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Doctor of Education in Organizational Leadership

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All-Day Prekindergarten: Closing the Achievement Gap in Literacy

A dissertation submitted in partial satisfaction
of the requirements for the degree of
Doctor of Education in Organizational Leadership

by

Theodore Clevenger IV

November 2022

Dedication

This dissertation is dedicated to Stephanie Clevenger and family, Randy and Debbie Ferguson, Rickey and Pam Shelton, Theodore and Donna Clevenger III, and George and Ruth Reynolds for all the sacrifices you made for me, and for giving me never-ending love, encouragement, and support. This dissertation is also dedicated to Theodore Clevenger Jr., who was a great influence in my life at a young age, and I always wanted to do this for him as well. So, this one is for you, Grandfather. And, to my two sons Kaiden and Hudson Clevenger, in achieving this great milestone, I hope you can see that you can achieve anything in your life that you put your trust in God with, pray to God about, set your heart on, believe in, and put forth the effort towards.

Acknowledgments

First and foremost, I would like to thank my chair, Dr. Timothy B. Jones, for all his support throughout this journey. You spent countless hours of your time helping me and leading, guiding, and directing me. Thank you for believing in me, molding me, and for encouraging me along the way. I could not have done this without your support. I will always remember how available you were throughout this program and for the great level of support I received from you.

I would also like to thank Dr. Andrew Lumpe, Dr. Dana McMichael, Dr. Sandra Harris, and Dr. Wade Fish. Your expertise was very instrumental in helping me to achieve my educational goals and in helping me focus my study. I appreciate all the lifting words throughout this journey and for always being available to offer help and expertise.

Thank you, Scott January. You are a mighty man of God in my life. You have been with me from Day One. We started the doctorate cohort together and stuck together through it all. You were there for me when I had my knee surgery and showed up when I needed you the most. You encouraged me, spoke life into me, and prayed for me, and for that, I am forever grateful.

Thank you, God, for planting this seed in me, and for helping me bring this mighty work to pass. To you, God, I give all the glory. May you continue to work through me in spirit to further glorify your kingdom.

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Abstract

The purpose of this quantitative causal-comparative research study was to compare the impact that half-day and full-day prekindergarten had on economically disadvantaged students on Grade 3 State of Texas Assessments of Academic Readiness (STAAR) Reading test results. Data from students who previously attended a half-day and full-day prekindergarten program were analyzed to see which program had a greater impact on STAAR reading scores at the conclusion of third grade. The comparison included two urban school districts with an economically disadvantaged threshold of 70% or greater. Descriptive statistics to obtain frequencies were used to create data that showed how students performed in the areas of Did Not Pass, Approaches, Meets, and Masters. The resulting data from Research Question 1 showed there was no statistical mean difference on Grade 3 STAAR Reading test results for economically disadvantaged students who previously attended a half-day or full-day prekindergarten program in the areas of Did Not Pass and Approaches. The resulting data from Research Question 2 showed that there was a statistical mean difference on Grade 3 STAAR Reading test results for economically disadvantaged students who previously attended a half-day or full-day prekindergarten program in the areas of Meets and Masters. The data analysis results were reported and discussed. The findings were summarized, conclusions were given, and recommendations for future research were made.

Keywords: half-day prekindergarten, full-day prekindergarten, economically disadvantaged, Grade 3 STAAR Reading test, reading achievement, independent samples *t* test, chi square test

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Chapter 1: Introduction

As early as when children enter kindergarten, significant achievement gaps exist within economically disadvantaged students in the area of literacy (Ansari et al., 2018). Scholars have argued that children who attend a prekindergarten program before enrolling in kindergarten are significantly ahead of their peers in reading (Atteberry et al., 2019; Johnson et al., 2019; Pezoa et al., 2019; Weems, 2019). Ansari et al. (2018) found early primary education is the best time to teach English proficiency, which in turn impacts later reading achievement throughout a child's school career. Pezoa et al. (2019) asserted that creating reading interests and positive reading habits at a young age is critical to a student's academic success throughout primary school. Furthermore, other data show that prekindergarten programs deliver exceptional opportunities to youth during a crucial early learning window.

Background

Coleman et al. (1966) were some of the first researchers to study student academic achievement gaps. From a large quantitative study, Coleman et al. were able to show that family background, not schools, was the cause of academic achievement gaps in students. This study helped open the door for policy makers to see how school stakeholders were in a position to help close those achievement gaps in students within the primary educational years.

Payne (2013) argued academic achievement gaps were closely tied to students of low-income families. Payne described this as cyclical in nature, moving from one generation of family members to the next. Essentially, students coming from these low-income families were missing those same vocabulary, phonics, and comprehension skills that were necessary to be successful in the elementary school years. Payne further noted these low-income families were

unable to provide previous schooling for their children, and as a result, students from these families entered kindergarten with achievement gaps.

Lipsey et al. (2018) provided information that in 1985, the U.S. Department of Education spent millions of dollars to expand prekindergarten programs and created half-day prekindergarten programs in the state of Texas. This big push showed policy makers and all stakeholders the stance that the U.S. Department of Education had, which was early childhood education programs narrow achievement gaps, resulting in saved money for the long term. With this amount of push and new-found attention on prekindergarten programs, it was more important now than ever to show data that supported this big initiative for half-day and possibly a future for full-day prekindergarten and the funding that followed.

Henson (2016) expressed enrollment in a full-day prekindergarten program positively affected economically disadvantaged students educationally due to the early response to intervention strategies in reading made available to them at an early age. Williams (2017) said students who attended a full-day prekindergarten are more likely to show high academic success in reading achievement in third grade. Schuth (2017) asserted economically disadvantaged students who attended a full-day prekindergarten program had an overall higher positive student achievement rate over their economically disadvantaged peers who attended only a half-day prekindergarten program.

On the opposing end of the prekindergarten spectrum, Atteberry et al. (2019) suggested the initial benefits of prekindergarten on children's academic skills may be short lived, diminishing quickly over time as students progress through school to third grade. This has led to an opposing group of policymakers, who raise eyebrows at data that show student academic impact of preschool fades after first grade (Bassok et al., 2018). Moreover, additional researchers

have argued that the effects of all-day prekindergarten fade over time, such that prekindergarten attendees and nonattendees no longer differ in measurable ways soon after they transition to kindergarten (Abenavoli, 2019).

In the midst of this argument, as noted by the Texas Education Agency (2019), House Bill 3 passed in Texas during the 86th legislative session, which included several educational reforms. One such reform mandated all-day prekindergarten in every public school within the state of Texas. Specifically, this bill mandated all-day prekindergarten programs across the state for economically disadvantaged students in every public school. This mandate is only half-day funded, leaving the public-school districts to foot the other half of the money it takes to run these programs (Texas Education Agency, 2019).

Bassok et al. (2018) indicated despite some strong evidence that supports all-day prekindergarten showing how early investments in prekindergarten students can create impactful and lasting benefits, research tracking these impacts over time within present-day prekindergarten programs has yielded some mixed results. Moreover, this mixed data has appeared to communities and policymakers as a clear limitation of the current evidence surrounding the impacts of prekindergarten. This is quite possibly why there is a mandate from House Bill 3 for school districts to have full-day prekindergarten programs, but only half-day funding (Texas Education Agency, 2019). Abenavoli (2019) reported that while short-term impacts on children's school readiness represent an important goal of Texas public legislators, others argue early childhood educational programs, such as preschool, are worth public investment only if they produce meaningful long-term effects. With such a high expectation from policymakers for all-day prekindergarten, Lipsey et al. (2018) noted all stakeholders need to be informed by sufficient research on the effects of state-funded all-day prekindergarten.

Henson (2016), Rose (2010), Schuth (2017), Sutherland (2009), and Williams (2017) have identified several indicators for student success in primary education. Researchers have reported the relationship between these studies on economically disadvantaged students in the area of reading. However, these studies lacked research associated with economically disadvantaged students who attended prekindergarten on State of Texas Assessments of Academic Readiness (STAAR) reading scores upon exiting third grade. They also lacked a comparison of those same Grade 3 STAAR Reading scores of students who previously attended half-day prekindergarten with students who previously attended a full day of prekindergarten.

Statement of the Problem

Researchers have shown that achievement gaps between socioeconomic classes have existed for nearly half a century (Abenavoli, 2019). Although many school district stakeholders have specifically dedicated time, energy, and resources into closing the achievement gap, those gaps still exist for economically disadvantaged students (Lipsey et al., 2018). Strunk and McEachin (2014) argued that educational gaps between socioeconomic classes can be reduced by integrating technology into the lessons within school programs. Elias et al. (2014) advocated for achievement inequity to be resolved by improving campus climate and culture, where school leaders work towards character development and meeting students' social and emotional needs. However, a plethora of compelling evidence indicates early childhood programs, such as all-day prekindergarten, can help to stop achievement gaps in a student's primary years (Henson, 2016; Rose, 2010; Schuth, 2017; Sutherland, 2009; Williams, 2017). Specifically, researchers have shown the introduction of an all-day prekindergarten yields positive results for economically disadvantaged students in the area of literacy (Atteberry et al., 2019; Rose, 2010; Weems, 2019). To level the playing field for economically disadvantaged students, Texas legislators need to

think hard on the idea of fully funding all-day prekindergarten programs (Atteberry et al., 2019; Philips et al., 2017; Weiland, 2018).

Purpose of the Study

Currently, full-day programs are mandated, but only half-day funded (Texas Education Agency, 2019). The purpose of this study was to compare the impact that half-day and full-day prekindergarten had on economically disadvantaged students on Grade 3 STAAR Reading test results. Data from this study could potentially reveal positive comparisons between students who attended all-day prekindergarten and their performance on the Grade 3 STAAR Reading test. Moreover, stakeholders could potentially use data from the study to present a strong case to policymakers and legislators that support either half-day or all-day fully funded prekindergarten programs for economically disadvantaged students.

Research Questions

RQ1: To what extent, if any, does a significant mean difference exist in 2019 Grade 3 STAAR Reading scores between economically disadvantaged students who previously attended half- and full-day prekindergarten programs?

RQ2: To what extent, if any, does a significant mean difference exist between economically disadvantaged students who achieved the Approaches level or better on the 2019 Grade 3 STAAR Reading test between those who previously attended half- and full-day prekindergarten programs?

Significance of the Study

Henson (2016) argued educational leaders should focus and invest in students designated as low income. This is because independent studies of economically disadvantaged students have indicated that poverty influences brain development. More specifically, poverty influences brain

development associated with vocabulary and reading in children. Furthermore, Henson showed enrollment in a prekindergarten program positively impacted economically disadvantaged students educationally due to early intervention strategies in reading that were made available to them. Moreover, Henson showed that economically disadvantaged students continually showed the highest academic gains from attending a prekindergarten program. Henson recommended researchers conduct future longitudinal research with examination of pretests and posttests that would include further study of half-day and full-day prekindergarten and the effects they have on economically disadvantaged students.

Williams (2017) explained that while education stakeholders have focused on primary education for many years, the early elementary school years have been ultimately responsible for the stimulation and growth of cognitive abilities in young students. Furthermore, this cognitive stimulation has led to increased academic benefits later in life for students beyond schooling years. Williams showed a positive correlation between students who attended prekindergarten and their reading achievement in third grade. An important proposal from Williams for future researchers was to examine early childhood education in association with varying standardized test scores. Williams also proposed future researchers compare locally made district assessments to the state-created STAAR tests.

Schuth (2017) explained a student's ability to master reading at a third-grade reading level by the end of third grade as highly important to educational leaders. Further, Schuth posited that a multitude of factors, such as low economic status and whether or not a student attended half- or full-day prekindergarten, affect a student's educational tract. More specifically, researchers potentially proved that economically disadvantaged students who have attended a full-day prekindergarten program have an overall higher positive student achievement rate over

their economically disadvantaged peers who attended only a half-day prekindergarten program. Schuth potentially proved students who attended an all-day prekindergarten program experienced significant growth by the second-grade year of school. Additionally, students who originally attended all-day prekindergarten who had individualized education plans, who were English language learners, and who were also economically disadvantaged showed significant growth. An important proposal for future researchers presented by Schuth was to examine test scores on all primary grade levels beyond the prekindergarten and kindergarten years and distinguish at which grade level students experienced the biggest academic gains. An additional proposal for future researchers was to look at specific student demographics of those who attended half-day and full-day prekindergarten programs and monitor those same students and their reading achievement by the end of third grade.

Since the passage of House Bill 3 (Texas Education Agency, 2019), few researchers have investigated half-day versus full-day prekindergarten programs and the impact they both have on economically disadvantaged students in reading. Furthermore, since the passage of House Bill 3, few researchers have compared Grade 3 STAAR Reading test scores of students who attended a half-day versus full-day prekindergarten programs. Research in this area could potentially illuminate data that would help state representatives, educational leaders, and citizens in Texas understand the impact of half-day and full-day prekindergarten programs for economically disadvantaged students in the area of reading. In addition, research in this area could also potentially ensure these same constituents see the value in the decision of Texas legislators to fully fund half-day or full-day prekindergarten programs for economically disadvantaged students, taking the financial burden from school districts.

Definitions of Terms

The following are operational definitions for the reader to apply and clarify these terms throughout the study.

Achievement gaps. Achievement gaps in the United States are observed, persistent disparities in measures of educational performance among subgroups of U.S. students, especially groups defined by socioeconomic status, race, or gender (Coleman et al., 1966; Palickar, 2015).

Approaches. Approaches grade level means the student is performing below proficient for the third grade and is approaching expectations in reading (Texas Education Agency, 2022a).

Economically disadvantaged. Bowman (1992) stated economically disadvantaged students are those children who come from families who make a combined household income that is below the poverty line. These students are eligible for free or reduced-priced meals at school. Additionally, these students are thought to not have the same opportunities other students have who come from families that make a combined household income that is higher than the poverty line. These opportunities include, but are not limited to, life and social experiences, access to literacy materials, and access to vocabulary usage at home.

House Bill 3. According to Texas Education Agency (2019), Texas legislators passed a sweeping and historic school finance bill in 2019. Governor Greg Abbott signed this bill into law. This bill addresses school finance such as more money for classrooms, teacher compensation, and property taxes and covers a multitude of other educational reforms. Further, House Bill 3 mandated all Texas public educational entities provide an all-day prekindergarten program. These mandated all-day prekindergarten programs are only half-day funded.

Masters. Masters grade level means the student is performing above grade level and is exceeding expectations for the third grade in reading (Texas Education Agency, 2022a).

Meets. Meets grade level means the student is performing proficiently at grade level and is meeting expectations in reading (Texas Education Agency, 2022a).

Reading literacy. According to Reardon et al. (2012), reading literacy is the process whereby readers have had substantial literary experience, read books regularly, enjoy reading, and have gained and continue to gain useful knowledge that gives the student a continual lifelong education. Furthermore, reading literacy is a skill that unlocks learning and provides students with a means to pursue knowledge.

School readiness. School readiness means each child enters school ready to engage in and benefit from early learning experiences that promote student success (Atteberry et al., 2019).

STAAR. STAAR is an abbreviation for State of Texas Assessments of Academic Readiness. According to the STAAR performance standards (Texas Education Agency, 2022a), stakeholders give these assessments to all third- through 12th-grade students. Stakeholders use these assessments to benchmark students to test readiness in math, reading, science, and social studies. For example, third-grade students are tested at the end of the school year in math and reading.

Texas Academic Performance Reports. According to the Texas Education Agency (2021), the Texas Academic Performance Reports (TAPR) pull together a wide range of information on the performance of students in each public school district in Texas. This information provides a compilation of data for each school district and provides an overall school rating for each campus.

Texas Education Agency. According to the historical overview of assessment in Texas, the Texas Education Agency (2009) is a state agency that oversees primary and secondary public education. The Commissioner of Education heads the agency. Furthermore, the Texas Education

Agency strives to improve outcomes for all public-school students in the state by providing leadership, guidance, and support to all school systems in Texas.

