-2013 through the 2016-2017 school years.

CHAPTER IV**DIFFERENCES IN COLLEGE READINESS IN READING AND IN MATHEMATICS
AND IN BOTH SUBJECTS BY GENDER OF TEXAS STUDENTS: A MULTIYEAR
ANALYSIS**

This dissertation follows the style and format of *Research in the Schools (RITS)*.

Abstract

Analyzed in this investigation were the degree to which differences were present in college readiness in reading, in mathematics, and in both subjects between boys and girls. Texas, statewide data were analyzed for five school years (i.e., 2012-2013, 2013-2014, 2014-2015, 2015-2016, and 2016-2017) to determine whether trends were present in the reading, mathematics, and both subjects college readiness rates of boys and girls. In reading, in three school years (i.e., 2012-2013-2013-2014, 2014-2015), girls were more college ready than boys. In mathematics, for four school years (i.e., 2013-2014, 2014-2015, 2015-2016, and 2016-2017), boys were more college ready than girls. In both subjects, in the first three school years (i.e., 2012-2013-2013-2014, 2014-2015), girls were more college ready than boys. Implications for policy and for practice, as well as recommendations for future research, are provided.

Keywords: College Readiness, Reading, Mathematics, Gender, Boys, Girls, Texas

DIFFERENCES IN COLLEGE READINESS IN READING AND IN MATHEMATICS
AND IN BOTH SUBJECTS BY GENDER OF TEXAS: A MULTIYEAR ANALYSIS

Rigorous academic preparation will help prepare students for college (Barnes & Slate, 2013) because relationships exist between academic achievement in high school and college success (Barnes, Slate, & Rojas-LeBouef, 2010; Malin, Bragg, & Hackman, 2017). Yet, many high school graduates do not gain the skills to be prepared for college (Moore et al., 2010). Compared to females, males complete college at lower rates and earn lower grades (Conger & Long, 2010; King, 2006). The overall female advantage in college performance, persistence, and completion shows that males may not be obtaining the education they need upon high school graduation (DiPrete & Buchmann, 2006; Fortin, Oreopoulos, & Phipps, 2015; Jaeger & Page, 1996).

Gender gaps in student achievement at the secondary level have some effect on gender gaps in educational achievement outcomes in college (Marks, 2008). For many years, gender differences in test scores have been the topic of much research (Buchmann, DiPrete, & McDaniel, 2008) with researchers (e.g., Hedges & Nowell, 1995; Marks, 2008; Williams, 2011) concluding the gaps have narrowed and some investigations showing the gaps have remained the same. Essentially, at different points in the educational pipeline, academic achievement gaps have been documented between males and females (Bridgeman & Wendler, 1991; Cook, 2006; Glenn & Van Wert, 2010; Young, 2001).

For years, girls have scored higher on reading assessments than boys, and boys have scored higher on mathematics assessments than girls (Baker & Jones, 1993; Beller & Gafni, 1996; Gallagher & Kaufman, 2005; Marks, 2008; National Association of

Educational Progress, 2015; Nowell & Hedges, 1998). Reported in the National Association of Educational Progress (2015) was that 26% of Grade 12 male students and 23% of Grade 12 female students scored at or above the proficient level in mathematics. Concerning reading, 33% of Grade 12 male students and 42% of Grade 12 female students scored at or above the proficient level. Mathematics and reading skills are two of the strongest predictors of later achievement (Duncan et al., 2007; Schwieter, 2011). The lack of mathematics and reading skills are reasons for academic underpreparedness at the postsecondary level (McCormick & Lucas, 2011; Perin, 2013).

Trevino and Slate (2013), in an investigation, examined the degree to which boys and girls differed in their college-readiness skills. They specifically analyzed college-readiness rates in reading, in mathematics, and in both subjects for the 2006-2007 and 2011-2012 school years. For reading, statistically significant results were present, albeit small effect sizes. Girls were 11.97% more college-ready than boys in reading in 2006-2007. Concerning mathematics, boys were 8.16% more college-ready than girls. In both subjects combined, girls were 2.11% (i.e., a trivial effect size) more college-ready than boys. The 2011-2012 school year revealed similar results. Girls were 8.55% more college-ready than boys. Boys were 2.17% more college-ready than girls in mathematics. In both subjects combined, girls were 3.66% more college-ready than boys.

Combs et al. (2010) examined existing reading, mathematics, Scholastic Assessment Test (SAT), and the American College Test (ACT) data to determine high school boys' and girls' college-ready performance. Combs et al. determined that 51.01% of girls were college-ready in reading, and 52.57% of boys were college-ready in mathematics. Overall, after examining both subjects, Combs et al. (2010) discovered that

less than one third of the participants were college-ready graduates according to the reading and mathematics data. Also, according to the SAT and ACT data, boys achieved at higher rates; whereas, more girls took both tests. Therefore, Combs et al. suggested the achievement gap between boys and girls might be decreasing, and “it is possible that school and classroom efforts to provide equal opportunities for school-aged boys and girls have improved” (p. 454).

Conger and Long (2010) examined the gender gaps in college performance and persistence using data in Florida and Texas 4-year colleges. The researchers sought to determine whether gender gaps are increasing or decreasing during students’ years in college. Conger and Long determined that males enter college with lower high school grades and therefore, earn lower grades during their first semester in college. Females perform higher than males concerning college persistence and academic achievement. For example, 79% of female college freshman and 74% of male college freshmen persisted through the sixth semester of college.

With respect to student educational outcomes, gender and ethnicity/race often interact (Heath, 1992; Kettler & Hurst, 2017). In a study using data from the Texas Education Agency’s Academic Excellence Indicator System, Moore et al. (2010) analyzed scores for all students and each ethnic/racial subgroup in reading, mathematics, and both subjects combined to determine the college-ready graduate rates. Statistically significant differences were present in reading, mathematics, and both subjects among Hispanic, Black, and White students. Moore et al. suggested educational policies should be reexamined because only one third of the students were college ready in both subjects.

Moore et al. further noted more students had to take remedial courses because of the lack of preparedness for college.

