Fall 9-2016

A Mixed-Method Case Study of Growth Mindset, Grit, and Reading Scores in a Midwest Public Elementary School

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Midwest Public Elementary School

by

Christina Wilson

A Dissertation submitted to the Education Faculty of Lindenwood University

in partial fulfillment of the requirements for the

degree of

Doctor of Education

School of Education

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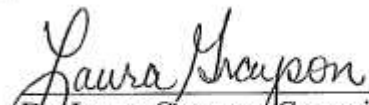
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This dissertation has been approved in partial fulfillment of the requirements for the

degree of

Doctor of Education

at Lindenwood University by the School of Education

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Declaration of Originality

I do hereby declare and attest to the fact that this is an original study based solely upon my own scholarly work here at Lindenwood University and that I have not submitted it for any other college or university course or degree here or elsewhere.

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Abstract

This study examined a possible relationship between grit, growth mindset, and reading scores. The study also examined the influence of grit and growth mindset on closing the achievement gap. Reading was an essential skill all students needed to achieve in order to be successful in school and life. Historically, schools implemented numerous academic interventions to ensure all students were proficient readers and to close achievement gaps in reading, yet the gaps continued to exist. The literature on non-cognitive skills such as grit and growth mindset indicated teaching students these skills would increase academic achievement.

The study collected teacher frequency of instruction of the concepts of grit and growth mindset along with anecdotal teacher information regarding instruction of the concepts. The information was utilized to determine if a relationship existed between teacher instruction on grit and growth mindset and student grit and growth mindset scores. The results of the study indicated no relationship existed between teacher instruction on grit and growth mindset and student grit and growth mindset scores. However, the study did provide useful information regarding how teachers taught the concepts which possibly explained why no relationship existed and provided insight for improvements in the area of instruction.

The results of the study also revealed no relationship existed between student grit and growth mindset scores and reading scores. The scope of the study was limited; the researcher recommended additional studies be pursued to investigate the relationship between grit, growth mindset, and reading scores further.

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Chapter One: Introduction

Background of the Study

At the time of this writing, educators in the U.S. had identified academic achievement gaps between low economic students and students from higher incomes, students who received special education services and those who did not receive services, and between students of color and White students. Statistics indicated Black and Hispanic students were about two grade levels below White peers on the National Assessment of Educational Progress (NAEP) reading and mathematics assessments (Editorial Projects in Education Research Center [EPERC], 2011, para. 3). Data results recent to this writing indicated 76% of children living in poverty could not read proficiently (Riccards, 2012, para. 3). Twenty five percent of poor children did not graduate from high school (Amber, 2014, p. 89). The 2015 NAEP test scores indicated 33% of fourth grade students and 37% of eighth grade students with an educational disability scored at or above basic in reading (Samuels, 2015, para. 4). The same test indicated 54% of fourth grade students and 32% of eighth grade students with an educational disability scored at or above basic in mathematics (para. 5). These gaps existed even though federal laws, such as the No Child Left Behind (NCLB) Act, and numerous research-based academic interventions existed. The research current to this writing indicated non-cognitive skills, such as grit and growth mindset needed to be taught and developed to support increased academic achievement and close achievement gaps.

Non-cognitive skills. Non-cognitive skills are academic and occupational relevant traits and skills not exclusively intellectual in nature (Rosen, Glennie, Dalton,

Lennon & Bozick, 2010). These skills included a variety of motivational and personality

tendencies and attitudes that facilitated favorable performance in school (Rosen et al.,

2010). Examples of non-cognitive skills noted in the literature included persistence, grit,

resilience, self-efficacy, mindsets, effort, motivation, cooperation, and work habits

(Farrington et al., 2012). Researchers and educators discovered evidence that non-

cognitive skills were necessary to increase student achievement. Duckworth (2009,

2016), associate professor in the department of Psychology at the University of

Pennsylvania and a leading researcher on grit, argued that the best way to close the

educational inequality in the U.S. was to teach children "achievement character" (as cited

in Hartnett, 2012, p. 60). Duckworth (2009, 2016) stated, "Schoolwork is not hard in the

way that electromagnetism is hard. It is hard because it's aversive and not fun to do. So,

. . . .it made me think there must be something besides IQ holding them back" (as cited in

Hartnett, 2012, p. 60). Research at Choate Rosemary Hall, a college preparatory

boarding and day school for students in grades 9 through 12, indicated cognitive skills

alone would not produce academic success (Hoerle, 2014).

      Grit. Duckworth (2009, 2016) researched grit over the 13 years previous to this

writing and defined grit as a quality of individuals who passionately work hard towards

long-term goals (as cited in Perkins-Gough, 2013). Duckworth learned a high IQ did not

guarantee success (2012). The researcher found this to be true through the researcher's

experience with her son, who was identified as gifted (high IQ) in the fourth grade. The

researcher's son failed to achieve the success of obtaining a college degree. Perkins-

Gough (2013) stated, "Being gifted is no guarantee of being hardworking or passionate

about something" (p. 17). Research results indicated grit contributed considerably to

successful outcomes (Laursen, 2015). "Grit is a better predictor of high school graduation and grade point average than IQ" (p. 20). The researcher found this to be true, as well. In high school, the researcher's son had a grade point average (GPA) of 2.5 despite his high IQ. In 2015, 1.92 million students took the American College Test (ACT) (Adams, 2015, p. 6). The ACT was used to determine qualification for college entrance (Roell, 2015). The researcher's son obtained a score of 31 out of 36 on the ACT. Information from Tough's (2012) book, *How Kids Really Succeed,* indicated that a student's high-school GPA predicted college completion better than a student's ACT score. The researcher's experience found this to be true. The ACT test score of 31 that the researcher's son obtained was high enough that some colleges overlooked his GPA, and he was accepted into a respected four-year university. However, grit became a factor while the researcher's son was in college, and he struggled to maintain an acceptable college GPA. Researchers indicated high school GPA demonstrated a lot more than mastery of content. Grades also indicated if a student possessed the qualities of motivation, perseverance, time management, and good study habits (Tough, 2012). The researcher's son did not possess these qualities, and after two years of college the researcher's son quit school without obtaining a college degree.

Growth mindset. Dweck (2006), a professor of Psychology at Stanford University and author of the book, *Mindset: The New Psychology of Success,* researched why people succeed and how to foster success. This research led Dweck (2006) to the identification of two mindsets – fixed and growth mindset. Growth mindset was the belief that a person could improve his or her skills and talents (as cited in Fensterwald, 2015). People who had a growth mindset believed intelligence and skills could be

improved through hard work and dedication (Laursen, 2015). "They see education, experience, and practice as opportunities to increase their mastery. They understand that no one has ever accomplished great things . . . without years of passionate practice and learning" (Laursen, 2015, p. 20). To foster a growth mindset in children, one needed to avoid praise for a child's intelligence. Fensterwald (2015) noted if a child's intelligence was praised instead of praising his or her efforts, then the child often gave up when he or she encountered something difficult or got stuck on a problem. The child learned to believe he or she was not smart enough to achieve success. The researcher's experience supported this statement. The researcher's son was often praised for his intelligence and teachers were not concerned with the lack of effort displayed by the researcher's son. As a result, the researcher's son never learned that sustained effort was necessary to achieve success. When the researcher's son encountered difficulty, such as with the challenge of college, he gave up instead of putting effort into the work required to achieve a college degree. Children with a growth mindset learned the brain became stronger with repetition just like a muscle and the level of intelligence could change. When children understood that effort, not intelligence, led to success, they became more persistent. "Changing students' mindsets about intelligence can change the way they deal with challenges and setbacks in their school environment, making them more tenacious learners and higher achievers" (Dweck, Walton & Cohen, 2014).

Purpose of the Study

The purpose of this study was to research a possible relationship between grit, growth mindset, and reading scores at a public elementary school in the Midwest. This study involved students in grades three through five, who had parent permission to

participate in the study. Comparisons of academic performance between students with high grit and growth mindset scores and students with low grit and growth mindset scores were made using data collected from students and their teachers. The study also made comparisons of academic performance between subgroups of students, to determine if an achievement gap existed.

The researcher collected reading benchmark assessment data on each student who participated in the study at the beginning of the school year in August 2015 and at the end of the school year in May 2016. The reading benchmark assessment data and grit and growth mindset scores collected at the same times were compared for each student participant. A comparative analysis examined if a relationship existed between grit, growth mindset, and reading scores. The results of this study possibly provided valuable information regarding the relationship between grit, growth mindset, and student achievement. Then-current research indicated students with higher grit and growth mindset scores had higher reading and mathematics achievement (Dweck et al., 2014). This study attempted to confirm previously conducted studies on grit and growth mindset and attempted to provide schools with a strategy that would increase academic achievement and close achievement gaps.

Problem Statement

At the time of this writing, the U.S. continued to have race, gender, and social class achievement gaps (Rattan, Savani, Chugh, & Dweck, 2015). The average achievement level of American students had not improved in the 10 years previous to this writing (Rattan et al., 2015). "The achievement gap starts at birth and follows students all the way through high school and we have a moral responsibility to do something

about that" (Yaffe, 2009, p. 1). The researched school had an identified achievement gap

between students in the super subgroup (Black students, students who received special

education services, and students who received free and/or reduced lunch) and the general

population of students. Table 1 provides an overview of the disaggregated data of the

Missouri Assessment Program (MAP) from the 2014-2015 school year. The achievement

gap was evident from examination of the data.

Table 1

2014-15 Disaggregated MAP Data

	Black	White	Free & Reduced Lunch	IEP
3rd ELA	58.8%	98%	66.7%	
3rd Math	35.3%	94%	42.9%	
4th ELA	81.3%	91.7%	88.9%	60%
4th Math	75%	87.5%	77.8%	53.3%
5th ELA	47.4%	95.2%	61.9%	
5th Math	21.1%	80.6%	31.8%	

Note. Data indicated percentage of students who scored proficient & advanced on the MAP test. IEP = Individualized Education Plan.

Researchers indicated that despite educational reforms designed to eliminate gaps,

many children continued to struggle academically (Spitzer & Aronson, 2015). Numerous

cognitive and academic interventions were implemented at the researched school in an

effort to close the achievement gap. Progress was made and the achievement gap

narrowed; however, it still existed. Evidence recent to this writing indicated traits other

than general intelligence were important for success in life and school (West et al., 2016).

Differences in non-cognitive skills contributed to the achievement gap between affluent

and disadvantaged students (West et al., 2016). The then-current research indicated

teaching and developing non-cognitive skills, such as grit and growth mindset increased student achievement and closed achievement gaps.

Rationale

Researchers indicated reading was an essential academic skill all students must possess to further their academic skills and to become successful members of society (Annie E. Casey Foundation, 2014; Gewertz, 2011; Hernandez, 2011; Workman, 2014). Students were more likely to perform well in science, mathematics, and other subjects if they were competent readers (Child Trends Databank, 2015). According to NAEP, the reading assessment results from fourth graders in 2011 indicated only 67% scored at a basic level or above (Reardon, Valentino, & Shores, 2012, p. 21). On the same test, 34% scored at the proficient level or above (Reardon et al., 2012, p. 22). The researcher believed these numbers were concerning. Students unable to read were more likely to drop out of school and were unable to obtain the education needed to gain employment. Riccards (2012) stated, "Twenty five percent of young adults lack the basic literacy skills needed for a job" (para. 3). Literacy scores were highly predictive of the future; California and Arizona planned for future prison populations based on fourth grade reading scores (Riccards, 2012). In addition to the overall low performance in reading, subgroups of students from low-income families, minorities, and students who received special education services were even farther behind than the general population. Forty nine percent of children from higher-income families were below proficiency in reading compared to 80% of children from low-income families, who were reading below proficiency (Annie E. Casey Foundation, 2014, p. 2). There were also disparities among results for Black students. The data indicated 83% of Black students were not proficient

in reading and 89% of students with an educational disability were not proficient in

reading, compared to 55% of White students who were not reading proficiently (Annie E.

Casey Foundation, 2014, p. 2). The researcher observed these same disparities among

test scores and an overall lack of achievement in reading at the researched elementary

school.

      Many academic interventions failed to produce the expected academic results.