Summary

This chapter included a compelling argument of what school readiness is, how economically disadvantaged family backgrounds educationally impact students, and how economically disadvantaged students arrive at kindergarten with significant achievement gaps in reading. Moreover, this chapter included multiple examples of existing studies where researchers reported on economically disadvantaged students as related to those same students' reading outcomes. However, this body of existing literature lacks research associated with the comparison of half-day versus full-day prekindergarten of economically disadvantaged students on STAAR reading scores upon exiting third grade. Further, this chapter provided literature indicating a proposed future study with the researcher closely examining half-day versus full-day prekindergarten and the impact on those same students' Grade 3 STAAR Reading scores for economically disadvantaged students, which may be of added benefit to the existing body of literature on this same subject. Chapter 2 includes a review of relevant literature.

Chapter 2: Review of Literature

The purpose of this study was to compare the impact that half-day and full-day prekindergarten had on economically disadvantaged students on Grade 3 STAAR Reading test results. Studies have indicated prekindergarten programs deliver exceptional opportunities to youth during a crucial early learning window (Lipse et al., 2018; Pezoa et al., 2019; Sabol et al., 2017; Weems, 2019). The subject of the study, prekindergarten programs and their impact on economically disadvantaged students' reading scores upon exiting third grade, has emerged with commonalities across many topics. These topics are (a) a history of achievement gaps, (b) attempting to close the achievement gap, (c) prekindergarten and its impact on student reading achievement, (d) a focus on accountability and increasing standards on state-wide testing, (e) reading performance of economically disadvantaged students in Grade 3, (f) a narrowed focus for all-day prekindergarten, (g) and House Bill 3 implications. This chapter encompasses different facets of the subject, topics as presented previously, and the review of the pertinent literature.

Theoretical Framework

The main theoretical framework for the study has John Dewey at the center. Cuffaro (1995) said Dewey held many theories, including one that had a pragmatic approach to education. This progressive theory includes a central idea that children should learn by doing, which means children learn better when they are actively engaged. Additionally, Dewey argued for interactive classes because interaction with the environment was essential for the learning process. By applying this framework, one can imply that early elementary education directly impacts students and their educational success for the duration of their schooling years and beyond into life (Shouse, 1947). Within that same concept is the topic of full-day

prekindergarten and its academic impact on economically disadvantaged students. Schuth (2017) posited full-day prekindergarten students and their experiences in school such as instruction in the realm of reading are a critical part of the schooling experience. As these same students move through school to third grade, the aim is to have them all reading at grade level, thus impacting their entire educational career in a positive way.

According to the STAAR performance standards (Texas Education Agency. 2022a), students in the third grade take a STAAR reading test. State-level stakeholders prepare this test and give it to students in various grade levels beginning in the third grade. Performance grades for this test include Approaches, Meets, and Masters. Students who take this Grade 3 STAAR Reading test can perform anywhere on that spectrum. Approaches grade level means the student is performing below proficient for the third grade and is approaching expectations in reading. Meets grade level means the student is performing proficiently at grade level and is meeting expectations in reading. Masters grade level means the student is performing above grade level and is exceeding expectations for the third grade in reading.

According to House Bill 3 (Texas Education Agency, 2019), all Texas public school districts must include an all-day prekindergarten program within their districts for economically disadvantaged students. The idea is school district stakeholders can start identifying students who have achievement gaps, start the intervention process, and get students reading at higher levels before entering third grade. The purpose of this study was to compare the impact that half-day and full-day prekindergarten had on economically disadvantaged students on Grade 3 STAAR Reading test results. Additionally, with this study I sought to further inform legislature in a way that positively impacts half-day or full-day prekindergarten programs.

A History of Achievement Gaps

Coleman et al. (1966) were some of the first researchers to coin the phrase *achievement gaps*. In their yearlong study of over 4,000 schools, 66,000 teachers, and almost 600,000 first, third, sixth, ninth, and 12th graders, Coleman et al. were able to write with authority within their report to the public. Through this sheer amount of quantitative data, Coleman et al. were able to show that family background, not schools, was the cause of achievement gaps in students. Overall, the Coleman et al. report involved one of the first major studies to outline the difference between race, income, school, and children's academic and life outcomes. Soon, conversations with policymakers and educational reformers regarding equality, achievement gaps, and how public schools can help to eliminate them stirred the nation.

Some years later, Bowman (1992) mentioned *at-risk* students as being students who come from families who are marginally culturally deprived and are at great risk of dropping out of school. Bowman spoke on other reasons why a student might be labeled at-risk, such as the economic status of a student's family. Additionally, Bowman argued these same students can come from single-family, limited English-speaking, and low-income backgrounds. Furthermore, these same students are characterized as not being ready for kindergarten and beyond, leading to high failure rates.

Bowman (1992) showed economically disadvantaged students have poor living conditions, poor diets and nutrition, and have parents who do not have any time within the house to read to them and help them with their schoolwork. Additionally, Bowman showed there were no conversations with any type of academic language going on in these types of households, thus leading to poor academic reading and writing skills. Overall, the Bowman study indicated it was this economically disadvantaged background and family circumstances that led to the

achievement gap in students upon entry into elementary school. If not corrected early while in primary school, these gaps would continue through secondary school.

Bowman (1992) further noted legislators and professional educators had become increasingly worried about students who entered school with achievement gaps. These same constituents gained steam regarding how prekindergarten might help close those reading gaps in those same economically disadvantaged students. Furthermore, Bowman argued prekindergarten, early intervention strategies in reading, and tracking progress in students as ways to bridge the education equity gap for economically disadvantaged students. These central ideas sparked an additional study into all-day prekindergarten and its impact on student learning for economically disadvantaged students. The purpose of this study was to compare the impact that half-day and full-day prekindergarten had on economically disadvantaged students on Grade 3 STAAR Reading test results.

The conclusions of the Bowman (1992) study indicated that students who attended a half-day prekindergarten program outperformed the students who attended a full-day prekindergarten program. Bowman speculated that it may have been that the prekindergarten curriculum in the two different environments could have been taught with different levels of fidelity. Another speculation was students in the group who attended a full day of prekindergarten might have been at a lower cognitive level upon entering prekindergarten the previous year.

Payne (2013) argued academic achievement gaps were most correlated to students of low-income families. This author wrote on how students coming from low-income families are in survival mode. These parents are not present in the home because they are busy working two and three jobs a day. As a result, these parents get home late and do not read books to their

children. These children mainly feed themselves and are in bed asleep before the parents return home. Additionally, because money is tight, there are no reading materials in the house.

Payne (2013) described this as a generational issue and how vocabulary in the household was not at a high level and children were missing the same vocabulary, phonics, and comprehension skills necessary to be successful in kindergarten and primary school years. So, these economically disadvantaged students are a product of their environment (Hanushek et al., 2019). Payne (2013) argued that these same children come from low-income families. They have not had any previous schooling, and as a result, come to kindergarten with achievement gaps. Lastly, as state testing and accountability have become increasingly harder, these same students who come to school with achievement gaps have a harder and harder time passing these same benchmark tests. Further, this data showed that something needs to be done for economically disadvantaged students as they enter the primary school that can help to alleviate gaps in reading.

Palickar (2015) posited achievement gaps were present when looking closely at classes who are advantaged in society versus classes of families within the lower income. Palickar argued children at birth are on the same cognitive level. Additionally, the author asserted achievement gaps are a product of home life and the environment. Moreover, gaps in learning are created at a very early age, and a large part of this issue is whether any in-home learning or other childhood education is going on within the home or somewhere else during this important developmental time. Lastly, Palickar argued this achievement gap follows these same children into kindergarten, where they are underprepared, and it lasts an entire lifetime.

Whilby (2020) suggested achievement gaps exist between students who are economically disadvantaged and students who are not. Data showed students who were born in the top quarter income bracket are more than two times likely to be in the middle class or higher when they

mature, as compared to students who were born in poverty. Furthermore, data showed that economically disadvantaged students show a 3-year gap in reading behind their peers by the time they reach high school as freshmen.

Whilby (2020) stated that neighborhoods may affect student educational opportunities because each neighborhood is attached to its associated school district and home campus. A quantitative study of over 200 million standardized test scores potentially indicated students who come from economically disadvantaged neighborhoods are lower on proficiency scores than their economically advantaged peers (Reardon, 2016; Whilby, 2020). This is largely due to the income disparity and economic resources among school districts. A school district in an economically disadvantaged neighborhood has fewer economic resources than a school district located in an economically advantaged neighborhood. Because of the school district location, the achievement gap between students who are economically disadvantaged and not continues to grow (Owens, 2017; Whilby, 2020). Moreover, an inference is economically disadvantaged students are living and going to school in a completely different environment than that of their economically advantaged peers (Hanushek et al., 2019; Whilby, 2020).

An Economically Disadvantaged Family Background

Payne (2013) said regardless of ethnicity, children who come from economically disadvantaged backgrounds are more likely than children who do not to suffer developmental delays, more likely to drop out of school, and more likely to give birth during their teen years. Additionally, Payne mentioned economically disadvantaged students are more likely to come from a single-parent household. Furthermore, the poverty factors such as a parent's employment status and low wage earning, family structure, and low parental education lead to learning gaps in students at an early age.

Payne (2013) argued children who are under the age of 7 are particularly vulnerable to poverty. These students lack the emotional, mental, spiritual, and physical resources and support systems that could help them grow and develop successfully. Payne posited this cycle of living in poverty and lacking the resources and support systems necessary to develop and grow successfully represents itself repeatedly as a cycle of poverty. Payne noted this cycle of poverty becomes generational poverty, which is poverty in a family that has existed for at least two generations or more. Payne highlighted that generational poverty causes the damage of achievement gaps within youth. These young children who are living in poverty most likely do not have access to early childhood education, parental developmental experiences, use of vocabulary in the home, or hands-on learning within the home or near the home. Furthermore, these parents living in these homes raising these children are not keeping their best and brightest kids at home. These parents are sending their best. But their best show up to kindergarten not prepared for school and with achievement gaps and developmental gaps in learning. Therefore, they are way behind peers who come from affluent families. Legislators and educational leaders have been fighting this generational achievement for many years. So many people are trying to figure out how to close the achievement gap in these same students. Further, these same constituents are trying to figure out how to make early learning opportunities more equitable across the state of Texas and the nation.

David and Marchant (2015) asserted communities and families living at or under the poverty line do not always understand the value of education. These parents are both working away from the home and in most cases working two or three jobs to make ends meet. To these parents, a roof over their head, food on the table, and making ends meet have taken precedence. David and Marchant affirmed that these economically disadvantaged students do not have books

to read at home, do not have parents that read to them regularly, and therefore do not have the vocabulary or reading skills needed to be successful when beginning school. With the poverty gap growing every year, more students are showing up to school unprepared and without the knowledge and skills necessary to be successful in kindergarten. This in turn affects these same students not only in kindergarten, but into first, second, third grade, and beyond.

Sabol et al. (2017) suggested kindergarten preparedness is critical to student outcomes in later school years. The researchers also said the United States and Texas included large disparities in school readiness among students from low-income families. Students from low-income families are averaging at least 1 year's academic deficiency gap from their non-low-income counterparts.

Students Arriving at Kindergarten With Achievement Gaps

Şahin et al. (2013) noted the transitional movement from kindergarten to first grade is significant, and more and more students are coming not prepared for the rigors of the first-grade literacy curriculum. Furthermore, if unprepared for the first grade, the students then have learning gaps and fall behind at an early age. The authors further argued grade levels before first grade are important, tracing learning back to prekindergarten as a precursor to positive outcomes in first grade. Şahin et al. explored teachers' different views about kindergarten reading literacy readiness and came up with overarching themes of what it truly means to be academically ready for the first grade. For the study, the authors used face-to-face interviews to elicit and compare teachers' views of school readiness. Interviews consisted of 35 female preschool teachers and 35 female first-grade teachers who were working in either public or private school settings. According to the findings, most teachers interviewed believed (a) all developmental domains in kindergarten were imperative for children's school readiness in first grade, (b) effective

cooperation of parents with the preschool and primary school teachers was paramount, and (c) family was one of the essential pieces to the school readiness puzzle. As a proposal, the teachers interviewed emphasized preschool education as an important precursor to school readiness in primary school.

Strunk and McEachin (2014) were concerned with achievement gaps between the advantaged and disadvantaged student population. In a quantitative longitudinal study, the authors used data from California's student-level administrative data to track approximately 26.3 million students in 9,000 schools from 2005 to 2011. For the study, they were only interested in achievement scores in the areas of math and reading and divided the students into subgroups of Black, Hispanic, White, low-socioeconomic status, and English language learners. The data showed a statistic significance for economically disadvantaged students, which potentially proved that technological assistance was one of the keys to closing the performance gap for disadvantaged students.

Palickar (2015) posited preschool education plays a huge part in closing the achievement gaps. As previously mentioned, these same achievement gaps are very apparent between well-off families and low-income families. Palickar argued healthy babies at birth are all born with the same cognitive ability no matter race or economic status. Moreover, Palickar believed achievement gaps are not beginning at birth, but rather created over time within early learning years and as students progress through school and at home. Lastly, Palickar showed learning gaps are a product of combined home environment and economic status. This is why quality preschool programs and closing achievement gaps are so important for economically disadvantaged students.

Sabol et al. (2017) were concerned with economically disadvantaged student outcomes and noticed a large disparity in learning between that subset of students and their economically advantaged counterparts. The researchers examined the impact that high-quality student engagement had on student achievement in kindergarten. The authors also examined the impact of positive teacher-student relationships and how those positive interactions led to positive student outcomes.

The Sabol et al. (2017) study took place over 18 months, and the authors measured students over 10 different dimensions. The authors reviewed the 10 different dimensions carefully as four different classroom observations took place throughout the school year. Results indicated the strongest correlations existed between the positive engagement with tasks and the teachers and positive engagement with tasks between the students and their peers. The researchers suggested student engagement and positive interactions with the teacher and their peers all related to student success and their learning in prekindergarten.

Borre et al. (2019) asserted living in poverty has devastating impacts on early academic student achievement for students. The authors argued that minority students who come from low-income families struggle to attain educational success and are more likely to not be kindergarten ready. Furthermore, they noted there is a Matthew effect, where students who enter kindergarten not prepared in math and reading continue to struggle throughout their education and into adulthood. These students fall farther and farther behind their peers. Moreover, the authors argued this achievement gap does not just impact these students in primary and secondary school; it follows these same students into adulthood and their careers. This same disparity of achievement is then sometimes passed down to the next generation and so on.

Borre et al. (2019) focused on the effects of prekindergarten students through kindergarten. Specifically, the researchers sought data on an early reading literacy intervention, the Early Authors Program (EAP), and its effects on prekindergarten students of diverse and low-income backgrounds as they transition into kindergarten. The overall goal was to see if this early reading literacy intervention would close the achievement gap with those students. The authors included 115 students in the study. Of the students, 55% were male, 57% of the students were African American, 33% of the students were identified as English language learners, 43% of the students were Hispanic, and 90% of the students were from low-income families. Half of the students were 3 years old, and half of the students were 4 years old. The authors used a control group to see if the EAP worked to close the achievement gap. At the end of the study, the authors compared both groups to each other for kindergarten readiness. Using a chi square and *t*-test analysis, results indicated economically disadvantaged students who did not receive the EAP during their prekindergarten years lost ground over time as compared to their peers. Furthermore, students who participated in EAP made significant gains in literacy as compared to their peers. The significance was not of the EAP but that there was a reading program in place for those prekindergarten students.