College readiness deserves attention beyond high school academic achievement (Tierney & Sablan, 2014). Lorah and Ndum (2013) analyzed trends over time (i.e., 1998 through 2009) for students in first-year college courses. The courses include English Composition I, College Algebra, biology, and social science courses. In this investigation female students outperformed male students in each first-year college course with the largest differences in performance in English Composition I and in College Algebra. Lorah and Ndum further suggested continued efforts to close the college achievement gap.

A challenge for all students is becoming prepared academically for college coursework (Callan, Finney, Kirst, Usdan, & Venezia, 2006). However, differences in academic achievement between boys and girls persist. According to the National Center for Education Statistics, in 2015, approximately 26% of male students and 23% of female Grade 12 students scored at or above proficient in National Assessment of Educational Progress mathematics. Accordingly, on the NAEP Reading test, approximately 33% of male students and 42% of female Grade 12 students scored at or above proficient.

Under the Every Student Succeeds Act, President Obama called for all students to be ready for college and careers upon high school graduation (Darling-Hammond et al., 2016). However, a challenge for students is becoming prepared academically for college coursework (Callan, et al., 2006). Ultimately, students have to hold more than a high school diploma when they walk across the stage.

Statement of the Problem

Overall, a great deal of research on college readiness exists, but little focus has been given to the gender differences in college readiness. Lotkowski, Robbins, and Noeth (2004) contended that one of the strongest predictors of college persistence and degree attainment is prior academic achievement. Yet, nonacademic factors may influence academic performance (Hearn, 1991; Lotkowski et al., 2004; Pritchard & Wilson, 2003; Tierney & Sablan, 2014; Welton & Martinez, 2013). Furthermore, a gap continues to persist between groups of students who are more or less likely to attend college (Cates & Schaeffle, 2011; Harris, Mayes, Vega, & Hines, 2016). In 2006, Attewell, Lavin, Domina, and Levey established that approximately 40% of traditional college students took at least one remedial course to prepare for college-level coursework. Scott-Clayton, Crosta, and Belfield (2014) determined that approximately 50% of all undergraduates will take at least one remedial college course in college.

Purpose of the Study

The first purpose of this proposed study was to examine the degree to which differences were present in reading college-readiness between boys and girls. A second purpose was to determine whether differences existed in mathematics college readiness between boys and girls. A third purpose was to ascertain the degree to which differences were present in both subjects college readiness between boys and girls. Texas, statewide data were analyzed for five school years (i.e., 2012-2013, 2013-2014, 2014-2015, 2015-2016, and 2016-2017) to determine whether trends were present in the reading, mathematics, and both subjects college readiness rates of boys and girls.

Significance of the Study

Many U.S. high school graduates are not academically prepared for the rigor of postsecondary education (Conley, 2007a, 2007b; Flippo & Caverly, 2009; Hunt, Boyd, Gast, Mitchell, & Wilson, 2012; Tierney & Sablan, 2014). Yet, all students, male and female, need to be prepared for life after high school (Harris et al., 2016). Gender differences have been documented by numerous researchers. If differences are present in college readiness between boys and girls, researchers must uncover that and determine why the differences exist.

Research Questions

The following research questions were investigated in this study: (a) What is the difference in reading college readiness performance between boys and girls?; (b) What is the difference in mathematics college readiness performance between boys and girls?; (c) What is the difference in both subjects college readiness performance between boys and girls?; (d) What trend is present in the reading college readiness of boys and girls for the 2012-2013, 2013-2014, 2014-2015, 2015-2016, and 2016-2017 school years?; (e) What trend is present in the mathematics college readiness of boys and girls for the 2012-2013, 2013-2014, 2014-2015, 2015-2016, and 2016-2017 school years?; and (f) What trend is present in the both subjects college readiness of boys and girls for the 2012-2013, 2013-2014, 2014-2015, 2015-2016, and 2016-2017 school years. The first three research questions were repeated for the five school years; whereas, the last three research questions involved a comparison of results across the five school years. As a result, 18 research questions were addressed in this study.

Method

Research Design

In this study, based on the nature of the data that were obtained, a causal comparative research design (Johnson & Christensen, 2012) was used. Because the independent and dependent variables had already occurred, the independent variable could not be manipulated, and the extraneous variables were not controlled. The independent variable was gender and the dependent variable was the college readiness status of boys and girls in reading, in mathematics, and in both subjects.

Participants and Instrumentation

High school State of Texas Assessments of Academic Readiness (STAAR) End of Course (EOC) data were obtained from the Texas Education Agency Texas Academic Performance Report database in an Excel format. To conduct statistical analyses, the data were converted and recoded into a Statistical Package for the Social Sciences (SPSS) data file. Included in this study were Texas public school students who took the STAAR EOC in English II and Algebra I from the 2012-2013 through the 2016-2017 school years. All test questions on the STAAR EOC in English II and Algebra I count when determining whether students are college ready (Texas Education Agency, 2017a). College ready students meet the Final Level II Satisfactory Academic Performance on STAAR EOC and meet the grade level passing standards (Texas Education Agency, 2017a).

Results

Prior to conducting inferential statistics to determine whether differences were present in college readiness in reading, in mathematics, and in both subjects between

boys and girls, checks were conducted to determine the extent to which these data were normally distributed (Onwuegbuzie & Daniel, 2002). Although some of the values were indicative of non-normally distributed data, a decision was made to use parametric dependent samples *t*-tests to answer the research questions. Statistical results will now be presented by school year, in order of the research questions previously delineated.

Results for Research Question 1 Across All Five School Years

For the 2012-2013 school year, the parametric dependent samples *t*-test revealed a statistically significant difference, $t(1462) = -27.33, p < .001$, Cohen's $d = 0.64$, in reading college readiness between boys and girls. The effect size for this difference was moderate (Cohen, 1988). A statistically significantly higher percentage of girls, 70.54%, were college ready in reading than were boys, 59.77%. Readers are directed to Table 4.1 for the descriptive statistics for this analysis.

 Insert Table 4.1 about here

Concerning the 2013-2014 school year, the parametric dependent samples *t*-test yielded a statistically significant difference, $t(1462) = -28.09, p < .001$, Cohen's $d = 0.60$, in reading college readiness between boys and girls. The effect size for this difference was moderate (Cohen, 1988). A statistically significantly higher percentage, 70.55%, of girls were college ready in reading than were boys, 60.41%. Descriptive statistics for this analysis are contained in Table 4.1.