Dweck and Yeager (2012) stated educational reform efforts must address resilience or the

educational efforts would not be as effective. Research by Dweck and Yeager (2012)

revealed

> If students can be redirected to see intellectual ability as something that can be
>
> developed over time with effort, good strategies, and help from others, then they
>
> are more resilient when they encounter the rigorous learning opportunities
>
> presented to them. (p. 306)

      Dweck (2007), a leader in studying character traits and student performance,

observed over 400 students during their transition to seventh grade (as cited in Blackwell,

Dweck & Trzesniewski, 2007, p. 246) and concluded students who displayed a fixed

mindset did not do well during the transition to seventh grade even if the students had

done well in the past (Dweck, 2007a). When faced with a challenge, students with a

fixed mindset demonstrated less resilience, poor motivation, and received lower grades

compared to students who demonstrated a growth mindset (Dweck, 2007a). One way to

improve student academic performance was to teach growth mindset. According to

Dweck (2009) "Researchers around the globe have now shown that students who believe

their intelligence can be developed show superior academic performance across

challenging school transitions, enhanced learning on challenging cognitive tasks and superior performance on IQ tests" (para. 10).

In addition to teaching growth mindset, researchers showed grit could also increase student achievement. Duckworth, Kelly, Matthews and Peterson (2007) defined grit as "perseverance and passion for long term goals. Grit entails working strenuously toward challenges, maintaining effort and interest over years despite failure, adversity and plateaus in progress" (p. 1087). Research results revealed perseverance and grit correlated with student success (Pappano, 2013). Duckworth and Seligman (2005) conducted a study of 140 eighth grade students and concluded adolescents who were highly self-disciplined performed better than their peers on academic tasks, such as report card grades, attendance, and standardized achievement test scores. The study also found that self-discipline was a larger indicator for academic performance gains than IQ (Duckworth & Seligman, 2005). Although there were many studies on growth mindset and grit the researcher did not find any studies regarding the combination of growth mindset, grit, and student achievement.

The current study built on prior research conducted on growth mindset and grit. The researcher intended to close the gap in the literature by conducting a study that combined the teaching of these concepts. The study attempted to demonstrate how the combination of teaching growth mindset and grit could possibly increase reading scores in third through fifth grade students at an elementary school in the Midwest. The state of Missouri disaggregated data into a 'super' subgroup that included students with a disability, English language learners, students who received free and reduced (F&R) lunch, and minority students (McKinney, 2014). Since there was an established

achievement gap in reading between students in the super subgroup and the general population of students, the researcher analyzed the super subgroups and investigated a possible relationship between teaching growth mindset and grit and narrowing the existing gaps. If the current study indicated a relationship between teaching growth mindset and grit and reading scores, then these findings could lead to informed decisions on the teaching practices used in the classroom. In addition, if the proposed study indicated there was a relationship between growth mindset, grit, and the achievement gap then it could possibly lead to academic reading success for a population of students who struggled to achieve proficient reading skills. This study had the potential to support an increase reading achievement for all students.

Research Question and Hypotheses

The researcher investigated the following research question: How do teachers develop and implement lessons/activities on growth mindset and grit?

This study tested the following hypotheses:

Hypothesis 1: There is a relationship between pre-Grit score, post-Grit score and reading scores.

Hypothesis 2: There is a relationship between pre-Growth Mindset score, post-Growth Mindset score and reading scores.

Hypothesis 3: There is a relationship between the frequency of teacher instruction of concepts of Grit and student Grit scores.

Hypothesis 4: There is a relationship between the frequency of teacher instruction of concepts of Growth Mindset and student Growth Mindset post-scores.

Hypothesis 5: There is a relationship between the Grit scores and Growth Mindset scores.

Hypothesis 6: When comparing the Super Subgroup of students to the general population, there is a difference in, Grit score, Growth Mindset score, and percentage of students at or above the grade-level reading benchmark.

Methodology Overview

All teachers at the researched school attended a behavior workshop in the summer of 2014 that included information on growth mindset and grit. The teachers learned about the concepts, learned methods to incorporate the concepts into their classrooms, and learned about the book, *Mindsets in the Classroom,* written by Ricci (2013). This book provided several activity ideas, as well as information about how to incorporate growth mindset into the classroom. In addition, teachers learned how to encourage students to use grit by creating lessons and projects that required students to sustain their efforts over a long period. Teachers were encouraged to incorporate the terminology and definition of grit throughout their daily lessons and teach the concepts of grit and growth mindset. This study examined how teachers chose to teach and incorporate the concepts of growth mindset and grit into their classrooms. The researcher believed students with a higher grit score and growth mindset score would also have higher reading scores. The literature indicated non-cognitive skills, such as grit and growth mindset made a difference in students' academic success (Tough, 2016). All students in third, fourth and fifth grade at a public elementary school in the Midwest had the opportunity to participate in the study. The researcher utilized student growth mindset and grit surveys, Fountas and Pinnell (2012) reading benchmark scores, teacher interviews, and a teacher frequency

data and anecdotal sheet (see Table 16) to explore this potential correlation. In August 2015 and again in May 2016, the researcher collected reading, grit, and growth mindset data.

Limitations of the Study

> **Measure used to collect the data.** The grit and growth mindset surveys were self-report instruments, and these instruments had limitations. Social desirability and reference bias were two limitations of self-report instruments, which could have influenced the grit and growth mindset survey scores in the study. Social desirability involved participants rating themselves higher to seem more appealing to observers or to themselves (West et al., 2016). Reference bias occurred when a participant was influenced by different values of judgment (West et al., 2016). Participants in the study had different views regarding a 'hard worker' and rated themselves according to their perspectives.

> In addition to the self-report limitations, some respondents could have had difficulty understanding the questions on the surveys. The instructional coach observed some students had difficulty reading and/or understanding the questions in the survey. To address this problem, the instructional coach read the survey to students and clarified the meaning of questions for students who requested clarification.

> **Participant limitations**. Teacher participants could have been uncomfortable to share information that did not reflect well on them in their job environment, even though teacher responses were anonymous. The teacher participants could have overstated the extent to which they taught grit and growth mindset concepts, and teachers could have provided information that they thought the researcher wanted, as opposed to the correct

information. To address this limitation, the researcher made it clear anonymity would be maintained for the participant, and the researcher encouraged honesty.

Student participants could have chosen answers on the grit and growth mindset surveys that reflected how they 'think they should be,' rather than how the students actually perceived themselves. The instructional coach made a concerted effort to remain unbiased toward the choices the students made during the survey. The instructional coach also told the students there was no right or wrong answer, before the students participated in the survey and reminded students as they completed the survey that there was not a correct choice.

Definition of Terms

Achievement Gap - "in education refers to the disparity in academic performance between groups of students. The achievement gap shows up in grades, standardized-test scores, course selection, dropout rates, and college completion rates." (EPERC, 2011, para. 1).

Fountas and Pinnell Reading Benchmark – A formative benchmark reading assessment that includes 58 fiction and nonfiction original titles, used to determine a student's reading level as a means to document the student's reading progress and to inform instruction (as cited in Heinemann, 2015, p. 1). "The assessment measures decoding, fluency, vocabulary and comprehension skills for students in kindergarten through 8th grade" (Heinemann, 2015, p. 1).

Grit – "Perseverance and passion for long-term goals. Grit entails working strenuously toward challenges, maintaining effort and interest over years despite failure, adversity and plateaus in progress" (Duckworth et al., 2007, pp. 1087-1088).

Growth Mindset – "The belief that your basic qualities are things you can cultivate through your efforts" (Dweck, 2006, p. 7). Students with a growth mindset believe intellect can be developed. As a result, growth minded students focus on learning, put effort into learning and are resilient when setbacks are encountered (Dweck, 2010a).

Resilient - "Any behavioral, attributional, or emotional response to an academic or social challenge that is positive and beneficial for development such as seeking new strategies or putting forth greater effort" (Dweck & Yeager, 2012, p. 303).

Super sub-group - The super-subgroup consists of English language learners, students who receive F&R lunch, minority students, and students who have a special education plan (McKinney, 2014).

Summary

"In recent years, education leaders and the business world have realized that the standards-based reform movement was unable to solve the inherent inequalities in American education or prepare students for the demands in today's workforce" (Laursen, 2015, p. 20). This realization led to researchers investigating the influence of non-cognitive skills. There was a growing body of evidence that non-cognitive skills, such as grit and growth mindset had a positive influence on academic performance and success (Laursen, 2015). "Students who demonstrate a growth mindset and grit earn higher grades than students who do not" (Laursen, 2015, p. 21). The literature also indicated schools could significantly influence the non-cognitive skills of students (West et al., 2016).

The purpose of this study was to research a possible relationship between grit,

growth mindset, and reading scores at a public elementary school in the Midwest. The

then-current achievement gap within the researched school at the time of this analysis

supported the need for this study. The results of this research added to the body of

knowledge in the areas of grit, growth mindset, and the influence of non-cognitive skills

on closing the achievement gap while also providing the researched school with data that

could be used to make future decisions regarding the use of teaching grit and growth

mindset as a proven strategy to increase academic achievement and to close achievement

gaps.

Chapter Two: Literature Review

This researcher studied grit, growth mindset, and reading scores in a public elementary school setting in the Midwest to examine a possible relationship between the variables. Prior to data collection, the researcher completed a review of literature on the description of and instructional methods related to grit and growth mindset, why each of these concepts were important in the field of education, and the relationship between these concepts and academic achievement in reading. The researcher found a depth of information on growth mindset and grit; however, the researcher found no literature that studied the relationship between growth mindset, grit, and reading scores.

Researchers noted many factors that influenced student achievement and divided the factors into two groups: cognitive and non-cognitive (Garcia, 2014). Grit and growth mindset were considered to be non-cognitive factors, while literature recent to this writing focused on non-cognitive skills and the relationship between non-cognitive skills and academic achievement (Laursen, 2015). This review summarizes the literature on non-cognitive skills, grit, growth mindset, and how these concepts influenced student achievement. In addition, literature on achievement gaps and the influence of non-cognitive skills, including grit and growth mindset, on achievement gaps was reviewed and summarized.

The researcher also reviewed literature related to measuring student achievement. The literature indicated reading scores were considered a reliable measure to monitor student achievement (Child Trends Databank, 2015). The research also indicated future student success could be predicted from reading scores (Faria et al., 2012). This literature review summarizes the research on reading scores, as a measure of student

achievement, benchmark reading scores, and why reading scores were a good measure of student achievement.

Non-cognitive Skills

At the time of this review, researchers in the field of human cognition no longer believed cognition was isolated within the brain and discussed limitations of the belief that an individual's IQ was a permanent and measurable amount of intelligence (Farrington et al., 2012). "Noncognitive skills are important predictors of cognitive performance, and cognitive skills are also influential in the level of noncognitive performance" (Garcia, 2014, p. 14). Hunter (2013) stated students with non-cognitive skills were stronger academically, because the students were better at understanding and engaging in academic tasks, which allowed the students with non-cognitive skills to achieve more control over learning.

Description and characteristics. Non-cognitive skills included a variety of motivational and personality tendencies and attitudes that facilitated performing favorably in school (Rosen et al., 2010). Intelligence quotient (IQ) tests measured specific levels of cognition, not utilized when measuring non-cognitive skills, described as learned behaviors represented by engagement levels and emotional intelligence (Hunter, 2013). Researchers implied cognitive skills contributed 15% to a person's success compared to non-cognitive skills, which contributed 85% to a person's success (Hunter, 2013, para. 11). Duckworth (2009) described non-cognitive skills as what one usually does, compared to cognitive skills that she described as what one can do. The term non-cognitive skill described a variety of traits and skills. Some examples of non-cognitive skills included: persistence, grit, resilience, self-efficacy, mindset, effort,

motivation, cooperation, and work habits (Farrington et al., 2012). "Successful students develop personal strengths including grit, tenacity, perseverance, and positive academic mindsets" (Weissberg & Cascarino, 2013, p. 9). Non-cognitive qualities contributed to limiting or reversing delays in cognitive development and academic attainment (Rosen et al., 2010). Educators across the U.S. agreed students needed more than content knowledge to be prepared for life after high school (Felton, 2016). Under the new Every Student Succeeds Act (ESSA), which replaced NCLB in December 2015, each state was required to incorporate measures of non-academic skills in addition to mathematics and reading assessments (Felton, 2016).