Reading Achievement Gaps for Economically Disadvantaged Students

Hamilton (2020) noted literacy is a skill set that has a wide spectrum of attributes such as comprehension, word recognition, vocabulary, recall of knowledge, and use of what has been comprehended. These attributes are necessary to be successful in everyday life, careers, and for a life-long journey of learning and personal growth. Regarding early childhood development, some of the first steps in learning how to read include reading fluency, recognizing sight words, and letter-word recognition (Reardon et al., 2012; Wibayanti et al., 2020).

Hamilton (2020) maintained the inability to read effectively by third grade is detrimental to students, especially because all taught subjects and tested subjects involve the ability to read effectively. Unfortunately, there are students who come from poverty and struggle with reading by the third grade because they have not effectively developed skills such as comprehension, fluency, reading stamina, or vocabulary depth of knowledge. As these students arrive to third grade, low reading achievement starts to affect the outcomes of later academic growth and life beyond. Furthermore, evidence shows 10% or more of juniors in high school are reading on a freshman grade level, putting those same students at great risk for academic and career failure (Hernandez, 2011; Reardon et al., 2012; Weems, 2019; Wibayanti et al., 2020).

Lack of Skills

Wibayanti et al. (2020) argued the clear lack of literacy skills that students from poverty arrive to third grade with presents a huge problem concerning academic growth and life beyond school. These students carry this lack of literacy skill into the workforce, which is so dependent on high functioning literacy skills. Borre et al. (2019) suggested these gaps in literacy create a Matthew effect, essentially meaning students who come from a background of poverty learn at a much slower pace than students who come from a well-to-do family. Therefore, students in one group are better equipped for learning at a faster pace, and one group that is not so well equipped is learning at a much slower pace. The Matthew effect happens largely because students who come from a background of poverty are less likely to be exposed to a rich context of vocabulary within the household, are less likely to be read to by adults within the household, and are less likely to have the experiences within and outside the household that are necessary to apply within the context of reading (Borre et al., 2019; Hamilton, 2020; Stanovich, 2009, 2017; Wibayanti et al., 2020).

Whilby (2020) and Reardon et al. (2012) posited that with an increasing number of economically disadvantaged students over the last half century, the achievement gap on standardized tests between economically disadvantaged students and economically advantaged students is currently 40% greater than it was over 2 decades ago. Although there has been some improvement in achievement levels for economically disadvantaged students within under resourced schools, these students are still a great distance behind their economically advantaged peers. Data consistently show economically disadvantaged students are far behind their peers on standardized tests encompassing reading (Hanushek et al., 2019; Micheltmore & Dynarski, 2016).

A Widening Achievement Gap

Data show that there is an ever-increasing achievement gap between students who are economically disadvantaged and those who are not (Micheltmore & Dynarski, 2016; Whilby, 2020). In the last quarter century, Texas stakeholders have seen rapid increases within the percentage of economically disadvantaged students in public schools. In the late 1980s, 35% of Texas public school students were economically disadvantaged. By the early 2000s, 50% of Texas public school students were economically disadvantaged (Hanushek et al., 2019; Reardon et al., 2012; Whilby, 2020). In 2017, that rate had reached 59%, which was 3.1 million of the state's 5.3 million public school students. Collectively, this represented a growing rate of 1 million economically disadvantaged students from 2001 to 2017 (Texas Education Agency, 2016). With this increasing number of economically disadvantaged students over the last half century, the achievement gap on standardized tests between economically disadvantaged students and economically advantaged students is currently 40% greater than it was over 2 decades ago (Reardon et al., 2012; Whilby, 2020).

Attempting to Close the Achievement Gap

Owens (2017) and Whilby (2020) asserted that in 1954, the *Brown v. Board of Education* ruling forced policy makers to closely monitor achievement gaps in schools. Segregation from neighborhoods of low-socioeconomic status to neighborhoods of high-socioeconomic status over a century had caused huge economic, achievement, and school resource gaps. In 1964, the entire country watched as President Lyndon Johnson addressed the American nation during his State of the Union address. At the time the national poverty rate was around 20%, and individuals in the country began to worry about the economy, children, and the future of the country. Palickar (2015) asserted that during his speech, President Lyndon Johnson was able to persuade the legislature to pass the Economic Opportunity Act. Additionally, within this act were several programs with aims of ending poverty. This act was pivoted towards low-income neighborhoods and living conditions.

A Focus on Prekindergarten

Even though the Economic Opportunity Act was passed and many projects improved some living conditions tremendously, Palickar (2015) argued achievement gaps in the nation's youth still existed. These same achievement gaps concerned legislators and educational leaders, which motioned congress to pass further acts. Collectively, people started to focus their attention on prekindergarten and how educational programs could close this achievement gap.

Palickar (2015) explained in the 1980s, only 10 states within the United States funded prekindergarten programs. Legislators and educational leaders became concerned and started focusing on achievement gaps and how to close those gaps for all economically disadvantaged students. One of the biggest concerns of educational leaders was that students were not fully prepared to enter kindergarten and under grade level with large achievement gaps in reading and

math. Due to these growing concerns, in 1989, Congress passed the Goals of 2000: Educate America Act that was meant to increase student achievement and enacted legislation to help facilitate increased access to preschool programs for economically disadvantaged students. With this heightened awareness of achievement gaps and new legislation regarding equal access to preschool for all students, the number of states that included state prekindergarten programs increased from 10 states in the 1980s to 38 states in 2005.

Closing Achievement Gaps With Technology

Drigas et al. (2017) put together a study that showed the importance of technology in early childhood classrooms. They noted how important early childhood was and how early childhood success was a huge indicator of future academic readiness. Additionally, they explained how high-quality learning opportunities before kindergarten could positively impact student performance in kindergarten and beyond. Moreover, they argued that learning tools such as technology implementation within the classroom activities in these prekindergarten years were critical for kindergarten readiness and would enhance learning opportunities for students in prekindergarten years and beyond.

Drigas et al. (2017) focused on several different technology tools aimed at identifying and closing academic gaps in learning. Technology tools discussed included the Bee-bot, the working memory scale, the Get Ready to Read screening tool, the Athena test, various dyslexia tests, Alpha test, phonological screening test, MetaPhon test, and various other digital multimedia resources available to teachers. Results from the study indicated children who were at risk of learning difficulties benefited from teachers who integrated technology into classroom activities. Additionally, the authors showed how technology gave a clear advantage to students

who were having learning difficulties, giving them a better opportunity to learn by enhancing the lesson taught.

Closing Gaps Through Intervention and Progress Monitoring

Greenwood et al. (2018) explained that prekindergarten teachers struggled to close the achievement gap for all students, especially economically disadvantaged students. Furthermore, the authors noted most of the students within the fourth quintile were often the students that came from low-income backgrounds and most often lacked prior experiences in language. Thus, it is because of these backgrounds that several of these fourth quintile students had developmental delays in the English language and literacy and were at greater risk for not being academically ready for kindergarten and beyond.

Greenwood et al. (2018) explored a universal screening and progress-monitoring method to see how closing the performance gap could be achieved for prekindergarten students who would be transitioning into kindergarten. For purposes of the study, they examined 354 students in prekindergarten. For randomization, they chose six students from each classroom to participate. A 25-item survey went home to the parents of students who were participating. Additionally, the Get Ready to Read Literacy Screener was initiated, along with a Circle measurement for all students participating. Students had intervention and progress monitoring all year long in prekindergarten. Results from this study indicated a consistency from a previous and similar study conducted. Teachers using the multitiered system to drive interventions were able to impact student learning because the interventions targeted specific student needs. Moreover, multitiered systems to drive intervention led to teachers providing greater instructional intensity to students who needed it the most, which resulted in achievement gaps being closed to a degree.

Johanson et al. (2015) argued students who come from an economically disadvantaged background were more likely to have a trajectory of learning gaps in reading literacy. They argued inadequate access to high-level vocabulary from parents at home, lack of access to textbooks, and lack of parent-child linguistic conversations at home have all led to learning gaps in these children at early ages. Johanson et al. sought to find the answers to those learning gaps that existed in those students who came from an economically disadvantaged background.

As a way to address low language skills in economically disadvantaged prekindergarten students, Johanson et al. (2015) applied Love for Learning (LLI), which was a reading intervention. The authors used forty-nine classrooms in the study. Twenty-five classroom teachers used LLI as a reading intervention strategy, and 24 classroom teachers used what they had always used. The teachers who implemented LLI received high-quality professional development to support their initiative, and the teachers who did not use LLI did not receive any additional training. Once all these students entered kindergarten, they completed their beginning of the year reading assessment. The results from the study showed a positive correlation between LLI intervention and students who were successful on the kindergarten reading beginning of the year assessment. The authors also demonstrated that teachers who received high-quality professional development yielded better student results.

Closing Gaps by Meeting Social and Emotional Needs

Cavadel and Frye (2017) expressed significant attention has been brought forth regarding school readiness, what it is, and how school district stakeholders could do a better job of closing the achievement gap. They explained many educational practitioners and theorists have tried to do a better job of understanding achievement gaps, where they begin, and the strategies that have

been used to close those gaps. The authors argued social and emotional skills needed extra attention to close those gaps in reading literacy.

Cavadel and Frye (2017) examined the understanding of teaching practices, students' learning behaviors, and how the theory of mind can be used as a predictor of student readiness in numeracy and reading literacy. To achieve this, they used a year-long longitudinal study of 120 head-start students. They wanted to see how the theory of mind predicted significant variance in numeracy and reading literacy scores as these head-start students transitioned into kindergarten. Using a variety of measures, including the theory of mind battery, the authors found valuable data that showed significant amounts of variance in the outcome variables, which suggested this social-emotional program for economically disadvantaged students was successful in predicting student outcomes.

Closing Achievement Gaps With Increased Student Attendance

Ehrlich et al. (2018) discussed chronic absenteeism as being an indicator for achievement gaps among prekindergarten students and how school attendance has gained attention from policymakers across Texas. The hypothesis became that school attendance in prekindergarten students is correlated to student achievement in kindergarten and beyond. Results from the study showed students who missed more than 10% of preschool were more likely to have achievement gaps and need math and reading intervention in kindergarten and beyond. This study showed that if students only attended a half-day program, they would be missing 4 hours of instruction a day. In a 187-day year, a half-day prekindergarten student would end up with 93 days of missed instruction. By the conclusion of the study, it was easy to see a correlation between more time spent in a prekindergarten seat and positive results on standardized and locally made assessments.

Closing Achievement Gaps With All-Day Prekindergarten

Whereas researchers have chosen to focus on technology, intervention programs, social emotional skills, or attendance, Robin et al. (2006) performed a student-focused study that concentrated on economically disadvantaged students. The researchers looked at prekindergarten students who were attending half-day and full-day prekindergarten programs. The study results would provide data to show if there was a significant difference in students who attended half- versus full-day prekindergarten in the area of student reading achievement. Study participants included 254 students who attended half-day prekindergarten programs and compared those same students to 85 students who attended a full-day prekindergarten program. Both sets of students received tests upon completion of their programs that tested for vocabulary, letter-word identification, and passage comprehension. Data revealed from the study showed students who attended a full-day prekindergarten program outperformed students who attended only a half-day program in vocabulary and reading. Not only did this data show that prekindergarten length impacted students immediately following the prekindergarten years, but further longitudinal studies of these same full-day prekindergarten students revealed data showing success through kindergarten and first grade. The full-day prekindergarten students when entering kindergarten and first grade continued to show higher achievement scores in reading as compared to their counterparts who only attended a half-day prekindergarten program previously.

Valenti and Racey (2009) examined the effects of half-day and full-day preschool programs on first grade reading achievement. The study consisted of 64 half-day students and 86 full-day students. All first-grade students completed a universal reading assessment, with results compared on significant difference in reading scores of students who attended half-day prekindergarten and students who attended full-day prekindergarten. Results from the study

indicated students who attended a full-day prekindergarten program made significant gains in reading and scored higher on the first-grade reading assessment than their counterparts enrolled in the half-day prekindergarten program.

Zhao et al. (2009) assessed 1,887 at-risk prekindergarten students. Some of these students attended the full-day and some attended half-days. All students studied were in the Montgomery County public schools. This study revealed students who had the full day of prekindergarten outperformed half-day students. Furthermore, the study indicated full-day students showed more significant gains in the areas of reading as compared to half-day students.

Morris (2015) believed the introduction of an all-day prekindergarten program would help to increase student participation in organized activities at an earlier age, resulting in improved positive behavior, improved social and development outcomes, and higher student achievement scores, all of which assist school districts in closing the achievement gaps between socioeconomic classes. The study results showed increased time spent in organized activities correlated with higher cognitive skills and increased math and reading scores for disadvantaged students. Furthermore, Morris showed economically disadvantaged students were missing access to resources such as mental challenges, safe and reliable recreation space, and practice with communication skills. Moreover, the Morris study indicated participation in organized activities acted as resource compensation for economically disadvantaged students, leveling the playing field for those disadvantaged students. Lastly, Morris supported the implementation of all-day prekindergarten classes and concluded that getting economically disadvantaged students involved in organized activities at an early age would help give them exposure to previously unavailable resources, increasing their cognitive skills.

Barnes et al. (2016) suggested school districts should try to increase early interventions for economically disadvantaged students, therefore giving elementary school stakeholders a jump on identifying students in need and helping to decrease the overall gap between socioeconomic classes. Barnes et al. focused on 49 all-day prekindergarten classrooms in Texas and 36 half-day prekindergarten classrooms in California. The purpose of the study was to see how Tier 1 instruction in combination with small group math and reading intervention would improve scores for preschool children.

The Barnes et al. (2016) study revealed all-day prekindergarten students performed better on posttests than students who were only in half-day programs. Additionally, they discovered that most students responded positively to the all-day Tier 1 instruction in combination with small-group math and reading intervention strategies, all of which better prepared them for Tier 1 math and reading instruction at the kindergarten level. Most of the students in the study responded positively to all-day Tier 1 instruction in combination with math and reading intervention. Barnes et al. reported there was still a small percentage of students who did not respond successfully to the all-day Tier 1 instruction in combination with math and reading intervention. Scholars with differing viewpoints say this was an indication of failure, while others point out that this was a process and within that process yielded valuable information.

The Barnes et al. (2016) study was vital because it revealed these particular students were not ready for Tier 1 math and reading instruction at the kindergarten level, thus, further revealing the introduction of an all-day prekindergarten program would increase early interventions for economically disadvantaged students and therefore give elementary schools a jump on identifying students for early interventions and help to decrease the gap between socioeconomic classes. In other words, the data revealed that having these students highlighted for Tier 2 and

Tier 3 instruction during prekindergarten helped kindergarten teachers start targeted interventions sooner, which helped to close the achievement gap between socioeconomic classes.

Atteberry et al. (2019) performed a study on full-day and full-week prekindergarten students and found students who attended a full-day prekindergarten for a full week for the entire year yielded positive results. Additionally, the authors voiced students who attended a full-day prekindergarten program for a full week for the entire year scored an entire quarter of standard deviation higher on the Peabody Picture Vocabulary Test, which is a widely used measure of receptive vocabulary. These full-day prekindergarten students outperformed their peers who completed only a half-day prekindergarten program.

Prekindergarten and Its Impact on Student Reading Achievement

McConnell and Wackerle-Hollman (2016) began by stating reading is the most important and foundational support system for future educational success that students can have. This study showed students who struggle in reading within the earliest grades tend to struggle year after year and that prekindergarten reading ability is one of the best indicators for future success. Moreover, the study showed this higher understanding of prekindergarten readiness has helped stakeholders bring attention to intervention processes that can help to close the achievement gap for those struggling students in reading. Lastly, the authors uncovered the best practices of reading intervention for prekindergarten students. Specifically, this study showed how student assessment outcomes compared to general outcome measures.

