

ASSESSING THE LINK BETWEEN GRIT AND ACADEMIC ACHIEVEMENT IN
READING, MATHEMATICS, AND WRITING AMONG 4TH GRADERS: AN
EXPLANATORY SEQUENTIAL MIXED METHODS INQUIRY

A Dissertation

by

MELISSA M. BARRINGTON

BS, Texas A&M University – College Station, 1994
MS, Walden University, 2008

Submitted in Partial Fulfillment of the Requirements for the Degree of

DOCTOR OF EDUCATION

in

EDUCATIONAL LEADERSHIP

Texas A&M University-Corpus Christi
Corpus Christi, Texas

December 2017

© Melissa M. Barrington

All Rights Reserved

December 2017

ASSESSING THE LINK BETWEEN GRIT AND ACADEMIC ACHIEVEMENT IN READING,
MATHEMATICS, AND WRITING AMONG 4TH GRADERS: AN EXPLANATORY
SEQUENTIAL MIXED METHODS INQUIRY

A Dissertation

by

MELISSA M. BARRINGTON

This dissertation meets the standards for scope and quality of
Texas A&M University-Corpus Christi and is hereby approved.

Kamiar Kouzekanani, PhD
Chair

Frank Lucido, PhD
Committee Member

Dessynie Edwards, PhD
Committee Member

Charles Etheridge, PhD
Graduate Faculty Representative

December 2017

ABSTRACT

Building a culture of success in schools has been a goal in Texas public schools since standardized tests were developed in 1979. Many schools have begun instilling grit in the classrooms in hopes of increasing student achievement and teaching students how to push themselves through difficult tasks. The primary purpose of the study was to assess the link between grit and academic achievement on standardized academic achievement in reading, mathematics, and writing in a non-probability sample of 4th graders.

The explanatory sequential mixed methods study was conducted in a rural elementary school in South Texas. The State of Texas Assessments of Academic Readiness (STAAR) scores of 78 4th graders were used for the quantitative component of the study. A focus group (n = 4) was conducted to document the perspectives of grade four teachers regarding the academic achievement of students that have grit.

Quantitative results showed that the study's 4th graders demonstrated grit; however, it was not statistically associated with academic achievement in reading, mathematics, and writing. Qualitative data resulted in three themes, namely, *Student Perspectives*, *Teacher Presentations*, and *Understanding Failure*, and suggested that grit has the potential to positively impact academic achievement.

The study's results have the potential to provide educational leaders and other concerned individuals with the opportunity to learn if non-cognitive skills may play a role in the academic success of students. The results of this study may persuade school administrators and personnel to take a closer look at students and grit. Even though the quantitative and qualitative results did not complement each other, there were reasons to believe that there could be a link between grit and academic achievement and that other factors (e.g., socioeconomic status) must be taken into

consideration in designing and conducting interventional programs that may enhance the development of grit. The study's results add to the body of knowledge about mindsets, grit, and academic achievement.

DEDICATION

I dedicate my dissertation to my high school track and field coach, George Harris. Coach Harris taught me the virtue of perseverance and I have continued to push myself in all that I do. Coach taught me GRIT! He instilled in me the virtue to never quit and to always strive to be my very best. To this day he still checks on me and supports me in all that I do and has always believed in me.

I also dedicate my dissertation to my husband, Bryan, and my two children, Scott and Brooke. We have been a rock solid family and even through all the busy times we have made it a priority to stand together through difficult tasks. Thank you for standing beside me as I worked to achieve this goal. Bryan, you are my best friend and I am the person I am today because of the love and support you have given me. Brooke and Scott, I am so blessed to have two kids that supported me and took up the slack on nights that I was pursuing this goal. There were many days that I wanted to quit, but the values that Coach Harris taught me and the support from you, my family, kept me going. I hope I have instilled in you the confidence to keep working towards your goals. I truly believe it takes the right mindset and grit to get you through anything. I hope you will follow your dreams and never let anyone tell you that you cannot do something.

ACKNOWLEDGEMENTS

My sincerest gratitude is extended to my doctoral committee chair, Dr. Kamiar Kouzekanani. I cannot say enough about this amazing man who pushed me and only expected the very best from me. I truly admire and will always be grateful to “Dr. K” for the countless hours spent assisting me with my dissertation. He will always have a special place in my heart. I would also like to thank my committee members, Dr. Frank Lucido, Dr. Dessynie Edwards, and Dr. Charles Etheridge for investing time in reading the dissertation and giving me excellent feedback. Your guidance and expectations helped me to improve the quality of my dissertation. There is also a special thanks to all the professors who shared their words of wisdom and encouragement. Thank you to Dr. Lynn Hemmer who was the first professor I met at Texas A&M and ensured I had everything I needed and a special thank you to Dr. Randall Bowden for helping me finalize my topic. Also, I could not have made it through this process without the encouragement of a fellow student, Diana Ortega. “Thank you Diana for pushing me.”

My family must also be included in this accomplishment. My parents, Rindle and Rosemary, have been a constant source of love and support. My children, Scott and Brooke have endured many evenings and social gatherings without their mom present. They bring tremendous joy to my life, and their sacrifices do not go unnoticed. Finally my most sincere appreciation goes to my best friend and husband Bryan. Thank you for believing in me, encouraging me, and most of all for telling me how proud you are of me. Thank you for loving me unconditionally through all of this and always standing by my side.

TABLE OF CONTENTS

CONTENTS	PAGE
ABSTRACT.....	V
DEDICATION.....	VII
ACKNOWLEDGEMENTS.....	VIII
TABLE OF CONTENTS.....	IX
LIST OF FIGURES	XII
LIST OF TABLES.....	XIII
CHAPTER I: INTRODUCTION.....	1
Background.....	1
Statement of the Problem.....	4
Theoretical Framework.....	5
Purpose of the Study	6
Operational Definitions	7
Glossary of Terms.....	8
Delimitation, Limitations, and Assumptions.....	8
Significance of the Study.....	9
CHAPTER II: REVIEW OF LITERATURE	11
Introduction.....	11
Grit.....	11
Theory of Mindset	16
Factors Influencing Academic Achievement.....	18

History of the Texas Assessment Program.....	21
Research Methods.....	23
Summary.....	27
CHAPTER III : METHODS.....	28
Introduction.....	28
Research Design	28
Subject Selection	30
Instrumentation	32
Data Collection	35
Data Analysis.....	36
CHAPTER IV : RESULTS.....	38
Introduction.....	38
Quantitative Results.....	38
Qualitative Results.....	43
Summary.....	51
CHAPTER V : SUMMARY, CONCLUSIONS, AND DISCUSSION	52
Introduction.....	52
Summary of the Results.....	54
Conclusions.....	55
Discussion.....	56
Implications	58
Recommendations for Further Research	62
Final Remarks.....	62

REFERENCES	64
APPENDIX A.....	72
Short Grit Scale.....	72
APPENDIX B	74

LIST OF FIGURES

FIGURES	PAGE
Figure 1 : Explanatory Sequential Design	29

LIST OF TABLES

TABLES	PAGE
Table 1 : Campus Student Profile	31
Table 2 : Campus Staff Profile.....	31
Table 3 : A Profile of the Subjects- Quantitative Component	39
Table 4 : Frequency and Percentage Distributions of Responses to Grit Scale.....	40
Table 5 : Outcome Measures	41
Table 6 : Correlation Matrix	42
Table 7 : Group Comparisons	43
Table 8 : Qualitative Data Codes	45
Table 9 : Qualitative Data Themes	46
Table 10 : Theme I Student Perspectives.....	47
Table 11 : Theme II Teacher Presentation	49
Table 12 : Theme III Understanding Failure	50
Table 13 : Teaching Grit	60

CHAPTER I: INTRODUCTION

Background

For generations, students have been educated in schools and have worked to learn the basic skills needed to function in society. They have been taught reading, mathematics, science, social studies, and writing, which are considered basic cognitive skills. Cognitive skills are customarily learned in school, essentially a student's grasp of content knowledge and academic skills such as writing and problem solving (Farrington, et al., 2012). Cognitive skills involve reflecting, reasoning, or remembering, and are based on particular brain structures that help us learn, apply, and solve problems (Wood & Siberry, 2014, p. 1). There are also non-cognitive skills, which represent patterns of thought, perception, and behavior that may continue to advance throughout life (Garcia, 2014, p. 1). Non-cognitive or "soft skills" are related to motivation, integrity, and interpersonal interaction (National Academies Press, 2011), which may also involve ability, but are mostly correlated with an individual's personality, temperament, and belief (Garcia, 2014). Non-cognitive skills are not measured by commonly administered cognitive tests such as standardized tests or academic examinations (Farrington, et al., 2012).

Due to the accountability movement, there has been a large emphasis on developing cognitive skills, and non-cognitive skills have been shadowed (Farrington, et al., 2012). Cognitive skills have been a focus of students' academic success, which are defined by how well students perform on standardized tests (TEA, 2016). Without the necessary cognitive skills, children may fall behind, because they are not able to understand and apply the new information; nevertheless, their skills and mastery of the required standards are tested by the state, benchmarks, and unit tests (Steiner-Adair, 2014). Recent research has suggested non-cognitive skills and the importance of having them for academic performance (Farrington et al., 2012).

The demands for students to perform are high and school districts are constantly looking at ways to increase their students' scores. In Texas, each district must meet the accountability standards set by the Texas Education Agency, which is responsible for providing assessment instruments to evaluate students' academic achievement and determine each district's accountability ratings. The modern approach of education is driven by state assessments that are reflected in our public schools across the nation (TEA, 1996).

Since the first Texas state standardized test was administered in 1980, the rigor and expectations for student performance has increased. For example, graduation rates increased from 73.80% in 1996 to 89.0% in 2015 (TEA, 2016). The progress "among Texas students has stalled recently with most average scores on the national assessment dropping or staying flat since 2011" (Chang, 2016, p. 1). The accountability requirements also include the State of Texas Assessments of Academic Readiness (STAAR), which is a criterion-referenced assessment, designed for grades 3 – 8 and End of Course (EOC) assessments for high school students, and is consistent with the assessments that were mandated by House Bill (HB) 3 in 2009 (TEA, 2016). The STAAR tests were first administered in the 2011-2012 year and were considered more rigorous than the previous state assessments due to the increased standards and expectations. The STAAR measures student achievement and academic growth during each child's academic career (TEA, 2011). In 2015, Texas 4th graders only had a two-point gain in mathematics on the STAAR compared to the National Assessment of Educational Progress (NAEP) in 2013, which ranked them 11th nationally (Chang, 2016). The "NAEP is the largest nationally representative and continuing assessment of what America's students know and can do in various subject areas" (NAEP, 2016, p. 1).

With accountability being a big concern and schools being graded on their state

assessments, it has raised questions about what educators are doing to ensure performance scores are increasing and students are showing growth (Lead4ward, n.d.). Educators have been at student data from assessments, asking themselves if they do everything they can to help students perform at high levels (NAEP, 2016). Tough (2016) advocated for the “acquisition of non-cognitive skills such as grit, resilience, and perseverance” to help make a difference in students performance levels (p. 2). Educators have embraced the idea that the key to success not only falls under cognitive skills, but also on character strengths, which are important and should be taught as necessary skills in the classroom (Tough, 2016). If non-cognitive skills are critical to academic performance, then a key task for educators becomes the development of these skills, traits and strategies of content knowledge and academic skills (Farrington et al., 2012).

Dweck (2008) provided examples of people that have been successful in life due to their grit. Duckworth (2016) defined grit as having the power of passion and perseverance toward a goal despite being confronted by obstacles and distractions. Some examples of people who have had grit are people that had to put in a lot of effort to be successful. Michael Jordan who was cut from his high school basketball team because he did not make the height requirement took this devastating event as an opportunity to prove that he was good enough and became a famous basketball player (Dweck, 2008). Walt Disney who was fired from a Missouri newspaper for not being creative enough and who went bankrupt at one time used these events to learn from his failures and became a success with his many Walt Disney movies and amusement parks (Dweck, 2009). Eminem, one of the highest selling rappers of all time, was close to hanging up his microphone when his first album flopped, but showed grit and stuck with it even when no one was listening (Duckworth, 2016). There are also many famous women with grit and determination. These women were willing to stand up for themselves and fight against the odds.

Maria Mitchell, who was told she could never be an astronomer because she was a woman, became the first woman astronomer. Harriet Tubman, who led over 300 slaves to freedom, and Susan B. Anthony, who fought for women's rights to vote, are just a few of the many who ventured forth to make themselves better people and their country stronger (Taylor, 2000). These people were not necessarily talented and were turned down many times. However, they never quit and continued to try and try again until they were successful.

Educators state that perhaps the single most common attribute of success is how hard students work (Tomlinson, 2013). Students face many challenges, experience failures, and must learn to persist. It is believed that students, who persevere when faced with challenges and adversity, have grit (Duckworth, Peterson, Matthews, & Kelly, 2007).

Statement of the Problem

Students with high IQ scores are reported to be performing at lower levels than do some students with lower IQ scores (Hochanadel & Finamore, 2015). These students have the cognitive skills, but many are missing the non-cognitive ones (Hochanadel & Finamore, 2015). This may relate to the accountability system, because if students are not passing the assessments, then something must be missing and it is the educator's job to find out what it is (Tough, 2012). If they have high cognitive skills, but do not have the drive and perseverance to push themselves and fail at something, then "...we do our students no favors if we fail to prepare them for the real world because they do not know how to respond to frustration and failure" (Hoerr, 2013, p. 2).

Students must be prepared in school to be able to function in society in order to succeed in the future (Ricci, 2013). They need to know how to read, write, and solve mathematics problems, which are important skills. However, educators must also prepare students socially for success in the real world by teaching them how to handle situations they may encounter.

Educators have begun to learn the importance of growth mindsets and how grit helps students persist in the face of adversity (Hoerr, 2013).

People that value effort are described as having a growth mindset, and people that think intelligence is unchangeable and exert less effort have a fixed mindset (Dweck, 2010a). There are students who are taught all the skills, but cannot perform well on standardized tests.

Teachers are mandated to embed rigorous questioning in their teaching and to follow the state standards, but they are not mandated to teach non-cognitive skills (TEA, 2016). They are not required to teach perseverance and grit.