Non-cognitive skills and education. Researchers indicated students who were taught non-cognitive skills exhibited better educational performance, school behavior, increased motivation to learn, and had better attendance (Civic Enterprises, Bridgeland, Bruce & Hariharan, 2013). "Non-cognitive skills are increasingly considered to be at least as important as cognitive skills or IQ in determining academic achievements and job prospects" (Gutman & Ingrid, 2013, p. 1). A study with more than 9,000 elementary students in Baltimore City Public Schools used the Maryland Model for School Readiness to rate the non-cognitive skills of incoming kindergarten students and track the students through fourth grade (Loewenberg, 2016). The study indicated by fourth grade the students who entered kindergarten with "developing" or "approaching" non-cognitive skills were 80% more likely to require special education services or to be retained and were seven times more likely to be suspended (Loewenberg, 2016, para. 4). Students who had strong non-cognitive skills, such as participating in class and completing assignments, were more likely to perform better in school. There was evidence that

academic traits played a vital role in shaping students' grades (Farrington et al., 2012).

Researchers demonstrated a student's GPA was a better predictor of high school and

college graduation than standardized test scores (Farrington et al., 2012; Laursen, 2015;

Tough, 2012).

To achieve a high GPA, students needed to apply non-cognitive skills throughout

their schooling. At Choate Rosemary Hall in Connecticut, a statistical correlation

between self-efficacy, intrinsic motivation, locus of control data, and student GPA was

uncovered (Hoerle, 2014). The researchers found cognitive skills alone did not produce

academic success. The literature indicated a difference between meeting the status of

eligible for college and being college ready (Felton, 2016). Students could have the

knowledge to do well in a college course, but not have the non-cognitive skills to manage

the other required college tasks, including going to class, seeking help when needed, and

being persistent when faced with challenges (Felton, 2016). The majority of teachers

(75%) who participated in a national teacher survey indicated teaching students non-

cognitive skills improved student academic achievement (Civic Enterprises et al., 2013,

p. 23). "The suggestion that *how* students approach learning may be as critical as *what*

they learn is resonating with educators" (Pappano, 2013, p. 4). Educators recognized

non-cognitive skills were more important than cognitive skills for increasing student

achievement measured by test scores and GPA in school and increased achievement in

the work force (Dweck et al., 2014). Non-cognitive skills offered an advantage for

increasing academic achievement of students who came from underprivileged

environments and led to closing achievement gaps (Dweck et al., 2014).

Developing non-cognitive skills. The literature explained schools needed to develop non-cognitive skills in kindergarten through 12th grade students, the same as literacy and mathematics skills were developed (Loewenberg, 2016). "Successfully educating all students requires both academic and psychological resources – academic, social, and emotional factors are essentially interwoven, mutually interdependent, and should not be considered in isolation from one another" (Hamedani & Darling-Hammond, 2015, p. 12). In schools across the U.S., educators needed to balance teaching academics with teaching non-cognitive skills (Weissberg & Cascarino, 2013). "Teachers can incorporate social and emotional skills into all school topics across all grades" (Civic Enterprises et al., 2013, p. 9). Connecting the teaching of non-cognitive skills to existing school-wide and classroom instruction was just one way to develop non-cognitive skills in students (Civic Enterprises et al., 2013). Hamedani and Darling-Hammond (2015) stated, "Social emotional learning will be most effective when practiced and implemented comprehensively and coherently across key levels of the school – climate and culture, features and structures, and formal and informal practices" (Hamedani & Darling-Hammond, 2015, p. 12). Teachers, principals, and other educational staff required professional development on non-cognitive skills to enable them to teach and develop non-cognitive skills in students (Civic Enterprises et al., 2013). The recommended professional development included direct teaching of core non-cognitive skills, embedding non-cognitive teaching in regular academic instruction, and the application of non-cognitive skills throughout the day (Civic Enterprises et al., 2013). The University of Chicago Consortium on Chicago School Research conducted a literature review and found evidence that suggested the best way to improve student

performance was to ensure that teachers understood the relationship between "classroom context and student behaviors, providing teachers with clear strategies for creating classrooms that promote positive academic mindsets in students, and building teacher capacity to help students develop strategies that will enhance their learning and understanding of course material" (Farrington et al., 2012, p. 6). All schools in the U.S. needed to make developing student's non-cognitive skills a priority. Using a systematic approach and being committed could develop non-cognitive skills (Hunter, 2013).

Growth Mindset

Researchers showed students' levels of academic performance predicted the students' belief in their ability to learn and the student's abilities to accomplish tasks in school (Dweck et al., 2014). "There is increasing evidence that academic success is influenced not only by actual ability, but also by students' beliefs about their own intelligence" (Blazer, 2011, p. 1). Dweck (2006, 2007, 2008, 2009, 2010, 2015) identified two beliefs about intelligence, fixed and growth mindset, and demonstrated that individuals achieved based on the beliefs the persons held regarding intelligence (as cited in Laursen, 2015). Protheroe (2010) stated, "This belief about personal capability to accomplish meaningful tasks can directly affect a student's motivation to learn" (p. 41).

Description and characteristics. Students who exhibited a growth mindset believed intelligence and ability could be developed through effective strategies, hard work, and support from other people (Parker, 2015). "They don't necessarily believe that everyone's equally smart or talented, but they believe that everyone can grow" (Parker, 2015, para. 5). Students were encouraged to put effort into schoolwork, because the effort resulted in new learning and growth for the student (Dweck, 2008). A person with

a growth mindset had the understanding that effort resulted in success. Author Lee

(2009) stated, "People with a growth mindset want to take on difficult tasks as they know

that these will provide them with the opportunity to improve and learn" (p.45).

Individuals with a growth mindset believed that individual abilities could be refined and

often sought a challenge. Dweck (2006) explained, "People in a growth mindset don't

just *seek* challenge, they thrive on it. The bigger the challenge, the more they stretch" (p.

21). Perceived difficulty was a natural part of learning, and if an individual's growth

mindset resulted in someone who accepted difficult situations and strived to find new

strategies that worked better (Parker, 2015). An individual who understood intelligence

could change through deliberate practice and effort and had a tendency to be more

resilient when a challenge was encountered (Spitzer & Aronson, 2015). Research by

Dweck and Yeager (2012) demonstrated students could learn that intellectual ability was

something that could be acquired, if students put effort into learning, used good

strategies, and sought help from others when needed. Students who exhibited these

behaviors became resilient and were able to handle rigorous academic opportunities

(Dweck & Yeager, 2012). According to Sternberg (2008), a resilient person

demonstrated a willingness to overcome obstacles, achieved goals, was passionate and

motivated when working towards a goal, and believed in an individual's ability to

achieve the goals. "The most motivated and resilient students are the ones who believe

that their abilities can be developed through effort and learning (Dweck, 2007a, p. 6).

  The belief that the brain could grow and learn was the foundation for a growth

mindset. Researchers indicated a person's brain changed with each learning experience

(Dweck, 2008). "Brain structures are changed and adapted with each human activity"

(Aldrich, 2013, p. 397). The field of neuroscience grew in the area of how the brain functions and changes. Researchers indicated scientists had a new understanding of how the brain worked and this understanding related to an increase in elementary student achievement (Burns, 2011; Dweck, 2008; Schachter, 2012). Educators understood neural connections changed through experience, and every time an experience occurred, neurons fired, which led to a physical change (Fisher & Frey, 2010). With time and repetition, these changes became more permanent (Fisher & Frey, 2010). Students needed instruction, "The brain is malleable, and that the more the brain is exercised, the stronger the neural links become" (Zinshteyn, 2015, para. 13). Students became more persistent when they learned the brain functioned like a muscle and became stronger with effort and practice (Fensterwald, 2015). According to Burns (2011), genes, disadvantages in early learning, or any other factor could not predetermine the brain capacity of an individual. According to Dweck (2006), researchers stated individuals had the ability to continue learning and the brain continued to develop throughout life. Fisher and Frey (2010) explained, "Neuroplasticity, the brain's ability to physically change, is an important consideration given that our actions can permanently alter the learner's brain" (p. 105). "Neural plasticity is what allows teachers to educate a classroom of children who range in background, environmental experiences, or learning behaviors" (Burns, 2011, para. 5). The capacity of the brain to establish new neural pathways and abandon old pathways allowed individuals to learn, memorize, adapt, and forget (Aldrich, 2013). One of the co-founders and the CEO of Mindset Works, Briceno, stated "when we understand that we can build our intelligence, rather than it being fixed, we take risks; we are interested in learning from mistakes" (as cited in Sparks, 2013, p. 1).

Growth Mindset and Education

Students who were underperforming, especially minority students, benefited from growth mindsets; which explained the belief that growth mindsets reduced achievement gaps (Rattan et al., 2015). Dweck (2015) and her colleagues found students' mindsets contributed to their motivation and achievement. "Students who believed their intelligence could be developed (a growth mindset) outperformed those who believed their intelligence was fixed (a fixed mindset)" (Dweck, 2015, para. 2). As cited in Fensterwald's (2015) article, Dweck stated a 2012 study indicated students with a growth mindset scored significantly higher in mathematics and reading than students with a fixed mindset, regardless of income. Researchers showed a student's belief about intelligence influenced performance (Spitzer & Aronson, 2015). Students who believed intelligence influenced performance were malleable and opted for more difficult tasks so they could learn, rather than choosing easier tasks that guaranteed success (Spitzer & Aronson, 2015). Researchers revealed individuals with a growth mindset devoted more time on the hardest questions on a test (Dweck, 2006; Lee, 2009; Saxena, 2016) and were more capable of accurately assessing their own abilities and gaps in their knowledge, which led to increased learning. "Students may learn more effectively if they are taught to have a growth mindset and abandon the idea that intelligence is fixed" (Saxena, 2016, para. 7). In addition to academic success, researchers demonstrated mind-sets influenced social success at school as well (Dweck, 2016). Students with a growth mindset perceived themselves as evolving and growing; and therefore, better able to deal with social stresses (Dweck, 2016).

In addition to the students' mindset, it was important to consider the educators' mindset as well. "An educator's mindset refers to the unquestioned assumptions he or she holds in regard to the teaching process, the role of the teacher, student learning, and what criteria constitute quality education and effective school practice" (Nicoll, 2014, p. 50). Teachers with a fixed mindset believed the teacher was unable to influence students' intelligence (Dweck, 2010a). In addition, a teacher with a fixed mindset focused on protecting reputation and self-esteem (Nicoll, 2014). "Such educators will tend to neither acknowledge, nor correct, deficiencies or failures when problems arise. Rather, the fixed mindset educator will become defensive when criticism or problems in school performance or student progress are raised" (Nicoll, 2014, p. 52). An educator with a fixed mindset was detrimental to a student's success. John Hattie (as cited in DeWitt, 2015) indicated growth mindset had a low effect size because adults had a fixed mindset and treated students according to the teacher's fixed mindset beliefs. If a teacher perceived some students were not capable of achieving, the teacher would most likely not do anything to help the student develop their potential (Dweck, 2010a). However, teachers with a growth mindset believed the teacher could influence and enhance the intellectual skills of students (Dweck, 2010a). Lee (2009) stated a growth mindset teacher "has to find time to allow their pupils to engage in the struggle to understand and to find different ways to enable their students to understand. They know that their students can succeed through their own efforts" (p. 46). In an article recent to this writing, Dweck (2016) cautioned against teachers incorrectly fostering a growth mindset by simply encouraging students to try hard and assuring children they could do anything if they try hard enough. Instead of just telling students to try harder, teachers needed to

teach students the necessary skills and strategies to accomplish the task, and students needed to learn that new strategies and effort created deeper learning, and the brain grew through learning (Dweck, 2016). "A growth mindset can be taught and, when it is, people can become more motivated, more resilient and more successful" (Parker, 2015, para. 7).

Developing a Growth Mindset

Because researchers proved non-cognitive skills predicted student achievement, schools and educators needed to teach critical non-cognitive skills such as changing how students viewed intelligence (Dweck et al., 2014). "Changing students' mindsets about intelligence can change the way they deal with challenges and setbacks in their school environment, making them more tenacious learners and higher achievers" (Dweck et al., 2014, p. 17). The literature stated a growth mindset required instruction where students learned hard work, learning strategies, and support increased intelligence over time (Rattan et al., 2015). Stein's (2014) article, "Creating the Context for Growth Mindsets in the Classroom," mentioned the importance of creating classrooms where students learned by naturally putting effort into tasks and maintained persistence to achieve academically. Dweck (2010b) stated, "We can design and present learning tasks in a way that helps students develop a growth mindset, which leads to not just short-term achievement but also long-term success" (p. 16).