The McConnell and Wackerle-Hollman (2016) study helped with future understanding of reading intervention and best practices. For purposes of the study, 340 students participated. Students' ages ranged from 3 years old to 8 years old. The authors conducted beginning and middle of the year assessments and compared them to general outcome measures for those

students. Results from the study revealed the need for school districts to develop an integrated and seamless assessment system for students in the area of reading, with the intent to move students closer to proficient. Furthermore, the authors noted measures to mark progress and target meaningful intervention as needed for students. Moreover, they argued that the district stakeholders' expectations for student achievement needed to increase to a higher level. Findings from this study showed with an increase of expectations from the district will come an increase of normative behavior of what the district expects. Essentially, what teachers taught in the later grades should be taught in the lower-level grades and therefore higher outcomes.

Kim and Morrison (2018) reported,

Research has demonstrated that special intervention programs positively contribute to literacy skills, but less is known about whether the effects of practice-as-usual literacy instruction vary as a function of grade-level schooling experiences and different literacy skills important for fluent reading. (p. 1)

The authors showed emergent literacy skills in children develop as early as the age of 4. Kim and Morrison argued that home life and different parenting environments lead to a variety of individual levels of reading development at an early age. That is why they argued for a strong literacy program that is universal for prekindergarten students.

Kim and Morrison (2018) reported, "Most classrooms adopt a standard core reading curriculum intended to meet the needs of all students. In implementing these standard curricula, teachers often have a wide latitude of how they deliver literacy instruction" (p. 2). The authors reported that while there is data showing prekindergarten attendance, curriculum, and the impact on student outcomes, there are still many things not understood about economically disadvantaged students and how prekindergarten impacts their reading achievement. Further, this

study showed that what is less understood is how different children from different backgrounds and ages experience successful literacy instruction outcomes.

Cetin et al. (2018) explained emergent literacy has caught widespread attention from stakeholders. Emergent literacy is the reading and writing skills that students obtain throughout childhood and develop as they learn at home with family and as they go on to daycare, prekindergarten, grade school, and beyond. Cetin et al. argued as soon as a child picks up a pen, pencil, or crayon and starts to draw or scribble, they are starting an early expression of communication and form of writing. The authors explained more and more students are entering kindergarten with a lack of vocabulary structure and knowledge and struggle in reading. Therefore, vocabulary implementation among the youngest students in prekindergarten would be of utmost importance. Additionally, they asserted along with vocabulary implementation, phonological awareness and writing awareness need to be developed during these adolescent years in prekindergarten.

Cetin et al. (2018) aimed at identifying the literacy skills of prekindergarten students, such as vocabulary implementation, phonological awareness, and writing awareness, to see if prekindergarten had a positive impact on student outcomes in those areas. There were 178 students who participated in the study. Data collection tools consisted of a phonological awareness scale, checklist for evaluating writing skills, checklist for evaluating writing awareness, checklist for name writing, and the Peabody image word matching test. Findings from this study indicated prekindergarten had a positive impact on phonological awareness, receptive language skills, and writing skills.

Wenz-Gross et al. (2018) first explained that achievement gaps for low-income children have existed for quite some time, yet researchers have not thoroughly studied the impact that the

second step early learning (SSEL) curriculum has on these students. The authors aimed to address this long-standing achievement gap among low-income students through the use and implementation of the SSEL curriculum in prekindergarten classrooms. The researchers conducted a year-long study with 922 students from 63 different classrooms, all of whom were from low-income schools. The authors fully implemented the SSEL curriculum in those 63 prekindergarten classrooms. Prekindergarten students received tests at the beginning and end of the school year and tested upon transition into kindergarten. Results from this study indicated the SSEL curriculum did not directly impact the academic outcomes of these low-income students during their prekindergarten years, but the curriculum did increase things like attention span, memory, and behavior. These skills enabled the prekindergarten students to retain more, and upon entry into kindergarten they had higher academic achievement on reading and were more ready for kindergarten as a result.

Johnson et al. (2019) explained prekindergarten and how it impacts students has caught the nation's attention. With the pressure of student performance on the minds of many educators, stakeholders have started focusing on publicly funded prekindergarten and the effects it has on low-income students. Further, Johnson et al. explained publicly funded school districts have a strong potential to help prekindergarten students from low-income families as they transition to kindergarten. Moreover, they asserted the topic of individual differences in prekindergarten students, such as child difficult temperament status, had not yet been thoroughly explored. Particularly, the authors asserted students with child difficult temperament status traditionally have had higher rates of behavior issues, were more distracted in class, have had difficulty adapting to the classroom environment, and have had a harder time regulating their classroom behaviors as compared to their peers.

Johnson et al. (2019) focused on how publicly funded prekindergarten affected students who have been identified with child difficult temperament status and how they transition into kindergarten as compared to their peers. Approximately 10,700 students participated in Johnson et al.'s study. The authors conducted interviews, administered questionnaires, and administered several assessments that measured temperament, cognitive, and social-emotional ability. Results from the study indicated an immediate gain for low-income students in the temperament of prekindergarten students that impacted overall reading scores.

Hamilton (2020) and Hernandez (2011) indicated students who are not proficient readers by the third grade are four times more likely to not graduate than those students who are on reading grade level by the time they leave third grade. Additionally, data show economically disadvantaged students who are not proficient readers by third grade are eight times more likely not to graduate high school. While the financial inequity gap grows in Texas and the United States, researchers are trying to find out how to quickly close that reading gap for economically disadvantaged students (David & Marchant, 2015; Hamilton, 2020; Hernandez, 2011).

A Focus on Accountability and Increasing Standards on Statewide Testing

Having concerns for underprivileged children and associated achievement gaps thereof, information from the *Historical Overview of Assessment in Texas* (Texas Education Agency, 2009) and Searson (2016) showed that Texas created a statewide testing system in 1980, starting with a statewide mandated test called the Texas Assessment of Basic Skills. The Texas Assessment of Basic Skills test only involved math, reading, and writing for certain grade levels. In 1986, Texas raised the testing standards and released a mandated test called the Texas Educational Assessment of Minimum Skills. For the first time in Texas, students had to be able to pass an examination to be able to receive a high school diploma. In 1990, legislators raised the

bar once more and shifted from minimum standards and increased standards for passing rates. This mandated test was called the Texas Assessment of Academic Skills, which encompassed math, reading, and writing tests for both English- and Spanish-speaking students in Grades 3, 5, 7, 9, and 11. Seniors had to have passed these tests to graduate as well (Searson, 2016; Texas Education Agency, 2009).

Soon after, with the inauguration of George W. Bush in 2001, the No Child Left Behind Act became the poster child for high stakes testing policies in Texas (Hamilton, 2020; Heilig & Darling-Hammond, 2008; Hong & Youngs, 2008; Searson, 2016). One year after President Bush was elected, a former superintendent of schools for the Houston Independent School District, Rod Paige, joined the team, as Paige was appointed U.S. Secretary of Education. Together, President Bush and Secretary of Education Paige attempted to lead educators across the United States in an attempt to close the achievement gaps for economically disadvantaged students (Hamilton, 2020; Hong & Youngs, 2008; Nichols et al., 2012). This led to the increased standard for testing in Texas with the release of a new mandated test for students called the Texas Assessment of Knowledge and Skills in 2003. For the first time in Texas history, seniors had to pass four content area exams in English, history, math, and science to graduate. With increased accountability came lots of controversy. Some thought that increased testing standards would help ensure efforts toward helping students become more literate, well rounded, and technologically savvy. Others thought the high standards were too high because they covered many more subjects and put too much pressure on the students. Many people argued that students with achievement gaps, namely the economically disadvantaged students, would suffer the most (Hamilton, 2020; Ninness, 2006; Searson, 2016; Smiley, 2005; Texas Education Agency, 2009).

Hamilton (2020) said as stakeholders in Texas began to once more raise the standards in Texas accountability for testing, student expectations increased once more with the release of the STAAR and End of Course Exams (EOC). These STAAR exams start in the third grade with reading and math; fourth grade with reading, math, and writing; fifth grade with reading, math, and science; sixth grade with reading and math; seventh grade with reading, math, and writing; and eighth grade with reading, math, science, and social studies. EOCs start with high school students in ninth grade with English I, Algebra I, and Biology; 10th grade with English II; and 11th grade with U.S. History. At any grade level, students can be held back. At fifth and eighth grades, students have to pass the exams in reading and math in order to be promoted. If a student in fifth grade or eighth grade does not pass, a Grade Placement Committee (GPC) can meet and decide to hold a student back. At ninth, 10th, and 11th grade, all students must pass all five exams in order to be considered for graduation. If a student does not pass all five EOCs, then a GPC can meet and decide if a student can be eligible to meet graduation requirement. In that situation, a senior must have met three of five EOCs and complete a GPC packet to show mastery to be considered for graduation (Hamilton, 2020; Nichols et al., 2012; Searson, 2016).

Essentially, Hamilton (2020), Nichols et al. (2012), and Searson (2016) shared data showing that each time a new testing accountability system was released, the tests became more difficult for economically disadvantaged students, involving a deeper understanding of the curriculum, encompassing more necessary skills to perform satisfactorily, and became more like reading tests. Effectively, questions became longer, with richer vocabulary and more complex reading passages. For example, according to the Texas Education Agency (2019) and the *Historical Overview of Assessment in Texas* (Texas Education Agency, 2009), a math test on the newest STAAR test might have 60 questions, and each question on the STAAR test might have

several sentences within one question. Therefore, students who are economically disadvantaged and who struggle with vocabulary, struggle with reading comprehension and fluency, struggle with reading stamina, or have gaps in reading will have a more difficult time achieving success on these newer forms of released tests (Hamilton, 2020; Nichols et al., 2012; Searson, 2016).

Reading Performance of Economically Disadvantaged Students in Grade 3

Hamilton and Slate (2019) conducted a comparative quantitative study on Grade 3 reading performance of Black students by their economic status. Within this study, Black students who were economically disadvantaged clearly showed a statistical significance of lower passing rates than Black students who were not economically disadvantaged on the STAAR reading test. At the Approaches standard, 54% of Black students who were economically disadvantaged met the Approaches standard, with their economically advantaged peers performing much higher at 82%. At the Meets standard, 22% of Black students who were economically disadvantaged met the Meets standard, with their economically advantaged peers performing much higher at 51%. At the Masters standard, 9% of the Black students who were economically disadvantaged met the Masters standard, with their economically advantaged peers performing much higher at 29%.

Within that same study, Hamilton and Slate (2019) compared Grade 3 reading performance of Hispanic students by their economic status. Within this study, Hispanic students who were economically disadvantaged clearly showed a statistical significance of lower passing rates than Hispanic students who were not economically disadvantaged on the STAAR reading test. At the Approaches standard, 64% of Hispanic students who were economically disadvantaged met the Approaches standard, with their economically advantaged peers performing much higher at 88%. At the Meets standard, 29% of Hispanic students who were

economically disadvantaged met the Meets standard, with their economically advantaged peers performing much higher at 59%. At the Masters standard, 14% of Hispanic students who were economically disadvantaged met the Masters standard, with their economically advantaged peers performing much higher at 36%.

In both instances, Hamilton and Slate (2019) showed that Black and Hispanic students who were economically disadvantaged performed much lower than their economically advantaged peers on Grade 3 STAAR Reading tests. Therefore, results from this study showed a significant difference in Grade 3 STAAR Reading results. The authors did not take a comparison of prekindergarten and its impact on these scores into account.

Hamilton (2020) did a comparison study on three studies conducted by Harris (2018), McGown (2016), and Schleeter (2017) on differences in demographic characteristics on the Grade 3 STAAR Reading test results. This study encompassed economic status, ethnicity and race, and English language learners. Results from this study showed a significant difference of boys, English language learners, and economically disadvantaged students. In all instances, boys performed lower than girls, English language learners who were boys performed lower than girls, and economically disadvantaged students performed lower than economically advantaged students. Therefore, the results from this comparative study showed a significant difference in how boys, English language learners, and economically disadvantaged students performed on the Grade 3 STAAR Reading test (Hamilton, 2020; Harris, 2018; McGown, 2016; Schleeter, 2017).

A Narrowed Focus for All-Day Prekindergarten

Sutherland (2009) performed a study and through a quantitative approach affirmed existing beliefs about the importance of prekindergarten in early childhood education.

Furthermore, the conclusive findings from the study illuminated test data that potentially proved

prekindergarten to be a precursor to a successful school career. More specifically, the Sutherland study showed that test scores of students who attended prekindergarten programs were consistently higher on reading than those who did not attend some kind of prekindergarten program previously. Sutherland recommended a future study be done regarding prekindergarten that is not broad and that focuses on reading scores and relationships between students and those scores.

Rose (2010) posited students who do not perform at grade level in reading by the end of their third-grade year face challenges later in life and throughout their learning career. The Rose study results showed the absence of prekindergarten is a big indicator of a far-reaching impact on student performance not only in the middle of their elementary learning career but throughout life. Furthermore, Rose explained studies have shown that students who did not attend prekindergarten, when assessed in kindergarten through third grade, consistently struggled on reading assessments. Rose also found there is a strong correlation between students who do not attend some sort of prekindergarten program and lower reading outcomes for students. Rose recommended a study involving school districts and examining prekindergarten participation levels and following and assessing that same cohort of students through third grade. Also, Rose argued this future study could be strengthened by adding an element such as targeting a group of economically disadvantaged students. Moreover, Rose strongly suggested following a prekindergarten cohort of economically disadvantaged students over 4 or 5 years. Doing such would add to the credibility of the study.

Williams (2017) explained that while primary education has been a focus in education for many years, the early elementary school years have been ultimately responsible for the stimulation and growth of cognitive abilities in young students. This cognitive stimulation led to

increased academic benefits later in life for students beyond schooling years. Moreover, the study results showed a positive correlation between students who attended prekindergarten and their reading achievement in third grade. Williams recommended a study examining early childhood education in association with varying standardized test scores. Additionally, the researcher recommended comparing locally made district assessments to the state-created STAAR tests.

Schuth (2017) explained a student's ability to master reading at a third-grade reading level by the end of third grade is among the highest importance for educational leaders. Furthermore, the author posited that a multitude of factors, such as low economic status and whether a student attended half- or full-day prekindergarten, affects a student's educational tract. The Schuth study showed economically disadvantaged students who have attended a full-day prekindergarten program have an overall higher positive student achievement rate over their economically disadvantaged peers who attended only a half-day prekindergarten program. The author potentially proved students who attended an all-day prekindergarten program experienced significant growth by the second-grade year of school. Furthermore, the Schuth study showed students who originally attended all-day prekindergarten who had individualized education plans, who were English language learners, and who were also economically disadvantaged showed significant growth. Schuth recommended a future study examining test scores on all primary grade levels beyond the prekindergarten and kindergarten year distinguishing at which grade level students experienced the biggest academic gains. Additionally, the researcher recommended a study to specifically look at the demographics of students who attended half-day and full-day prekindergarten programs and monitor those same students and their reading achievement by the end of third grade.

Weems (2019) performed a quantitative correlational study to identify whether children who attend a prekindergarten program achieve higher academic success in reading and math by third grade. The author focused on a campus with high numbers of economically disadvantaged students, and the numbers for this campus included 500 students within the prekindergarten program. The population was 20% African American, 60% Hispanic, 50% English language learners, and 80% economically disadvantaged. Results from this study showed there was a significant difference in math in Grades 3 and 4 with students who attended a prekindergarten program. Additionally, results from this study showed no significant difference in reading for any grade level. The author recommended performing a similar study, with the addition of comparing half-day versus full-day prekindergarten and third grade STAAR results.

Palickar (2015) shared while the focus of educational leaders and legislators has turned to achievement gaps and how to close those gaps with quality prekindergarten programs, parents, researchers, and educators continue to debate the appropriate length of the school day for preschool programs. Before moving into an area, buying a home, or before taking their child to a new school district, many parents will have to decide if their child will need a half-day prekindergarten program or a full-day prekindergarten program. The fact remains that there is mixed research on this topic. Half of the studies available indicate half-day programs are sufficient, and the other half of the studies indicate a full day is optimal for closing achievement gaps.