Grit is perceived as a combination of perseverance of effort and consistency (Duckworth, 2016). However, with the world continuously changing, displaying grit can be instrumental in dealing with daily challenges and may affect student outcomes. This brings us to the statement of the problem on grit and student outcomes. These two dimensions have not been adequately researched and there are only a small number of investigations on the relationships between grit dimensions and student outcomes (Bowman, Hill, Denson, & Bronkema, 2015).

Currently, Texas 4th graders are assessed in reading, writing, and mathematics, using the STAAR. The academic achievement in these three subject matters in relation to grit has not been systematically investigated and documented.

Theoretical Framework

Carol Dweck's (2008) Theory of Mindset (TM) served as the study's theoretical framework. According to Dweck, it is not just our abilities that bring success, but how we approach our goals. It has been said, "the view you adopt for yourself profoundly affects the way you lead your life" and people with a fixed mindset feel rejected and blame others for their mistakes when they fail at something, while those with a growth mindset try harder to overcome

failures and find ways to improve (Dweck, 2008, p. 6).

Interestingly, Dweck has suggested that praising children for their intelligence and ability may actually jeopardize learning, and that a more important trait that affects success is grit (2008a,). The belief that effort is more important than is the ability may help support the potential for the relation between grit and academic achievement in reading, mathematics, and writing (Tough, 2012).

This is the mindset that can be connected to grit, allowing others to push forward during difficult times. Duckworth connected the TM to a psychological trait known as grit. As a psychologist, she explained that in the past, the key to success was intelligence (Duckworth, 2007). After conducting a study at an Ivy League school, people who were not as bright as their peers scored higher on tests; “their effort was measured and the grittiest students, not the smartest ones, had the highest GPAs” (Hansford, 2013, p. 1). Duckworth found that smarter students actually had less grit than did their peers who scored lower on an intelligence test (2009).

Purpose of the Study

The purpose of the study was to test the hypothesis that STAAR reading, writing, and mathematics scores of 4th graders were correlated to grit. The setting was an elementary school in a rural school district in South Texas. Students in the study had been educated in grit and taught to apply it as a skill in their everyday life. Their teachers had taught the importance of grit in their lessons. Only 4th graders were investigated because all three STAAR assessments were conducted at this grade level. To better understand the quantitative results, the study also included a qualitative component to assess and document the perspectives of 4th grade teachers regarding the role grit may play in academic achievement. The qualitative component of the

study followed interpretivism (Crotty, 1988), which is designed to understand individuals' social reality by focusing on how they see the world in an attempt to understand and explain human experiences. The study was guided by the following research questions:

1. To what extent is academic achievement in reading related to grit among 4th graders?
2. To what extent is academic achievement in mathematics related to grit among 4th graders?
3. To what extent is academic achievement in writing related to grit among 4th graders?
4. What are the perspectives of grade four teachers on the link between grit and academic achievement?

Operational Definitions

For the purpose of the study, the following operational definitions were adopted:

Grit was measured by the Grit Scale (Duckworth, Peterson, Matthews, & Kelly, 2007). Academic achievement in mathematics was measured by the proportion of the total number of correct answers to the total number of questions on the four STAAR reporting categories of (1) Numerical Representations and Relationships, (2) Computations and Algebraic Relationships, (3) Geometry and Measurement, and (4) Data Analysis and Personal Financial Literacy. Academic achievement in reading was measured by the proportion of the total number of correct answers to the total number of questions on the three STAAR reporting categories of (1) Understanding and Analysis Across Genres, (2) Understanding and Analysis of Literary Texts, and (3) Understanding and Analysis of Informational Texts. Academic achievement in writing was measured by the proportion of the total number of correct answers to the total number of questions on the three STAAR reporting categories of (1) Revision and (2) Editing, and the total

score for the Composition component of the test. Perspectives of the study participants were documented by analyzing the focus group qualitative data and identifying themes.

Glossary of Terms

The following terms are defined to help the reader better understand the terminology used throughout the study.

Non-cognitive skills are the skills based on character traits and are not related the main core subjects, such as reading, writing, mathematics, science, and social studies. (Steiner-Adair, 2014). Non-cognitive skills are often referred to as character strengths and include resilience, conscientiousness, optimism, self-control, and grit (Tough, 2016).

Cognitive skills are the core skills that are taught in school related to reading, writing mathematics, science, and social studies. The brain uses the skills to think, read, learn, remember, analyze, and absorb information. These skills are used daily at school, at work, and in life (Arguedas, Daradoumis, & Xhafa, 2016).

Growth mindset is a belief system that suggests one's intelligence can be grown or developed with persistence, efforts, and a focus on learning (Ricci, 2013).

Fixed mindset is a belief system that suggests a person has a predetermined amount of intelligence, skills or talents (Ricci, 2013).

Texas Academic Performance Report (TAPR), formerly known as the Academic Excellence Indicator System (AEIS), is the accountability rating for the state of Texas (TAPR, 2016).

Delimitation, Limitations, and Assumptions

The study was delimited to (1) 4th grade students in a rural school district in South Texas, (2) the predictor variable of grit, and (3) the outcome measures of academic achievement in 4th

grade reading, mathematics, and writing. Due to the non-probability nature of sampling, external validity was limited to the study's participants. Due to non-experimental nature of the study, no causal inferences were drawn. Existing quantitative data were used for academic achievement and it was assumed they had been collected and measured correctly; it was also assumed that the predictor variable, grit, was measured correctly. It was assumed that the focus group participants would honestly share and discuss their opinions of the grit and its relation to academic achievement and that the researcher would remain academically rigorous with objectivity and subjectivity in both the quantitative and qualitative components of the study, respectively. Additionally, truth and realities could not be triangulated because to do so, multiple data sources must be collected, analyzed, and synthesized to contribute to verification and validations.

Significance of the Study

All students need to develop social skills in order to cope with the very demanding society. Students can walk away from education with all the cognitive skills they need, but if they lack the non-cognitive skills, they may not be prepared for everyday challenges. Educational practices should provide students with real-world issues in an attempt to prepare them in becoming lifelong learners. A transformation is needed to create opportunities for growth and success. It is imperative that researchers continue to seek evidence that grit and perseverance have the potential to positively influence academic performance.

The study's results have the potential to provide educational leaders and other concerned individuals with the opportunity to learn if non-cognitive skills may play a role in the academic success of students. The results of this study may persuade school administrators and personnel to take a closer look at students and grit. Even though the quantitative and qualitative results did not complement each other, there were reasons to believe that there could be a link between grit

and academic achievement and that other factors (e.g., socioeconomic status) must be taken into consideration in designing and conducting interventional program that may enhance the development of grit. The study's results add to the body of knowledge about mindsets, grit, and academic achievement.

CHAPTER II: REVIEW OF LITERATURE

Introduction

This chapter provides a systematic review and historical overview of the literature and research related to grit and academic performance. The literature review is organized into five components. The first component is the literature that pertains directly to grit; it provides an introduction to explain what the topic is, and research examples are provided to share findings pertaining to studies on grit and other related topics. The second component includes a review of the literature related to the theory of mindsets and how it pertains to grit in the classroom. The third component is the literature on academic achievement and the factors that influence it. The fourth component includes a review of literature related to the history of the Texas assessment program. The last component provides a brief summary of various research methods. In retrieving the literature, the following search engines, literature databases, and sites were utilized: EBSCO, ERIC-Education Resources Information Center, ProQuest, Google, SAGE, and the Mary and Jeff Bell Library at Texas A&M University-Corpus Christi.

Grit

Duckworth (2009) defined the term grit as perseverance and passion for long-term goals. Grit may be as important as other measures of intelligence in the context of high achievement and success in life. Grit emphasizes stamina and shares the achievement aspect of conscientiousness, requiring sustained effort, interest in goals, notwithstanding failure, lack of progress and feedback, and difficulty; the person with grit approaches achievement as a marathon (Duckworth et al., 2007; Duckworth, Quinn, & Tsukayama, 2012). Individuals with grit behaviors are described as being obsessed with an idea or project, being diligent on completing tasks, and maintaining focus on a project over a period of time (Duckworth, Kirby,

Gollwitzer, & Oettingen, 2013). The term grit has been described as one of the skills that students must have to achieve success.

Duckworth (2009, 2016) and Dweck (2008) are the leading researchers in the non-cognitive areas that affect performance and the achievement of long-term goals. Both researchers have conducted experiments to determine that non-cognitive skills, such as grit, are predictors of long-term success. Grit is also referred to as academic grit in some discussions related to education and a student with academic grit is described as a perseverant student who is engaged, focused, and in pursuit of academic goals, despite obstacles, setbacks, and distractions (Farrington et al., 2012).

Duckworth (2016) quoted Will Smith, an Oscar-nominated actor and musician to describe grit: “The only thing that is distinctly different about me is I’m not afraid to die on a treadmill. I will not be outworked, period. You might have more talent than me, you might be smarter than me, you might be sexier than me, you might be all of those things – you got it on me in nine categories. But if we get on the treadmill together, there are two things: You’re getting off first, or I’m going to die. It’s really that simple” (p. 1).

In several studies, it has been predicted that grit affects success (Duckworth, 2016). A question was asked to determine the amount of grit individuals possess and who continues to push on, even when passed up by someone smarter, faster, and stronger (Duckworth & Eskreis-Winkler, 2013). In 2007, a study was completed on the 2005 Scripps National Spelling Bee finalists. Duckworth, Kirby, Tsukayama, Berstein, and Ericsson (2010) wanted to know the importance of grit as it pertains to accomplishments, and test the hypothesis that students who spend the most hours studying for the spelling bee will become the finalists. There were 273 finalists, of which 175 participated in the study, ranging in age from seven to fifteen. The results

of the study showed that older children did better in the competition because they had more opportunities to compete and study than did the younger children. Measurements of grit were taken before the final competition took place and predicted how the spellers would perform (Duckworth, 2016). Grittier contestants ended up going further in competition. Grit predicted a student's ability to move on to another round, and verbal IQ predicted a student's ability to move to the final round but there was no relationship between verbal IQ and grit (Duckworth, 2016). Contestants participated in a questionnaire with the oldest contestant being 15 (maximum age) and youngest being a 7-year-old. The study informed us that students with grit work harder and longer than do their peers with less grit; therefore, they perform better.

In another study, Duckworth (2016) and colleagues collected data on 1,545 participants, ages 25 and older. The goal was to study the attitudes and behaviors of high achieving individuals, namely, dentists, doctors, lawyers, academics, and other professionals. A 5-point scale was used to determine one's focus, where a rating of a 1 = not at all like me, and a rating of a 5 = very much like me. The researchers found that educated adults had more grit than did less educated adults of the same age. They also discovered that people who are persistent with their long-range goals are more likely to succeed in higher levels of education. The study may inform us that grit helps determine success over IQ. Researchers stated, "In our view, achievement is the product of talent and effort, the latter a function of the intensity, direction, and duration of one's exertions toward a goal" (Duckworth et al., 2007, p. 1098). The conclusion was that those who were less bright worked harder and had more grit than did their brighter counterparts.

There have been numerous studies that show the importance of self-discipline in achieving success. Self-discipline is defined as "the capacity to do what you want to do" (Duckworth, 2009, p. 273).

One study showed that highly disciplined adults outperformed peers that were impulsive on all academic variables (Duckworth, 2016). Cadets who are admitted to West Point must have a high Whole Candidate Score, which consists of high SAT scores, above level high school ranks, leadership experience, athletic ability, and recommendations from high-leveled officials (US Military Academy Westpoint, 2012). In July 2004, 1,218, West Point cadets were given the Grit Scale; the link between the grit and Whole Candidate Scores was examined, which showed no relationship between the two scores (Duckworth, 2016). In other words, the talent of a cadet said nothing about his/her grit. By the end of training, 71 cadets dropped out and grit turned out to be a predictor of who made it through and who did not (Duckworth, 2016). The research was continued for a second year and the cadets who dropped out provided a support for the predictive validity of Grit Scale. In contrast, those who stayed and left had indistinguishable Whole Candidate Scores, but those who left had low Grit Scale scores.

There are also negative connotations on grit. Socol (2014) explored the pros and cons of grit and argued that what children need is support, time, love, and resources to make persistence, which he called “abundance.” “It is not falling down which makes you stronger, it is the people who help you get up after you’ve fallen who teach you to get up after you’ve fallen, who tend your wounds, and who supply resources which allow you to keep trying with a growth expectation of success” (Socol, 2014, p.3). Socol scrutinized Dr. Paul Toughs’ “How Children Succeed” by comparing kids in a sprinting race. Children in poverty started the race with a bear trap on one leg, while a middle class child started at the 40-meter mark, and an affluent kid at the 90-meter mark (Socol, 2014). All kids were told to have grit and do their very best but the kids that were high in poverty were expected to run just as fast even with the bear trap on their legs, and if they had grit, they would do whatever it takes to finish even if they had to gnaw off their

foot with the bear trap (Socol, 2014). The moral of his argument is that you cannot tell kids who are high in poverty to have grit because they have issues that keep them from finishing. Socol (2014) argued that what Tough really wanted kids to possess was willing compliance, not grit nor character.

Mullainathan and Shafir (2013) believed that all children living and learning in relative affluence are “afforded slack by the accidents of their birth” (p. 43). Slack is described as the gap created by abundance that allows a person to access more of his/her emotional and cognitive resources (Mullainathan & Shafir, 2013). In comparison to Socol’s (2014) race to the top, affluent children that are starting the race at the 90-meter line can jog, walk, lie down, and even quit before the finish because they have the slack necessary to fail, quit, and try again (Berliner, 2013). Affluent children do not have to struggle with hunger, worry where they will sleep at night, or feel guilty for needing medical treatment when they know their family has no funds to treat them (Berliner, 2013). Mullainathan and Shafir (2013) argued that “Scarcity captures the mind” and children in poverty do not have slack which causes their emotional resources to be drained (p. 43). Abundance and slack also allow children to work slower, make more mistakes, quit, and to start again (Berliner, 2013). Children who are not afforded that slack because they are born into the trap of poverty do not have the head start. Berliner (2013) and Mullainathan and Shafir (2013) believed that the sayings such as “no excuses” and “grit” did not result in achievement but believed that “slack” is the result of achievement, not grit.