Challenges and mistakes. Students with a growth mindset liked a challenge; so, teachers needed to develop learning tasks that challenged every student. "It is crucial that no student be able to coast to success time after time; this experience can create the fixed-mindset belief that you are smart only if you can succeed without effort" (Dweck, 2010b,

para. 15). Children needed to understand easy tasks were boring and did not benefit their

brains. As a result, teachers encouraged students to pursue challenges by presenting

demanding tasks as exciting and interesting (Dweck, 2010b). Students often did not

understand learning was a gradual process that required hard work and was sometimes

uncomfortable for students who were trying to understanding content for the first time

(Miller, 2013). The more often students were exposed to challenging learning tasks, the

more likely the student embraced the challenge as part of the learning process (Miller,

2013). Experiences with challenging tasks created a belief that the student had the ability

to complete tasks and accomplish goals. This belief led to students who were eager to

approach new leaning tasks, who put effort into achieving goals, and who endured in the

midst of challenge (Protheroe, 2010). In addition to providing challenging tasks, teachers

needed to help students understand that mistakes led to new learning and allowed

students to try new strategies and to problem solve (Dweck, 2010b). Tugend (2011a)

stated children in Japan were expected to problem solve for 10 minutes or longer in front

of other students. In Japanese classrooms, mistakes were an indication of what students

needed to learn, not an indication of failure (Tugend, 2011a). Sometimes educators in the

U.S. focused on a perfect outcome for a lesson, which resulted in educators who forgot to

establish an environment where learning and growth could occur (Moussavi-Bock, 2013).

"Practice is about gradual progress, not perfection. Send the message of perfection, and

people will shut down" (p. 62). It was important to teach students that it took time and

effort to be good at something (Elish-Piper, 2014). If teachers did not allow students to

make mistakes, then students would learn mistakes were bad. Too often students

experienced learning that was all about the end result, which discouraged experimenting,

because students might make mistakes and fail (Tugend, 2011a). Tugend (2011b) stated

educators were creating "victims of excellence – kids who are afraid to take risks, to be

creative, to be wrong. Because wrong is always bad" (para. 6). "We need to teach and

embrace the term *good failure*. No one wants to fail, but failure can help us learn and

become stronger" (Hoerr, 2013, p. 84). When educators taught students to embrace

failure, students learned failure was not the end (Hoerr, 2013). Miller (2013) explained,

"We can convey that real learning is about growth and that real growth can be

uncomfortable. Learning is hard work, especially when students are urged to question,

evaluate, and interpret ideas they're trying to comprehend for the first time" (2013, p.

52). Teachers needed to create a supportive environment where students could learn

from each other, take risks, and learn from mistakes (Moussavi-Bock, 2013). Tugend

(2011a) suggested, "We have to be willing to let our children struggle and fail and make

mistakes without always rushing in to protect them or fix the problem" (para. 26).

Praise effort not intelligence. When students attempted challenging tasks and

learned from mistakes, it was important for the teacher to praise the student's effort and

not intelligence. Dweck (2007b) found "praise for intelligence tended to put students in a

fixed mind-set, whereas praise for effort tended to put them in a growth mind-set" (para

17). Educators needed to convey to students that teachers admired students who took on

challenging tasks, stayed with the task, and tried new strategies (Heggart, 2015). Praising

students who committed to a struggle and worked hard increased students' academic

success (Heggart, 2015). Researchers indicated students focused on effort when teachers

cultivated a growth mindset rather than reverting to predetermined attitudes about the

student's intelligence or ability (Stein, 2014). A study conducted by Dweck (2006, 2007)

showed students became less motivated when praised for intelligence (as cited in

Krakovsky, 2007). Burnett and Mandel (2010) cited a series of studies that revealed

"those students who received only ability feedback and then failed attributed their failure

to not being smart; had a decline in performance after the failure and lied about their

results after the failure" (p. 146). Instead of praising intelligence, adults needed to praise

effort. Glenn (2010) stated, "People nearly always perform better if they focus on things

they can control, such as their effort, rather than things they cannot" (para. 4). Educators

and parents needed to use praise focused on the process and commend student effort

(Fensterwald, 2015). Dweck (2008) conducted several studies with children of all ages

regarding praise, and the results were the same. Students praised for effort preserved

their confidence, continued to be motivated, and maintained their participation. In

contrast, students praised for intelligence refused challenging tasks and did not want to

learn (Dweck, 2008). Johnson (2014) found similar results in a study conducted with two

classes of fourth grade music students. "In the effort feedback group, significantly more

students selected challenging rhythms (learning goals) over easier rhythms with which

they could appear more accomplished (performance goals)" (Johnson, 2014, p. 57).

Despite all of the research on the influence of praise, a study conducted by Burnett and

Mandel (2010) found 71% to 93% of praise in classrooms was general praise, and praise

for effort and ability was given less than 10% of the time (p. 149).

A reduction in students' mindset regarding new challenges occurred if adults

praised talent rather than effort (Johnson, 2014). Glenn (2010) cited a series of landmark

studies that "demonstrated that praising children for their intelligence, rather than for

effort, often leads them to give up when they encounter setbacks" (para. 22). Praising

intelligence not only led to students avoiding challenging tasks, it also led to students

lying about their performance. A study conducted by Dweck (2006, 2007) showed

students who received praise for their intelligence overstated their test scores to peers (as

cited in Krakovsky, 2007). "Almost 40 percent of the intelligence-praised children

elevated their scores, whereas only 12 or 13 percent of children in the other group did so.

To me this suggests that it's too humiliating for them to admit mistakes" (Dweck, 2008,

para. 20). Teachers needed to provide the right kind of encouragement and praise so that

students participated and benefited from challenging tasks. The right praise focused on

the process and effort the students applied, the persistence the students displayed, and the

strategies the students used (Dweck, 2010b).

Grit

The cause of students' inability to acquire basic academic skills was not due to a

shortage of intelligence or the complexity of the content; the problem was lack of

character (Hartnett, 2012). Harnett (2012) referred to Duckworth's (2009, 2016) belief

that many students had difficulty forgoing short-term wants for gains in the long-term.

Researchers indicated grit predicted success because individuals who were gritty were

likely to work hard, improve skills, and finish things (Laursen, 2015; Matchar, 2016;

Perkins-Gough, 2013). "People who are really gritty tend to put in daily deliberate

practice to get better at what they do" (Matchar, 2016, para. 4).

Description and characteristics. Duckworth et al. (2007) defined grit as

"perseverance and passion for long term goals. Grit entails working strenuously toward

challenges, maintaining effort and interest over years despite failure, adversity and

plateaus in progress" (Duckworth et al., 2007, p. 1087). Duckworth (2009, 2016) stated

successful students persevered through boredom and frustration, put effort into

practicing, and had gritty determination to work towards a long-term goal (as cited in

Hartnett, 2012). "Grit predicts success over and beyond talent. When you consider

individuals of equal talent, the grittier ones do better" (Perkins-Gough, 2013, p. 16).

Individuals who had talent could do things quickly and easily, but did not necessarily stay

with a task and work harder to improve (Matchar, 2016). A person with grit also

demonstrated resilience. An individual who was gritty was resilient when he or she faced

a challenge or became frustrated (Bashant, 2014). Resilience involved developing a

positive response to hardship or failure (Perkins-Gough, 2013). "Part of what it means to

be gritty is to be resilient in the face of failure or adversity. But that's not the only trait

you need to be gritty" (Perkins-Gough, 2013, p. 14). Research also established a

correlation between perseverance and grit with student success (Pappano, 2013).

Perseverance was the capability to persist to accomplish a goal regardless of obstacles,

difficulty, or delay (Seider, 2013). Advanced levels of achievement in school required

continued effort on complicated tasks; this is why grit was a significant predictor for

remaining in and thriving in school (Dweck et al., 2014). Individuals with grit wanted to

improve and put in daily effort to get better (Matchar, 2016). Grit incorporated a variety

of traits, such as motivation, positive mind-set, goal focused, and self-control (Goodwin

& Miller, 2013). There was a strong correlation between self-control and grit, but the

two traits were not the same concept (Duckworth & Gross, 2014). Self-control involved

making sure actions aligned with a goal, regardless of more appealing choices. In

contrast, grit involved working diligently toward a single goal through good and bad

times, for years or even decades (Duckworth & Gross, 2014). Individuals with self-

control were able to delay gratification and resisted distraction, which led to better academic success (Bond, 2014). Schools understood teaching grit and self-control was as important as teaching academic content (Tough, 2016). "If you have grit, you have the toughness and tenacity to see a goal through, with an added dash of resourcefulness and pluck to help overcome setbacks. You have stamina and persistence" (Stains, 2014, para. 12).

Grit and education. Duckworth's (2009, 2016) research found grit was a predictor of student academic success, graduating from high school, and students going to college (as cited in Sparks, 2014). Most successful and high-achieving people had the personal quality of grit (Bashant, 2014). "Grit may be the quality that sets these highly successful individuals apart from everyone else" (Bashant, 2014, p. 14). In order to achieve success in school, one must learn to sustain effort on difficult tasks. Therefore, grit was a valuable predictor for staying in school and succeeding in school (Dweck et al., 2014). Talent and grit were not the same thing; not all talented people were gritty (Perkins-Gough, 2013). The people who were both gritty and talented were the most successful people (Perkins-Gough, 2013). "Grit turns potential into accomplishment" (Stains, 2014, para. 14). For decades, we relied on intelligence and IQ tests to explain human behavior, but intelligence actually left a lot unanswered (Hanford, 2012). According to Duckworth's (2012) research, grit was as vital as intelligence when it came to high achievement. Researchers showed children who had a high IQ were not necessarily the highest achievers later in life (Bond, 2014). One must understand the importance that IQ was difficult to change; an IQ score of a child in kindergarten was highly predictive of the child's intelligence as an adult (Hartnett, 2012). Personality, on

the other hand, did not become fixed until a person was at least 50 years old (Hartnett, 2012, p. 62). As a result, "schools should devote more – not less – intentional effort to developing grit in students" (Bashant, 2014, p. 17). Researchers showed students learned gritty behaviors, such as working on a big project until it was completed, demonstrating persistence on academic tasks, and staying with an academic task when it got hard (Farrington et al., 2012). Duckworth (2016) revealed grit changed and individuals could become grittier over time.

Developing grit. Hoerr (2014) stated parents and educators needed to help children develop grit. "Children need to know that good things don't often come easily and that success comes from not giving up. Children need to learn that there is merit in trying and trying again, even if they aren't immediately successful" (Hoerr, 2014, para. 3). In Pappano's (2013) article, "Grit and the new character education," a study of three charter schools in Boston led to a two-part strategy to develop grit. The first strategy was to develop and establish a common vocabulary used during instructional moments. The second strategy was to practice behaviors, such as persistence, and other character traits (Pappano, 2013). To develop grit, Stains (2014) suggested teaching students to set goals and encouraging deliberate practice to strengthen skills. Bashant (2014) stressed the importance of establishing a school culture that focused on grit. In the article, "Grit + Talent = Student Success," four strategies for developing grit were suggested (see Table 2) (Goodwin & Miller, 2013).

A growth mindset led students to sustain effort over time; so, the students could accomplish a goal. Elish-Piper (2014) stated a growth mindset was an important part of developing grit, because individuals with a growth mindset believed hard work, practice,

and perseverance led to learning and success. In Duckworth's (2016) book, *"Grit: The Power of Passion and Perseverance,"* four assets were suggested to increase grit: interest, practice, purpose, and hope. These assets could be developed, "You can learn to discover, develop, and deepen your interests. You can acquire the habit of discipline. You can cultivate a sense of purpose and meaning. And you can teach yourself to hope" (Duckworth, 2016, p. 92).

Table 2

Strategies for Developing Grit

Start early.
Teach students how to set and achieve the goals.
Explicitly teach growth mindsets.
Create opportunities to help students learn to persevere and succeed.