With respect to the 2014-2015 school year, a statistically significant difference, $t(1495) = -29.31, p < .001$, Cohen's $d = 0.62$, was revealed in reading college readiness

between boys and girls. The effect size for this difference was moderate (Cohen, 1988). Again, a statistically significantly higher percentage, 66.64%, of girls were college ready in reading than were boys, 55.75%. Delineated in Table 4.1 are the descriptive statistics for this analysis.

Regarding the 2015-2016 school year, a statistically significant difference, $t(1360) = 12.74, p < .001$, Cohen's $d = 0.24$, was again yielded in reading college readiness between boys and girls. The effect size for this difference was small (Cohen, 1988). A statistically significantly higher percentage, 40.68%, of boys were college ready in reading than were girls, 35.92%. Table 4.1 contains the descriptive statistics for this analysis.

For the 2016-2017 school year, the parametric dependent samples t -test revealed a statistically significant difference, $t(1358) = 12.73, p < .001$, Cohen's $d = 0.24$, in reading college readiness between boys and girls. The effect size for this difference was small (Cohen, 1988). A statistically significantly higher percentage, 40.71%, of boys were college ready in reading than were girls, 35.95%. Revealed in Table 4.1 are the descriptive statistics for this school year.

Results for Research Question 2 Across All Five School Years

Concerning the 2012-2013 school year, the parametric dependent samples t -test procedure did not yield a difference between boys and girls in their mathematics college readiness, $t(1456) = -0.87, p = .387$. The percentage of boys and girls who were college-ready in mathematics was similar. Table 4.2 contains the descriptive statistics for this analysis.

Insert Table 4.2 about here

Regarding the 2013-2014 school year, a statistically significant difference, $t(1457) = 4.61, p < .001$, Cohen's $d = 0.09$, was revealed in mathematics college readiness between boys and girls. The effect size for this difference was trivial (Cohen, 1988). A statistically significantly higher percentage, 66.78%, of boys were college ready in mathematics than were girls, 65.19%. Delineated in Table 4.2 are the descriptive statistics for this analysis.

With respect to the 2014-2015 school year, a statistically significant difference, $t(1489) = 6.97, p < .001$, Cohen's $d = 0.14$, was yielded in mathematics college readiness between boys and girls. The effect size for this difference was trivial (Cohen, 1988). Congruent with the previous school year, a statistically significantly higher percentage, 71.30%, of boys were college ready in mathematics than were girls, 68.95%. Descriptive statistics for this analysis are contained in Table 4.2.

Concerning the 2015-2016 school year, a statistically significant difference, $t(1360) = 11.53, p < .001$, Cohen's $d = 0.22$, was again present in mathematics college readiness between boys and girls. The effect size for this difference was small (Cohen, 1988). A statistically significantly higher percentage, 35.33%, of boys were college ready in mathematics than were girls, 31.15%. Readers are referred to Table 4.2 for the descriptive statistics for this analysis.

For the 2016-2017 school year, the parametric dependent samples t -test procedure yielded a statistically significant difference, $t(1358) = -11.50, p < .001$, Cohen's $d = 0.21$,

in mathematics college readiness between boys and girls. The effect size for this difference was small (Cohen, 1988). Similar to the previous three school years, a statistically significantly higher percentage, 35.35%, of boys were college ready in mathematics than were girls, 31.19%. Table 4.2 contains the descriptive statistics for this analysis.

Results for Research Question 3 Across All Five School Years

With respect to the 2012-2013 school year, the parametric dependent samples t -test revealed a statistically significant difference, $t(1428) = -10.83, p < .001$, Cohen's $d = 0.23$, in college readiness in both subjects between boys and girls. The effect size for this difference was small (Cohen, 1988). A statistically significant higher percentage, 54.36%, of girls were college ready in both subjects than were boys, 50.21%. Revealed in Table 4.3 are the descriptive statistics for this analysis.

 Insert Table 4.3 about here

Concerning the 2013-2014 school year, a statistically significant difference, $t(1452) = -12.84, p < .001$, Cohen's $d = 0.24$, was yielded in college readiness in both subjects between boys and girls. The effect size for this difference was small (Cohen, 1988). A statistically significantly higher percentage, 54.57%, of girls were college ready in both subjects than were boys, 49.92%. Descriptive statistics for this analysis are contained in Table 4.3.

Regarding the 2014-2015 school year, a statistically significant difference, $t(1486) = -16.99, p < .001$, Cohen's $d = 0.33$, was again yielded in college readiness in both subjects between boys and girls. The effect size for this difference was small

(Cohen, 1988). Again, a statistically significantly higher percentage, 54.68%, of girls were college ready in both subjects than were boys, 48.46%. Delineated in Table 4.3 are the descriptive statistics for this analysis.

For the 2015-2016 school year, a statistically significant difference, $t(1359) = -12.32$, $p < .001$, Cohen's $d = 0.23$, was revealed in college readiness in both subjects between boys and girls. The effect size for this difference was small (Cohen, 1988). A statistically significantly higher percentage, 32.35%, of boys were college ready in both subjects than were girls, 28.06%. Contained in Table 4.3 are the descriptive statistics for this analysis.

With respect to the 2016-2017 school year, a statistically significant difference, $t(1357) = 12.29$, $p < .001$, Cohen's $d = 0.23$, was yielded in college readiness in both subjects between boys and girls. The effect size for this difference was small (Cohen, 1988). Congruent with the previous school year, the percentage of boys who were college ready in both subjects, 32.37%, was higher than the percentage of girls who were college ready in both subjects, 28.09%. Descriptive statistics for this analysis are presented in Table 4.3.

Research Question for Trends Across All School Years

The final research questions regarding college readiness in reading, in mathematics, and in both subjects between boys and girls across all five school years (i.e., 2012-2013, 2013-2014, 2014-2015, 2015-2016, and 2016-2017) of data will now be addressed. Trends were present in college readiness rates in reading in mathematics and in both subjects between boys and girl. Statistically significant results were present in each school year of the study.