There has also been the argument of grit versus talent. There are many people that are talented that make it to the top. This is true, but the argument is that those who do not have the grit do not stay at the top because when they fail at something, they do not know how to handle the situation (Bashant, 2014).

Theory of Mindset

Carol Dweck's (2008) Theory of Mindset (TM) was the theoretical framework guiding this study. Research has shown that our beliefs about ourselves affect the way by which we live our lives and determine whether we become the person we want to be and accomplish the things we value (Dweck, 2010a). The belief that effort is more important than is the ability may help support the potential for the relation between grit and academic achievement in reading, mathematics, and writing. Research on mindsets is connected with Duckworth's grit by the passion we may have for pushing ourselves and sticking to something, even when it is not going well (Blazer, 2011). This is the "hallmark of the growth mindset" and allows people to move forward during challenging times (Dweck, 2008, p.7).

Mindsets, as described, are "powerful beliefs...but they are just something in your mind, and you can change your mindset through experiences, training, and personal effort" (Dweck, 2008, p. 16). The book, *Mindsets: The New Psychology of Success*, focuses on two distinct mindsets, fixed and growth. The book focuses on how everyone is born with the sense to learn and notes that when children begin school, they believe they can learn. Even as babies, children strive to learn to walk and move forward. It is when they begin school and begin to evaluate themselves that fixed and growth mindsets come into play (Dweck, 2008b).

A growth mindset is described as a belief that one can learn anything and that intelligence can be developed (Dweck, 2010b). A person with a fixed mindset believes learning has a limit. The belief is that everyone is born with a certain amount of intelligence or skills, and that more cannot be learned (Dweck & Mueller, 1998). With these types of mindsets in play, we can look at school children as they begin school.

A study was conducted with preschool children who were given jigsaw puzzles (Dweck,

2008b). One set of students were told how smart they were after completing the jigsaw puzzles and the other students were told they had put in a lot of effort to complete the puzzle. The children who were told they were smart opted to do easier puzzles instead of harder ones when offered a choice, which represents a fixed mindset because by referring to them as smart, they may become afraid of failing and choose easier puzzles (Dweck, 2008). The students who chose the harder puzzles were the ones with the growth mindsets. They were told the teacher would realize they had put a lot of effort in completing the task. This made the students believe they were successful because of their efforts. Researchers believe “Mindsets are an important part of your personality, but you can change them just by knowing about the two types of mindsets and how to think and react” (Dweck, 2008, p. 46).

There are few studies on mindsets and grit in the classroom setting. Ricci’s (2013) book, *Mindsets in the Classroom: Building a Culture of Success and Student Achievement in the Schools*, provided a profound example of a fixed mindset that was witnessed in a classroom. An eight-year-old student believed that another student was smarter than him, and that no matter how hard he tried, the other student would always be smarter than him. This is an example of a fixed mindset in the classrooms and it is important to educate students and teachers about how intelligence develops so their beliefs can be changed and to understand that the brain, like a muscle, can be grown (Ricci, 2013).

Believing that our qualities are carved in stone exemplifies a fixed mindset, which may make one perceive others with fixed mindsets, always blaming others for faults. Those who believe that traits can be cultivated through effort, application, and experience have what Dweck (2008) considered a growth mindset. Students, regardless of being advanced or at-risk, must be educated that their success relies on their ability to develop a growth mindset (Ricci, 2013).

We must have a paradigm shift in our classrooms and teachers need to focus drive, motivation, effort, and persistence instead of simply measuring how fast students master learning that is delivered by the teacher. The process of building a growth mindset culture in our schools is to “build a school culture that values intellectual growth with a staff who has internalized the belief that intelligence can be cultivated” (Ricci, 2013, p. 13). An observation was made that many young teachers have a growth mindset and the older teachers have a fixed mindset. It was reasoned that the older teachers are in a different norm, that school communities need to promote the belief that intelligence is malleable, and the entire school staff and community must truly believe that all children can be successful and students themselves must believe they can learn (Ricci, 2013).

A study was conducted of kindergarten students to capture their beliefs about intelligence by surveying two classrooms, where one classroom was made up of high poverty students and the other classroom consisted of middle-class students, all children demonstrated a growth mindset (Ricci, 2013). The study continued through first, second, and third grades and showed increase in grade level was associated with decrease in growth mindsets. As the students moved onto higher grades, they began to demonstrate a fixed mindset; the study supported the notion that “we need to start working with educators and children as early as possible so they can maintain a belief system that communicates that all students can succeed” (Ricci, 2013, p. 11).

Factors Influencing Academic Achievement

The success of students in schools has been a concern of educators, policymakers, and parents (Rojas-LeBouef & Slate, 2012). Programs have been created in an attempt to increase academic achievement and schools are always looking for ways to make changes that will show growth. Traditionally, schools focus on academic achievement by decreasing the learning gap in

the core subjects, namely, reading, writing, mathematics, science, and social studies, and by looking at teacher quality and what changes need to take place (Tough, 2016). The focus has been on the cognitive perspective and what we can do to help students, but with very little change in academic achievement, researchers have considered other factors (Cumings-Mansfield & Thachik, 2016). Also, it is important to identify why students are not all alike and each student has different backgrounds and experiences they begin school with. Nevertheless, it is important that educational leaders must be able to provide a quality education to each individual student. It is also important to understand how each student has their own obstacles and may begin their education with obstacles in place (Cumings-Mansfield & Thachik, 2016).

Tough (2016) listed obstacles in his book *How Children Succeed*, and refers to poverty and how many children are not provided a good learning environment. According to the Texas Academic Performance Report (TAPR), there are a large number of low socio-economic Hispanic students in South Texas (TAPR, 2016). In 2000, one-third of Texas' population was Hispanic, and as of 2016, it was at 38.60% (Cumings-Mansfield & Thachik, 2016). The state of Texas has changing demographics, resulting in an increase in the Hispanic population that is young and not well educated (Cumings-Mansfield & Thachik, 2016). Some of the poorest children face violence and threats all around when there is not a steady source of income in the family (Tough, 2016). When there is poverty in the family, there is a higher chance that a single parent is raising that child and chances for abuse or neglect increase (Cumings-Mansfield & Thachik, 2016). With these ongoing conditions for children, their academic achievement can be adversely affected.

In analyzing achievement data, the achievement gap is defined as a “persistent, pervasive, and significant disparity in educational achievement and attainment among groups of students as

determined by a standardized measure” (Larke, Webb-Hasan, Jimarez, & Li, 2014, p. 2). The achievement gap is also defined as the “difference between how well low-income and minority children perform on standardized tests as compared with their peers” (Rojas-LeBouef & Slate, 2012, p. 7).

Research shows correlates of gaps in academic achievement among Hispanics, suggesting socioeconomic status, ethnicity, and class as factors affecting the outcome (Larke et al., 2014). According to the US Department of Education, for many years, low-income and minority children have been falling behind their White peers in terms of academic achievement (TEA, 2014). Other factors that influence the achievement gap are: (1) poverty; (2) test bias; (3) academic loss over the summer; (4) racial stereotyping (5) access to childcare; (6) parental involvement; (7) qualified teachers; and (8) high student mobility (Rojas-LeBouef and Slate, 2012, p. 7). If solutions could be found to effectively tend to these factors, ethnicity and socioeconomic status may not adversely affect the outcome. Researchers continue to suggest that one of the factors that influence academic achievement is poverty and that it is the primary contributor to the achievement gap in minority success (Trafton, 2015). It has also been estimated that when Hispanics are compared to Asian Americans and White families, they are twice as likely to be raised in a poor household (Trafton, 2015).

Although researchers have tried to close the achievement gap by studying low socioeconomic and minority students, Trafton (2015) claimed that the focus must have been wrong; thus, alleviating achievement gap has not been as good as it could have been. Tough (2016) suggested that perhaps the concerned individuals had been looking at wrong places and must pay attention to non-cognitive skills or personality traits. Tough (2016) also agreed that persistence and grit play a crucial role in life’s outcomes and can decrease the gap in academic achievement.

One particular group of students that have not been adequately researched based on factors that may impact academic achievement is students with perseverance and grit (Hsin & Xie, 2017). Nurturing behavioral conditions for student success has become a topic of discussion on how to address the achievement gap (Richard, 2016). Research has shown children can be taught the self-control strategy of setting goals and putting forth effort to benefit academic achievement (Richard, 2016). Duckworth stated in *The Power of Passion and Perseverance* that if students' non-cognitive skills and grit are developed, then it will make a difference in academic achievement (2016). To thoroughly apply the teaching of grit, there are some considerations that help ensure the success of academic achievement. The suggestions are: (1) interpret grit and perseverance for yourself; (2) recognize hard work and creativity; and (3) make it safe to keep trying (Richard, 2016, p.23).

There have been many factors listed that could influence academic achievement, but the missing link could be the lack of grit, which may explain the gap in learning among low socio-economic Hispanic students.

History of the Texas Assessment Program

The dependent variables, academic achievement in reading, writing, and mathematics, were measured by a relatively new and more comprehensive test, the State of Texas Assessments of Academic Readiness (STAAR). This test was introduced in 2014 and replaced the Texas Assessment of Knowledge and Skill (TAKS) (TEA, 2014).

Statewide assessments in reading and mathematics, using criterion-referenced tests have been around since 1973, but in 1979, the Texas Legislature passed a bill for statewide testing of all students in selected grades (TEA, 1996). The first formal assessment was the Texas Assessment of Basic Skills (TABS) that linked student assessment results to statewide

curriculum in Texas (Cruse & Twing, 2000). At the time, there was no mandated statewide curriculum; thus, the TABS learning objectives were developed by the TEA and only represented a small portion of the skills students were expected to learn (Cruse & Twing, 2000). Each year, the educator review committees worked to align curriculum, and in 1983, the Texas Education Code was further amended to require 9th grade students failing TABS to retest until they passed (Cruse & Twing, 2000). The TABS did not deny 9th graders their diploma, but required schools to provide remedial help to students who failed the TABS. In Addition, schools were required to share their results from the TABS assessments by publishing them, which became the beginning point of high-stakes accountability (Cruse & Twing, 2000).

The History of Statewide Achievement Testing in Texas by Cruse and Twing, (2000) reported a chronological summary of the evolution of the “high-stakes” assessments. In 1984, Cruse and Twing (2000) described the change that was put in place by the legislature. The wording of “basic skills competencies” to “minimum basic skills” was changed on the Texas Education Code to increase the rigor of assessments (Cruse & Twing, 2000, p. 2). With this change, a new test was evolved, the Texas Educational Assessment of Minimum Skills (TEAMS), which replaced the TABS as the new state test. For the first time in Texas, students were denied their diplomas based on their performance on the TEAMS test (Cruse & Twing, 2000).

With high-stakes testing in place, a change came again in the late 1980s, and in 1990, a new assessment program, the Texas Assessment of Academic Skills (TAAS), which shifted the word “minimum” to “academic” on the Texas Education Code was created (TEA, 1996). Cruse and Twing (2000) indicated that the primary purpose of all testing must raise the accountability of student performance. The TEA (1996) published *The Development of Accountability Systems*

Nationwide and in Texas, which described the adoption of Chapter 35 of the Texas Education Code in 1993, that involved the Academic Excellence Indicator System (AEIS) where significant changes were made. This required the accountability system to be performance-based and to measure student achievement in grades three through eight and at exit level (TEA, 1996).

In the 2002-03 school year, the Texas Assessment of Knowledge and Skills (TAKS) replaced the TAAS, which assessed students' skills in reading, writing, mathematics, science, and social studies (TEA, 2016). The replacement of TAKS came quickly in the spring of 2012 with our current state assessment, STAAR. With this change, the Texas Senate Bill 1031 called for secondary schools' grade levels 9 - 11 to take the end-of-the-year course assessments (EOC). Changes were made and currently all students in grades 3-8 take assessments in reading and mathematics yearly; science, social studies, and writing are assessed at different grade levels (TEA, 2016).

Research Methods

The decision on choosing the correct approach for studying a topic should be based on what the researcher brings to the study. Creswell (2014) suggested in choosing an appropriate research approach, the research problem, purpose, and design provide the philosophical assumptions that are helpful in making the final decision. There are three general approaches to conducting scientific inquiry: (1) qualitative, (2) quantitative, and (3) mixed methods.

Qualitative Research

Qualitative research involves the researcher exploring and understanding the meaning individuals or groups attribute to a social or human issue (Creswell, 2014). A paradigm, framework, or philosophy helps the researcher decide on the types of questions to explore and how to go about doing so (Glesne, 2011). There are four paradigms or theoretical frameworks

that are in the paradigmatic family: positivism/post-positivism/logical empiricism (cause and effect thinking, empirical observation and measurement, quantitative research), interpretivism/constructivism/naturalism (understanding of phenomena, social and historical construction, qualitative research), critical theory/participatory (empowerment and issue oriented, improvement of status quo, qualitative research, and post-structuralism/post-modernism/post-colonialism (deconstruction, genealogy) (Glesne, 2011). These paradigms help guide the work of researchers when beginning their research. The researcher must address how the research questions are answered, make comparisons of the findings from past research studies, and may also use their own personal experiences to find meanings. A qualitative method includes unstructured open-ended interviews and observations that can be used to generate qualitative data. To use personal experiences to draw personal assessments of the meanings separates qualitative research apart from quantitative (Creswell & Clark, 2011). A qualitative researcher believes that interpretations and personal views can never be separated.

Qualitative researchers can collect data in numerous ways by using an instrument, test, or by observing a site or behavior. They can use interview data, observation data, document data, and audiovisual data (Creswell, 2014). The type of data/information that needs to be collected before the study begins determine the method. The methods of qualitative researchers are emerging, by making their questions open-ended, and by relying on themes, patterns, and interpretation (Creswell, 2014). In addition, there is more of a focus on validity than reliability in qualitative research when it comes to determining whether the information provided can be trusted, is accurate, and also credible (Creswell & Clark, 2011).