Grit Scale. Duckworth (2009, 2016) worked with Peterson to develop a test to measure grit, which Duckworth called the Grit Scale (as cited in Tough, 2012). The test relied completely on self-report; the persons taking the test (Grit-O) rated themselves on 12 questions (Tough, 2011) (see Appendix A). Respondents rated themselves on a five-point scale for each statement. A score of 5 indicated 'very much like me,' and a score of 1 indicated 'not like me at all' (Tough, 2012). The test was completed in about three minutes and researchers found the Grit Scale was reliably predictive of achievement (Tough, 2011). In 2004, Duckworth administered the Grit Scale to 1,200 cadets at West Point, before the cadets began the rigorous summer program. West Point used a 'Whole Candidate Score' which was comprised of the candidate's SAT score, class rank, and the candidate's score on the Army's Physical Aptitude Exam, to determine admission to West Point (Hartnett, 2012). Cadets who scored the highest on the Grit Scale were 60%

more likely to complete the rigorous summer program, and the Grit Scale was four times as successful as the Whole Candidate Score at predicting which candidates would leave the program without completing (Harnett, 2012, p. 62). Duckworth (2009, 2016) also developed a brief grit test called the Short Grit Scale (Grit-S), which had eight statements instead of the original 12 (as cited in Duckworth & Quinn, 2009) (see Appendix B). Four statements on the Grit-S portrayed the propensity toward continued effort for long-term goals, and the other four statements described sustained, focused interest over a period of time (Von Culin, Tsukayama & Duckworth, 2014). The goal of the eight-Item Grit Scale was to evaluate the traits of resilience, self-control, and perseverance (Pappano, 2013). The Grit-S was psychometrically stronger and briefer than the Grit-O, and researchers proved the Grit-S was a more efficient measure of grit (Duckworth & Quinn, 2009). After taking the Grit Scale, individuals received a grit score with a maximum score of five (extremely gritty) and a low score of one (not at all gritty) (Duckworth, 2016). The Grit Scale was a self-reported reflection of how individuals viewed themselves at that moment; and therefore, an individual's grit score could change (Duckworth, 2016).

Achievement Gap

The NCLB Act of 2001 attracted attention to the underperformance of low-income students, English-language learners, students with disabilities, and minority students who had unsatisfactory levels of academic achievement (Ushomirsky, Hall, & Haycock, 2011). As a result, school leaders and policy makers focused on closing achievement gaps that divided students of color and low-income students from other students (Rowan, Hall, & Haycock, 2010). "Nationwide, low-income students and students of color perform, on average, below their peers" (Rowan et al., 2010, p. 2). The

inequities in educational achievement continued to exist despite the educational reforms put in place to close the achievement gaps (Spitzer & Aronson, 2015). The economic stability and security of the U.S. depended on the education provided to students; the country needed to correct the recurrences of low performance (Ushomirsky et al., 2011). "If we do not find ways to reduce the growing inequality in education outcomes . . . schools will no longer be the great equalizer we want them to be" (Reardon, 2013, p. 10).

     Description. "The achievement gap in education refers to the disparity in academic performance between groups of students. The achievement gap shows up in grades, standardized-test scores, course selection, dropout rates, and college-completion rates among other success measures" (EPERC, 2011, para. 1). In the U.S., an achievement gap existed between African American and Latino students and White and Asian students, and an achievement gap between low-income students and students who were not from a low-income family also existed (Chudowsky, Chudowsky, Kober, & Center on Education Policy [CEP], 2009). The achievement gap between African American students and White students was an issue in the U.S. for many years. The NAEP provided the country with a common measure of student achievement and released the results as *The Nation's Report Card* (National Center for Education Statistics, 2013). The NAEP assessment consistently revealed a gap in academic achievement between African American, Latino, and American Indian students, compared to their White and Asian peers (Pitre, 2014). According to the 2009 NAEP, in reading 12% of fourth grade Black male students performed at or above proficiency, compared to 38% of White male students (Finkel, 2010, p. 28). The National Center for Education Statistics (2013) completed a special analysis, which showed Hispanic and Black students tested 20 points

lower on NAEP reading and mathematics assessments. This difference equated to

approximately two grade levels lower (EPERC, 2011, para. 3). Schools and reform

measures tried numerous tactics to address the achievement gap, including expanded

early childhood programs, raised academic standards, reduced class sizes, and improved

teacher quality (EPERC, 2011). Some small gains occurred; however, the significant

differences in educational outcomes remained persistent (Pitre, 2014). There were

various reasons why the achievement gap continued to remain an issue. In an article

written by Amber (2014), the author stated the academic preparation of African

American students was less rigorous than the preparation of their White peers. In

preschool, African American students were significantly more likely to attend a preschool

with teachers who had less experience than the teachers who taught at predominantly

White preschools (Amber, 2014). In addition, African American students were likely to

come from a low socioeconomic family. "Thirty-eight percent of Black children in this

country live below the poverty level. Poor children disproportionately attend the most

underfunded and lowest-performing schools and almost 25 percent never graduate from

high school" (Amber, 2014, p. 89). In an article written by Finkel (2010), the

achievement gap would continue as long as there were "opportunity gaps" (p. 29). These

opportunity gaps prevented high-poverty area students from receiving an equal education

that would include high-quality teachers and educational resources (Finkel, 2010).

Researchers indicated that students in poverty and racial minority students attended the

lowest-achieving schools, with less access to more experienced and effective teachers

(EPERC, 2011). All of these explanations led to African American students who

demonstrated differences in early skill acquisition compared to their White peers.

"However, all schools can implement practices and structures that have been shown to increase the academic performance of students from low-income and historically marginalized communities" (Pitre, 2014, p. 216).

No Child Left Behind. The NCLB Act was designed to hold schools in the U.S. accountable and to reduce the achievement gap between minority students and White students (Rojas-LeBouef & Slate, 2011). A primary objective of NCLB was to reduce the inequality in student academic performance between different demographic groups in schools and reduce disparities in performance between schools, districts, and states (Blank & Council of Chief State School Officers, 2011). Each state was required to test students in grades three through eight in the areas of mathematics and reading, and each state was required to release the test results (Webley, 2012). "States have been required to report disaggregated test results in four subgroups – economic disadvantage, race and ethnicity, disability and English language proficiency – in an effort to make achievement gaps transparent" (Alvarez, Frey, & Mandlawitz, 2012, p.67). NCLB contributed to holding school districts accountable for the achievement of certain demographic subgroups' performance, that in the past was not accounted for, because the information was hidden within state and school district averages (Yaffe, 2009).

In American schools, a large achievement gap existed, according to the data gathered through state testing (Webley, 2012). As part of NCLB requirements, each year an Adequate Yearly Progress (AYP) report was created to determine if students made sufficient academic progress, and the expectation was that the academic progress would be at 100% by the 2013-14 school year (Rojas-LeBouef & Slate, 2011, p. 3). Academic progress was measured in each state using a minimum of three levels to report student

achievement: basic, proficient, and advanced (Chudowsky et al., 2009). However, "NCLB gave states the latitude to define these levels in terms of their own tests and academic content standards; as a result, states' definitions vary considerably" (CEP, 2009, p. 5). Each state had its own test and its own definition of proficiency. Some states followed the proficiency standard set by the NAEP, and some states set a lower standard for proficiency in order to produce a higher success rate (Yaffe 2009). "State test proficiency standards are essentially academic hurdles, and thanks to NCLB, those hurdles are set at different heights in nearly every state" (Cronin & Dahlin, 2010, p. 3). This discrepancy led to skewed statistics, such as in Mississippi, where 90% of students who took the state test were proficient. However, according to the NAEP standard, only 18% of those same students would be considered proficient (Yaffe, 2009, p. 3). Since NCLB allowed states to define proficiency it "resulted in a system that rewards states with low standards and punishes states that have set the bar high" (Alvarez et al., 2012, p. 67). Schools that failed to meet AYP repeatedly were identified for improvement and faced corrective action (Alvarez et al., 2012). In spite of NCLB and the accountability mandate, an achievement gap continued to exist among White, non-White, and students who had Limited English Proficiency (Rojas-LeBouef & Slate, 2011).

Achievement gap and reading. NCLB emphasized President Bush's commitment to children by mandating every child must read proficiently at the end of third grade (Hernandez, 2011). Reading was an essential skill for students to obtain in order to achieve academic success. "Children who read proficiently by the end of third grade are more likely to graduate from high school and to be economically successful in adulthood" (Annie E. Casey Foundation, 2014, p. 1). Despite educators knowing the

importance of reading, achievement gaps in the area of reading still existed. Students

who were Hispanic or Black entered high school three years behind in literacy skills,

compared to the literacy skills of Asian and White students (Reardon et al., 2012, p. 17).

Students who came from low-income families entered high school five years behind in

literacy skills, compared to the literacy skills of students who came from high-income

families (Reardon et al., 2012, p. 17). The reading achievement levels for students with

disabilities were even more alarming. Eighty nine percent of students with disabilities

were not proficient in reading, and the gaps in reading achievement set the stage for

difficulties in adulthood (Annie E. Casey Foundation, 2014, p. 2). "The evidence

suggests that many students have not achieved sufficient literacy proficiency by eighth

grade to prepare them for success in high school, college, and the labor force" (Reardon

et al., 2012, p. 25). Statistics indicated 25% of young adults did not have the literacy

skills needed to obtain employment (Riccards, 2012, para 3). In fact, literacy skills were

such an important factor in adult success that "states like Arizona and California

currently use fourth grade reading scores to determine future prison population planning"

(Riccards, 2012, para. 3). In order for the U.S. to remain competitive, society needed to

ensure all children achieved reading proficiency (Annie E. Casey Foundation, 2014).

The educational gaps found in the U.S. not only created a moral challenge, but

also posed a threat to the economy. Employment in society required moderate to high

levels of literacy skills and economic growth relied on ensuring the U.S. labor force had

the required literacy skills (Reardon et al., 2012). Educational gaps found in the fourth

grade appeared to predict high school and college graduation rates (McKinsey &

Company, 2009). Low high school and college graduation rates resulted in poorer health,

low yearly incomes, and higher rates of incarceration (McKinsey & Company, 2009).

Levin (2009) found a lack of high school and college graduates also led to lower income

tax payments. "Over a lifetime, a male dropout pays $130,000-$212,000 in income taxes.

A male high school graduate pays $232,000-$358,000, and a male college graduate pays

$610,000-$854,000" (Levin, 2009, p. 11). The chronic economic effects of the

achievement gap imposed the equivalent of an everlasting national recession in the U.S.

(McKinsey & Company, 2009). "By underutilizing such a large proportion of the

country's human potential, the U.S. economy is less rich in skills than it could be"

(McKinsey & Company, 2009, p. 17). The U.S. needed to ensure all of its citizens were

educated to a level of proficiency and able to obtain employment that benefited the U.S.

and created a society with higher employment, less crime, better health, and lower

dependency on the government (Levin, 2009). "The future of our nation depends on the

education we provide to our children today" (Ushomirsky et al., 2011, p. 12). The

literature revealed the U.S. would not regain economic stability if students continued to

graduate lacking the needed mathematics and reading skills for employment, if hundreds

of students continued to drop out each year, and if people continued to tolerate

inadequate schools for other people's children viewed as intolerable for their children

(Ushomirsky et al., 2011).

Reading Assessments

The 2004 Individuals with Disabilities Education Act (IDEA) required schools to

implement assessments that included documentation of data collected from repeated

assessments conducted at intervals throughout the school year (Wixson & Valencia,

2011). "Teachers are very aware that frequent, in-process checks for understanding are

what allows them to teach better and improve student achievement" (National Council of Teachers of English [NCTE], 2013, p. 2). Many different forms of reading assessment were available and each assessment served a different purpose (Afflerbach, 2016). Educators used formative and summative assessments to measure students' acquisition of skills and used the data to identify students who were at-risk readers (Riccards, 2012).

  Benchmark reading assessments. Reading assessments revealed a student's reading ability. When teachers assessed, they had a student read a passage aloud and the teachers made inferences about the student's reading (Afflerbach, 2016). "Good assessment is the foundation for effective teaching. Assessment in its simplest form means gaining information about the learners you will teach" (Fountas & Pinnell, 2012, p. 275). Researchers suggested a vital component of curriculum was formative assessment, which was an effective tool to increase student learning (NCTE, 2013). Benchmark assessments administered at predetermined times throughout the school year assessed student progress (Wixson & Valencia, 2011). The assessments were not given as often as formative assessments, but were given more frequently than annual, summative assessments. Benchmark assessments were systematically administered at regular intervals (e.g., in the fall, winter, and spring) during the school year to collect information about students' skills and knowledge (Faria et al., 2012). The assessments determined if students made sufficient progress in relation to grade, age expectations, or benchmarks (Wixson & Valencia, 2011). According to Afflerbach (2016), "Assessment should produce information that is useful in helping students become better readers, and assessment should do no harm" (p. 413). Benchmark assessments were one component of a balanced assessment system that provided the school, classroom, and district with

data to make informed decisions (Herman, Osmundson & Dietel, 2010). The information gained from benchmark assessments provided teachers with information needed to tweak instruction to meet the learning needs of students or to monitor and evaluate how well academic programs, the curriculum, and other resources were working to ensure students mastered learning goals (Herman et al., 2010). Educators used benchmark assessments to gather information to plan instruction that promoted learning. Benchmark assessments became a significant tool and played a key role in providing information (Bergan, Bergan, & Burnham, 2009). In addition, benchmark assessments were important for teachers to understand if students were making sufficient progress to justify continuation of the then-current instruction or to warrant a change in the then-current instruction (Wixson & Valencia, 2011). Benchmark measures also helped to determine if a student made significant progress, and therefore, no longer needed intensive instruction (Wixson & Valencia, 2011). Benchmark assessments conveyed to parents, students, and teachers which skills and knowledge were essential to learn and predicted whether students were on track to meet specific end-of-the-year goals (Herman et al., 2010).