The gap in college readiness in reading between boys and girls remained relatively consistent (i.e., moderate) in the first three school years of the study with a difference in achievement of 10.77 percentage points in 2012-2013, 10.14 percentage points in 2013-2014, and 10.89 percentage points in 2014-2015. In the first three school years of the study, girls were more college ready in reading than boys. In the 2015-2016 school year, the gap decreased by approximately 6.00 percentage points (i.e., 10.89% to 4.75%). In the last two school years of the study, the gap (i.e., small) remained relatively the same with a difference of 4.75 percentage points in the 2015-2016 school year and 4.76 percentage points in 2016-2017 school year. In the last two school years of the study, boys were more college ready in reading than girls. Figure 4.1 is a graphical representation of this trend.

Insert Figure 4.1 about here

In mathematics, for the last four years of the study (i.e., 2013-2014, 2014-2015, 2015-2016, and the 2016-2017) boys were statistically significantly more college ready than were girls. In the four school years, boys were more college ready in mathematics than girls. The gaps in mathematics college readiness were below small and small. In the 2013-2014 and the 2014-2015 school years, the size of the difference was below small, and in the 2015-2016 and 2016-2017 school years, the gap in mathematics college readiness achievement was small. The gap in college readiness in mathematics increased in the first four years of the study (i.e., 0.39 percentage points in 2012-2013, 1.59 percentage points in 2013-2014, 2.35 percentage points in 2014-2015, and 4.18

percentage points in 2015-2016). However, in the last two years of the study, the gap remained relatively the same. In Figure 4.2 a graphical representation of this trend is provided.

Insert Figure 4.2 about here

In both subjects, girls were statistically significantly more college ready in 2012-2013, 2013-2014, 2014-2015 school years. In the last two school years of the study (i.e., 2015-2016 and 2016-2017), boys, compared to girls, were statistically significantly more college ready in both subjects. In both subjects, the gap between boys and girls remained relatively consistent (i.e., small) throughout each year of the study with differences in achievement of 4.15 percentage points in 2012-2013, 4.65 percentage points in 2013-2014, 6.22 percentage points in 2014-2015, 4.29 percentage points in 2015-2016, and 4.18 percentage points in 2016-2017. A graphical representation of this five school year trend is provided in Figure 4.3.

Insert Figure 4.3 about here

Performance standards for the STAAR have been scheduled with yearly, incremental improvements (Texas Education Agency, 2017b). In the 2012-2013 through the 2014-2015 school years, to meet satisfactory performance in reading the scale score was 3750 (Texas Education Agency, 2017b). In the same aforementioned school years, to meet satisfactory performance in mathematics, students had to score at least 3500

(Texas Education Agency, 2017b). The standard to meet grade level performance increased in the 2015-2016 school year. In the 2015-2016 school year, a scale score of 4000 was required in reading and in mathematics to meet grade level performance (Texas Education Agency, 2017b). Students had to perform better to pass the STAAR. If less students meet the passing standard, then less students will inevitably meet the college readiness standard. As readers can see from Figures 3.1, 3.2, and 3.3, college readiness in reading, in mathematics, and in both subjects for both boys and girls decreased from the 2014-2015 school year to the 2015-2016 school year.

Discussion

Presented in this investigation was the degree to which differences existed in the college readiness in reading, in mathematics, and in both subjects between boys and girls in Texas public schools. Five years of archival data from the Texas Academic Performance Reports were obtained and analyzed to determine whether college readiness differed by gender. In this study, college readiness data in reading, in mathematics, and in both subjects were analyzed for five school years. Statistically significant differences were present in all five school years. Table 4.4 contains a summary of the results of the effect sizes for the differences in college readiness in reading, in mathematics, and in both subjects between boys and girls for five school years.

Insert Table 4.4 about here

Historically, girls perform better in reading than do boys (Marks, 2008; National Association of Educational Progress, 2015; Nowell & Hedges, 1998). In the first three

school years (i.e., 2012-2013-2013-2014, 2014-2015) of this study, girls were statistically significantly more college ready in reading. Results for boys who were college ready in reading were as follows: 59.77% in 2012-2013 school year, 60.41% in the 2013-2014 school year, and 55.75% in the 2014-2015 school year. The size of the difference in each of the school years was moderate. However, in the last two school years of this study (i.e., 2015-2016 and 2016-2017), boys were statistically significantly more college ready in reading than girls. The size of the difference the last two years of the study was small. Results for girls who were college ready in reading were as follows: 35.92% in the 2015-2016 school year and 35.95% in the 2016-2017 school year.

Regarding mathematics, researchers (Baker & Jones, 1993; Beller & Gafni, 1996; Gallagher & Kaufman, 2005; National Association of Educational Progress, 2015) have revealed that boys perform better in mathematics than girls. In mathematics in the last four school years of the study (i.e., 2013-2014, 2014-2015, 2015-2016, and 2016-2017) boys were more college ready. However, it is important to note that the sizes of the differences in college readiness in mathematics between boys and girls were trivial and small during those four school years. The percentage of girls who were college ready was 65.19% in the 2013-2014 school year, 68.95% in the 2014-2015 school year, 31.15% in the 2015-2016 school year, and 31.19% in the 2016-2017 school year.

Concerning college-readiness in both subjects, girls were statistically significantly more college ready in the 2012-2013, 2013-2014, and the 2014-2015 school years than were boys. The size of the difference in college readiness in both subjects between boys and girls was small. In the 2012-2013 school year, 50.21% of boys were college ready in both subjects, 49.92% of boys were college ready in 2013-2014, and 48.46% of boys

were college ready in 2014-2015. In the 2015-2016 and the 2016-2017 school years, boys were more college ready in both subjects. Only 28.06% of girls were college ready in both subjects in the 2015-2016 school year, and 28.09% of girls were college ready in both subjects in the 2016-2017 school year.

Connections with Existing Literature

In the first three school years of the study (i.e., 2012-2013, 2013-2014, and 2014-2015), girls were more college ready in reading and in both subjects than were boys. Four of the five school years (2013-2014, 2014-2015, 2015-2016, and 2016-2017), boys were more college ready in mathematics than girls. In the last two school years of the study, boys were more college ready in reading, in mathematics, and in both subjects than girls. In 2010, Combs et al. examined college readiness for students in Texas and determined that 51.01% of girls were college-ready in reading, and 52.57% of boys were college-ready in math. A few years later, Trevino and Slate (2013) examined the differences in college-readiness skills between boys and girls and established that girls were 11.97% more college ready in reading than boys, and boys were 8.16% more college ready in mathematics than girls.