Quantitative Research

Creswell (2014) stated that, “quantitative methods involve the processes of collecting,

analyzing, interpreting, and writing the results of a study” (p. 51). Quantitative research is a style of research that takes the science approach by testing hypotheses or models. Quantitative research is “grounded in the assumption that features of the social environment constitute an objective reality that is relatively constant across time and settings; the primary methodology for inquiry involves collecting numerical data about samples and subjecting these data to statistical analysis” (Gall, Gall, & Borg, 2015, p. 581). There are many designs that can be used in conducting quantitative research; for example, descriptive, correlational, causal-comparative, true-experimental, and quasi-experimental (Gall et al., 2015).

Descriptive studies are done to describe the status quo, to explore, and cannot be used to test hypotheses because independent and dependent variables are not identified (Patten, 2014). Correlational and causal-comparative studies are done to either explain or predict and cannot be used to draw causal inferences because of their non-experimental nature (Gall et al., 2015). True- and quasi-experimental studies involve the manipulation of at least one independent variable, and can be used to establish cause and effect relationships (Mills & Gay, 2016). Validity and reliability are two important concepts that must be taken into consideration in conducting quantitative studies. Reliability refers to the consistency of the measuring measurement; validity is the degree to which a test measures what it is intended to measure (Vogt, 2007). Creswell (2014) noted that quantitative methods are pre-determined, have instrument-based questions, and researchers can use performance data, attitudinal data, observational data, or census data to achieve the objectives of the study. Descriptive and inferential statistics are used to analyze the data (Field, 2013).

Mixed Methods Design

Mixed methods are the combination of qualitative (open-ended) and quantitative (closed-ended) data in response to research questions or hypotheses (Creswell, 2014). This method is used for an in depth understanding of the topic when one method is not sufficient enough to support the research study. The combination allows for a stronger understanding of the research problem or question. There are several mixed methods models in which the quantitative and qualitative data are collected, analyzed, and synthesized to reach a better understanding of the research problem (Creswell, 2014). Three primary models that are found in social sciences are convergent parallel mixed methods (quantitative and qualitative data collected at the same time), explanatory sequential mixed methods (quantitative data are collected and analyzed first, followed by collection and analysis of qualitative data, and exploratory sequential mixed methods (qualitative data are collected and analyzed first, followed by collection and analysis of quantitative data) (Creswell, 2014). In choosing a mixed methods design, according to Creswell and Clark (2011), the following must be taken into consideration: (1) the level of interaction between the strands; (2) the relative priority of the strands; (3) the timing of the strands; and (4) procedures for mixing the strands. Creswell and Clark (2011) described a strand by saying, “A strand is a component of a study that encompasses the basic process of conducting quantitative or qualitative research: posing a question, collecting data, analyzing data, and interpreting results based on that data” (p. 63). Mixed methods research provides the bridge between the qualitative and quantitative paradigms. The belief that qualitative and quantitative research belong in different paradigms and are incompatible has been a fading theory. The challenge for the researcher is to select the optimal mixed methods research design to create a rigorous study (Leech & Onwuegbuzie, 2009).

Summary

The literature review included the distinction between grit, the theory of mindsets, and how Dweck and Duckworth intertwined them. Dweck showed the importance of knowing the difference between a growth and fixed mindset and that success could come from grit and effort. The literature review included the factors that could influence academic achievement and a section on the history of the state of Texas assessment, showing that the focus has been on increasing accountability and academic achievement. The review of the literature also provided a justification for the study's research methods. The review of the literature not only showed several studies on positive aspect of grit but also some negative connotations brought forward in regards to grit. The literature suggests that children who are high in poverty may not be able to be successful or reach their academic even if they possess grit. For example, Socol (2014) argued that grit has nothing to do with success and that students high in poverty are faced with roadblocks that they must maneuver around first before they can succeed in their academic tasks. In conclusion, academic achievement is an important factor in academic success. The review of literature shows that grit and having the right mindset have the potential to play an important role in academic achievement. Additionally, the negative impacts of poverty on academic achievement cannot be ignored. Understanding the impact of these factors on academic achievement is needed for further research.

CHAPTER III: METHODS

Introduction

The primary purpose of the study was to investigate the relationship between grit and academic achievement in reading, mathematics, and writing of 4th graders. The secondary purpose of the study was to investigate the perspective of grade four teachers regarding the academic achievement of students that have grit. This chapter describes the methods, including the design, subject selection, instrumentation, data collection, and data analysis. The theory-based and databased study was guided by the following research questions:

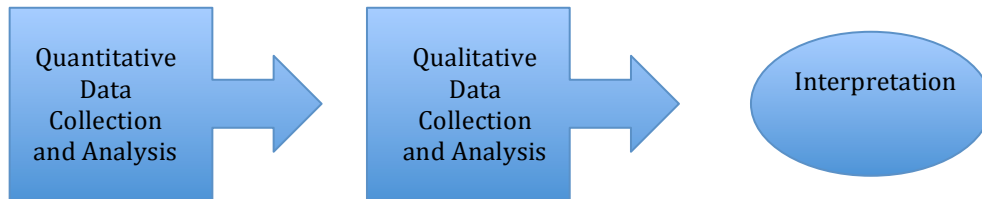
1. To what extent is academic achievement in reading related to grit among 4th graders?
2. To what extent is academic achievement in mathematics related to grit among 4th graders?
3. To what extent is academic achievement in writing related to grit among 4th graders?
4. What are the perspectives of grade four teachers on the link between grit and academic achievement?

Research Design

The study employed an explanatory sequential mixed methods model to collect, analyze, interpret, and synthesize quantitative and qualitative data to answer the research questions (Creswell & Clark, 2011). Specifically, quantitative phase of the study was conducted first, followed by the qualitative component. The reason for this approach was that the quantitative data were not enough to understand the study's topic and the qualitative data helped provide a more in-depth understanding of the research problem and purpose of the study. Figure 1 illustrates the study's explanatory sequential design.

Figure 1

Explanatory Sequential Design



Quantitative

The quantitative component of the study employed a correlational design to examine the nature of the association between grit and academic achievement. A correlational design employs associational statistics to assess how variables are related or how well they go together (Vogt, 2007). Correlations can be bivariate, allowing the researcher to investigate relations between two variables or multivariate that allows the investigation of relations between three or more variables (Vogt, 2007). The proposed study was designed to determine if there were relationships between the independent variable, grit, and the outcome measures of academic achievement in reading, mathematics, and writing. Due to non-experimental nature of the study, no causal inferences were drawn.

Qualitative

The qualitative component of the study utilized a focus group interview. The focus group was designed to allow participants to express and formulate their thoughts and views that are not one-on-one. It was designed to be non-threatening in an attempt to make participants feel comfortable in sharing their thoughts (Creswell & Clark, 2011).

The focus group included teachers that worked directly with 4th grade students and

allowed them to discuss the advantages and disadvantages of grit in relation to academic achievement. The qualitative component was conducted under the theoretical perspective of interpretivism. Goldkuhl's (2012) theory of interpretivism is to work with the subjective meanings that are already in the social world; that is, to acknowledge their existence, to reconstruct them, to understand them, to avoid distorting them, and to use them as building blocks. "In the interpretive tradition, there are no correct and incorrect theories but there are interesting and less interesting ways to view the world" (Goldkuhl, 2012, p. 135). Interpretive research aims at knowledge and understanding that are of interest to audiences.

Subject Selection

Quantitative

The participants for the quantitative component of the study consisted of 4th grade students at a small rural elementary school in South Texas that had taken the STAAR test in reading, writing, and mathematics in the spring of 2017 (n = 78). The school's student and staff profiles are summarized in Tables 1 and 2 (TAPR, 2016).

Table 1

Campus Student Profile

Student Information	Count/Average
Attendance Rate	95.70%
Total Number of Students	445
Grade Levels	Pre-kindergarten – 4 th grade
Economically Disadvantaged Students	92.40%
At-Risk Students	52.10%
Bilingual Students	4.70%
Hispanic Students	96.40%
White Students	2.50%
African American Students	0.40%
Asian Students	0.20%

Table 2

Campus Staff Profile

Staff Information	Count/Average
Number of Teachers	27
Professional Support	4.3
Campus Administration	2.0
Educational Aides	15.5
Hispanic Staff	85.20%
White Staff	14.80%
Bachelor Degrees Held	74.10%
Masters Degrees Held	25.90%

Qualitative

The sample consisted of four teachers in the above-mentioned school who worked with 4th grade students. A focus group was conducted to explore the teachers' subjective experiences and attitudes of grit. The focus group emphasized the interaction among the participants. The proper sample size for a focus group can be a minimum of four people and up to a maximum of twelve people; a larger group can negatively affect the quality of focus group discussion (Carlsen & Glenton, 2011). For the purpose of the study, four 4th grade teachers were invited to participate in the focus group.

Permission to conduct the focus group was obtained from the elementary school's independent school district and the Institutional Review Board at Texas A&M University-Corpus Christi. In order for the teachers to participate in the focus group, they were required to sign a consent form.

Instrumentation

Quantitative

In the Spring of 2012, the new State of Texas Assessments of Academic Readiness (STAAR) standardized testing system was materialized with the commitment to test students in the core subject areas of reading, writing, mathematics, social studies, and science in grades 3 - 12 annually (TEA, 2016). The STAAR is an assessment program designed to measure what students have learned and shows if they are able to apply the knowledge and skills, as defined in the state-mandated curriculum standards, the Texas Essential Knowledge and Skills (TEKS) (TEA, 2016).

The TEA (2011) reported that STAAR assessments, test content that students study each year, as opposed to testing content studied over multiple years. This would heighten the

sequence between what is taught and what is tested for a given course of study. There are knowledge and skills for each grade level that are set for each grade. The TEA (2011) identified these knowledge and skills as readiness standards. There are remaining knowledge and skills that are considered supporting standards that are assessed, but not emphasized. The TEA (2011) listed the following characteristics for readiness standards: (1) being essential for success in the current grade or course; (2) being important for preparedness for the next grade or course; (3) supporting college and career readiness; (4) necessitating in-depth instruction; and (5) addressing broad and deep ideas. In addition, there are supporting standards that are introduced in the current grade but are emphasized in a subsequent year (TEA, 2011).

For the purpose of the study, the 2016-2017 STAAR Spring scores in reading, writing, and mathematics in grade four were used. The proportion of correct answers to the total number of test items were used to measure academic achievement in each STAAR category.

Achievement in STAAR grade four reading was measured by three reporting categories of (1) Understanding and Analysis Across Genres (10 items), (2) Understanding and Analysis of Literary Texts (18 items), and (3) Understanding and Analysis of Informational Texts (16 items). Academic achievement in STAAR grade four mathematics was measured by four reporting categories of (1) Numerical Representations and Relationships (12 items), (2) Computations and Algebraic Relationships (16 items), (3) Geometry and Measurement (15 items), and (4) Data Analysis and Personal Financial Literacy (5 items). Achievement in STAAR grade four writing was measured by the three reporting categories of (1) Composition (1 item, which is the average of three scores given by three readers), (2) Revision (6 items), and (3) Editing (12 items).

A Grit Scale (Appendix A) was used to measure the participants' level of grit (Duckworth & Quinn, 2009). "The Grit Scale has face validity for varied populations, a low

probability of ceiling effects in high-achieving groups, and a precise focus on the construct of grit” (Robertson-Kraft, & Duckworth, 2014, p. 1089). The scale assumed grit as a personality trait, indicating the ability to overcome difficulties and a stability of interest over time (Duckworth & Quinn, 2009). The items were based on behavior characteristics of high-performing individuals given by professionals of varied domains (Robertson-Kraft & Duckworth, 2014). In terms of validity, the grit score has predicted educational attainment, the number of lifetime career changes, and the completion of some training programs (Duckworth et al., 2007).

The instrument was completed by answering a series of questions, using a 5-point Likert-type scaling: (1) very much like me, (2) mostly like me, (3) somewhat like me, (4) not much like me, or (5) not like me at all. Negatively stated items were reverse-coded. Specifically, for questions 2, 4, 7 and 8, the following points were assigned: 5 = very much like me, 4 = mostly like me, 3 = somewhat like me, 2 = not much like me, 1 = not like me at all. For questions 1, 3, 5 and 6, the points were 1 = very much like me, 2 = mostly like me, 3 = somewhat like me, 4 = not much like me, 5 = not like me at all.

After assigning points, all the points were added up and divided by eight. The scores ranged from five (extremely gritty) to one (not as gritty) (Duckworth et al., 2007).

Qualitative

In alignment with the explanatory sequential mixed methods research model, the quantitative data were analyzed first and the results were used to formulate the lead questions for the focus group in the qualitative part. The lead questions were:

1. Should there be a relation between grit and academic achievement in reading, mathematics, and writing?

2. In your opinion, in what ways do you think teaching grit to your students can be used to help maintain the level of instruction needed to keep students on pace with regular instruction?
3. In your opinion, what do you think are some advantages of teaching grit to students?
4. In your opinion, what do you think are some disadvantages of teaching grit to students?

Data Collection

Quantitative

The STAAR data were obtained from the Texas Education Office of Assessment and Accountability at the study's rural school district. The STAAR data included raw scale scores for each of the categories in mathematics, reading, and writing. Data on age, gender, at-risk status, ethnicity, and socioeconomic status were also obtained. The grit data were collected from 4th grade students that had been enrolled at the rural South Texas School for the 2016-2017 school year. After obtaining the IRB approval, parental consent, and student assent, the students were given the 8-Item Grit Scale in their classrooms by their 4th grade teachers on May 23, 2017.

Qualitative

Qualitative data were collected from the focus group. The researcher assigned a moderator to facilitate the focus group, which was audiotaped and later transcribed and coded by the researcher. The moderator introduced and explained the purpose of the focus group, introduced members to each other, introduced herself, established ground rules, facilitated and maintained the discussion, managed group dynamics, and summarized key points. The focus group participants were asked to sign a consent form. The focus group took place on June 22, 2017.

Data Analysis

Quantitative

The raw data were exported into the Statistical Package for the Social Sciences (SPSS), which was used for the purpose of data manipulation and analysis. Descriptive statistics were used to manipulate, organize, and summarize the data. Specifically, frequency and percentage distribution tables and appropriate measures of central tendency and variability were reported.