The Fountas and Pinnell (2012) *Benchmark Assessment System* (BAS) measured vocabulary, decoding, fluency, and comprehension skills to determine a student's developmental reading level (as cited in Heinemann, 2015). Reading levels included independent, instructional, and frustrational, and were used to identify the reading difficulty a student would have with the text (Kontovourki, 2012). On a daily basis, students needed to experience reading successfully in order to become proficient readers (Fountas & Pinnell, 2012). "Not only should they be able to read books independently, building interest, stamina, and fluency; they also need to tackle harder books that provide

the opportunity to grow more skillful as a reader" (Fountas & Pinnell, 2012, p. 276). The

Fountas and Pinnell (2012) BAS was designed for students in kindergarten through

eighth grade and was individually administered (as cited in Heinemann, 2015). The

formative reading assessment was a tool teachers used to reliably place students on the

Fountas and Pinnell (2012) *A-Z Text Level Gradient* (as cited in Ransford-Kaldon et al.,

2010). An example of the Fountas and Pinnell (2012) *Text Level Gradient* is shown in

Figure 1.

Fountas & Pinnell Reading Levels	
Grade Level	F&P Levels
Kindergarten	A, B, C or D
1st Grade	D, E, F, G, H, I or J
2nd Grade	J, K, L, M or N
3rd Grade	N, O, P or Q
4th Grade	Q, R, S or T
5th Grade	T, U, V or W
6th Grade	W, X, Y or Z
7th & 8th Grade +	Z
High School/Adult	Z+

Figure 1. Fountas and Pinnell Text Level Gradient provided grade level goals, which are intended to provide general guidelines, which should be adjusted, based on school/district requirements and professional teacher judgment. Adapted from Fountas and Pinnell (2012).

. The books in the Fountas and Pinnell (2012) BAS gradually became more difficult as the levels advanced from A-Z (as cited in Heinemann, 2015). "Teachers look to the gradient as a series of goals represented as sets of reading competencies to reach across the school years" (Fountas & Pinnell, 2012, p. 270). To help children read proficiently and to reach the goal of reading at grade level, teachers selected books based on the child's reading level (Fountas & Pinnell, 2012).

Importance of reading assessments. Assessments were used to identify students who were reading proficiently, because being able to read proficiently was a skill that affected school performance and learning experiences (Child Trends Databank, 2015). Students were more likely to accomplish more in other subjects if the students were able to read proficiently (Child Trends Databank, 2015). Students in third grade shifted from learning to read to reading to learn, as the students moved from decoding words to fluent reading that could be used for more difficult learning in other subject areas (Paul, 2012). "If children do not have proficient reading skills by third grade, their ability to progress through school and meet grade-level expectations diminishes significantly" (Workman, 2014, para. 2). Students who could not read proficiently by third grade were more likely to drop out of school, and that often led to unemployment and an increased risk of involvement in the criminal justice system, as well as an increased risk of participation in the welfare systems (Workman, 2014).

States were required to measure students' progress in reading and mathematics every year staring in third grade and continuing through eighth grade, and states had to set performance standards to measure student progress (Child Trends Databank, 2015). As a result, it was not uncommon for school districts to consider reading proficiency in

the third grade as a vital goal (Gewertz, 2011). A study recent to this writing found

students were four times less likely to graduate from high school if the students were not

reading at grade level by third grade. Additionally, students who came from low

socioeconomic homes and were not reading at grade level were 13 times more likely to

drop out of high school than wealthier peers (Gewertz, 2011, para. 8). The NAEP

reported 67% of all fourth-grade students scored below proficient in reading and 83% of

low-income fourth-graders scored below proficient (Smith, 2011, p. 4). A prominent

reason why so many students were scoring below proficient in reading was attributed to

the fact many children did not achieve reading proficiency before finishing third grade

(Smith, 2011).

School districts focused on using benchmark assessments to gather data used to

monitor student progress, inform decision making, and impact instruction (Abrams,

Varier, & McMillan, 2012). Benchmark assessments provided teachers with information

about student progress and identified students' strengths and weaknesses, and teachers

used this information to modify instruction to improve student learning (Abrams et al.,

2012). Schools needed to identify early the kindergarten and elementary students who

struggled to read; so, changes in instruction were made and students learned to read at

average or above average levels (Riccards, 2012). Researchers indicated literacy levels

were flexible; however, if the remedial instruction did not occur until high school, then it

was likely the reading gaps were not eliminated (Reardon et al., 2012). A study reported

by Abrams, Varier, and McMillan (2012) indicated 82% of teachers used data from

benchmark testing to identify students who needed remedial instruction (p. 25). "There is

compelling evidence of the potential for benchmark assessment data to have a profound

impact on instruction and in turn student learning" (Abrams et al., 2012, p. 49).

Summary

A review of literature described reading as an essential skill in the early grades to

ensure future success (Annie E. Casey, 2014). Literacy was a requirement for

educational, social, and economic success (Reardon et al., 2012). "If we do not make

sure all children gain the needed reading skills to be successful in school, their future

educational and economic prospects will be dim, and our economy will lag" (Annie E.

Casey, 2014, p. 1). A well-known fact in education, at the time of this writing, was that

students needed to master reading by the end of third grade. Students who did not

achieve this milestone struggled in school and dropped out of school before receiving a

high school diploma (Hernandez, 2011). Researchers indicated many eighth grade

students lacked sufficient literacy skills to prepare them for high school, college, or the

workforce (Reardon et al., 2012). A substantial gap in reading skills between groups of

students was documented in the research. Achievement gaps existed in reading skills

between students from low-income and high-income families, Black and White students,

and English-language speakers and non-English language speakers (Reardon et al.,

2012). These achievement gaps gained attention in schools and states, and with policy

makers (Rowan et al., 2010). The recognition that early reading skills were important led

to laws that required states to test reading skills each year, beginning in third grade.

States were required to report the test results by income status, race, and ethnicity, as well

as report results for students with disabilities and English Language Learners (Hernandez,

2011).

According to the literature, assessments were used to identify students who struggled to read so changes could be made. Teachers used assessments to gain information about the students they taught. "Good assessment is the foundation for effective teaching" (Fountas & Pinnell, 2012, p. 275). Benchmark assessments were administered throughout the year to determine if students were making sufficient progress towards grade-level expectations (Wixson & Valencia, 2011). These assessments provided information used to make informed decisions. Benchmark assessments assisted in predicting how students would perform on state tests at the end of the school year; the assessments also assisted in identifying student strengths and weaknesses, and provided data utilized to evaluate the effectiveness of instruction (Faria et al., 2012). Student achievement increased when teachers reviewed and analyzed data and then used the information to make instructional decisions (Faria et al., 2012). Researchers indicated literacy levels improved if students were identified early and appropriate interventions were put in place (Riccards, 2012).

The literature review establishes an understanding that students needed to develop behaviors, skills, strategies, and attitudes, in addition to academic skills, to perform well in school (Farrington et al., 2012). Non-cognitive skills, such as problem solving, critical thinking, persistence, and self-control allowed students to successfully contribute to society and to succeed at school, work, and home (Garcia, 2014). Researchers and educators noticed non-cognitive skills were positively associated with educational attainment (Garcia, 2014). Non-cognitive skills gained attention in research and policy as a major factor in student achievement (Hamedani & Darling-Hammond, 2015). Researchers suggested non-cognitive skills contributed 85% to a person's success,

compared to academic skills, experience, and intelligence, which contributed 15% to a person's success (Hunter, 2013, para. 11). In our society, knowledge was important, but it was also imperative to be able to solve problems, interact and deal with people, and to be adaptable (Hunter, 2013). "Failing to meet students' psychological, social, and emotional needs will continue to fuel gaps in opportunity and achievement for students – in particular, low-income students and students of color" (Hamedani & Darling-Hammond, 2015, p. 1).

Grit and growth mindset were non-cognitive factors that researchers found increased academic achievement and success in life and at school (Elish-Piper, 2014). A key belief of individuals with a growth mindset was that intelligence was developed through effort and instruction over time (Blazer, 2011). Individuals who had grit worked towards a goal by sustaining effort over a long period of time (Farrington et al., 2012). Researchers indicated grit was a good predictor of success and predicted success better than intelligence, income, or achievement scores (Elish-Piper, 2014). According to researchers, achievement increased when teachers encouraged the development of a growth mindset (Blazer, 2011; Dweck, 2010a, 2015a; Parker, 2015), and teaching students to have a growth mindset also decreased achievement gaps. Studies indicated Black and Hispanic students obtained grades and test scores closer to those of White students when Black and Hispanic students assumed a growth mindset (Blazer, 2011). Duckworth (2009, 2016) stated, "One thing we've found is that children who have more of a growth mindset tend to be grittier" (as cited in Perkins-Gough, 2013, p. 19). However, a review of the literature lacked research that focused on the relationship

between grit and growth mindset and combining the teaching of these concepts to

increase academic achievement.

Chapter Three: Methodology

Overview

This mixed methods study investigated a possible relationship between grit, growth mindset, and reading scores within elementary students. One purpose of the study was to identify a potential correlation between high grit and growth mindset scores and high reading scores. The second purpose of the study was to determine if an achievement gap existed between students in the super subgroup and the general population of students in the research setting. The researcher compared the percentage of students in the super subgroup who were at or above grade level reading with the percentage of students in the general population who were also at or above grade level reading to determine if a relationship existed. The then-current research indicated students with a higher grit and growth mindset score would also have higher reading scores (Laursen, 2015). All students in third, fourth, and fifth grade at a public elementary school in the Midwest were asked to participate in this study. The researcher utilized student growth mindset and grit surveys, Fountas and Pinnell (2012) BAS scores, teacher interviews, and teacher frequency data and anecdotal sheet to explore this potential correlation.

The researched school utilized the Fountas and Pinnell (2012) BAS to determine the reading level of students in kindergarten through fifth grade. The Fountas and Pinnell (2012) BAS was a formative assessment used with students in kindergarten through eighth grade to measure students' decoding, fluency, vocabulary, and comprehension skills (as cited in Heinemann, 2015). The researched school used the Fountas and Pinnell (2012) BAS at the beginning of each school year to identify the reading level of each

student. Students were provided reading instruction throughout the school year, based on the Fountas and Pinnell (2012) BAS and other formative assessments. At the end of the school year, students at the researched school were assessed again using the Fountas and Pinnell (2012) BAS to identify the students' reading levels and identify students who were reading at or above grade level and students who were reading below grade level. The study analyzed this information to determine if relationships existed between grit, growth mindset and student reading scores.

All teachers at the researched school attended a behavior workshop in the summer of 2014; all teachers received professional development on growth mindset and grit concepts, instructional ideas, and the benefits and research behind the concepts. The researched school presented the information as part of ongoing professional development in the area of addressing student behavior. Teachers were expected to apply this information by providing students instruction on grit and growth mindset. The study collected frequency data to determine if a relationship between the frequency of teacher instruction on grit and growth mindset and student grit and growth mindset scores existed.

Students at the researched school completed a grit and growth mindset survey at the beginning and end of the school year. The students obtained a grit and growth mindset score, based on the students' answers to the survey questions. The students' scores determined if a relationship existed between pre-grit and growth mindset instruction and post-grit and growth mindset instruction scores. The scores were also utilized to determine if a relationship existed between students' pre-post teacher instruction on grit, growth mindset, and post reading scores.

The researcher was concerned an achievement gap existed at the researched

school between students in the super subgroup and the general population of students.

All students needed to achieve academic success, which in this study correlated to

reading at or above grade level. If the literature was correct and teaching grit and growth

mindset increased student girt and growth mindset scores, then a relationship between

grit and growth mindset scores and reading scores would be established at the researched

school. The researcher believed this study would provide a proven strategy to reduce or

eliminate the achievement gap at the researched school.

Research Site

The research site was a suburban Midwest public elementary school; the

community population was 38,495, according to the 2010 U.S. Census Bureau.