Palickar (2015) said full-day prekindergarten programs consist of 8-hour days, 5 days a week. Typically, a half-day prekindergarten program is only 4 hours a day. So, the real difference between these two programs is time spent in class, which is a difference of 4 hours per day. Palickar suggested the other big difference is how many additional opportunities the full-

day prekindergarten students get to engage in hands-on learning activities and richer developmentally appropriate learning. Other researchers, however, suggested full-day prekindergarten students have more time to get into programs within the school day that allow for better nutrition, health screenings, and better parent-teacher communication that are critical in helping prekindergarten students to avoid challenges that would otherwise inhibit student academic achievement. Furthermore, students in a full-day prekindergarten program receive up to three square meals a day, and many school districts provide these meals for free.

Again, Palickar (2015) explained that even though the school day is shorter with half-day preschool programs, these same students are exposed to core curriculum such as math and reading. Students at a half-day program get breakfast and lunch provided. Most school districts offer free and reduced lunch prices for economically disadvantaged students. Students in this half-day setting get about the same time with curriculum-rich classes, but less time or fewer opportunities to engage with other students, less time for hands-on learning activities, less time working on gross-motor skills, and less time engaging in language and communication experiences. In this type of situation, half-day prekindergarten students would potentially have more time with parents at home to engage in these types of experiences. However, most of the time, economically disadvantaged students will not get these rich experiences at home, creating potential achievement gaps in socioeconomic classes of students.

House Bill 3 Implications

When legislation is passed in Texas regarding education, the Texas Education Agency (2019) is responsible for enforcing those educational reforms. As a result, the Texas Education Agency enforces House Bill 3 implementation. Specifically, House Bill 3 mandates all-day prekindergarten in every public school within the state of Texas for economically disadvantaged

students. This mandate is only half-day funded, leaving the public-school districts to foot the other half of the money it takes to run these programs. With an ever-growing tighter budget in education, this presents a big problem. The reforms within House Bill 3 have caused arguments from legislators on both ends of the educational spectrum (Atteberry et al., 2019).

Atteberry et al. (2019) and Weiland (2018) asserted despite some strong evidence that supports all-day prekindergarten showing how early investments in 3- and 4-year-old students can create impactful and lasting benefits, studies tracking these impacts over time within present-day prekindergarten programs have yielded some mixed results. Bassok et al. (2018) argued this mixed data has come across to communities and policymakers as a clear limitation of the current evidence surrounding the impacts of prekindergarten. This is quite possibly why there is a mandate from House Bill 3 for school districts to have full-day prekindergarten programs but only half-day funding.

Atteberry et al. (2019) suggested an additional study regarding all-day prekindergarten programs could possibly help state representatives, educational leaders, and citizens in Texas understand the impact of all-day prekindergarten programs for economically disadvantaged students in the area of reading literacy. Furthermore, Lipsey et al. (2018) suggested a study in this area could also potentially ensure that these same constituents see the value in the decision of Texas legislators to fully fund all-day prekindergarten programs for economically disadvantaged students, taking the financial burden off school districts. Therefore, additional longitudinal studies are needed.

Summary

In this chapter, I presented several studies to establish a greater understanding of achievement gaps and how prekindergarten is a fundamental building block for kindergarten

readiness and beyond. Although prekindergarten is a powerful indicator of whether students will arrive at kindergarten with fewer gaps in learning, mixed results from studies have forced legislators within Texas to mandate full-day programs but only fund half a day. The next chapter includes the rationale for the methodology of the study and procedures for completing the quantitative causal-comparative analysis of half-day and full-day prekindergarten students within two large school districts in Texas.

Chapter 3: Research Method and Design

Researchers have shown that achievement gaps for economically disadvantaged students have existed for nearly half a century (Abenavoli, 2019). Compelling evidence indicates early childhood programs such as all-day prekindergarten could potentially help to stop achievement gaps in a student's primary years in the area of reading (Atteberry et al., 2019; Henson, 2016; Schuth, 2017; Weems, 2019; Williams, 2017). The purpose of this quantitative causal-comparative study was to compare the impact that half-day and full-day prekindergarten had on economically disadvantaged students on third grade STAAR reading test results. This chapter includes a description of the research design and method applied.

In this study, I focused on answering the following questions:

RQ1: To what extent, if any, does a significant mean difference exist in 2019 Grade 3 STAAR Reading scores between economically disadvantaged students who previously attended half- and full-day prekindergarten programs?

RQ2: To what extent, if any, does a significant mean difference exist between economically disadvantaged students who achieved the Approaches level or better on the 2019 Grade 3 STAAR Reading test between those who previously attended half- and full-day prekindergarten programs?

Research Design and Methods

The aim of the study was to analyze data from both half-day prekindergarten students and full-day prekindergarten students to see which prekindergarten program has a greater impact on students' STAAR reading scores at the conclusion of third grade. I used a pragmatic approach to education as a lens to analyze the half-day and full-day prekindergarten programs and impact on reading outcomes for students. Using Dewey's progressive approach, Cuffaro (1995) noted

children should learn by doing, and children learn better when they are actively engaged. Additionally, individuals using this progressive theory push for students learning in interactive classes because interaction with the environment is essential for the learning process. Therefore, when applying this framework, one can imply that early elementary education directly impacts students and their educational success for the duration of their schooling years and beyond into life (Shouse, 1947). This is true as prekindergarten students and their experiences in school, such as engaging instruction in the realm of reading, are a critical part of the schooling experience (Schuth, 2017). As these same students move through school to third grade, the aim is to have them all reading at the third grade reading level, thus impacting their entire educational career in a positive way. Through that educational lens and within the study, I carefully analyzed half-day and full-day prekindergarten and their academic impact on economically disadvantaged students Grade 3 STAAR Reading scores.

The methodology of this study is quantitative, while the design is causal-comparative in nature. The type of inferential statistic used to determine a significant difference, was both the independent samples t test and the chi square test. I used the independent samples t test because the dependent variable, which was Grade 3 STAAR Reading scores, was seen as continuous data with finite intervals of 1255, 1345, 1465, 1555, and with numerical endpoints of 1255 and 1555. Furthermore, I also used the chi square test because the dependent variable of Grade 3 STAAR Reading scores was also seen as ordinal or categorical data with categories of Did Not Pass, Approaches, Meets, and Masters, and with cutoff scores of 1255, 1345, 1465, and 1555. Moreover, because of the way I obtained and presented the raw data from each district and to further strengthen the study, I used both the independent samples t test and chi square test. Utilizing both the independent samples t test and chi square test added strength to this study and

enabled the study to include a comparison of mean differences between two groups, which consisted of economically disadvantaged third-grade students who either attended a half or full day of prekindergarten. Methods of collecting data included analysis of documents consisting of TAPR and Texas Public Education Reports for Prekindergarten (TPEIR). In both cases, the data were not put together on these reports just for the study, but instead the data are public information and archival.

According to the Texas Education Agency (2021) the TAPR report has data such as the percentage of economically disadvantaged students on each specific campus concerning districts across the state of Texas. Additionally, the TAPR report has data regarding Grade 3 STAAR Reading test results for all third graders on each specific campus. Therefore, looking at this TAPR report showed school districts that have high numbers of economically disadvantaged students and showed the Grade 3 STAAR Reading test results for each campus.

Furthermore, according to the Texas Education Agency (2021), an additional report called the TPEIR for prekindergarten showed students who were deemed kindergarten ready from districts across the state of Texas and whether these same students attended a half-day or full-day prekindergarten program in the year 2014. Looking at this data allowed me to see which districts implemented half-day and full-day prekindergarten programs in the year 2014. It was important to look at the year 2014 regarding this specific report because it was the same group of students who took the Grade 3 STAAR Reading test in 2019.

Population

In the study, I focused on two separate school districts. Both school districts have high numbers of economically disadvantaged students above the 70% threshold. Additionally, one school district has previously implemented a half-day prekindergarten program in the 2014–2015

school year, while comparatively the other school district previously has implemented a full-day prekindergarten program in the 2014–2015 school year.

Cohort A, the first cohort chosen for the study, had 135 prekindergarten students in the 2014–2015 school year. This targeted district implemented a half-day prekindergarten program in the 2014–2015 school year. Data from this school district was collected in both the 2014–2015 and 2018–2019 school years. The 2014–2015 data showed that campus stakeholders previously implemented a half-day prekindergarten program, and the 2018–2019 data showed how well those same students did on the Grade 3 STAAR Reading test. Additionally, in looking at the TAPR report for this district, there was an indicator showing a large amount of economically disadvantaged students above the 70% threshold. Therefore, the targeted population for the study was economically disadvantaged students who attended a half-day prekindergarten program in 2014–2015 and analyzing how well they did on the 2019 STAAR test.

Cohort B, the second cohort chosen for the study, had 258 prekindergarten students in the 2014–2015 school year. This targeted district had implemented a full-day prekindergarten program in the 2014–2015 school year. Data from this school district were collected in both the 2014–2015 and 2018–2019 school years. The 2014–2015 data showed that campus stakeholders previously implemented a full-day prekindergarten program, and the 2018–2019 data showed how well those same students did on the Grade 3 STAAR Reading test. Additionally, in looking at the TAPR report for this district, there was the same indicator showing a large amount of economically disadvantaged students above the 70% threshold. Therefore, the targeted population for the study was economically disadvantaged students who attended a full-day prekindergarten program in 2014–2015 and analyzing how well they did on the 2019 STAAR reading test.

For simplicity purposes, Cohort A was coded to half day and Cohort B was coded to full day. Further, each cohort consisted of third-grade students who previously attended a half-day or full-day prekindergarten program. Moreover, each cohort consisted of third-grade students who took the Grade 3 STAAR Reading test after third grade and who previously attended a campus with economically disadvantaged student populations that exceeded the threshold of 90% or higher. Furthermore, for the purpose of this study, Cohort A and B were the independent variables, and the Grade 3 STAAR Reading test results was the dependent variable. In other words, the independent variable data point was the student, and the dependent variable data point was the Grade 3 STAAR Reading test score assigned to each student.

Sample

The sample population for the study included students who entered prekindergarten in the 2014–2015 school year within two separate urban central Texas school districts. The sample size for Cohort A consisted of all the half-day prekindergarten programs within that respective district, with a total number of 135 students. The sample size for Cohort B consisted of all the full-day prekindergarten programs within that respective district, with a total number of 258 students. The data used for the sample size was taken from the TAPR and TPEIR reports the Texas Education Agency releases each year, which is public information anyone can access on the Texas Education Agency website.

I compared Cohorts A and B longitudinally from prekindergarten through third grade. Specifically, for both cohorts, the sample population for the study was half-day and full-day prekindergarten students who entered third grade in the 2018–2019 school year. Additionally, for both cohorts, the 2014–2015 data came from previously released data archived in the TPEIR, and the 2018–2019 data came from previously released data archived from the TAPR report that the

Texas Education Agency releases each year. For this sample, I conducted a causal-comparative study examining data from both reports.

For the purpose of this study, the independent variables were half-day and full-day prekindergarten students. All half-day and full-day prekindergarten students also received a dependent variable, which was a Grade 3 STAAR Reading Cutoff Score. Each student who achieved Did Not Pass received a cutoff score of 1255. Each student who achieved Approaches received a cutoff score of 1345. Each student who achieved Meets received a cutoff score of 1465. Lastly, each student who achieved Masters received a cutoff score of 1555.

Instrumentation

According to the *Historical Overview of Assessment in Texas* (Texas Education Agency, 2009), the STAAR was first implemented in the spring of 2011–2012 school year. This assessment was created to measure student academic readiness upon completion of each grade level that a student enrolls. This assessment includes measurements of reading, math, science, social studies, and writing. Broadly stated, the STAAR assessments begin in third grade with reading and math and end in the 11th grade with U.S. history. Campus administrators administer the STAAR assessments, and the Texas Education Agency (2022a) creates all assessments. Questions within each test are based on readiness and supporting standards that come straight from the Texas Essential Knowledge and Skills (Texas Education Agency, 2022b). Students should know the required Texas Essential Knowledge and Skills upon completion of a grade level and be able to do them with efficiency. For fidelity purposes, each administrator and teacher administering the STAAR test receives annual training and signs an oath regarding testing securing before, during, and after the tests are taken (Texas Education Agency, 2022a).

Information from the Texas Education Agency (2022b) and STAAR performance standards (Texas Education Agency, 2022a) show Texas school districts, campuses, principals, and teachers it is essential that teachers create lesson plans centered around readiness and supporting standards found in the Texas Essential Knowledge and Skills. Additionally, information shows that each unit taught by teachers on each campus throughout the year should help to build the students' knowledge base up in that subject. This ultimately prepares those same students for the STAAR tests, which are administered at the end of the academic year. Moreover, information shows the STAAR test is the ultimate EOC exam, which shows the student, teacher, and parents where each student presently is academically in that specific area tested.

Data Collection and Analysis Procedure

The Texas Education Agency (2022a) creates STAAR performance standards and performance-level cutoff scores. STAAR performance standards specifically include the following:

STAAR performance standards relate levels of test performance to the expectations defined in the state-mandated curriculum standards known as the Texas Essential Knowledge and Skills (TEKS). Cutoff scores established by the agency distinguish between performance levels, or categories. The process of establishing cutoff scores that define performance levels for an assessment is the standard-setting. The standard setting is also used to classify students into an appropriate performance category.

For STAAR ..., the labels for the performance categories are

- Masters Grade Level
- Meets Grade Level

- Approaches Grade Level
- Did Not Meet Grade Level. (paras. 1–2)

For data collection, the Texas Education Agency (2021) compiles all the STAAR test data on one document called the TAPR report. Each campus and district receives a copy of their TAPR report, and this report is made public for all Texas residents to see. Information on this report is critical for seeing where a campus is, where they can improve, and how to best meet student needs in the future. For some residents, these reports help make decisions on where students will go to school. Many public information sites use these reports, and this ultimately can drive student enrollment up or down for a district.

For the study, I examined the Grade 3 STAAR Reading test results from the 2018–2019 school year. I examined Cohort A, which was the half-day prekindergarten cohort in 2014–2015 and Cohort B, which was the full-day prekindergarten cohort in 2014–2015. Specifically, to address Research Question 1, I analyzed data percentages of Did Not Meet, Approaches, Meets, and Masters from that Grade 3 STAAR Reading test in 2018–2019 and compared for Cohorts A and B to see whether significant mean differences existed in 2019 Grade 3 STAAR Reading scores between economically disadvantaged students who attended half-day and full-day prekindergarten programs in 2014–2015. Specifically, to address Research Question 2, I analyzed and compared data percentages on only Approaches, Meets, and Masters from the Grade 3 STAAR Reading test in 2018–2019 for Cohorts A and B to see whether significant mean differences existed in 2019 Grade 3 STAAR Reading scores between economically disadvantaged students who attended half-day and full-day prekindergarten programs in 2014–2015.

Furthermore, I used the independent-samples t test and chi square test to compare the means between two unrelated groups. The independent samples t test aided in comparing means between two unrelated groups that had continuous dependent variables, and the chi square test aided in comparing the means between those same unrelated groups that had categorical dependent variables. For this study, I used both the independent samples t test and chi square test to understand whether half-day or full-day prekindergarten was more beneficial regarding how those same economically disadvantaged students performed on Grade 3 STAAR Reading tests. Lastly, the dependent variable was the Grade 3 STAAR Reading test, and the independent variables were half-day and full-day prekindergarten for economically disadvantaged students.

Moreover, for simplicity purposes, I coded the dependent variable of the Grade 3 STAAR Reading test as follows: Did Not Pass received a Texas Education Agency cutoff score of 1255, Approaches received a Texas Education Agency cutoff score of 1345, Meets received a Texas Education Agency cutoff score of 1465, and Masters received a Texas Education Agency cutoff score of 1555. Lastly, it is important to note each student, which was the independent variable, received a dependent variable data point. In other words, for the purpose of the study, each student received a Grade 3 STAAR Reading test score.