Implications for Policy and Practice

In this analysis, college readiness in reading, in mathematics, and in both subjects by gender was analyzed. In the 2012-2013, 2013-2014, and 2014-2015 school years, girls were more college ready in reading and in both subjects. Boys were more college ready in mathematics in the 2013-2014, 2014-2015, 2015-2016, and 2016-2017 school years. In the 2015-2016 and 2016-2017 school years of the study, boys were more college ready in reading, in mathematics, and in both subjects.

Literacy skills and mathematics skills are the fundamental for academic learning (Perin, 2018). For boys to develop as critical readers, it is important for boys to be engaged in discussions about reading selections and discerning about the implications of the choices they make concerning reading (Hall & Coles, 1997). Furthermore, for the reading achievement of boys to improve, instruction should be focused on reading motivation and language skills (Schwabe, McElvany, & Trendtel, 2015). For students, particularly girls, to be more mathematics literate and ready for high school mathematics, educators and policymakers need to emphasize and develop rigorous elementary and middle school academic math curriculum (Atuahene & Russell, 2016). Overall, based upon the data, educators and policymakers need to examine the type of English and mathematics courses that student take in middle school and in high school. Additionally, higher education leaders will need to determine the resources students will need to succeed in college.

Recommendations for Future Research

In this Texas statewide multiyear investigation, several recommendations for future research can be made. This study was limited Texas public school students. A recommendation for future research is to extend this study to other states. Additionally, researchers are encouraged to replicate this study for students enrolled in charter schools. College readiness for ethnicity/race and gender combined was not analyzed. Researchers are encouraged to investigate college readiness by ethnicity/race (e.g., Black, White, Hispanic, and Asian) and by ethnicity/race and gender combined. To determine whether students are prepared for college-level coursework, it is important to continue to study college readiness.

Conclusion

The purpose of this research study was to examine whether gender differences were present in college readiness in reading, in mathematics, and in both subjects in Texas. Statewide data were analyzed for five school years (i.e., 2012-2013, 2013-2014, 2014-2015, 2015-2016, and 2016-2017) to determine the trends present in college readiness in reading, mathematics, and both subjects for boys and girls. Inferential statistical procedures revealed the presence of statistically significant differences in college readiness in reading, in mathematics, and in both subjects between boys and girls. In the first three school years (i.e., 2012-2013-2013-2014, 2014-2015) of this study, girls were statistically significantly more college ready in reading. However, in the last two school years of this study (i.e., 2015-2016 and 2016-2017), boys were statistically significantly more college ready in reading than girls. In mathematics, in the last four school years of the study (i.e., 2013-2014, 2014-2015, 2015-2016, and 2016-2017), boys were more college ready than were girls. Concerning both subjects, girls were statistically significantly more college ready in the 2012-2013, 2013-2014, and the 2014-2015 school years. Only in reading in the first three school years of the study (i.e., 2012-2013, 2013-2014, and 2014-2015) were there moderate gaps in college readiness between boys and girls. In every other instance, small and below small gaps in college readiness in reading, in mathematics, and in both subjects were attained.

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Table 4.1

Descriptive Statistics for Reading College Readiness of Boys and Girls for the 2012-2013 Through the 2016-2017 School Years

School Year and Gender	<i>n</i> of schools	<i>M</i>	<i>SD</i>
2012-2013			
Boys	1,463	59.77	17.48
Girls	1,463	70.54	16.25
2013-2014			
Boys	1,463	60.41	17.63
Girls	1,463	70.55	16.32
2014-2015			
Boys	1,496	55.75	17.82
Girls	1,496	66.64	17.39
2015-2016			
Boys	1,361	40.67	20.75
Girls	1,361	35.92	18.78
2016-2017			
Boys	1,359	40.71	20.75
Girls	1,359	35.95	18.77

Table 4.2

Descriptive Statistics for Mathematics College Readiness of Boys and Girls for the 2012-2013 Through the 2016-2017 School Years

School Year and Gender	<i>n</i> of schools	<i>M</i>	<i>SD</i>
2012-2013			
Boys	1,457	64.92	18.34
Girls	1,457	65.31	17.56
2013-2014			
Boys	1,458	66.78	17.39
Girls	1,458	65.19	17.86
2014-2015			
Boys	1,490	71.30	16.52
Girls	1,490	68.95	16.84
2015-2016			
Boys	1,361	35.33	20.07
Girls	1,361	31.15	18.70
2016-2017			
Boys	1,359	35.35	20.07
Girls	1,359	31.19	18.69

Table 4.3

Descriptive Statistics for Both Subjects College Readiness of Boys and Girls for the 2012-2013 Through the 2016-2017 School Years

School Year and Gender	<i>n</i> of schools	<i>M</i>	<i>SD</i>
2012-2013			
Boys	1,429	50.21	18.08
Girls	1,439	54.36	18.57
2013-2014			
Boys	1,453	49.92	19.19
Girls	1,453	54.57	19.28
2014-2015			
Boys	1,487	48.46	19.17
Girls	1,487	54.68	18.94
2015-2016			
Boys	1,360	32.35	19.65
Girls	1,360	28.06	18.20
2016-2017			
Boys	1,358	32.37	19.65
Girls	1,358	28.09	18.19

Table 4.4

Summary of Results for the Effect Sizes for the College-Readiness Differences Between Boys and Girls in Their College Readiness in Reading, Mathematics, and in Both Subjects

College Readiness and School Year	Effect Size	Lower Achieving Group
Reading		
2012-2013	Moderate	Boys
2013-2014	Moderate	Boys
2014-2015	Moderate	Boys
2015-2016	Small	Girls
2016-2017	Small	Girls
Mathematics		
2012-2013	None	Boys
2013-2014	Trivial	Girls
2014-2015	Trivial	Girls
2015-2016	Small	Girls
2016-2017	Small	Girls
Both Subjects		
2012-2013	Small	Boys
2013-2014	Small	Boys
2014-2015	Small	Boys
2015-2016	Small	Girls
2016-2017	Small	Girls