Cronbach's Coefficient Alpha (Crocker & Algina, 1986) was used to estimate the internal consistency of the Grit Scale. Specifically, $\alpha = [k/k-1] [1-(\sum \sigma_i^2/\sigma_x^2)]$, where k is the number of items on the test, σ_i^2 is the variance of item i , and σ_x^2 is the total test variance (sum of the variances plus twice the sum of the co-variances of all possible pairs of its components, that is, $\sigma_x^2 = \sum \sigma_i^2 + 2\sum \sigma_{ij}$) was computed for each of the constructs.

The proportion of the total number of questions answered correctly to the total number of questions in reading, mathematics, and writing were used to measure academic achievement. A series of Pearson-Product Moment Correlation Coefficient (Field, 2013) was computed to examine the direction and magnitude of the bivariate associations between the grit scores and each of the STAAR category scores. Coefficient of determination was used to examine the practical significance of the associations and was characterized as 0.10 = small effect, 0.30 = medium effect, and 0.50 = large effect (Cohen, 1988). First- and second- order partial correlation coefficients (Field, 2013) were computed to examine the extent of the abovementioned associations independent of socioeconomic status, ethnicity (coded as either Hispanic or Non-Hispanic), individually (first order) and together (second order).

A median-split was used to divide the sample into students with low and high grit. A series of t-test for Independent Samples (Field, 2013) was performed to compare the two groups

on the basis of the three outcome measures. Mean difference effect sizes were computed to examine the practical significance of the findings and were characterized as 0.20 = small effect, 0.50 = medium effect, and > 0.80 = large effect (Cohen, 1988).

Qualitative

The focus group audiotaped interviews were transcribed, coded, and categorized into identifiable themes. The researcher used the following system to guide the analysis of the qualitative data: (1) reading the entire transcription through its entirety to get a sense of the whole; (2) using brackets to identify text segments; (3) using a code word or phrase to define the text segment; (4) grouping the code words and making a list; (5) going over the transcription; and (6) minimizing the codes into themes that are similar and forming major ideas of the transcription (Creswell & Clark, 2011).

After the transcript was recorded and analyzed, the moderator and researcher met on July 2, 2017 to discuss and validate the findings. Both agreed the derived themes reflected the participating teachers' perspective of grit and its potential impact on academic achievement.

Additionally, a meeting took place between the researcher and the focus group participants over lunch on July 31, 2017 to discuss the qualitative results. The researcher thanked the teachers for participating in the focus group. The themes were shared and the teachers speculated on why results showed that the study's 4th graders demonstrated grit; however, it was not statistically associated with academic achievement in reading, mathematics, and writing. The speculations were used in discussing the study in Chapter five.

In accordance with the explanatory sequential mixed methods model, the quantitative and qualitative results were synthesized in order to draw conclusions, discuss the findings, and offer theoretical and practical implications.

CHAPTER IV: RESULTS

Introduction

The purpose of the explanatory sequential mixed methods study was to assess the link between grit and academic achievement in reading, mathematics, and writing of 4th grade students. Quantitative data were obtained from the Texas Education Agency Office of Assessment and Accountability, which included 4th grade STAAR raw total scores for reading, mathematics, and writing. Data on gender, ethnicity, socio-economic-status, and membership in special populations were also provided to describe the study's participants. Fourth grade students also completed a Grit Scale to measure their level of grit. For the qualitative component of the study, a focus group was conducted to collect the data.

Quantitative Results

The quantitative component of the study was guided by the following research questions:

1. To what extent is academic achievement in reading related to grit among 4th graders?
2. To what extent is academic achievement in mathematics related to grit among 4th graders?
3. To what extent is academic achievement in writing related to grit among 4th graders?

A Profile of the Subjects

The non-probability sample consisted of 78 4th grade students who voluntarily agreed to participate in the study. The majority of the students were male (59.00%), Hispanic (92.30%), economically disadvantaged (93.60%), proficient in English language (89.70%), and not in special education (94.60%). Results are summarized in Table 3.

Table 3

A Profile of the Subjects – Quantitative Component

Variable	F	%
Gender		
Female	32	41.00
Male	46	59.00
Ethnicity		
Hispanic	72	92.30
White	3	3.80
Black	2	2.60
Asian	1	1.30
SES		
Not economically disadvantaged	5	6.40
Economically disadvantaged	73	93.60
LEP		
No	70	89.70
Yes	8	10.30
SPED		
No	74	94.90
Yes	4	5.10

Predictor Variable

The 8-item Grit Scale (Cronbach's Coefficient Alpha = 0.64) measured the predictor variable, using a 5-point Likert-type scaling, ranging from one (not at all gritty) to five (extremely gritty). For items 2,4,7, and 8, the following were used: 5 = very much like me, 4 = mostly like me, 3 = somewhat like me, 2 = not much like me, and 1 = not like me at all. For items 1, 3, 5, and 6, the scaling was 1 = very much like me, 2 = mostly like me, 3 = somewhat like me, 4 = not much like me, and 5 = not like me at all. On the basis of the individual responses, a grit scale score was computed, which ranged from 2.10 to 5.00 (Mean = 3.53, SD = 0.68). Responses to the Grit Scale items are summarized in Table 4.

Table 4

Frequency and Percentage Distributions of Responses to Grit Scale, n = 78

Question	Response	F	%
1. Projects sometimes distract me from previous ones.	Very much like me	7	9.00
	Mostly like me	10	12.80
	Somewhat like me	26	33.30
	Not much like me	22	28.20
	Not like me at all	13	16.70
2. Setbacks don't discourage me.	Not like me at all	18	23.10
	Not much like me	15	19.20
	Somewhat like me	16	20.50
	Mostly like me	11	14.10
	Very much like me	18	23.10
3. I have been obsessed with a project but lost interest.	Very much like me	5	6.40
	Mostly like me	16	20.50
	Somewhat like me	11	14.10
	Not much like me	18	23.10
	Not like me at all	28	35.90
4. I am a hard worker	Not like me at all	7	9.00
	Not much like me		
	Somewhat like me	12	15.40
	Mostly like me	22	28.20
	Very much like me	36	46.20
5. I often set a goal but later choose another one.	Very much like me	9	11.50
	Mostly like me	8	10.30
	Somewhat like me	19	24.40
	Not much like me	19	24.40
	Not like me at all	23	29.50

Table 4 (cont'd)

Question	Response	F	%
6. It is difficult to focus on projects over a month.	Very much like me	15	19.20
	Mostly like me	11	14.10
	Somewhat like me	14	17.90
	Not much like me	12	15.40
	Not like me at all	26	33.30
7. I finish whatever I begin.	Not like me at all	5	6.40
	Not much like me	4	5.10
	Somewhat like me	12	15.40
	Mostly like me	28	35.90
	Very much like me	29	37.20
8. I am diligent.	Not like me at all	1	1.30
	Not much like me	5	6.40
	Somewhat like me	16	20.50
	Mostly like me	23	29.50
	Very much like me	33	42.30

Outcome Measures

The STAAR test measured academic achievement in mathematics, reading, and writing. The proportion of the correct answers to the total number of questions in each subject was used to measure the academic achievement. Descriptive statistics were used to summarize the data. Results are summarized in Table 5.

Table 5

Outcome Measures, n = 78

Variable	Minimum	Maximum	Mean*	SD
Reading	0.14	0.97	0.62	0.21
Mathematics	0.15	1.00	0.63	0.25
Writing	0.06	0.91	0.57	0.19

* Proportion of correct answers to the total number of test items

Correlational Analysis

A series of Pearson Product Moment Correlation Coefficient (Pearson r) analysis was performed to examine the strength and direction of the simple associations between grit and the three outcome measures. As can be seen in Table 6, none of the associations was statistically significant. The coefficients of determination (r^2 , explained variation) ranged from 0.81% to 3.24%, suggesting that the grit scale score explained little of the variation in the outcome measures.

Table 6

Correlation Matrix, $n = 78$

		Reading	Mathematics	Writing
Grit	Pearson r	0.18	0.18	0.09
	p	0.10	0.10	0.40

A series of first-order partial correlation coefficients was computed to measure the extent of the bivariate correlations independent of socioeconomic status and ethnicity (coded as either Hispanic or Non-Hispanic). Independent of socioeconomic status, the associations ranged from 0.08 to 0.17 and none was statistically significant. Independent of ethnicity, the associations ranged from 0.10 to 0.18 and none was statistically significant. Independent of socioeconomic status and ethnicity together, second-order partial correlations showed that the associations ranged from 0.08 to 0.17 and none was statistically significant.

Group Comparisons

A median-split was used to divide the 4th graders into two groups: (1) low grit and (2) high grit. A series of t-test for independent samples was performed to compare the two groups based on achievement scores. The homogeneity of variances assumption was met in all analyses.

As can be seen in Table 7, none of the differences was statistically significant and effect sizes were negligible. The mean difference effect sizes ranged from 0.12 to 0.24, suggesting that the practical significance of the findings was negligible/small. The group comparisons and correlational analyses showed that in this non-probability sample of 4th graders, grit was not a statistically significant predictor of academic achievement in reading, mathematics, and writing.

Table 7

Group Comparisons

Outcome Measure	Low Grit (n=38)		High Grit (n=40)		t	ES*
	M	SD	M	SD		
Reading	0.60	0.22	0.65	0.20	1.05	0.24
Mathematics	0.61	0.26	0.65	0.25	0.71	0.16
Writing	0.58	0.20	0.56	0.18	0.50	0.12

* ES = Mean Difference Effect Size, 0.20 = small effect, 0.50 = medium effect, > 0.80 = large effect

Qualitative Results

The qualitative component of the explanatory sequential mixed methods model was utilized to address the study's research question four, (What are the perspectives of grade four teachers on the link between grit and academic achievement?) and explaining the quantitative results in greater detail. The quantitative results were used to formulate the following lead questions for the focus group discussion:

- Should there be a relation between grit and academic achievement in reading, mathematics, and writing?

- In your opinion, in what ways do you think teaching grit to your students can be used to help maintain the level of instruction needed to keep students on pace with regular instruction?
- In your opinion, what do you think are some advantages of teaching grit to students?
- In your opinion, what do you think are some disadvantages of teaching grit to students?

A Profile of the Subjects

The focus group utilized a semi-structured format and consisted of four female 4th grade teachers. The ethnicity of the four participants consisted of three Hispanics and one White. All were teachers at the elementary school where the study was conducted.

Focus Group Process

The focus group was conducted on June 22, 2017. The setting was the conference room in the study's small rural South Texas elementary school. Prior to the beginning of the interviews, the participants provided the researcher with signed voluntary consent forms and were assured of the confidentiality of their identities. Participants were informed they could withdraw from the focus group at any time. The researcher did not serve as the facilitator, instead, a colleague with doctoral degree in educational leadership served as the moderator and encouraged an open discussion. The focus group lasted nearly 75 minutes and resulted in a wide range of discussion. It was useful in exploring the unknowns, discussing the quantitative results, and capturing a variety of opinions in a short amount of time.

The Coding Process

The focus group discussion was audio-recorded by the moderator and later transcribed by the researcher. The transcript of the focus group was analyzed, utilizing a coding process. Saldana (2016) defined a code as a word or short phrase that assigns a summative attribute to a

portion of the spoken words. Specifically, analysis of the transcripts resulted in several topics, which were coded and categorized by words and phrases, identifying common themes.

According to Creswell (2014), themes are clusters or clumps of meaning that form the central ideas from the focus group. Table 8 shows the codes that were utilized to derive the themes.

Table 8

Qualitative Data Codes

Code 1	Instill the Skill
Code 2	Mental Blocks
Code 3	Change Perceptions
Code 5	Home Environment
Code 6	Teachers Need Grit
Code 7	Failing
Code 8	Setting Goals
Code 9	Mindsets

Focus Group Results

When the moderator shared the quantitative results with the focus group participants, the first word said was, “*Wow!*” All participants were surprised when they found out the results showed that the study’s 4th graders demonstrated grit; however, it was not statistically associated with academic achievement in reading, mathematics, and writing. The focus group tried to come up with reasons why the results were not statistically significant and even discussed the possibility of the Grit Scale being confusing to students or that the students were just tired at the end of the day and did not take the time to answer the questions thoroughly.

After discussing the quantitative results, focused group participants began the conversation about teaching grit to students and its advantages and disadvantages. The moderator facilitated the discussion.

There were three themes that emerged from analyzing the qualitative data, namely, *Student Perspectives*, *Teacher Presentations*, and *Understanding Failure*. Table 9 depicts the themes.

Table 9

Qualitative Data Themes

Theme 1	Students Perspectives
Theme 2	Teacher Presentations
Theme 3	Understanding Failure

The first theme, *Student Perspectives*, emerged as the participants discussed the students' mental blocks as they begin school. Many students come to school believing they are not good at a particular subject and cannot excel. The students tend to say they cannot do something and the participants discussed the importance of changing their perspectives on what they can and cannot do. The participants shared that some students do better on a subject than do others, and some may perceive themselves as not being as good as others. One participant stated that students' perspectives are affected by the teachers, "*If you don't believe it, how are you going to teach it.*" The participant stated that kids follow what the teacher believes: "*If you start the school year by believing that a student cannot be successful, then the student will most likely be unsuccessful because of the mindset that is set.*" Participants discussed the importance of establishing the correct mindset and being good role models in demonstrating grit to their students. The participants believed that students needed to have grit. They stressed the

importance of effort and not always being concerned about making 100s on papers but showing progress through efforts and grit.

The focus group participants noted that students' perspectives are affected by their goals. The participants discussed the importance of goals and how students must have the grit and push forward: *"students need to set goals, and must be aware of the pathways and directions to reach the goals."* The importance of goal charts were discussed, focusing on how they can help with students' perspectives of their progress and choosing the subsequent steps; a participant said, *"they may not be making perfect scores, but can determine the success they have had, which can be helpful in setting additional goals and pushing themselves to the next level."* Some of the participants' responses that contributed to the development of this theme are summarized in Table 10.