Texas Education Agency STAAR Cutoff Scores

To identify which scores defined Did Not Pass, Approaches, Meets, and Masters, I used the Grade 3 STAAR Reading Assessment Performance Standards. Specifically, I used the Grade 3 STAAR reading cutoff scores to define if a student had an achievement of Did Not Pass, Approaches, Meets, or Masters. The Did Not Pass raw score cutoff was a score of 1255. The Approaches raw score cutoff was a score of at least 1345. The Meets raw score cutoff was a score of at least 1468. The Masters raw score cutoff was a score of at least 1555 or higher.

Descriptive Statistics

Regarding Research Questions 1 and 2, I used descriptive statistics to obtain frequencies to create data that showed how students performed in the areas of Did Not Pass, Approaches, Meets, and Masters. Additionally, this type of descriptive statistic showed the frequency and percentage of students in half-day and full-day prekindergarten and which area of mastery they were grouped in based on student performance on the Grade 3 STAAR Reading test.

Furthermore, I used this descriptive statistic to produce several tables that are presented later in this chapter.

Defining Variables

Before uploading any data into the Statistical Package for the Social Sciences (SPSS) software, all data received a code: *Did Not Pass* = 0, *Approaches* = 1, *Meets* = 2, and *Masters* = 3. Additionally, each student received a Grade 3 STAAR Reading test score of either Did Not Pass of 1255, Approaches of 1345, Meets of 1465, or Masters of 1555. Additionally, half-day prekindergarten received a label of SCHOOL, and the numbers 0, 1, 2, and 3 received a label of SCORE. Using descriptive statistics, I created a frequency output (see Tables 1 and 2). Once all data received a code, I uploaded it into the SPSS software.

Establishing Dependability and Integrity

The bulk of the data used in this study is on the Texas Education Agency website. This allowed for the study to have an increased level of dependability and integrity within the methods of data collection (Saldaña & Omasta, 2017). Additionally, there was data from the study on the TAPR reports (Texas Education Agency, 2021). These TAPR reports included data such as STAAR reading scores, student populations, levels of economically disadvantaged students for each individual campus and district, and which year these tests were taken at the

conclusion of third grade. Moreover, the TPEIR for kindergarten was also on the Texas Education Agency website. This data show which years school districts implemented half-day and full-day prekindergarten programs. This data was important for establishing student cohorts for the study. Lastly, to account for transient student populations, I compared the prekindergarten student roster to the third-grade student roster for each cohort. I completed this comparison of rosters to distinguish reliability within whole group comparisons. Transient student roster percentages within a given cohort did not increase above a 20% threshold; therefore, I examined individual student STAAR cutoff scores for students who scored Did Not Meet, Approaches, Meets, and Masters. I only examined cutoff scores for students who made both the prekindergarten and third grade roster. The cutoff scores for Did Not Meet, Approaches, Meets, and Masters can also be found on the Texas Education Agency website, as these are also public information.

Ethical Considerations

Encountering ethical issues during a research study is unavoidable (Orb et al., 2000). Ethical considerations carried out in this study were within the Institutional Review Board (IRB), and the IRB gave approval (see appendix) before any interactions with individuals or collection of data. The IRB reviewed information with participating districts detailing the nature of the study, as well as the goals and purpose of the study and how the data were gathered and used (Peless, 2021; Sanjari et al., 2014).

The research type for the study was causal-comparative. Due to the nature of this type of study, all participants who participated in either half-day or full-day prekindergarten in the 2014–2015 school year were masked and kept confidential. The TPEIR that are released each year only give out public information regarding each district and campus as a whole. For example, only the

campus, school year, and the number of student participants are released. Student names are never released and are kept confidential. Only each campus has individual student names for participation. Furthermore, for the study, only cohort student participation numbers and levels of achievement Did Not Pass, Approaches, Meets, and Masters were needed.

Additionally, due to the nature of this type of study, all participants who participated in the Grade 3 STAAR Reading test after their third-grade year in 2018–2019 were kept confidential. The TAPR reports that were released each year only give out public information regarding each district and campus as a whole. For example, only the campus, school year, and Grade 3 STAAR Reading percentages in Approaches, Meets, and Masters were released. Therefore, individual student names were never released and are kept confidential. Only each campus has individual student names and scores for participation in the third grade STAAR reading. Furthermore, for the study, only cohort student levels of achievement Did Not Pass, Approaches, Meets, and Masters in Grade 3 STAAR Reading were needed for the study.

I currently serve in the capacity as a superintendent of schools within a rural school district. This district's student population is 88% economically disadvantaged. Furthermore, this district implements a full-day prekindergarten program for all students. At no time did my position as superintendent of schools impact the data within the study or cause bias.

Assumptions

Using assumptions within a study is important and necessary for the study to be credible and valid because assumptions directly influence what kind of inferences the researcher can reasonably draw from the data within the study (Terrell, 2016). For researchers, policymakers, legislators, and educational administrators, this information could be valuable in decision-making for early childhood education. Second, it is easy to assume all-day prekindergarten

would be a better benefit to students. Some may assume this because the students in the all-day prekindergarten program in 2014–2015 would have had twice as much seat time in an all-day prekindergarten program as compared to a half-day program. Third, it is easy to assume this information could be beneficial in addressing potential emerging achievement gaps or early childhood education program needs and could be used to monitor the progress of childhood outcomes longitudinally over time. Last, another assumption is I conducted the study on the premise that elementary school programs for prekindergarten through third grade all have good teacher quality, good reading programs, and good reading interventions in place. Specifically, I compared half-day and full-day prekindergarten programs in reading and used data from Grade 3 STAAR Reading tests administered in the 2018–2019 school year.

Furthermore, there are six assumptions that all studies must adhere to when a researcher uses the independent samples t test. All six criteria must be checked before the study can be conducted using independent samples t test.

Assumption 1

Regarding the independent samples t test, the dependent variable was measured on a continuous scale. For this study, I analyzed Grade 3 STAAR Reading test scores. Did Not Pass had a cutoff score of 1255, Approaches had a cutoff score of 1345, Meets had a cutoff score of 1465, and Masters had a cutoff score of 1555.

Regarding the chi square test, the dependent variable was also measured on a categorical scale. For this study, I analyzed Grade 3 STAAR Reading test scores. Did Not Pass had a categorical cutoff score of 1255, Approaches had a cutoff score of 1345, Meets had a cutoff score of 1465, and Masters had a cutoff score of 1555.

Assumption 2

Regarding the independent samples t test, the independent variable consisted of two categorical and independent groups. I used students who attended half-day prekindergarten and students who attended a full-day prekindergarten as the independent groups.

The chi square test consists of independent variables that are independent from each other. These independent variables were the half-day and full-day prekindergarten cohorts in the study. These cohorts did not cross over and were truly independent from each other.

Assumption 3

Regarding the independent samples t test, the study had an independence of observations within both independent groups. In other words, there were two separate groups of students, with no participant being in more than one group. Half-day students did not participate in a full-day program and vice versa.

Assumption 4

Regarding the independent samples t test, there were no significant outliers on the data points when using the SPSS software. The students either had an academic achievement score of Did Not Pass, Approaches, Meets, or Masters.

Assumption 5

Regarding the independent samples t test, the dependent variable of STAAR cutoff scores was approximately normally distributed for each group of the independent variables. An academic achievement score of 1255 received a label of Did Not Pass. An academic achievement score of between 1345 and 1464 received a label of Approaches. An academic achievement score between 1465 and 1554 received a label of Meets. Last, an academic achievement score

over 1555 received a label of Masters. I determined all academic achievement labels using the Grade 3 STAAR Reading cutoff scores.

Assumption 6

Regarding the independent samples t test, through using Levene's test for equal variances, I determined that this assumption was violated. On Table 5 in Chapter 4, there was a p value of less than .001, which is less than .05. There was a significance on this, so I could not assume the two groups had equal variances. Therefore, I had to reject the null hypothesis. Ultimately, this meant that I used the bottom row for the independent samples t test when looking at the two-sided p value.

Limitations

Limitations are variables that could potentially have a negative influence on the results of the study, the researcher has little or no control over these limitations, and limitations almost always restrict the generalizations of findings (Terrell, 2016). Potential limitations to the study could be not measuring data in the areas of teacher quality, teacher years of experience, programs used to improve reading outcomes, and interventions done for specific students to close gaps in student learning in reading (Atteberry et al., 2019). Researchers have argued that for economically disadvantaged students, teacher and program quality play a huge part in determining positive outcomes student outcomes (Atteberry et al., 2019). Again, an assumption is I conducted the study on the premise that elementary school programs for prekindergarten through third grade all had moderate to good teacher quality, reading programs, and reading interventions in place. For both cohorts of students looked at within two separate urban central Texas school districts, all assumptions applied to both cohorts. Specifically, in the study, I

compared half-day and full-day prekindergarten programs in reading and used data from Grade 3 STAAR Reading tests administered in the 2018–2019 school year.

Lastly, a limitation to the study was within the independent samples *t* test. Before the independent samples *t* test can be used for a study, it must first pass all six assumptions.

Assumption 6 can be violated, but if it is violated, the researcher must use the bottom row on the data table showing results when interpreting and presenting the data. In the case of this study, I determined using Levene's test for equal variances that Assumption 6 was violated. Table 5 in Chapter 4 shows a *p* value of less than .001, which is less than .05. Because of the significance, one cannot assume the dependent variables of Did Not Pass, Approaches, Meets, and Masters have equal variances. Essentially, Assumption 6 was violated because the categories of data used, such as Did Not Pass, Approaches, Meets, and Masters. This is the exact reason this study also includes a chi square test. Researchers use a chi square test when the dependent variables, such as the ones listed above, are categorical in nature.

Delimitations

Delimitations are limitations that are intentionally set by the researcher, explain the boundaries of the study, and restrict the capacity of the study. Therefore, researchers control these factors to impact the results (Terrell, 2016). The first delimitation for the study was focusing on half-day and full-day prekindergarten programs and student outcomes in third grade. The second delimitation was focusing on Grade 3 STAAR Reading tests. The third delimitation was focusing on only economically disadvantaged students. To further narrow the focus, the fourth delimitation was to examine only two large urban central Texas school districts that have an economically disadvantaged student population threshold of 70% or higher. Lastly, for

simplicity and quantitative purposes, the only methods of collection of data included analysis of documents consisting of TAPR reports and TPEIR for prekindergarten.

Summary

This chapter included a description of the methodology for the quantitative causal-comparative study. Furthermore, this chapter provided a description of a study where I analyzed the impact that all-day prekindergarten has on economically disadvantaged students in literacy upon taking the Grade 3 STAAR Reading test. The next chapter includes a presentation of the findings from the study, in which I examined two cohorts of prekindergarten students from two large school districts in the state of Texas.

Chapter 4: Presentation of Data

The purpose of this study was to compare the impact that half-day and full-day prekindergarten had on economically disadvantaged students on Grade 3 STAAR Reading test results. This chapter includes a review of the data analysis model utilized, the statistical model previously outlined in Chapter 3, the descriptive statistics, and the data on how half- and full-day prekindergarten economically disadvantaged students upon exiting third grade performed on the Grade 3 STAAR Reading test. I used data to determine how economically disadvantaged students performed on academic achievement levels of Did Not Pass, Approaches, Meets, and Masters. Research Question 1 results showed data pertaining to student academic achievement scores of Approaches and below, and Research Question 2 results showed data pertaining to student academic achievement scores of Approaches and above.

Research Question 1

RQ1: To what extent, if any, does a significant mean difference exist in 2019 Grade 3 STAAR Reading scores between economically disadvantaged students who previously attended half- and full-day prekindergarten programs?

Information for the first research question follows in two parts. The first part is a presentation of the data, and the second part the applicable statistical analysis.

Presentation of the Data

Table 1 shows the cutoff scores that the Texas Education Agency has adopted as raw scores for Did Not Pass, Approaches, Meets, and Masters. I used these cutoff scores to determine the mastery level and academic performance for half-day and full-day prekindergarten students. Each student who took the Grade 3 STAAR Reading test landed on either Did Not Pass, Approaches, Meets, or Masters.

Table 1*Grade 3 STAAR Reading Cutoff Scores*

Assessment	Grade level performance			
	Did not pass	Approaches	Meets	Masters
Grade 3 reading	Less than 1345	1345	1468	1555

Table 2 shows data on 135 half-day prekindergarten students. Furthermore, it shows how they performed on the Grade 3 STAAR Reading test on the academic achievement areas of Did Not Pass, Approaches, Meets, and Masters.

Table 2*Half-Day Prekindergarten Frequency Table Including Did Not Pass Scores*

School	<i>f</i>	%	Valid %	Cumulative %
Half-day	135	100.0	100.0	100.0
Score				
Did not pass	50	37.0	37.0	37.0
Approaches	55	40.7	40.7	77.8
Meets	13	9.6	9.6	87.4
Masters	17	12.6	12.6	100.0
Total	135	100.0	100.0	

One hundred thirty-five students from Cohort A who had previously attended a half-day prekindergarten program upon exiting third grade took the Grade 3 STAAR Reading test. Out of 135 students, 50 students achieved Did Not Pass, 55 students achieved Approaches, 13 students achieved Meets, and 17 students achieved Masters.

Table 3 shows data on 258 full-day prekindergarten students and how they performed on the Grade 3 STAAR Reading test on the academic achievement areas of Did Not Pass, Approaches, Meets, and Masters. Two hundred and fifty-eight students from Cohort B who had previously attended a full-day prekindergarten program upon exiting third grade took the Grade 3 STAAR Reading test. Out of 258 students, 89 students achieved Did Not Pass, 86 students achieved Approaches, 33 students achieved Meets, and 50 students achieved Masters.

Table 3

Full-Day Prekindergarten Frequency Table Including Did Not Pass Scores

School	<i>f</i>	%	Valid %	Cumulative %
Full-day	258	100.0	100.0	100.0
Score				
Did not pass	89	34.5	34.5	34.5
Approaches	86	33.3	33.3	67.8
Meets	33	12.8	12.8	80.6
Masters	50	19.4	19.4	100
Total	258	100.0	100.0	

Data from the half-day and full-day frequency tables showed the overall pass rate for students who previously attended full-day prekindergarten programs was higher than that of students who had previously attended a half-day prekindergarten program. Students who previously attended a half-day program had an overall pass rate of 63%. Students who previously attended a full-day prekindergarten program had an overall pass rate of 65.5%.

Data from the half-day and full-day frequency tables showed the overall percentage of students who had previously attended a full-day prekindergarten program was higher in the areas of Meets and Masters but lower in Approaches. Students who had previously attended a full-day

prekindergarten program had an overall Approaches percentage of 33.3% as compared to 40.7% for students who had previously attended a half-day prekindergarten program. Students who had previously attended a full-day prekindergarten program had an overall Meets percentage of 12.8% as compared to 9.6% for students who had previously attended a half-day prekindergarten program. Students who had previously attended a full-day prekindergarten program had an overall Masters percentage of 19.4% as compared to 12.6% for students who had previously attended a half-day prekindergarten program. In other words, in comparing half-day and full-day prekindergarten and its effect on Grade 3 STAAR Reading scores in the areas of Did Not Pass and Approaches, data showed little difference in the percentage of students who did not pass versus did pass.