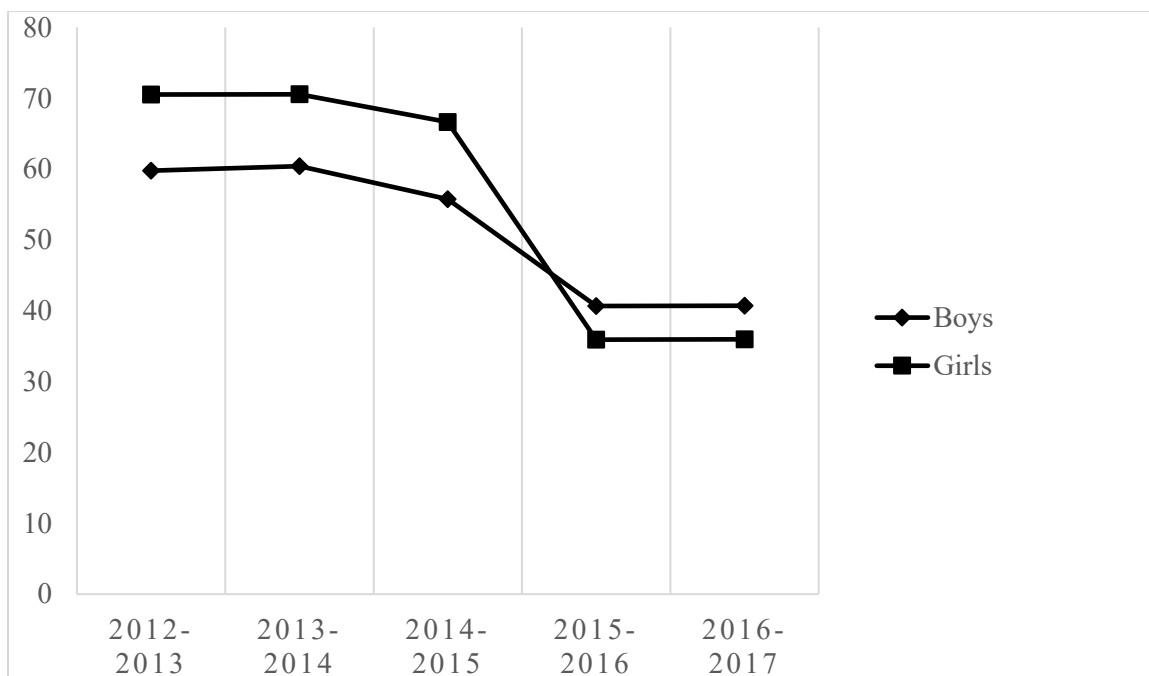


Figure 4.1. Average reading college readiness for boys and girls for the 2012-2013 through the 2016-2017 school years.

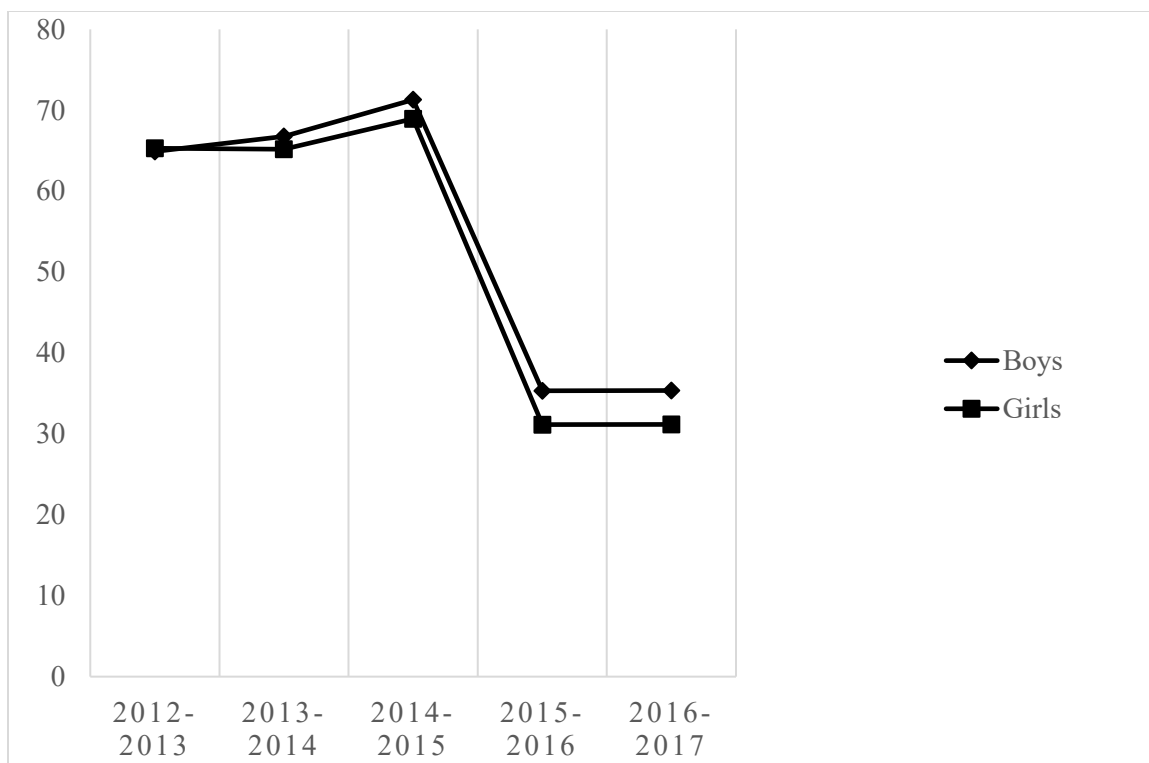


Figure 4.2. Average mathematics college readiness for boys and girls for the 2012-2013 through the 2016-2017 school years.