Table 10

Theme 1: Student Perspectives

Mental Blocks
• "... students learn at different levels" • "...they know if they are struggling" • "...they come in with a mental block" • "...he told me he didn't like math"
Mindsets
• "...it's not about making the 100s, it's the progress made" • "...grit can change their whole life" • "...you have to have grit"
Setting Goals
• "...you have to ask if they have grit" • "...students need to know direction" • "...you hear students use grit in their conversations" • "...you tell students if they have perseverance they can do it"

As the participants discussed student perspectives, the second theme, *Teacher Presentations*, emerged from three different but similar categories. One category consisted of

actually instilling the skill of grit in students; for example, *“in order for students to understand grit, you have to teach it to them.”* Participants talked about building students’ self-esteem by educating them about grit and having perseverance. They set the goals and use their grit to help push them to accomplish the goals. One participant stated, *“We want these kids to persevere and in order for them to persevere in life, we have to instill the mentality as well, because there are students that struggle and when they have all around perseverance, they will never give up and keep on trying.”*

The discussion continued on the importance of instilling these qualities in students to break down the mental wall and giving them the tools needed to be successful in the future. This led into the second category of how teachers could influence students’ understanding of the usefulness of grit. The participants talked about the importance of sharing success stories of others who have had grit and noted, *“when students learn about those who have been successful because of their efforts, it can motivate them and change their perspectives.”*

The participants talked about the importance of believing in what is being taught, which helped the transition into the third category; that is, teachers need grit too. One participant shared her story of being new in the grade level and how she herself had to rely on grit to learn the difficult curriculum. The participants agreed that if they were going to teach grit to students, they would need to not only have the grit themselves, but also believe in it. One participant stated, *“You have to believe it to instill it.”* Table 11 shows some of the responses used in developing the second theme.

Table 11

Theme 2: Teacher Presentations

Instilling Grit

- “....I think it’s on how it is presented by the teacher”
- “....you instill the positive they are going to excel”
- “....you have to build the students’ self-esteem and say look you are not a quitter”
- “....we have to enforce grit because some skills may be easier than others”

Changing Perspectives

- “....when they hear stories it helps them visualize what grit is”
- “....if they cannot do it then you show them a different way”
- “....it’s about how the teacher presents it and instills individuality”

Teachers Needing Grit

- “....teachers have to have grit too
 - “....if you don’t believe it how are you going to teach it”
 - “....and teachers it’s a mindset, I feel like it is important for them to learn about it”
-

The third theme, *Understanding Failure*, emerged as participants discussed their perspectives of attempting to educate students about grit and understanding their home environments. This is where the first category, home environment, surfaced: “*many students do not receive the support at home and when they go to school, they already believe they are failures.*”

There was a discussion of students’ various cultures and situations. Participants discussed how teachers have their work already cut out for them as soon as some students enter the school, which led into the second category of educating students - that it is ok to fail. The discussion began with one of the participants comparing failure to riding a bike, “*you are going to fall off your bike when you attempt to ride it the first time, but you pick yourself up and get back on.*” The participant described this as an example of failure and how one may learn from mistakes. Another participant discussed the importance of students being able to say, “*I don’t*

get it” and being able to move on without feeling like a failure. One participant stated, “I have an eraser on my board that says, mistakes are proof that you are trying.” and “students need to understand it is a part of life to fail and that we learn from our mistakes.”

The participants agreed that an important part of grit is the understanding that it is okay to fail. They discussed the subject of writing; for example, *“when students write, they need to understand there is no wrong answer and not be afraid of failing at something but pushing themselves with the understanding that it is okay to make mistakes.”* The participants talked about sharing strategies to use when students fail at something. It was discussed that students learn differently; thus, *“it would be important for students to have different strategies to try when they fail at something in order to correct their mistakes.”* This was considered an example of having grit, because *“students ought to be able to try different strategies.”* The participants talked about learning from mistakes and that even teachers could make mistakes. Additional responses are listed in Table 12.

Table 12

Theme 3: Understanding Failure

Home Environment

- “....sometimes we have our work cut out for us because of their home environment”
- “....they don’t get that encouragement or push
- “....so if they say they can’t then we tell them they may not know it yet”

Okay To Fail

- “....understanding we all make mistakes”
 - “....the student needs to know that they will fail and not always get it”
 - “....there is no wrong answer”
 - “....to show them to try and not give up
 - “....students need to be comfortable sharing their work”
-

Summary

Quantitative results showed that the study's 4th graders demonstrated grit; however, it was not statistically associated with academic achievement in reading, mathematics, and writing. Qualitative data resulted in three themes, namely, *Student Perspectives*, *Teacher Presentations*, and *Understanding Failure*. Although the quantitative results showed no statistically significant association between grit and academic achievement in reading, mathematics, and writing, the focus group participants agreed that grit could play an important role in students' academic success.

CHAPTER V: SUMMARY, CONCLUSIONS, AND DISCUSSION

Introduction

In education, deciding factors on decisions that are made are almost always based on what is best for kids. The focus on the education of students has been their cognitive skills: reading, mathematics, science, social studies, and writing, which have been measured by a Texas standardized test since 1980. Currently, the State of Texas Assessments of Academic Readiness (STAAR) measures student achievement and academic growth during each child's academic career (TEA, 2017). With accountability being the focus, educators have grasped at new ideas to help their students be academically successful. However, educators have embraced the idea that in addition to teaching students cognitive skills, they should also be taught non-cognitive skills, such as grit and perseverance in the classroom (Tough, 2016). Students must learn to cope with failure and utilize their character strengths with grit and perseverance, which are important and should be taught as necessary skills in the classroom (Tough, 2016). If non-cognitive skills are critical to academic performance, then a key task for educators becomes the development of these skills, traits, and strategies of content knowledge and academic skills (Farrington et al., 2012). This information set the stage for the need and desires to conduct this study.

The primary purpose of the mixed method study was to test the hypothesis that STAAR reading, writing, and mathematic scores of 4th graders were correlated to grit. The secondary purpose was to document the perspectives of 4th grade teachers regarding the role grit can play in academic achievement. The gap of information identified in the review of the literature contributed to the use of the explanatory sequential mixed methods design. The research questions that guided the study were:

1. To what extent is academic achievement in reading related to grit among 4th graders?

2. To what extent is academic achievement in mathematics related to grit among 4th graders?
3. To what extent is academic achievement in writing related to grit among 4th graders?
4. What are the perspectives of grade four teachers on the link between grit and academic achievement?

The theoretical framework that guided the study was Carol Dweck's (2008) Theory of Mindset (TM). According to Dweck, it is not just our abilities that bring success, but how we approach our goals (2008). Dweck (2008) believed that people's mindset affect the outcomes or results of their actions. It has been said, "the view you adopt for yourself profoundly affects the way you lead your life" and it is based on the difference between a fixed or growth mindset (Dweck, 2008, p. 6). People with a fixed mindset feel reject and blame others for their mistakes when they fail at something, while those with a growth mindset try harder to overcome failures and find ways to improve (Dweck, 2008). Carol Dweck's TM on growth mindsets states that effort is more important than is the ability to support the potential for a relation between grit and academic achievement in reading, mathematics, and writing that guided the present study (Tough, 2012).

This is the mindset that can be connected to grit, allowing others to push forward during difficult times. The lack of teaching non-cognitive skills and the studies conducted by Duckworth that found smarter students actually had less grit than did their peers who scored lower on an intelligence test supported the study's aims (2009). Their effort was measured and the grittiest students, not the smartest ones, had the highest GPAs (Hansford, 2013, p. 1).

Summary of the Results

Quantitative Results

The quantitative data were obtained from the non-probability sample that consisted of 78 4th grade students in a Texas rural elementary who voluntarily agreed to participate in the study. The 4th grade students completed the 8-item Grit Scale (Cronbach's Coefficient Alpha = 0.64) that measured the predictor variable, using a 5-point Likert-type scaling, ranging from one (not at all gritty) to five (extremely gritty). The majority of the students were male (59.00%), Hispanic (92.30%), economically disadvantaged (93.60%), proficient in English language (89.70%), and not in special education (94.60%).

The State of Texas Assessment for Academic Readiness (STAAR) test measured academic achievement in mathematics, reading, and writing. The proportion of the correct answers to the total number of questions in each subject was used to measure the academic achievement. Descriptive statistics were used to analyze and summarize the data. A series of Pearson Product Moment Correlation Coefficient (Pearson r) analysis was performed to examine the strength and direction of the simple associations between grit and the three outcome measures. Partial correlations were computed to examine the extent of the associations independent of socioeconomic status and ethnicity. A median-split was used to divide the 4th graders into two groups: (1) low grit and (2) high grit. A series of t-test for independent samples was performed to compare the two groups based on achievement scores. The homogeneity of variances assumption was met in all analyses.

In conclusion, none of the associations were statistically significant. The coefficients of determination (r^2 , explained variation) ranged from 0.81% to 3.24%, suggesting that the grit scale score explained little of the variation in the outcome measures. None of the differences

between low grit and high grit 4th graders were statistically significant and effect sizes were negligible. The mean difference effect sizes ranged from 0.12 to 0.24, suggesting that the practical significance of the findings was negligible/small. The group comparisons and correlational analyses showed that in this non-probability sample of 4th graders, grit was not a statistically significant predictor of academic achievement in reading, mathematics, and writing even though they demonstrated grit.

Qualitative Results

The qualitative data were obtained from a focus group of 4th grade elementary teachers (n = 4) at the study's Texas rural elementary school. The ethnicity of the four female participants consisted of three Hispanics and one White. The qualitative component of the explanatory sequential mixed methods model was utilized to better understand the quantitative results and to document the perspectives of the teachers regarding the link between grit and academic achievement. The key findings from the qualitative portion of the study indicated that grade 4 teachers who participated in the study perceived grit to have an impact on academic achievement. Teachers felt strongly that grit is an important factor that can be instrumental in making a positive difference in academic achievement. All participants were surprised by the study's quantitative findings, showing that grit was not statistically associated with academic achievement.

Conclusions

Based on the quantitative results, it was concluded that grit is not associated with academic achievement. The Grit Scale did show that the study's participants demonstrated grit, but it was not a statistically significant predictor of academic achievement in this non-probability sample of 4th graders. Based on the qualitative results, which did not complement the

quantitative results, it was concluded the study's focus group teachers felt that grit can positively impact academic achievement.

Discussion

In the quantitative phase of the study, results showed very little differences between students with low grit and high grit on reading, mathematics, and writing STAAR scores. Forty of the 78 students had high grit and their scores were higher than the students with low grit in reading and mathematics. This was encouraging, but none of the differences were statistically significant and effect sizes were negligible. The group comparisons and correlational analyses showed that in this non-probability sample of 4th graders, grit was not a statistically significant predictor of academic achievement in reading, mathematics, and writing. This was in contrast to the qualitative results that suggested a link between the two variables and supported by the *Student Perspectives* theme.

The quantitative results did not support Dweck's (2008) Theory of Mindset (TM) that having a growth mindset and using grit are associated with academic achievement. The researcher used the qualitative portion of the study to expand on the quantitative findings.

The focus group was not conducted by the researcher to avoid any potential biases. The participants were asked if there should be a relation between grit and academic achievement in reading, mathematics, and writing. All agreed that there should be a link between grit and academic achievement, which is supported by the previous research done by Duckworth (2016) and Dweck (2008) that grit is a predictor of long-term success. Focus group participants were asked if teaching grit to students can be used to help maintain the level of instruction needed to keep students on pace with regular instruction. As documented by the *Student Perspectives* theme all members of the focus group agreed that it could, and provided examples of how grit

pushed students to the next level even when they were not ready for it. By having grit, in spite of struggles, it is still possible to push forward.

A second discussion took place over lunch between the researcher and the focus group participants. The focus was on quantitative results not supporting their belief that grit has the potential to positively impact academic achievement. The teachers felt that when the kids took the Grit Scale, perhaps they were tired, did not understand the directions, or were not completely honest in completing the questionnaire. The researcher informed the teachers that providing socially acceptable responses (reactive effects) is a threat to internal validity of survey findings and could have applied to this study.

The teachers felt there were many advantages to teaching grit to students and that by instilling it at a young age, it could be used as a life-long skill, which was documented in the *Teacher Presentations* theme. They felt grit has the potential to positively impact how children cope with difficult everyday tasks, including academic-related activities.

Students with grit have a push or determination to keep moving forward (Duckworth, 2016). As was supported by the second theme, *Teacher Presentation* can be instrumental in instilling grit and changing perspectives of students. Teachers felt by always planning instruction with a measureable goal in mind, it would give the students a direction and help them move forward. They felt if students were discouraged and did not have grit, it would be hard to push them forward, which could negatively affect them academically. The teachers felt that although grit was very important, there should also be an understanding of pushing kids at their own individual levels in an attempt to meet their personal goals.

The study's non-probability sample was homogeneous, which could have resulted in small correlation coefficients that were not statistically significant. As a matter of fact, the focus

group teachers suggested that since the overwhelming majority of the study's students were Hispanic (92.30%) and economically disadvantaged (93.60%), it could have impacted the results. As shown by partial correlations, the associations remained small in magnitude and not statistically significant after controlling for ethnicity and socioeconomic status.

Even though the quantitative results were different from their perspectives, the participants were in agreement that there is a link between grit and academic achievement. The students' reading, mathematics, and writing scores were not very high; nevertheless, all had shown growth and met the state standards for the STAAR. The teachers agreed that their students' overall STAAR scores were lower than those for most neighboring districts, but compared to the previous year, it was a great improvement.

The teachers compared their current students to the previous year's students and discussed the changes they had observed in students that had grit and growth mindsets. As discussed in the *Understanding Failures* theme, the participants felt that although the black and white paper results did not show the link between grit and academic achievement, they saw it with their own eyes and knew their kids had improved tremendously, which could have been due to grit.

Implications

The intent of the study was to determine if there was a link between academic achievement and grit in a non-probability sample of students in 4th grade, as measured by regular STAAR assessment scores in reading, mathematics, and writing and the Grit Scale. The review of the literature showed that the achievement gap and schools' efforts to close it must be of paramount concern. There are factors that can be instrumental in influencing academic achievement, negatively or positively. For example, poverty, lack of access to good learning

environments, belonging to a minority group, academic loss over the summer, and student mobility can make closing or narrowing the achievement gap a difficult task. The lack of non-cognitive skills, grit, which was the focus of this study, could be another factor.

The theoretical implication that ties Dweck's TM and grit to academic achievement implies that efforts and mindsets may play an important role in how we live our lives. Dweck (2010a) suggested that either fixed or growth mindset that people employ in approaching their stated goals could affect success. According to Dweck (2010a), a student's mindset should be a starting point for learning and a growth mindset should be instilled at a young age. If students grow up with a fixed mindset, they will struggle to reach their goals for fear of failure (Tough, 2012). Without the growth mindset belief being instilled with grit, students will look for others to blame when they fail at something (Ricci, 2013).