Independent Samples t Test

The independent samples t test is most commonly used to test the statistical differences between the means of two groups (Muijs, 2010). To further answer Research Question 1, I used the independent samples t test. I chose this parametric test because it closely followed the type of inferential statistic used in the Schuth (2017) study. Furthermore, I chose an independent samples t test as one of the types of parametric tests because the data received from each school district of Did Not Pass, Approaches, Meets, and Masters with associated cutoff scores of 1255, 1345, 1465, and 1555 are continuous data and therefore meet the criteria for an independent samples t test to be performed. Additionally, I used this parametric test to compare mean differences between two groups, which consist of economically disadvantaged third grade students who either attended a half day of prekindergarten or a full day of prekindergarten. Additionally, I used an independent samples t test to compare Grade 3 STAAR Readings cores of students who had previously been enrolled in either half-day or full-day prekindergarten

programs, which produced the data shown in Tables 4 and 5. Specifically, to address Research Question 1, I analyzed and compared mean differences for cutoff scores for Did Not Meet, Approaches, Meets, and Masters.

Table 4 specifically shows the independent samples *t* test for group statistics. I used this group statistic to compare the 85 half-day prekindergarten students to the 169 full-day prekindergarten students who scored a raw score of Approaches or better. This data shows the overall score for full-day prekindergarten was just a little higher on the third-grade STAAR reading at an overall raw score of 1370.38 as compared to the half-day overall score of 1349.96. Lastly, this group statistic shows roughly a 12-point standard deviation with full-day prekindergarten students slightly outperforming the half-day prekindergarten students on Approaches or better.

Table 4

Independent Samples t Test—Group Statistics

School	<i>N</i>	<i>M</i>	<i>SD</i>	Std. error mean
Half-day score	135	1349.96	100.300	8.632
Full-day score	258	1370.38	112.608	7.011

Table 4 showed a mean difference in Grade 3 STAAR Reading scores between students who previously participated in half-day prekindergarten versus full-day prekindergarten that was very minimal. The half-day prekindergarten students had a mean score of 1349.96, and the full-day prekindergarten students had a mean score of 1370.38. Additionally, students who previously attended a half-day prekindergarten program had a standard deviation of 100.3, and students who previously attended a full-day prekindergarten program had a standard deviation of 112.6.

Table 5 shows the independent samples t test for quality means and variances. Within Table 5 are results for two separate tests. First, the results include a Levene's test for equality of variances. This tested Assumption 6 to either accept or reject the null hypothesis that both groups, half-day prekindergarten and full-day prekindergarten, have approximately equal variances of homogeneity. Additionally, within Table 5 are the results for the t test for equality of means. Researchers use this test to show whether or not there is a significant mean difference between both groups on the Grade 3 STAAR Reading scores. Along with both tests, there is data indicating two-sided p value of both the equal variances assumed and not assumed. Additionally, this table shows the mean difference and standard error difference between students who previously attended a half-day and full-day prekindergarten program.

Table 5

Independent Samples t Test—Quality of Means and Variances

	Eq. var.	Levene's test for equality of variances		t test for equality of means		Significance		Mean diff.	Std. error diff.
		F	Sig.	t	df	One- sided p	Two- sided p		
Score	Assumed	11.678	<.001	-1.772	391	.039	.077	-20.428	11.530
	Not assumed			-1.837	300.821	.034	.067	-20.428	11.121

Note. Eq. var. = equal variance.

To either accept or reject the null-hypothesis of Assumption 6, I used the Levene's test for equality of variances. The p value was less than .001, which showed there was a significance. Therefore, the assumption was violated, and I rejected the null-hypothesis because I could no longer assume that the groups had equal variances (Salkind, 2017). Therefore, in Table 5, I used

the bottom row when looking at the second test. When looking at the t test for equality of means, the not assumed bottom row had a two-sided p value of .067.

Table 5 showed a two-sided p value of both the equal variances assumed and not assumed. Using the cutoff of .05, Muijs (2010) stated any p value smaller than .05 translates to being statistically significant. When comparing students who previously attended a half-day prekindergarten to students who previously attended a full-day prekindergarten and how they performed on the Grade 3 STAAR Reading test in the academic areas of Did Not Pass, Approaches, Meets, and Masters, there was no significant mean difference, with $t(300.821) = -1.837, p = .067$.

Chi Square Test

The chi square test is a nonparametric test and different than the independent samples t test. Researchers use the chi square test when the dependent variables are ordinal or categorical in nature. Within the scope of the study, the data received from each school district could also be seen as continuous data or categorical in nature. Labeling each student's score as Did Not Pass, Approaches, Meets, or Masters with the associated cutoff scores of 1255, 1345, 1465, or 1555 meets the standard of categorical or ordinal. To further strengthen this study, I also performed a chi square test.

Table 6 shows the results of the chi square test performed. Additionally, this table shows a value, degrees of freedom, and a two-sided asymptotic significance. For the purpose of the study, I used the Pearson chi square data.

Table 6*Chi Square Tests—Academic Achievement Scores of Approaches and Below*

Frequencies	Value	<i>df</i>	Asymptotic significance (2-sided)
Pearson chi-square	4.669 ^a	3	.198
Likelihood ratio	4.789	3	.188
Linear-by-linear association	3.122	1	.077
<i>N</i> of valid cases	393		

Note. ^a = 0 cells (.0%) have expected count less than 5. The minimum expected count is 15.80.

Table 6 shows a two-sided asymptotic significance of .198. Muijs (2010) stated any significance value smaller than .05 translates to being statistically significant. The chi square test showed that $\chi(3) = 0.198$, $p = .198$. This means that there is no statistically significant association between half-day and full-day prekindergarten students who performed on the Grade 3 STAAR Reading tests when looking at students who scored in the academic performance areas of Did Not Pass, Approaches, Meets, and Masters.

Research Question 2

RQ2: To what extent, if any, does a significant mean difference exist between economically disadvantaged students who achieved the Approaches level or better on the 2019 Grade 3 STAAR Reading test between those who previously attended half- and full-day prekindergarten programs?

Information for the second research question follows in two parts. The first part is a presentation of the data, and the second part the applicable statistical analysis.

Presentation of the Data

Table 7 shows frequency output. The frequency output shows how many students participated on the Grade 3 STAAR Reading test. This data also shows how many prekindergarten students had previously been enrolled in a half-day prekindergarten program. Additionally, this data shows how students performed in the academic achievement areas of only Approaches, Meets, and Masters. Furthermore, this data shows the percentages of each category of Approaches, Meets, and Masters.

Table 7

Half-Day Prekindergarten Frequency Table

School	<i>f</i>	%	Valid %	Cumulative %
Half-day	85	100.0	100.0	100.0
Score				
Approaches	55	64.7	64.7	65.0
Meets	13	15.3	15.3	80.0
Masters	17	20.0	20.0	100.0
Total	85	100.0	100.0	

Table 7 shows frequency output, which was how many students participated on the Grade 3 STAAR Reading test who had previously been enrolled in a full-day prekindergarten program. Additionally, this data shows how students performed in the academic achievement areas of Approaches, Meets, and Masters. Lastly, this data shows the percentages of each category.

This data showed 85 out of 135 students from Cohort A achieved Approaches or greater on the Grade 3 STAAR Reading test, which makes a 62.96% pass rate. Additionally, this data showed 169 of 258 students from Cohort B achieved Approaches or greater on the Grade 3

STAAR Reading test, which makes a 65.5% pass rate. To further break this data down, of the half-day students who passed, students who previously were enrolled in half-day prekindergarten achieved student achievement rates with Approaches at 64.7%, Meets at 15.3%, and Masters at 20%.

Table 8

Full-Day Prekindergarten Frequency Table

School	<i>f</i>	%	Valid %	Cumulative %
Full-day	169	100.0	100.0	100.0
Score				
Approaches	86	50.8	50.8	51.0
Meets	33	19.6	19.6	71.0
Masters	50	29.6	29.6	100.0
Total	169	100.0	100.0	

Of the full-day students who passed, students who were previously enrolled in full-day programs achieved student achievement rates with Approaches at 50.8%, Meets at 19.6%, and Masters at 29.6%. So, the students who were previously enrolled in full-day prekindergarten had an overall pass rate in Approaches that was lower than students who were previously enrolled in half-day prekindergarten but had an overall pass rate in Meets and Masters that was higher than students who were previously enrolled in half-day prekindergarten programs.

Independent Samples t Test

Researchers most commonly use the independent samples *t* test to test the statistical differences between the means of two groups (Muijs, 2010). To further answer Research Question 2, I used the independent samples *t* test. Furthermore, I used this type of parametric test

because the focus of Research Question 2 was primarily on the spread of Grade 3 STAAR Reading scores of Approaches, Meets, and Masters. Additionally, I used this parametric test to compare mean differences between two groups, which consisted of economically disadvantaged third grade students who either attended a half day of prekindergarten or full day of prekindergarten and who had met a student achievement of Approaches, Meets, or Masters.

Table 9 shows data regarding group statistics, which I used to compare overall group statistics for the 85 half-day prekindergarten students who met Approaches or better as compared to the 169 full-day prekindergarten students who met Approaches or better. This data shows the overall score for full-day prekindergarten was higher on the Grade 3 STAAR Reading at an overall raw score of 1431.15, as compared to the half-day overall score of 1405.81.

Table 9

Independent Samples t Test—Group Statistics, Approaches or Better

School	<i>N</i>	<i>M</i>	<i>SD</i>	Std. error mean
Half-day score	85	1405.81	86.743	9.409
Full-day score	169	1431.15	92.904	7.146

Table 10 shows data regarding independent samples *t* test for quality means and variances. This table, used to compare Grade 3 STAAR Reading scores of students who had previously been enrolled in either half-day or full-day prekindergarten programs, shows the independent samples *t* test for quality means and variances. Within Table 10, one can see two separate tests. First, I used the Levene's test for equality of variances on Assumption 6 to either accept or reject the null hypothesis that both groups, including half-day prekindergarten and full-day prekindergarten, had approximately equal variances of homogeneity. Additionally, within Table 10, one can see the *t* test for equality of means. I used this test to show whether or not

there was a significant mean difference between both groups on the Grade 3 STAAR Reading scores. Along with both tests, one can see data indicating two-sided p value of both the equal variances assumed and not assumed.

Table 10

Independent Samples t Test—Quality of Means and Variances

	Eq. var.	Levene's test for equality of variances		t test for equality of means		Significance		Mean diff.	Std. error diff.
		F	Sig.	t	df	One- sided p	Two- sided p		
Reading Score	Assumed	4.480	.035	-2.096	252	.019	.037	-25.336	12.087
	Not assumed			-2.144	179.082	.017	.033	-25.336	11.815

Note. Eq. var. = equal variance; diff. = difference.

To either accept or reject the null-hypothesis of Assumption 6, I used the Levene's test for equality of variances. The p value was .035, which showed there was a significance. Therefore, this violated the assumption, and I rejected the null hypothesis because I could no longer assume that the groups had equal variances (Salkind, 2017). Therefore, in Table 10, I used the bottom row when looking at the second test. When looking at the t test for equality of means, the not assumed bottom row had a two-sided p value of .033.

Table 10 showed a two-sided p value of both the equal variances assumed and not assumed. Using the cutoff of .05, Muijs (2010) stated any p value smaller than .05 translates to being statistically significant. When comparing students who previously attended a half-day prekindergarten to students who previously attended a full-day prekindergarten and how they performed on the Grade 3 STAAR Reading test in the academic achievement areas of

Approaches, Meets, and Masters, there was a significant mean difference $t(179.082) = -2.144, p = .033$. Furthermore, by looking at Table 10, data show students who attended a full-day prekindergarten program outperformed students who previously attended a half-day prekindergarten program in the areas of Meets and Masters.

Chi Square Test

Research Question 2 specifically aligned with students who only scored Approaches, Meets, and Masters to see if there was any significant difference. Labeling each student's score as Approaches, Meets, or Masters with the associated cutoff scores of 1345, 1465, or 1555 met the standard of data that is categorical or ordinal in nature. To further strengthen this study, I also performed a chi square test.

Table 11 shows the results of the chi square test conducted to specifically focus on students who performed in the academic areas of Approaches, Meets, and Masters. Additionally, this table shows a value, degrees of freedom, and a two-sided asymptotic significance. For the purpose of the study, I used the Pearson chi square data.

Table 11

Chi Square Tests—Academic Achievement Scores of Approaches and Above

Frequencies	Value	<i>df</i>	Asymptotic significance (2-sided)
Pearson chi square	4.475 ^a	2	.107
Likelihood ratio	4.539	2	.103
Linear-by-linear association	4.336	1	.037
<i>N</i> of valid cases	254		

Note. ^a = 0 cells (.0%) have expected count less than 5. The minimum expected count is 15.39.

Table 11 shows a two-sided asymptotic significance of .107. Muijs (2010) stated any significance value smaller than .05 translates to being statistically significant. Using the chi square test, $\chi^2(2) = 0.107, p = .107$. This means there is no statistically significant association between half-day and full-day prekindergarten students who performed on the Grade 3 STAAR Reading tests when looking specifically at students who scored in the academic performance areas of only Approaches, Meets, and Masters.

Summary

This chapter included a summary of what was studied, research questions, null hypotheses, alternative hypotheses, and independent samples *t*-test data. The final chapter includes the summary and discussion related to the research findings, questions, and conclusion of the study of half-day and full-day prekindergarten programs and how these same programs impact Grade 3 STAAR Reading scores for economically disadvantaged students.

Chapter 5: Discussion, Conclusions, and Recommendations

Chapter 4 included a thorough examination of the half-day and full-day prekindergarten programs within two school districts. This final chapter includes a discussion of the findings and conclusions based on the analysis of the half-day and full-day prekindergarten programs within two separate school districts. The chapter concludes with the recommendations, including specific suggestions for future research.

Discussion

The summary of findings includes the data collected for Research Questions 1 and 2. For Research Question 1, there was no statistical mean difference in findings, but the answer to Research Question 2 did include a statistical mean difference.

Research Question 1

One hundred thirty-five students from Cohort A who had previously attended a half-day prekindergarten program upon exiting third grade took the Grade 3 STAAR Reading test. Data showed 63% of all the half-day students from Cohort A had an achievement score of Approaches or better on the Grade 3 STAAR Reading test. Additionally, 258 students from Cohort B who had previously attended a full-day prekindergarten program upon exiting third grade took the Grade 3 STAAR Reading test. Data showed 65% of all the full-day students from Cohort B had an achievement score of Approaches or better on the Grade 3 STAAR Reading test.

Furthermore, when comparing students who previously attended a half-day prekindergarten to students who previously attended a full-day prekindergarten and how they performed on the Grade 3 STAAR Reading test in the achievement areas of Did Not Pass, Approaches, Meets, and Masters, data from an independent samples t test showed a two-sided p value of .067. Having a two-sided p value greater than .05 scientifically shows that there is no

significant mean difference between students who attended half-day and full-day prekindergarten programs and how they performed on the Grade 3 STAAR Reading test (Muijs, 2010).

Moreover, when comparing students who previously attended a half-day prekindergarten program to students who previously attended a full-day prekindergarten program and how they performed on the Grade 3 STAAR Reading test in the achievement areas of Did Not Pass, Approaches, Meets, and Masters, data from a chi square test showed a two-sided asymptotic significance of .198. This test scientifically shows that there is no statistically significant association between half-day and full-day prekindergarten students who performed on the Grade 3 STAAR Reading tests when looking at students who scored in the academic performance areas of Did Not Pass, Approaches, Meets, and Masters.

Research Question 2

Data showed the half-day prekindergarten students in Cohort A achieved student achievement rates with Approaches at 64.7%, Meets at 15.3%, and Masters at 20%. Additionally, the data showed that the full-day students in Cohort B achieved student achievement rates of Approaches at 50.8%, Meets at 19.6%, and Masters at 29.6%. Furthermore, data showed the students who previously attended full-day prekindergarten had an overall pass rate in Approaches that was slightly lower than students who were previously enrolled in half-day prekindergarten but had an overall pass rate in Meets and Masters that was higher than students who previously attended half-day prekindergarten programs.