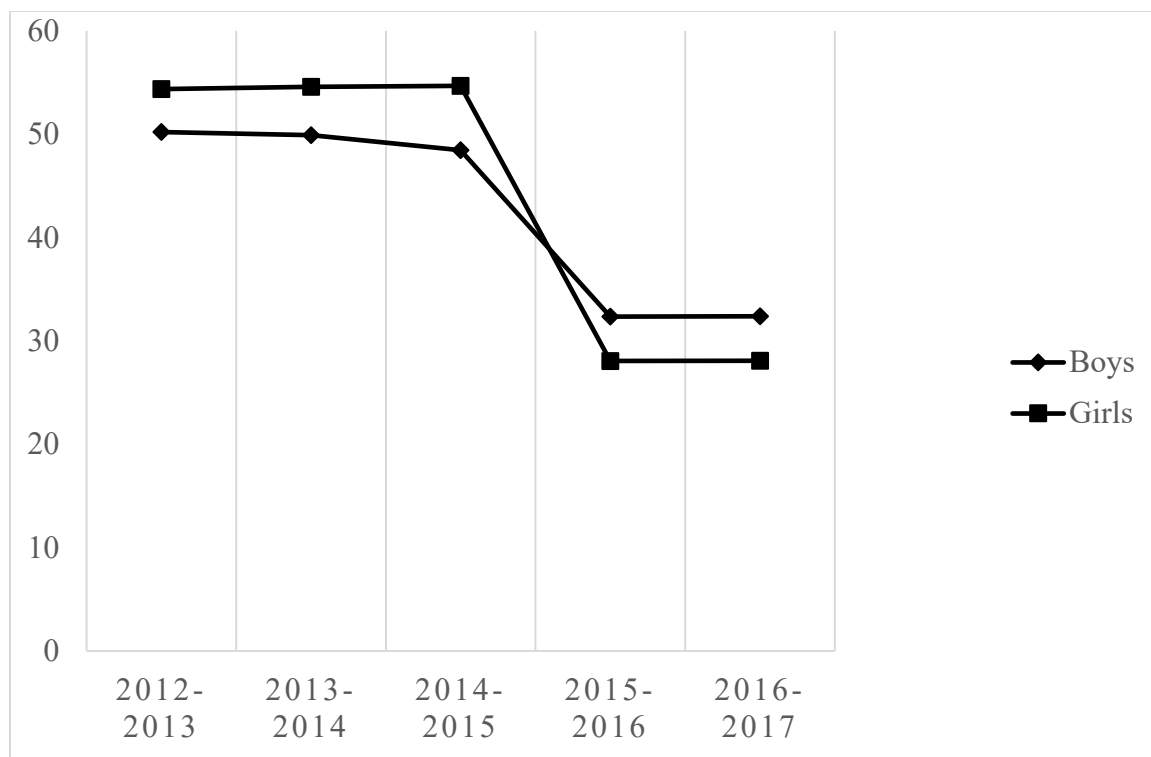


Figure 4.3. Average college readiness in both subjects for boys and girls for the 2012-2013 through the 2016-2017 school years.

CHAPTER V

DISCUSSION

The purpose of this journal-ready dissertation was to examine the differences present in college readiness in reading, mathematics, and in both subjects for Texas high school students by their demographic characteristics. In the first investigation, the extent to which ethnic/racial (i.e., Black and White) differences were present in college readiness in reading, in mathematics, and in both subjects was determined. Concerning the second investigation, differences in college readiness in reading, in mathematics, and in both subjects between Hispanic and White students was addressed. Regarding the third investigation, the differences present in college readiness in reading, in mathematics, and in both subjects by gender was ascertained. In each of these three investigations, data for five school years (i.e., 2012-2013, 2013-2014, 2013-2015, 2015-2016, and 2016-2017) were analyzed.

Study One Results

In this investigation, the differences in the college readiness in reading, in mathematics, and in both subjects between Black and White students in Texas public schools was examined. Five school years of archival data from the Texas Academic Performance Reports were obtained and analyzed to determine whether college readiness differed by race/ethnicity. In this study, college readiness data in reading, in mathematics, and in both subjects were analyzed for the 2012-2013, 2013-2014, 2014-2015, 2015-2016, and 2016-2017 school years. Statistically significant differences were present in all five school years. In all school years of the study, White students were statistically significantly more college ready in reading, in mathematics, and in both subjects than Black students.

Study Two Results

Presented in this investigation was the degree to which differences existed in the college readiness in reading, in mathematics, and in both subjects between Hispanic and White students in Texas public schools. Five years of archival data from the Texas Academic Performance Reports were obtained and analyzed to determine whether college readiness differed by race/ethnicity. In this study, college readiness data in reading, in mathematics, and in both subjects were analyzed for the 2012-2013, 2013-2014, 2014-2015, 2015-2016, and 2016-2017 school years. For the five school years of data that were analyzed, statistically significant differences were present in all five school years. In all school years of the study, statistically significantly higher percentages of White students were college ready in reading, in mathematics, and in both subjects than were Hispanic students

Study Three Results

Presented in this investigation was the degree to which differences existed in the college readiness in reading, in mathematics, and in both subjects between boy and girl students in Texas public schools. Five years of archival data from the Texas Academic Performance Reports were obtained and analyzed to determine whether college readiness differed by gender. In this study, college readiness data in reading, in mathematics, and in both subjects were analyzed for the 2012-2013, 2013-2014, 2014-2015, 2015-2016, and 2016-2017 school years.

For the five school years of data that were analyzed, statistically significant differences were present in the 2012-2013, 2013-2014, 2014-2015, 2015-2016, and 2016-2017 school years. Historically, girls perform better in reading than do boys. However, in three years of this study, boys were more college ready in reading than girls. In

reading, boys were statistically significantly more college ready in the 2012-2013, 2015-2016, and the 2016-2017 school years than girls. Regarding mathematics, researchers have revealed that boys perform better in mathematics than girls. In mathematics, boys were statistically significantly more college ready in the 2012-2013, 2014-2015, 2015-2016, and the 2016-2017 school years than girls. Concerning both subjects, boys were statistically significantly more college ready in the 2013-2014, 2015-2016, and the 2016-2017 school years than girls.