According to the Missouri Department of Elementary and Secondary Education

(MODESE, 2015), the student population at the elementary school consisted of 467

students enrolled in grades kindergarten through five. The enrollment at the researched

school was trending upward over the five years previous to the study, as seen in Table 3.

Table 3

Student Enrollment From 2012-2016

	Total number of students enrolled
2012	426
2013	435
2014	484
2015	467
2016	491

Note: Obtained from Missouri Department of Elementary & Secondary Education, 2016

MODESE (2015) reported 28.1% of the students in the researched school participated in the F&R lunch program. At the time of this study, students were eligible for reduced lunch prices if their family of four earned less than $44, 863 per year (U.S. Department of Agriculture, 2015, p. 2). Students became eligible for free lunch if their family of four earned less than $31,525 per year (U.S. Department of Agriculture, 2015, p. 2). Figure 2 displays the 2015-16 demographic information for the researched school.
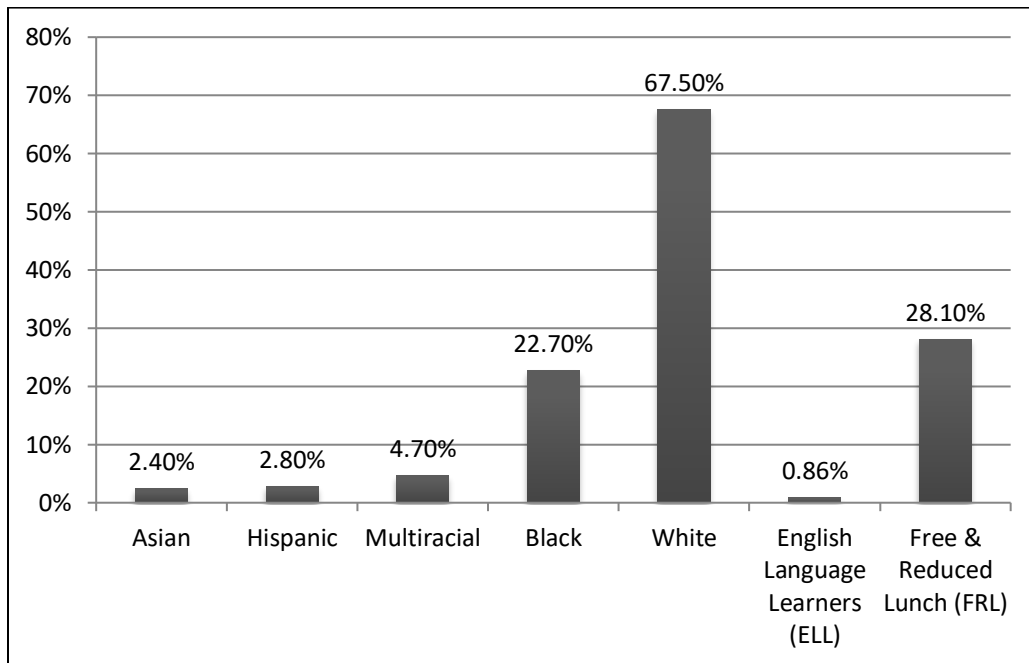
Figure 2. Student demographic information.

The researched school had a diverse population of students, which remained similar each year. It was important to note, during the school year many students moved in and out of the researched school. Over the last four years, the demographic information for the researched school was similar from year-to-year, with only slight increases or decreases in populations (see Table 4).

Table 4

Demographic Information From 2012-2015

	Free & Reduced Lunch	Asian	Black	Hispanic	White	Multiracial
2012	26.5%	2.3%	17.1%	4.2%	69.7%	6.6%
2013	28.4%	3.4%	20%	3.9%	66.9%	5.7%
2014	30.3%	3.7%	24.4%	3.3%	62.8%	5.8%
2015	28.1%	2.4%	22.7%	2.8%	67.5%	4.7%

Note: Obtained from Missouri Department of Elementary & Secondary Education, 2015

Table 5 shows the difference in demographic information of the researched school compared to the researched district and community demographic information. The researched district had an enrollment of 5920 students in grades pre-K through 12th; one early childhood center, five elementary schools, two middle schools, and one high school (MODESE, 2015). The researched school was the most diverse elementary school in the district.

Table 5

2015 Researched School and District Demographic Information

	Free & Reduced Lunch	Asian	Black	Hispanic	White	Multiracial
Researched School	28.1%	2.4%	22.7%	4.2%	69.7%	4.7%
District	15.9%	1.9%	14.5%	2.9%	76.2%	4.3%
Community		1.4%	7.0%	1.8%	89.4%	1.6%

Note: School and district information obtained from Missouri Department of Elementary & Secondary Education, 2015. City information obtained from U.S. Census Bureau, 2010.

Methodology

This study used a mixed-method research approach. According to Burke-Johnson, Onwuegbuzie, and Turner (2007), "Mixed methods research is an intellectual and practical synthesis based on qualitative and quantitative research" (p. 129). Quantitative data were collected in the form of Fountas and Pinnell (2012) reading scores for students in third, fourth, and fifth grades in August 2015 and again in May 2016. Additional quantitative data included grit and growth mindset scores; and students who participated in the study completed a grit and growth mindset survey in August 2015 and again in May 2016. The grit survey utilized an eight-item grit scale. Each question received a point value based on the student's response to the question. All points were added and divided by eight, resulting in an average grit score between one and five. The growth mindset survey used a Lickert scale and assigned a score of four for responses that demonstrated a growth mindset and a score of one for responses that indicated a fixed mindset. The points were added and divided by eight; which resulted in an average growth mindset score between one and four.

To address the research question, qualitative data were collected in the form of teacher interviews and self-recorded frequency checks and anecdotal notes. Teachers who participated in the study recorded how often they taught grit and/or growth mindset topics and recorded information on instructional delivery. Teacher interviews occurred in December 2015 and again in May 2016, to gather additional qualitative data regarding how students received instruction on grit and growth mindset concepts and to gather teachers' observations of the students in their classes, with regard to grit and growth mindset characteristics.

The basic concept of a mixed-method approach was, "integration of quantitative and qualitative data maximizes the strengths and minimizes the weaknesses of each type of data" (Creswell, Klassen, Plano-Clark & Smith, 2011, p. 5). The study collected both quantitative and qualitative data to create a deeper understanding of the research and to provide more reliable results.

Procedures

This study began with a request to the researched school district's superintendent for permission to conduct the study. The superintendent gave consent for the study and data collection began in August 2015. The researcher sent an email to parents who had students in third, fourth, or fifth grade at the researched school and gained parental consent for students to participate in the study. The email explained the study and provided parents a copy of the consent form, along with the researcher's contact information in case parents had questions about the study or the consent form (see Appendix C). The email was sent to all parents one day before the researched school conducted an open house for parents, which provided an opportunity for parents and students to come to school prior to the beginning of the school year to meet the new teacher. Parents received consent forms by email, which were available to sign during open house. Many parents attended the researched school's open house and signed a consent form (n = 127). To ensure all parents had an opportunity to learn about the study and adequate time to provide consent for their children to participate, the researcher sent out several additional emails (n = 40) to parents who had not already responded. The researcher also sent hard copies of the letter explaining the study, along with a consent form to parents who did not provide the researched school with an email address, and to

parents who had not responded to the emails. Several attempts to gain parental

permission occurred over a two-week time frame. See Table 6 for exact numbers per

grade level.

Table 6

Numbers of Consent Forms Obtained

	Consent forms obtained at open house	Emails & hard copies sent	Consent forms obtained after email/hard copy sent	Total consent forms obtained
3rd Grade	51	20	8	59
4th Grade	53	28	17	70
5th Grade	23	24	15	38
Totals	127	72	40	167

At the end of August, students at the researched school in grades three through

five, who had permission to participate in the study, were given a growth mindset and grit

survey. The students signed a Child Assent form giving their own agreement to

participate in the study before they participated in the grit and growth mindset survey

electronically. To ensure confidentiality, the instructional coach at the researched school

facilitated the survey process. All data from the surveys were stored electronically in a

password-protected file, and only the instructional coach had access to the data.

At the researched school, all students in grades three through five participated in

the Fountas and Pinnell (2012) BAS in the fall and spring, as a regularly scheduled

school-wide academic activity. The researcher analyzed the reading benchmark scores as

secondary data collected in August 2015 and May 2016 for the purpose of this study.

The instructional coach collected the Fountas and Pinnell (2012) BAS data on the

students who participated in the study (n = 167).

A master data spreadsheet included all data during the study and was coded by the instructional coach. The coding process included the separation of all student participants into two groups – a super subgroup (students who received F&R lunch, IEP students, African American students, and ELL students) and a non-super subgroup (all students who did not fit the criteria to be in the super subgroup). The coding was assigned according to letters and numbers; for example, SS1 (super subgroup student #1) and NSS1 (non-super subgroup student #1). The coding process also grouped students by grade and teacher on the master data sheet, which allowed per grade level and teacher comparisons. The instructional coach gave the researcher the identity-scrubbed data for the two groups on an excel spreadsheet.

Teachers who instructed students in grades three through five used either an electronic data sheet or a hard copy of the data sheet from September 2015 through April 2016, to record whether the teachers taught growth mindset or grit. The teachers also recorded information on the growth mindset and grit lessons taught, using either an electronic journal or a hard copy journal. The instructional coach collected this data at the end of each quarter and scrubbed all identifiable information before giving it to the researcher. All teacher responses were coded by using the grade level taught and a number; for example, 3T1 (Third grade teacher #1). In addition to the data teachers recorded, the instructional coach interviewed the teachers in December 2015 and again in April 2016. The instructional coach utilized a speech-to-text program to collect the information. The instructional coach scrubbed all identifiable information before giving the data to the researcher. A timeline and summary of the procedures are listed in Table 7.

Table 7

Study Procedures Timeline

Date	Procedure
November 5, 2014	Received permission from the researched school's superintendent.
Early August 2015	Obtained parent permission for students to participate in the study (over 2-3 week period).
Mid-August 2015	Met with grade 3-5 teachers to explain the study and got signed permission for them to participate in the study.
Mid-August 2015	Students participated in F&P reading assessment to identify their current reading level.
Late August 2015	Students signed Child Assent Form and participated in grit and growth mindset surveys.
September 2015	Instructional coach recorded grit, growth mindset, and reading score data on the master data list
September 2015-April 2016	Teachers recorded the frequency of incorporating grit and growth mindset concepts. Teachers also kept a journal and described how they incorporated the concepts.
December 2015	The instructional coach completed teacher interviews.
Early May 2016	Students took the grit and growth mindset survey.
Mid-May 2016	Students participated in F&P reading assessment to identify their current reading level.
Mid-May 2016	The instructional coach completed teacher interviews.
Late May 2016	Researcher was given master data list and teacher logs with all identifiable information scrubbed.

Developing the Intervention

The researched school was identified with an achievement gap between students

in the super subgroup and students in the general population (MODESE, 2015).

Table 8

Disaggregated MAP Data for the 2014-15 School Year

	Percentage Below Basic	Percentage Basic	Percentage Proficient	Percentage Advance	Percentage Proficient & Advance
Grade 3 ELA					
Black	0%	41.2%	35.3%	23.5%	58.8%
White	2%	0%	16%	82%	98%
F&R	4.8%	28.6%	33.3%	33.3%	66.7%
Grade 3 Math					
Black	11.8%	52.9%	29.4%	5.9%	35.3%
White	4%	2%	14%	80%	94%
F&R	14.3%	42.9%	28.6%	14.3%	42.9%
Grade 4 ELA					
Black	6.3%	12.5%	37.5%	43.8%	81.3%
White	4.2%	4.2%	12.5%	79.2%	91.7%
F&R	0%	11.1%	44.4%	44.4%	88.9%
IEP	26.7%	13.3%	20%	40%	60%
Grade 4 Math					
Black	0%	25%	43.8%	31.3%	75%
White	0%	12.5%	29.2%	58.3%	87.5%
F&R	0%	22.2%	50%	27.8%	77.8%
IEP	6.7%	40%	26.7%	26.7%	53.3%
Grade 5 ELA					
Black	15.8%	36.8%	36.8%	10.5%	47.4%
White	1.6%	3.2%	33.9%	61.3%	95.2%
F&R	9.5%	28.6%	33.3%	28.6%	61.9%
Grade 5 Math					
Black	26.3%	52.6%	5.3%	15.8%	21.1%
White	3.2%	16.1%	21%	59.7%	80.6%
F&R	18.2%	50%	9.1%	22.7%	31.8%

Note: Obtained from Missouri Department of Elementary & Secondary Education, 2015

Students who received F&R lunch, students who had an IEP, and Black students were included in the super subgroup. Table 8 displays the MAP disaggregated data from the 2014-15 school year for the researched school.