Teachers must be able to invest a significant amount of time to understand mindsets and be able to educate students on the difference between fixed and growth mindsets. If a teacher is able to educate students on growth mindset and persuade them that their efforts make a difference, then grit can also make a difference by encouraging students not to quit and to push forward (Tough, 2012).

Thus, schools and districts must take into consideration that teaching non-cognitive skills and including them in the curricula could be effective in enhancing academic success and closing the achievement gap. The *Teacher Presentations* theme suggested the notion that this should begin in the elementary level and continue throughout students' educational career.

Duckworth's research shows that grit is not just about the quantity of time devoted to interests, but also the quality of time (2016). Research shows that extensive practice and training are needed to acquire skills and become experts (Duckworth, 2016).

By teaching grit at an early age and educating children on mindsets, it may assist them in coping with challenges (Ricci, 2013). Many students start school and never struggle academically until they get farther along in school. These students who have never been introduced to mindsets or encouraged to have grit do not know what to do when they fail for the first time and may end up quitting for fear of failing again (Duckworth, 2016).

Grit can be taught by introducing the concept of what it entails and the impact it may have. People can learn it by making connections or hearing stories about successful people with grit. Sharing success stories helps people note for themselves the positive impacts of grit, which may encourage them to learn and practice it. Table 13 lists some of the steps that can be taken when teaching grit.

Table 13

Teaching Grit

-
- Define grit
 - Give examples of grit
 - Share success stories of people who have grit
 - Share the positive impact of grit
 - Practice grit
 - Recognize grit when you see it
 - Recognize that it is okay to make mistakes
 - Encourage people to look at their failures and identify areas of improvement
 - Understand that failure is a factor of success
 - Believe in grit when you teach it
-

Those who want to teach grit must lead their efforts by practical examples and convincing arguments. People can recognize grit when they see it; however, easy accomplishments should not be celebrated. The focus must be on achievements that require genuine efforts. Grit must be part of everyday activities, which must also be encouraged. As

students apply grit and recognize the success from their efforts, they will begin to apply it even more when they encounter difficult situations. Grit can also be taught by encouraging students who fail at something to re-evaluate the situation and try again. Students must understand that failure is a factor in success and that they learn from their mistakes. Students must also understand there is a time for grit and a time to quit in certain circumstances as supported by Socol (2014).

The purpose of selecting Dweck's mindset theory was to take into consideration the totality of the study results in an attempt to support the notion that having a growth mindset along with grit is necessary for maximum cognitive growth. In theory, having a growth mindset and grit are important; however, the demographic characteristic of subjects may affect the outcome measures. Not all students start school with the same skills or knowledge and if there is little parental involvement, the student could be behind academically. Expectations should not be the same for all students. Socol (2014) supported that a child's background must be taken into consideration in setting goals and encouraging grit in the literature review.

The results of this study should persuade school administrators and personnel to take a closer look at students and grit. Even though the quantitative relationships and differences were not statistically significant, the qualitative data from the focus group showed there could be a link. There is plenty of support in the literature for advantages of grit, showing that students with high levels of grit can be successful in several different incidences. The documented perspectives suggest that grit can be instrumental in affecting academic achievement; thus, it ought to be encouraged and taught.

Recommendations for Further Research

The study's delimitations, limitations, and assumptions offer opportunities for further research: (1) due to the non-probability nature of sampling, external validity was limited to the study's participants; (2) the study was delimited to 4th grade students in a rural school district in South Texas; (3) academic achievement in reading, mathematics, and writing were measured for students who took the regular version of the STAAR test; (4) the predictor variable of grit; and (5) the perspectives of a focus group of four educators regarding the link between grit and academic achievement. To enhance the study results, the researcher recommends: (1) the replication of the study in other schools with different demographics; (2) replication of the study with other grade levels; (3) replication of the study with other schools that have educated their students on grit; and (4) conducting a qualitative case study involving the perspectives of the students regarding grit and academic achievement. Specifically, additional research on students who are high in poverty and also possess grit must be conducted.

Final Remarks

During the course of the study, the researcher was involved in educating students about grit and mindsets. During this time, students were supported and encouraged to have grit at all times. While encountering any challenge or struggle, students were reinforced with positive comments and were praised for their efforts. The terms grit and growth mindset became common vocabulary for students, teachers, and parents. At the end of the first year of school, students showed growth from the previous year and the school was awarded several distinctions by the state. At the beginning of the second year, students were educated about mindsets and teachers taught in depth lessons on how students' brains were malleable and that there was no limit on what they could learn. They used words that encouraged a growth mindset and pushed

students at all times to have grit. Students were even recognized for having grit at monthly ceremonies.

The quantitative results were disappointing, knowing the progress that had taken place on campus. At the beginning of the third year, Texas released the accountability results and the study's school was awarded five distinctions, which was the highest at the elementary level. The school was one of the 400 elementary schools in the state of Texas to receive this distinction. The growth from the STAAR results was tremendous and the qualitative results, as well as the review of the literature, supported the potential for a positive link between grit and academic achievement.

REFERENCES

- Arguedas, M., Daradoumis, T., & Xhafa, F. (2016). Analyzing how emotion awareness influences students' motivation. Engagement, self-regulation and learning outcome. *Journal of Educational Technology & Society*, 19(2), 87-103.
- Bashant, J. (2014). Developing grit in our students: Why grit is such a desirable trait, and practical strategies for teachers and schools. *Journal for Leadership and Instruction*, 13(2), 14-17. Retrieved from <https://eric.ed.gov/?id=EJ1081394>
- Berliner, D., (2013). Inequality, poverty and the socialization of America's youth for the responsibilities of citizenship. *Theory Into Practice*, 52(3), 203-209. doi: 10.1080/00405841.2013.804314
- Blazer, C. (2011). How students' beliefs about their intelligence influence their academic performance. *Information Capsule*, 1012. Retrieved from <https://eric.ed.gov/?id:ED536502>
- Bowman, N. A., Hill, P. L., Denson, N., & Bronkema, R. (2015). Keep on truckin' or stay the course? Exploring grit dimensions as differential predictors of educational achievement, satisfaction, and intentions. *Social Psychological and Personality Science*, 6(6), 639-645. doi:10.1177/1948550615574300
- Carlsen, B., & Glenton, C. (2011). What about n? A methodological study of sample-size reporting in focus group studies. *BMC Medical Research Methodology*, 11(1), 26-35. doi: 10.1186/1471-2288-11-26

- Chang, J. (2016). Rigorous Texas student test was decades in the making. *Austin American Statesman*. Retrieved from <http://www.mystatesman.com/news/state--regional-govt--politics/rigorous-texas-student-test-was-decades-the-making/heq15aa0VZ5HkotwDhJbCK>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Creswell, J. W. (2014). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research*. Pearson College Div.
- Creswell, J. W., & Clark, V. L. (2011). *Designing and conducting mixed methods research* (2nd ed.). Los Angeles, CA: SAGE Publications, Inc.
- Crocker, L., & Algina, J. (1986). *Introduction to classical and modern test theory*. New York, NY: CBS College Publishing.
- Crotty, M., (1988). *The foundations of social research: Meaning and perspective in the research process*. St. Leonards, NSW: Allen & Unwin.
- Cruse, K. L., & Twing, J. S. (2000). The history of statewide achievement testing in Texas. *Applied Measurement in Education*, 13(4), 327-331.
- Cumings-Mansfield, K., & Thachik, S. L. (2016). A critical policy analysis of Texas closing the gaps 2015. *Education Policy Analysis Archives*, 24(3/4). doi:10.14507/epaa.v24.1991

Duckworth, A. L. (2009, April). (*Angela Duckworth: The power of passion and perseverance*).

Retrieved from

https://www.ted.com/talks/angela_lee_duckworth_grit_the_power_of_passion_and_perseverance

Duckworth, A. L. (2016). *Grit the power of passion and perseverance*. New York, NY: Scribner.

Duckworth, A. L., & Eskreis-Winkler. (2013). True grit. *Observer*, 26(4), 1-3. Retrieved from:

<https://www.psychologicalscience.org/observer/true-grit>

Duckworth, A.L., Kirby, T., Gollwitzer, A., & Oettingen, G., (2013). From fantasy to action:

Mental contrasting with implementation intentions (MCII) improves academic performance in children. *Social Psychological and Personality Science*, 4(6), 745-753.

Duckworth, A. L., Kirby, T., Tsukayama, E., Berstein, H., & Ericsson, K. A. (2010). Deliberate practice spells success: Why grittier competitors triumph at the national spelling bee.

Social Psychological and Personality Science, 2, 174– 181.

Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007). Grit: Perseverance and passion for long-term goals. *Journal of Personality and Social Psychology*, 92(6), 1087–1101. doi: 10.1037/0022-3514.92.6.1087

Duckworth, A. L., & Quinn, P. D. (2009). Development and validation of the Short Grit Scale (Grit-S). *Journal of Personality Assessment*, 91, 166–174.

doi:10.1080/00223890802634290

Duckworth, A. L., Quinn, P., Tsukayama, E. (2012). What no child left behind leaves behind:

The roles of IQ and self-control in predicting standardized achievement 99 test scores and report card grades. *Journal of Educational Psychology*, 104(2), 439.

doi: 10.1037/a0026280

- Dweck, C. S. (2008). *Mindset the new psychology of success*. New York: Ballantine.
- Dweck, C. S. (2008b). Brainology: Transforming students' motivation to learn. National Association of Independent Schools. Retrieved from <http://www.santeesd.net/cms/lib/CA01000468/Centricity/Domain/16/Brainology%20Article%20Fixed-Growth%20Mindset.pdf>
- Dweck, C. S. (2009). Who will the 21st-century learners be? *Knowledge Quest*, 38(2), 100 8-9. Retrieved from http://www.ala.org/aasl/sites/ala.org.aasl/files/content/aaslissues/toolkits/bldnglvl/09_No vDec_Dweck.pdf
- Dweck, C. S. (2010a). Even geniuses work hard. *Educational Leadership*, 68(1), 16-20.
- Dweck, C. S. (2010b). Mind-sets and equitable education. *Principal Leadership*, 10(5).
- Dweck, C. S., & Mueller, M. (1998). Intelligence praise can undermine motivation and performance. *Journal of Personality and Social Psychology*, 75(1), 33-52.
- Farrington, C., A., Roderick, M., Allensworth, E., Nagaoka, J., Keys, T., S., Johnson, D., W., & Beechum, N., O. (2012). Teaching adolescents to become learners. The role of noncognitive factors in shaping school performance: A critical literature review. Retrieved from <https://consortium.uchicago.edu/sites/default/files/publications/Noncognitive%20Report.pdf>
- Field, A. (2013). *Discovering statistics using IBM SPSS statistics (4th ed.)*. Thousand Oaks, CA: Sage.
- Gall, M.D., Gall, J.P., & Borg, W.R. (2015). *Applying educational research*. Boston: Pearson.

- Garcia, E. (2014). The need to address noncognitive skill in the education policy agenda. *Economic Policy Institute*. Retrieved from <http://www.epi.org/publication/the-need-to-address-noncognitive-skills-in-the-education-policy-agenda/#epi-toc-11>
- Glesne, C. (2011). *Becoming qualitative researchers: An introduction*. Boston: Pearson.
- Goldkuhl, G. (2012). Pragmatism vs interpretivism in qualitative information systems research. *European Journal of Information Systems*, 21(2), 135-146. doi: 10.1057/ejis.2011.54
- Hansford, E. (2013, August 12). Angela Duckworth and the research on grit [Audio podcast]. Retrieved from <http://americanradioworks.publicradio.org/features/tomorrows-college/grit/angela-duckworth-grit.html>
- Hochanadel, A. & Finamore, D. (2015). Fixed and growth mindset in education and how grit helps students persist in the face of adversity. *Journal of International Education Research*, 11(1), 47-50.
- Hoerr, T. (2013). *Fostering grit. How do I prepare my students for the real world?* Danvers, MA: ASCD.
- Hsin, A., & Xie, Y. (2017). Life-course changes in the mediation of cognitive and non-cognitive skills for parental effects on children's academic achievement. *Social Science Research*, 63, 150-165. doi: 10.1016/j.ssresearch.2016.09.012
- Larke, P. J., Webb-Hasan, G., Jimarez, T., & Li, Y. (2014). Analysis of Texas achievement data for elementary African American and Latino females. *Journal of Case Studies in Education*, 6.
- Lead4ward. (n.d). Quicklook 2018 accountability system - HB22. Retrieved from <http://lead4ward.com/resources>

- Leech, N., & Onwuegbuzie, A. (2009). A typology of mixed methods research designs. *Quality & Quantity*, 43(2), 265-275. doi: 10.1007/s11135-007-9105-3
- Mills, G.E. & Gay, L.R. (2016). *Educational research*. Boston: Pearson.
- Mullainathan, S., & Shafir, E. (2013). *Why having too little means so much*. London: Allen Lane.
- NAEP. (2016). NAEP Overview. Retrieved from <http://nces.ed.gov/nationsreportcard/about/>
- National Academies Press. (2011). Assessing cognitive skills. Retrieved from <https://www.ncbi.nlm.nih.gov/books/NBK84224/>
- Patten, M.L. (2014). *Understanding research methods*. Glendale, CA: Pyrczak.
- Ricci, M. (2013). *Mindsets in the classroom: Building a culture of success and student achievement in schools*. Waco, TX: Prufrock.
- Richard, A. (2016). The buzz grit & agency. *Principal*, 96(1), 22-23.
- Robertson-Kraft, C., & Duckworth, A. L. (2014). True grit: Trait-level perseverance and passion for long-term goals predicts effectiveness and retention among novice teachers. *Teachers College Record*, 116(3), 1-27.
- Rojas-LeBouef, A., & Slate, J. R. (2012). The achievement gap between White and non-White students. *International Journal of Educational Leadership Preparation*, 7(1).
- Saldaña, J. (2016). *The coding manual for qualitative researchers*. Sage.
- Socol, I. D. (2014). Taking a closer look at the grit narratives. *Knowledge Quest*, 43(1), 10-14. Retrieved from <http://www.ala.org/aasl/pubs/kq/v43no1>
- Steiner-Adair, C. (2014). Got grit? The call to educate smart, savvy, and socially intelligent students. *Independent School*, 72(2). Retrieved from <https://www.nais.org/magazine/independent-school/winter-2013/got-grit/>