Additionally, using SPSS software, the half-day prekindergarten students in Cohort A who took the Grade 3 STAAR Reading test produced a mean score of 1405.81. Sixty-five students performed in the Approaches category, 15 students in the Meets category, and 20 students in the Masters category. In comparison, using SPSS software, the full-day

prekindergarten students in Cohort B who took the Grade 3 STAAR Reading test produced a mean score of 1431.15. Fifty-one students performed in the Approaches category, 20 students in the Meets category, and 30 students in the Masters category. Therefore, one can see students who previously took a full day of prekindergarten outperformed their counterparts in the areas of Meets and Masters.

Furthermore, when comparing students who previously attended a half-day prekindergarten to students who previously attended a full-day prekindergarten and how they performed on the Grade 3 STAAR Reading test in the achievement areas of only Approaches, Meets, and Masters, data from the independent samples *t* test showed a two-sided *p* value of .033. Having a *p* value number that is lower than .05 scientifically proves there is a significant mean difference between students who attended half-day and full-day prekindergarten programs and how they performed on the Grade 3 STAAR Reading test (Muijs, 2010).

Moreover, when comparing those same students who previously attended a half-day prekindergarten program to students who previously attended a full-day prekindergarten program and how they performed on the Grade 3 STAAR Reading test in the achievement areas of only Approaches, Meets, and Masters, data from the chi square test showed a two-sided asymptotic significance of .107. This test scientifically shows that there is no statistically significant association between half-day and full-day prekindergarten students who performed on the Grade 3 STAAR Reading tests when looking at students who scored in the academic performance areas of Did Not Pass, Approaches, Meets, and Masters.

Researchers have argued whether half-day or full-day prekindergarten programs can better help to stop achievement gaps for economically disadvantaged students (Atteberry et al., 2019). Previous studies regarding the benefits of half-day and full-day prekindergarten programs

have shown mixed results. Atteberry et al. (2019) suggested the initial benefits of prekindergarten programs on children's academic skills could possibly be short lived, fading over time as students move through school to third grade. This ideology has led to an opposing group of stakeholders who question data that show student academic impact of preschool that diminishes after first grade (Bassok et al., 2018). Moreover, additional research on this topic shows that prekindergarten attendees and nonattendees no longer differ in measurable ways soon after they transition to kindergarten (Abenavoli, 2019).

On the opposing side of the prekindergarten spectrum are many researchers who have conducted studies that support the idea of full-day prekindergarten (Henson, 2016; Schuth, 2017; Weems, 2019; Williams, 2017). Henson (2016) produced data showing that early response to intervention strategies in the area of reading made available early on positively impacted economically disadvantaged students enrolled in a prekindergarten program. Moreover, this study indicated economically disadvantaged students continually showed the highest academic gains from attending a prekindergarten program versus their economically advantaged counterparts. Henson recommended future longitudinal research examining beginning-of-the-year and end-of-the-year tests with a further examination of half-day and full-day prekindergarten and the effects they have on economically disadvantaged students.

Schuth's (2017) study produced data that potentially proved that economically disadvantaged students who previously attended a full-day prekindergarten program have an overall higher positive student achievement rate by the end of their second-grade year of school. Additionally, students who originally attended all-day prekindergarten who had individualized education plans, who were English language learners, and who were also economically disadvantaged showed significant growth over students who only attended a half-day

prekindergarten program. Schuth recommended future researchers examine test scores in kindergarten, first, second, and third grades to distinguish which grade level students experienced the biggest academic gains. Schuth also suggested a future study involving student demographics such as economically disadvantaged students who attended a half-day and full-day prekindergarten program and monitoring those same students' reading achievement by the end of third grade.

Williams' (2017) study produced data that showed a positive correlation between students who attended prekindergarten and their reading achievement in third grade. An important proposal from Williams for future researchers was to examine early childhood education in association with varying standardized test scores, such as the state-created STAAR Reading test. Also, Weems (2019) confirmed that there was a significant difference in math in Grades 3 and 4 with students who attended a prekindergarten program. Additionally, results indicated no significant difference in reading for any grade level. The author recommended performing a similar study, with the addition of comparing half-day versus full-day prekindergarten and Grade 3 STAAR results.

As stated previously, Henson (2016), Schuth (2017), Weems (2019), and Williams (2017) identified several indicators for student success in primary education. Researchers have reported on the relationship between these studies on economically disadvantaged students in the area of reading. However, these studies lacked research associated with economically disadvantaged students who attended prekindergarten on STAAR Reading scores upon exiting third grade. The research also lacked a comparison of those same Grade 3 STAAR Reading scores of students who previously attended half-day prekindergarten versus students who previously attended a full day of prekindergarten.

For this study, I effectively compared two large school districts on the impact that half-day and full-day prekindergarten programs had on economically disadvantaged students on Grade 3 STAAR Reading test results within their respective districts. I assessed the academic achievement of students who previously attended either a half-day or full-day prekindergarten program and how they performed in the areas of Did Not Pass, Approaches, Meets, and Masters using both an independent samples t test and a chi square test.

The first set of data showed the overall pass rate of Approaches between economically disadvantaged students who completed the Grade 3 STAAR Reading test and who attended a half-day or full-day prekindergarten program was not significantly different for both the independent samples t test and the chi square test. However, the second set of data from the independent samples t test did show the overall number of students who had previously attended a full-day prekindergarten program performed higher in the areas of Meets and Masters as compared to their half-day counterpart. Furthermore, this second set of data included a significant mean difference between students who attended a half-day or full-day prekindergarten program on student achievement in the areas of Meets and Masters. The significant difference from the independent samples t test was in the full-day prekindergarten program, which showed higher levels of achievement in the Meets and Masters academic achievement category. Lastly, when looking at the data from the nonparametric chi square test on Research Question 2, and when only looking at Approaches, Meets, and Masters data, the chi square test did not show any significant mean difference between half-day and full-day prekindergarten students.

Moreover, the independent samples t -test data supports previous literature and findings from studies conducted by Henson (2016), Schuth (2017), Weems (2019), and Williams (2017).

These previous researchers all showed data that full-day prekindergarten educationally impacted economically disadvantaged students in some way. However, all these studies lacked sustained longitudinal data that showed that those same educational impacts for full-day prekindergarten would be sustained through third grade. Furthermore, all these previous studies had proposals for a future longitudinal study that focused on half-day and full-day prekindergarten programs for economically disadvantaged students and the impact that these educational programs had on those same students in the years following in primary education through third grade.

Conclusions

With this study, I revealed the following findings and conclusions derived from the analysis of half-day and full-day prekindergarten programs and the performance of those same students on the Grade 3 STAAR Reading test:

1. The educational impact on economically disadvantaged students who previously attended a half-day and full-day prekindergarten program is minimal when looking at only the passing standard of Approaches on the Grade 3 STAAR Reading test, as data indicated that there was no statistical mean difference (Muijs, 2010).
2. The educational impact on economically disadvantaged students who previously attended a half-day and full-day prekindergarten program is more significant when looking at higher passing standards of Meets and Masters on the Grade 3 STAAR Reading test, as data indicated that there was a statistical mean difference (Muijs, 2010).
3. Economically disadvantaged students appear to have benefited more from a full-day prekindergarten program, showing higher scores in the academic achievement

categories of Meets and Masters within the Grade 3 STAAR Reading test, as data showed that there was a statistical mean difference (Muijs, 2010).

4. Though previous studies regarding the benefit of half-day and full-day prekindergarten have yielded mixed results, data from this study could potentially be used to present a strong case to policymakers and legislatures that supports either half-day or full-day prekindergarten programs for economically disadvantaged students (Atteberry et al., 2019; Bassok et al., 2018; Palickar, 2015).
5. Even though currently full-day prekindergarten is only half-day funded from the state of Texas, data from this study could be used to drive decision making for educational leaders within school districts to decide whether or not to provide full-day prekindergarten for all students (Texas Education Agency, 2019).
6. Even though currently full-day prekindergarten is only half-day funded from the state of Texas, data from this study could be used to drive decision making for policy makers and legislators to fully fund full-day prekindergarten programs in the state of Texas (Texas Education Agency, 2019).

Recommendations

As a current superintendent of schools for a public school district in the state of Texas that has an economically disadvantaged student population of 88% and offers a full-day prekindergarten program for all students, I strongly recommend a full-day and fully funded prekindergarten program for all school districts across the state of Texas. The data from this study is loud and clear. Economically disadvantaged students who previously have attended a full-day prekindergarten program outperformed economically disadvantaged students who had only previously attended a half-day prekindergarten program. This difference in academic

achievement for students in full-day programs was in the higher levels of academic student achievement of Meets and Masters. Essentially, this data show students who are enrolled in a full-day prekindergarten program are more likely to be successful in reading by the time they exit third grade.

Texas legislators made the decision years ago to fund half-day prekindergarten programs. As a current superintendent of schools, data from this study shows that it is now time for legislators in Texas to take action and fully fund full-day prekindergarten programs for all economically disadvantaged students. As this study showed, the data potentially proved that the investment of a fully funded full-day prekindergarten program for all economically disadvantaged students would be impactful longitudinally through third grade. This is why as a superintendent of schools, I am strongly recommending full-day and fully funded prekindergarten programs for all public-school districts in the state of Texas. The following recommendations are to anyone involved in public educational policy and practices, the Texas House Education Committee, the Texas Senate Education Committee, legislators, administrators, educational leaders, teachers, and communities. The future of Texas public education hinges on the following recommendations, which stem from the findings from the view of a current superintendent of schools within Texas public education:

1. Policymakers and legislators should make the decision to fully fund full-day prekindergarten programs for all students, so school districts can better support students academically, close achievement gaps in reading, and help students reach their reading potential upon exiting third grade. Doing this would help students become better prepared for their educational careers and beyond, so educators can better help students become productive citizens within their communities.

2. Policymakers and legislators should make the decision to fully fund full-day prekindergarten programs for all students, so school districts can better utilize strong resources for that full day and offer more services to families and their communities within their respective districts.
3. School district stakeholders must continue to advocate for full-day prekindergarten programs. This means that superintendents need to contact their local house representatives and state senators to make them aware of the benefits of a full-day prekindergarten on student achievement for economically disadvantaged students.
4. School districts must continue to advocate for fully funded, full-day prekindergarten programs. This means superintendents need to contact their local house and senate representatives and make them aware of the current half-day funding and how full-day funding would better benefit prekindergarten economically disadvantaged students. This would require the prekindergarten allotment increasing from a half-day funded mechanism to a full-day funded mechanism for each student who attends a district's full-day prekindergarten program.
5. Educational leaders and educational constituents must make the time to let legislators know about current conditions of half-day and full-day prekindergarten funding and the educational impact on the students. Legislators do not always know what is going on at public schools, and they rely on current practitioners to give a public-school perspective. Therefore, it is imperative that these educational leaders and constituents take time to testify to the Texas House Education and Texas Senate Education committees at the state capitol in Austin. Individuals giving invited testimony get 15 minutes to testify, and individuals giving uninvited testimony get 3 minutes to testify.

- Any time the Texas House or Senate Education Committees convene, anyone can sign up and testify about what is on the agenda. I strongly recommend that educational leaders and constituents take the time to testify and give public school perspective needed to change policy for the betterment of students.
6. School district stakeholders must continue to be members and meet regularly with the Texas Association of Rural Schools, Texas Association of Mid-Sized Schools, Friends of Texas Public Schools, Texas Association of Community Schools, and other organizations that can all come together to help fight for what is right for public education. These organization members help school districts with issues each year by contacting legislators on behalf of public education leaders. Therefore, it is important to stay in constant communication with these organizations and continue membership.
 7. School administrators should examine their own best practices regarding curriculum, instruction, assessment, intervention, and professional development to produce the best possible full-day prekindergarten program.
 8. School administrators should examine their own best practices about recruiting and retaining highly qualified prekindergarten staff in order to produce the best possible full-day prekindergarten program.

Suggestions for Further Research

In this study, I examined economically disadvantaged students who previously attended a half-day and full-day prekindergarten program on how they performed on the Grade 3 STAAR Reading test. Future recommendations are the following:

1. Research economically disadvantaged students who previously attended a half-day and full-day prekindergarten program and how they performed on the Grade 3 STAAR Reading test. An additional recommendation to future researchers would be to not use Grade 3 STAAR cutoff scores, but instead use the independent samples t test using dependent variables such as raw data scores from each student's Grade 3 STAAR Reading test.
2. Research economically disadvantaged students who previously attended a half-day and full-day prekindergarten program and how they performed on the Grade 3 STAAR Reading test. An additional recommendation to future researchers would be to add variables of teacher quality, program quality, response to intervention strategies used during the year, or best practices used throughout the year by administrators and teachers to ensure student success.
3. Conduct a qualitative study with research of economically disadvantaged students who previously attended a half-day and full-day prekindergarten program and how they performed on the Grade 3 STAAR Reading test. An additional recommendation for future researchers would be to give teachers and administrators an opportunity to share their perceptions of half-day and full-day prekindergarten and what is working or not working. Additionally, report on what teachers and administrators feel are the best practices that yield the best academic outcomes for economically disadvantaged students within these programs.
4. Research economically disadvantaged students from two or more districts who previously attended only a full-day prekindergarten program and how they perform on the Grade 3 STAAR Reading test. An additional recommendation for future

- researchers would be to add variables such as teacher experience and program quality, including curriculum used in the classroom, response to intervention strategies used during the year, and best practices used throughout the year by administrators and teachers to ensure student success.
5. Research economically disadvantaged students from two or more districts who previously attended only a full-day prekindergarten program and how they perform on the Grade 3 STAAR Reading test. An additional recommendation for future researchers would be to add variables of program quality such as curriculum used in the classroom, response to intervention strategies used during the year, and best practices used throughout the year by administrators and teachers to ensure student success.
 6. Research both economically disadvantaged and economically advantaged students from two or more districts who previously attended only a full-day prekindergarten program and how they perform on the Grade 3 STAAR Reading test. An additional recommendation for future researchers would be to add variables such as teacher experience and program quality, including curriculum used in the classroom, response to intervention strategies used during the year, and best practices used throughout the year by administrators and teachers to ensure student success.
 7. Find two economically disadvantaged districts that have high academic achievement rates on the Grade 3 STAAR Reading test and research those same districts' prekindergarten programs on length of day, curriculum used, teacher experience, and other best practices administrators and staff feel impact student achievement.

8. Find two economically disadvantaged districts with high academic achievement rates on the Grade 3 STAAR Reading test and research administrators such as the superintendent, campus principals, teachers, and parents on their perceptions of the prekindergarten programs and their effectiveness on Grade 3 STAAR Reading test student outcomes.

Summary

This final chapter included discussion, conclusions, and recommendations regarding data from a study comparing the impact of half-day and full-day prekindergarten programs on economically disadvantaged students who took the Grade 3 STAAR Reading test. Results indicate further research may be necessary to fully understand the impact that full-day prekindergarten may have on economically disadvantaged students as they progress through their primary school years beyond third grade.

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Appendix: IRB Approval

ABILENE CHRISTIAN UNIVERSITY
Educating Students for Christian Service and Leadership Throughout the World

Office of Research and Sponsored Programs
 320 Hardin Administration Building, ACU Box 29103, Abilene, Texas 79699-9103
 325-674-2885



September 10, 2021

Theodore Clevenger IV
 Department of Organizational Leadership
 Abilene Christian University

Dear Teddy,

On behalf of the Institutional Review Board, I am pleased to inform you that your project titled "All-Day Pre-kindergarten: Closing the Achievement Gap in Literacy",

(IRB# 21-105) is exempt from review under Federal Policy for the Protection of Human Subjects as:

- Non-research, and
- Non-human research

Based on:

* The research does not involve interaction or intervention with living individuals, and the information being collected is not individually identifiable [45 CFR 46.102(f)(2)]

If at any time the details of this project change, please resubmit to the IRB so the committee can determine whether or not the exempt status is still applicable.

I wish you well with your work.

Sincerely,

Megan Roth

Megan Roth, Ph.D.
 Director of Research and Sponsored Programs