Implications for Policy and for Practice

A concern for many policymakers, practitioners, and researchers is college readiness (Tierney & Sablan, 2014). Examining college readiness by ethnicity/race and gender helps to add more information to the growing body of research concerning college readiness (e.g., Barnes, 2009; Barnes & Slate, 2013; Barnes & Slate, 2014; Combs et al., 2010; D'Agostino & Bonner, 2009; Moore et al., 2010). Finally, Dunbar and Welch (2018) suggested a need for determining the validity of college readiness interpretations through empirical analyses. Because the Texas state assessment is administered to all Texas high school students, educators can use the results to monitor the college readiness of students statewide and inform the college aspirations of high school students (Fina et al., 2018). Additionally, educators, counselors, practitioners, and higher education professionals can utilize the results of this study to inform student course placement.

Recommendations for Future Research

Based upon the results of this statewide, multiyear investigation, several recommendations for future research can be made. First, because this study was based entirely on Texas student data, the degree to which the results delineated herein would be generalizable to students in other states is not known. As such, researchers are

encouraged to replicate this investigation in other states. Second, the sole focus of this investigation was to investigate the difference in college readiness in reading, in mathematics, and in both subjects between Black and White students, between Hispanic and White students, and between boys and girls. The college readiness, or lack thereof, of other major ethnic/racial groups of students such as Asian warrants examination. Researchers are encouraged to investigate the degree to which other ethnic/racial groups of students and underrepresented groups such as English Language Learners are college ready. A third recommendation would be to address whether ethnicity/race and gender differences are present in college readiness. To what degree are Black, White, and Hispanic high school boys and Black, White, and Hispanic high school girls similar or dissimilar in their college readiness skills?

Conclusion

In this investigation, college readiness in reading, in mathematics, and in both subjects for Texas students were analyzed. In the first investigation, differences in college readiness in reading, in mathematics, and in both subjects between Black students and White students was examined. In the second study, the degree to which differences existed in college readiness in reading, in mathematics, and in both subjects between Hispanic students and White students was examined. In the third investigation, the differences present in college readiness in reading, in mathematics, and in both subjects by gender was analyzed. The final step of this journal-ready dissertation was to analyze the presence of any trends in these results across a 5-year period.

Descriptive statistical procedures revealed the presence of statistically significant differences in all school years of the study in college readiness in reading, in

mathematics, and in both subjects. In the first investigation, White students were more college ready in reading, in mathematics, and in both subjects than Black students in each school year of the study (i.e., 2012-2013, 2013-2014, 2014-2015, 2015-2016, and 2016-2017). Similar findings were present in the second investigation, for, again, White students were more college ready in reading, in mathematics, and in both subjects than Hispanic students. In the third investigation, girls were more college ready in reading in the 2012-2013-2013-2014, and 2014-2015 school years. Boys were more college ready in mathematics in the 2013-2014, 2014-2015, 2015-2016, and 2016-2017 school years. Girls were more college ready in both subjects in the 2012-2013, 2013-2014, and the 2014-2015 school years.

As students progress through school, achievement gaps occur in every grade level and in every subject area (Jencks & Phillips, 1998). To date, policy changes (i.e., the authorization and reauthorization of the Elementary and Secondary Act of 1965) and education reform efforts have yet to close the achievement gap in college readiness between Black and White students and between Hispanic and White students. However, gaps in college readiness between boys and girls are decreasing. For all students to achieve academically and be prepared for college, policymakers and educators have to bridge the gap in racial/ethnic and gender equity in learning and educational achievement outcomes.

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APPENDIX



Sam Houston
State University

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Date: Aug 13, 2018 10:09 AM CDT

TO: Jenifer Johnson

George Moore

FROM: SHSU IRB

PROJECT TITLE: DIFFERENCES IN STUDENT COLLEGE READINESS IN READING, IN MATHEMATICS, AND IN BOTH SUBJECTS BY ETHNICITY/RACE AND GENDER: A TEXAS STUDY

PROTOCOL #: IRB-2018-23

SUBMISSION TYPE: Initial

ACTION: Exempt

DECISION DATE: August 13, 2018

EXEMPT REVIEW CATEGORY: Category 4. Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.

Greetings,

Thank you for your submission of Initial Review materials for this project. The Sam Houston State University (SHSU) IRB has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will retain a copy of this correspondence within our records.

What should investigators do when considering changes to an exempt study that could make it nonexempt?

It is the PI's responsibility to consult with the IRB whenever questions arise about whether planned changes to an exempt study might make that study nonexempt human subjects research.

In this case, please make available sufficient information to the IRB so it can make a correct determination.

If you have any questions, please contact the IRB Office at 936-294-4875 or irb@shsu.edu.

Please include your project title and protocol number in all correspondence with this committee.

Sincerely,

Donna Desforges

IRB Chair, PHSC

VITA

Jenifer N. Johnson

EDUCATIONAL HISTORY

Doctor of Education in Educational Leadership, December 2018

Sam Houston State University, Huntsville, TX

Dissertation: Differences in Student College Readiness in Reading, in Mathematics, and in Both Subjects by Ethnicity/Race and Gender: A Multiyear Statewide Study

Master of Education in Curriculum and Instruction (Reading), December 2008

Prairie View A&M University, Prairie View, TX

Bachelor of Science in Interdisciplinary Studies, May 2006

Prairie View A&M University, Prairie View, TX

PROFESSIONAL EXPERIENCE

Associate Director of Undergraduate Recruitment and the First Year Experience,
Baylor University School of Education, 2018-Present

Human Resources Recruiter, Spring ISD, 2016-2018

Adjunct College Professor (Developmental English), Lone Star College, 2011-2018

Campus Content Instructional Specialist (ELAR), Cypress-Fairbanks ISD, 2010-2016

Teacher (Advanced Academic Strategies), Cypress-Fairbanks ISD, 2007-2009

Teacher (Language Arts), Cypress-Fairbanks ISD, 2006-2010

PROFESSIONAL LICENSURE AND CERTIFICATIONS

English Language Arts and Reading, Grades 4-8, State of Texas

Principal, Grades EC-12, State of Texas

RECOGNITIONS

Reaching for Excellence, Spring ISD, 2017-2018

SCHOLARLY RESEARCH ACTIVITY

Johnson, J., Slate, J. R., & Moore, G. W. (2014). Teacher production at 4-year institutions: Differences over time in students taking the state teacher exam. *Journal of Education and Human Development, 3*(2), 291-300.