- TAPR. (2016). 2015-2016 Texas Academic Performance Report. Retrieved from <http://tea.state.tx.us/tapr>
- Taylor, B. H. (2000). *Women with grit*. Logan, Ia.: Perfection Learning.
- TEA. (1996). The Development of accountability systems nationwide and in Texas. Statewide Texas educational progress study report No. 1. Retrieved from http://tea.texas.gov/acctres/all_reports_index.html
- TEA. (2011). General education development. Austin, TX: The Texas Education Agency. Retrieved from <http://www.tea.state.tx.us/ged/>
- TEA. (2014). Student attendance accounting handbook, 1-298. Retrieved from https://tea.texas.gov/Finance_and_Grants/Financial_Compliance/Student__Attendance_Accounting_Handbook/
- TEA. (2016). Accountability manual. Austin, TX. The Texas Education Agency. Retrieved September 10, 2016 from http://www.tea.texas.gov/Student_Testing_and_Accountability/
- TEA. (2017). Completion, graduation, and dropouts data search. Austin, TX: The Texas Education Agency. Retrieved from <http://tea.texas.gov/acctres/dropcomp/years.html>
- Tomlinson, C. C. (2013). Fairy dust and grit. *Educational Leadership*, 70(5), 85-86.
- Tough, P. (2016). *Helping children succeed: What works and why*. Boston: Houghton Mifflin Harcourt.
- Tough, P. (2012). *How children succeed: Grit, curiosity, and the hidden power of character*. Boston: Mariner Books.
- Trafton, A. (2015, April 17). McGovern Institute for Brain Research on MIT. Retrieved from <http://mcgovern.mit.edu/news/news/study-links-brain-anatomy-academic-achievement-and-family-income/>

US Military Academy Westpoint. (2012). Costa Mesa: Experian Information Solutions, Inc.

Retrieved from

<http://www.westpoint.edu/admissions/SitePages/Home.aspx?accountid=7084>

Vogt, W. P. (2007). *Quantitative research methods for professionals*. Boston, MA.

Wood, R., Siberry. L. (2014). Cognitive skills: what are they and how do we use them?

Australian Broadcasting Corporation. Retrieved from

<https://www.activememory.com/news/2014/cognitive-skills-what-are-they-and-how-do-we-use-them>

APPENDIX A

Short Grit Scale

Directions for taking the Grit Scale: Please respond to the following 8 items. Be honest – there are no right or wrong answers!

1. New ideas and projects sometimes distract me from previous ones.
 - ☐ Very much like me
 - ☐ Mostly like me
 - ☐ Somewhat like me
 - ☐ Not much like me
 - ☐ Not like me at all
2. Setbacks don't discourage me.
 - ☐ Very much like me
 - ☐ Mostly like me
 - ☐ Somewhat like me
 - ☐ Not much like me
 - ☐ Not like me at all
3. I have been obsessed with a certain idea or project for a short time but later lost interest.
 - ☐ Very much like me
 - ☐ Mostly like me
 - ☐ Somewhat like me
 - ☐ Not much like me
 - ☐ Not like me at all
4. I am a hard worker.
 - ☐ Very much like me
 - ☐ Mostly like me
 - ☐ Somewhat like me
 - ☐ Not much like me
 - ☐ Not like me at all
5. I often set a goal but later choose to pursue a different one.
 - ☐ Very much like me
 - ☐ Mostly like me
 - ☐ Somewhat like me
 - ☐ Not much like me
 - ☐ Not like me at all

6. I have difficulty maintaining my focus on projects that take more than a few months to complete.
- ☐ Very much like me
 - ☐ Mostly like me
 - ☐ Somewhat like me
 - ☐ Not much like me
 - ☐ Not like me at all
7. I finish whatever I begin.
- ☐ Very much like me
 - ☐ Mostly like me
 - ☐ Somewhat like me
 - ☐ Not much like me
 - ☐ Not like me at all
8. I am diligent.
- ☐ Very much like me
 - ☐ Mostly like me
 - ☐ Somewhat like me
 - ☐ Not much like me
 - ☐ Not like me at all
-

Scoring:

1. For questions 2, 4, 7 and 8 assign the following points:
5 = Very much like me
4 = Mostly like me
3 = Somewhat like me
2 = Not much like me
1 = Not like me at all
2. For questions 1, 3, 5 and 6 assign the following points:
1 = Very much like me
2 = Mostly like me
3 = Somewhat like me
4 = Not much like me
5 = Not like me at all

Add up all the points and divide by 8. The maximum score on this scale is 5 (extremely gritty), and the lowest score on this scale is 1 (not at all gritty).

APPENDIX B

Focus Group Transcript

Researcher	Respondent
First of all, I would like to thank you for taking time out of your busy schedule to participate in this focus group. Today we are meeting with four 4th grade teachers who have agreed to share their perspectives regarding the topic of Assessing the Link between grit and academic achievement. There are four females. Three are Hispanic and one is White. The first question I'd like to ask requires an answer of yes or no. The first question is: Should there be a relationship between grit and reading?	
	I believe that there is. Students don't all learn at the same levels and there are different levels. Students should not give up on reading because it's an essential skill. I feel like the teacher should instill all the qualities of grit so they can be successful. It's not going to happen all in Kindergarten and it may not happen in first grade, but eventually it will
	First of all I feel that grit and reading should go together. You have to build the students self-esteem and say look you are not a quitter you can do this you instill the positive they are going to excel. Since we are instilling grit right now, we don't have many kids that see themselves as failures. They excel.
	It's about progress. It's not about making the 100s.
	We are here, but we are going to push you further.
	I feel the same way. We want these kids to persevere and in order for them to persevere in life we have to instill the mentality as well because there are students that struggle so when they have all around

	perseverance they will never give up and keep on trying.
The second question is very much like the first question. Should there be a relation between grit and math?	
	I think in order to be successful in any subject you have to have grit.
Is that the mutual feeling between all of you guys?	
	Yes.
Because the third questions asks if there should be a relation between grit and writing? So coming from you it's just a life lesson that they need to have grit in order to succeed.	
	Not just that grit is the positive. Some students are not as strong in some content. So then it like telling them to focus. It's like riding a bike. Yes you are going to fall, but get back on there. A lot of kids don't like to write. The more they are writing and the more we are saying and encouraging them they are going to do better. So yes, grit does go with writing. They know it's ok to fall. We have weaknesses and strengths.

	And they are learning to connect all the other subjects with grit. If they know they got better in one subject then they will be willing to do it with another subject.
The next question is more of a discussion, but they are very similar. They are all more grade related. The next question is to what extent is academic achievement related to grit among 4 th graders. When I think of 4 th graders I think of different leveled 4 th graders.	
	I think what you said is very true. We have students who are excelling with higher leveled books that I might never pick up and then you see other students who are your struggling readers and they are trying to keep up. It's all about growing and showing progress
	It's also about the teacher. It's about how the teacher presents it and instill individuality.
When they get to 4 th grade instilling that is harder.	
	They know at that age what levels they are they know if they are struggling. I think it's on how it is presented by the teacher. Before, kids didn't now what the word grit meant. Before it was taught to me and then we started giving it to them and instilling it. When they hear stories it helps them visualize what grit is.
So reading is so developmental. What extent is academic achievement in mathematics related to 4 th graders? I think about all the 4 th graders and the ones we have had home grown and then the ones we just got	

	There are so many skills in math that students must learn in a short amount of time. We have to enforce grit even more because some skills may be easier than others. If we show them that math is fun and you can do a lot of fun strategies then they start to pick it up. To show them to try and not give up. Use your strategies And really push grit.
	They are already at that 4th grade level where they come in and already have a mental block. So it is really important to instill the qualities of grit to break down that mental wall. Maybe last year I had a student that I met on the first day of school and I asked him if he was ready for math and he said he didn't like math.
That was the first thing he said?	
	He told me he didn't like math and I could tell he had a bad mental block. And we worked with him and he ended up loving math and he got commended. So it's just about instilling those qualities.
	It's about pulling them in. Even if it's division, you are still not going to get them all at one time. You can do this or say it's going to be ok. I think it's important if you have a student who doesn't get it really quick, that student is comfortable saying, "I didn't really get it." The student needs to know that they will fail and not always get it.
	I think that grit can change their perception or their whole life. I remember when I was in 7th grade, I had that mental block with math and I had a very tough time through high school. Once you set the tone and teach students how to be successful,

	instilling perseverance, grit and determination. I mean grit is totally new to me. I didn't hear the word until Mrs. Barrington came into our campus. I think giving them all the tools to use can help them down the road to be successful.
Well especially in mathematics and you mentioned pulling the small groups. How do you feel like grit when you get those kiddos that have gaps. How do you think grit relates to that?	
	You show them different strategies like you have an algorithm. If they cannot do it then you show them a different way.
	So if they say they can't then we tell them they may not know it yet, but if they have perseverance
You would think some kids just naturally have more perseverance than others. Then I hear others that you have to build capacity.	
	Sometimes we have our work cut out for us because of their home environment. They don't get that encouragement or push.
So there are other variables affecting that maybe you are not in control.	
	At the beginning, we had a lot of grit activities embedded in stuff in the beginning to instill those skills. We see kids wanting to work harder because Mrs. Barrington gives those monthly grit awards too. Those kids want to get that award. It's something new, but they have started

	creating goals. It was something new to me to. We always did motivational movies, but we just didn't use words.
What about writing. What extent is academic achievement related to grit?	
	Until recently the 4 th graders were coming very very low in writing. It was a subject that was overlooked. Our 4 th graders still struggle in writing. In order for students to be successful they really have to have grit. It should have been taught and implemented. Things happen.
	Also, there is no wrong answer. Students need to know that when they write they can write what they want and students need to be comfortable sharing their writing. You have to have conferencing with writing and telling them positive things.
There's so many things in writing and a lot involved. It sounds like everyone is on the same page. The last question is what are the perspectives of grade 4 teachers and the link	
	4 th grade instilling those qualities is super important. We have to show that index of growth. The content in 4 th grade is really tough. It's really intense. In order for students to show that growth in index 2 for me that's the most important.
Yes, as a teacher we want them to move to different levels.	

	Last year it was kind of brand new to us and this year we needed grit too. Teachers have to have grit too. We had to dig in ourselves and help students get through their problems.
Sounds like grit and perseverance are such qualities that kids have to have because if they don't, they give up. Everybody likes to do stuff they're good at. It's the difficult stuff they really need to push. I heard somebody say the other day that motivation is doing stuff your good at and self discipline is doing things your not good at. I think that's what	
	Writing is not my favorite thing. And I had to tell my kids we were going to get it done together. You have to be able to believe it to instill it into your kids. If you don't believe it how are you going to teach it.
	This is my first year in 4th grade and I had to tell my kids I 'm new at this, I'm learning. I had to have grit myself. I think instilling grit into them and understanding we all make mistakes.
	I have an eraser on my board that says "mistakes are proof that you are trying." So every time somebody would make a mistake they would always refer to my eraser.
	The goal charts too are important to in showing their progress The stamina tests they can show they were here and now look where they are. If they went down, we needed to look at what we did wrong and how we can improve
Apparently Mrs. Barrington gave the kids an Item Grit Scale. I am very surprised to find out that based on the kids answers and the way they do academically there is no relation between and total scores.	

	Oh wow!
And no statistically significant relation between grit and academic achievement. So when she showed me the scores a minute ago . There is a slight difference but not anything significant. For example the kids in reading that had low grit had an average of .5987 and the kids with high grit .64. There was a little difference but not a lot. The same with math low grit was .61 and high grit was .65. In writing it was actually reversed which is very surprising. Low grit was .58 and high grit was .56. Sometimes when you do tests like this, it helps you think about if that is not the factor than what are all the other variables that play into that? If you research and you find out it wasn't significant it makes you look at other things. I would have thought the study would come out more correlated. I've always told kids that someone in this room is going to be valedictorian and it's not necessarily the smartest kid, but the one who wants it the most.	
I was kind of surprised at the results.	
	It could be because we gave it at the very end of the year and we didn't really talk about it too much beforehand. If we would have had more conversation on the grit scale and mentally they were exhausted from taking the STAAR test. Maybe they didn't understand the questions.

	I do feel like grit makes a difference even if the data didn't come out like that. I have noticed a change in my students and how they look at things. I think educating them about grit is important and I am glad we did.
I think grit plays in to self-esteem.	
	I really feel like Mrs. Barrington initiative with grit has helped our kids. It gives our students something to strive for. It also teaches our kids that it is ok to fail and they learn to cope with failure
	And teachers too.
	And teachers. It's a mindset. I feel like it is important for them to learn about it. Being educated about mindsets has really helped me when dealing with stuff. Now that I am educated about mindsets and teaching my students about mindsets I think it makes a difference.
I do too.	
	I think that always giving your best. I know as teachers we've always said it, but now there is a distinction. Teaching grit helps us encourage kids to not quit and it is more about effort.
	You hear kids now use grit in their conversations. They notice it too and they tell stories where they have used grit in different situations.

It becomes a culture of what is expected.	
	We have that grit award that every teacher gives to a student each month. And the class will applaud and are excited for the kids. It has really built a nice atmosphere and environment for the kids.
	We always have to reassure them to because those kids that do awesome in the classroom but then they are not getting the grit award. You have to ask kids do they have grit all the time and are they showing it?
	We have to be strategic on who we pick because you don't want to always pick those top kids. You can't always be giving It to the kids that do well, because it's not about doing well, it's about having grit and showing they did have grit and pushed forward.
You are right because some kid that is showing progress but is not on grade level yet may have a lot of grit.	
	Right, those are the ones that you want to get because we want them to keep having grit. They need a lot of encouragement during this time and we have to continue to push them.
	We also talked to each other to make sure we were in agreement since our kids rotate to classrooms.
Well thank you . It looks like you have built a really nice culture at your school. Your school is beautiful and I love it.	