Table 8 shows a student achievement gap in English Language Arts (ELA) and Mathematics. The percentage of White students demonstrating proficient or advanced skills in reading and mathematics was higher than the percentage of Black students, students with an IEP, and students who received F&R lunch. This achievement gap existed in third through fifth grades.

During this study the researcher worked at the research site and had a vested interest in contributing to closing the achievement gap that existed. Research on grit and growth mindset indicated students with higher grit and growth mindset scores performed better academically. In the article, "Leveraging Mindsets to Promote Academic Achievement: Policy Recommendations," the author stated underperforming students, minorities, and women in science and mathematics especially benefitted from having a growth mindset (Rattan et al., 2015). "Therefore, growth mindsets can narrow achievement gaps" (Rattan et al., 2015, p. 722). Goodwin and Miller (2013) stated, "Many educators have begun to believe that improvements in instruction, curriculum, and school environments are simply not enough to raise the achievement of all learners, especially disadvantaged ones. Also necessary is a quality called grit" (p. 74). For these reasons, the researcher wanted to investigate a possible relationship between grit, growth mindset, and reading scores at the researched school. A school improvement goal for the researched school was to close the achievement gap, and this researcher's intent was to contribute information to close the achievement gap.

Research Question and Null Hypotheses

The researcher investigated the following research question: How do teachers develop and implement lessons/activities on growth mindset and grit?

This study tested the following hypotheses:

Null hypothesis 1: There is no relationship between pre-Grit score, post-Grit score and reading scores.

Null hypothesis 2: There is no relationship between pre-Growth Mindset score, post-Growth Mindset score and reading scores.

Null hypothesis 3: There is no relationship between the frequency of teacher instruction of concepts of Grit and student Grit scores.

Null hypothesis 4: There is no relationship between the frequency of teacher instruction of concepts of Growth Mindset and student Growth Mindset post-scores.

Null hypothesis 5: There is no relationship between the Grit scores and Growth Mindset scores.

Null hypothesis 6: When comparing the Super Subgroup of students to the general population, there is no difference in, Grit score, Growth Mindset score, and percentage of students at or above the grade-level reading benchmark.

Participants

Participants in this study included students in grades three through five who ranged in age from eight years old to twelve years old. Only students who received parent permission participated in the study. Study participants included both male and female students (see Table 9). The researched school had a total of 234 students in grades three through five, and 167 students agreed to participate in the study.

Table 9

Study Participant Demographic Information

Grade	Number of Participants	Males	Females	Super Subgroup	Non-Super Subgroup
3	59	30	29	15	44
4	70	41	29	19	51
5	38	23	15	8	30

In addition to student participants, the study also included eleven adult participants. The adult participants included teachers who instructed students in grades three through five (see Table 10).

Table 10

Teacher Demographic Information

Teacher	Grade	Gender	Teacher Age	Number of years teaching
Teacher A	3	F	39	15
Teacher B	3	F	63	25
Teacher C	3	F	48	10
Teacher D	3	F	29	4
Teacher E	4	F	40	13
Teacher F	4	F	35	6
Teacher G	4	F	48	17
Teacher H	4	F	29	6
Teacher I	5	F	37	7
Teacher J	5	F	52	23
Teacher K	5	F	44	20

All teachers in grades three through five agreed to participate in the study with the exception of one fifth grade teacher, who was on maternity leave from August 2015 until the beginning of October 2015. As a result, that teacher did not participate in the study and neither did any of the students in the teacher's class. The ages of the adult participants ranged from 29 to 63, with a range of teaching experience from four to 25 years.

Instrumentation

The instruments used to provide data for this study included Fountas and Pinnell's (2012) BAS, grit survey, and growth mindset survey.

Validity is an all-encompassing concept that explains the quality of assessments; "validity asks the extent to which an assessment actually measures what it is intended to measure and provides sound information supporting the purpose(s) for which it is used" (Herman et al., 2010, p. 4). The definition indicated an assessment could have a high degree of validity for one purpose and low validity for another purpose (Herman et al., 2010). For surveys, validity referred to the accuracy of the assessment to measure the outcome of importance (Sullivan, 2011).

The consistency or dependability of the results established the reliability. "Reliability refers to whether an assessment instrument gives the same results each time it is used in the same setting with the same type of subjects" (Sullivan, 2011, p. 119). A researcher should not use scores from an assessment with a low reliability for decision-making (Herman et al., 2010). Reliability was a necessary component of assessing validity, but should not be used as the only criterion of validity (Herman et al., 2010).

Validity and reliability of the instruments. The grit survey (Grit-S) developed by Duckworth (2009, 2016) measured perseverance and passion for long-term goals. Studies provided evidence the grit survey, which consisted of eight items, was valid and reliable. Self-reported correlations found a medium-to-large correlation between grit scores, which indicated grit could be reliably self-assessed (as cited in Duckworth & Quinn, 2009). The Grit-S was determined to have predictive validity and strong psychometric assets used to measure an individual's grit (Duckworth & Quinn, 2009).

The growth mindset survey used a four point Lickert scale to measure an individual's mindset. "A Likert-type scale consists of a series of statements that define and describe the content and meaning of the construct measured" (Warmbrod, 2014, p. 31). The growth mindset survey consisted of eight statements that described a growth or fixed mindset; participants rated how much they agreed with each statement. Each participant received a score by calculating the responses to each statement. The validity and reliability of the growth mindset survey contributed to the use of a calculated score, multiple statements to describe fixed or growth mindset, and the use of a Lickert scale (Warmbrod, 2014).

The Fountas and Pinnell (2012) BAS implemented at the researched school assessed students' beginning of the year and end of the year reading levels. Researchers analyzed data to measure the test-retest reliability of the Fountas and Pinnell (2012) BAS; the reliability coefficient needed to be at least 0.85 to be reliable (as cited in Heinemann, 2015, p. 11). Table 11 depicts the Fountas and Pinnell (2015) test-retest results between fiction and nonfiction books in the assessment system.

Table 11

Reliability Coefficients for Fountas & Pinnell Test-Retest

Books A-N	.93
Books L-Z	.94
All Books A-Z	.97

Convergent validity of the Fountas and Pinnell (2012) BAS examined the

relationship between the Fountas and Pinnell (2012) BAS scores and the scores from

another assessment that measured similar variables (as cited in Heinemann, 2015). The

results indicated a strong relationship between the reading accuracy rates of Fountas and

Pinnell (2012) fiction books A-N (0.94) and nonfiction books A-N (0.93) and reading

accuracy rates in Reading Recovery (Heinemann, 2015). Reading Recovery was a

reading intervention that provided instruction to struggling readers to increase literacy

skills. The What Works Clearinghouse (WWC) indicated the Reading Recovery program

met the WWC evidence standards without reservations; Reading Recovery was found to

have positive effects on reading achievement (U.S. Department of Education [USDOE],

2013).

Data Collection and Analysis Procedures

Data analysis included a Pearson Product Moment Correlation Coefficient

(PPMC) to determine if a relationship existed between two variables. The PPMC

produced a correlation coefficient to determine the strength of the relationship, if one is

statistically established (Bluman, 2013, Chapter 10). The value of the correlation

coefficient ranged from -1.0 to +1.0; if the value of r was close to +1.0 it indicated a

strong positive relationship and an r value close to -1.0 indicated a strong negative

relationship. If the value of r was 0 or close to 0, the value indicated no linear

relationship between the variables (Bluman, 2013). The researcher used the PPMC to determine if a relationship existed between student pre-post teacher instruction on grit and growth mindset and reading scores. Grit and growth mindset scores and reading scores were collected in August 2015 and May 2016 to conduct the PPMC.

The PPMC analyzed a possible relationship between the frequency of teacher instruction on grit and growth mindset and student grit and growth mindset scores. Teachers self-reported the number of days of instruction on grit and growth mindset throughout the 2015-2016 school year. Analysis of the student grit and growth mindset scores determined if a relationship existed between pre-teacher instruction, grit, growth mindset scores, and post-teacher instruction on grit and growth mindset scores.

To analyze Null Hypothesis 6, a statistical z-test was applied to test the equality of two different proportions of a population. The researcher found the percentage of students who were at or above the grade level reading benchmark (post) for students in the super subgroup and the general population of students, to see if there was a difference between the groups. The researcher used a t-test to check for a potential difference between post-grit and post-growth mindset scores of students in the super subgroup and students in the general population to see if there was a difference in means between the two groups.

Summary

In Chapter Four the methodology, procedures, research site, intervention, instruments, data collection and analysis procedures, and participants were discussed. The purpose of this mixed-method study was to determine a possible relationship between grit, growth mindset, and reading scores. The researcher gathered Fountas and

Pinnell (2012) reading assessment data along with student grit and growth mindset scores to determine if a relationship existed. The PPMC was utilized to determine if a relationship existed between two variables. The researcher's claim was there was no direct correlation between grit scores, growth mindset scores, and reading scores. The study also determined the existence of an achievement gap by conducting a *t*-test for difference in means to compare grit scores and growth mindset scores of students in the super subgroup to the grit and growth mindset scores of the general population of students and a *z*-test to analyze for a difference in the percentage of students in the super subgroup who were at or above grade level in reading and the general population of students in grades three through five. The results of the study provided data to the researched school, with the intent to make future decisions regarding teaching grit and growth mindset.

Chapter Four: Results

Overview

The researched school had established an achievement gap between White students and students of color, students with an IEP, and students who received F&R lunch. Researchers indicated teaching non-cognitive skills could increase student achievement (Garcia, 2014). Grit and growth mindset were examples of non-cognitive skills used in this study to contribute to an increase in academic success in students. The researcher was interested in the influence grit and growth mindset would have on students and wondered if these concepts could close the achievement gap at the researched school. This study analyzed a possible relationship between teaching non-cognitive skills, specifically grit and growth mindset, and reading scores. A positive correlation in grit and growth mindset scores and reading scores could provide schools with information to close the achievement gap.

The researcher obtained data using student grit and growth mindset surveys, frequency and anecdotal teacher data, and Fountas and Pinnell (2012) reading scores. The researcher analyzed the collected data using the PPMC analysis to identify a possible relationship between grit, growth mindset, and reading scores. The study also involved collecting additional data in the form of teacher interviews to gain a better understanding regarding how teachers developed and implemented lessons or activities on growth mindset and grit. The information gained by this research added to the body of existing knowledge on grit and growth mindset and provided the researched school data to provide analysis to contribute to an increase in student achievement and close the achievement gap.

Research Question and Null Hypotheses

The researcher investigated the following research question: How do teachers develop and implement lessons/activities on growth mindset and grit?

This study tested the following hypotheses:

Null hypothesis 1: There is no relationship between pre-Grit score, post-Grit score and reading scores.

Null hypothesis 2: There is no relationship between pre-Growth Mindset score, post-Growth Mindset score and reading scores.

Null hypothesis 3: There is no relationship between the frequency of teacher instruction of concepts of Grit and student Grit scores.

Null hypothesis 4: There is no relationship between the frequency of teacher instruction of concepts of Growth Mindset and student Growth Mindset post-scores.

Null hypothesis 5: There is no relationship between the Grit scores and Growth Mindset scores.

Null hypothesis 6: When comparing the Super Subgroup of students to the general population, there is no difference in, Grit score, Growth Mindset score, and percentage of students at or above the grade-level reading benchmark.

Study Participants

The number of study participants changed from the original number reported in Chapter Three. (See table 12). The number of student participants decreased from 167 to 159, due to students moving out of the researched school and failure to complete the required data (survey or reading benchmark) (see Table 13).

Table 12

Original Study Participant Information

Grade	Number of Participants	Males	Females	Super Subgroup	Non-Super Subgroup
3	59	30	29	15	44
4	70	41	29	19	51
5	38	23	15	8	30

The researched school had a total of 234 students in grades three through, five.
At the conclusion of the study there were 157 students who participated, which was a
total of 67% of the students in grades three through five. The teacher participant
information did not change.

Table 13

Final Participant Information

Grade	Number of Participants	Males	Females	Super Subgroup	Non-Super Subgroup
3	55	27	28	13	42
4	67	39	28	17	50
5	35	20	15	8	27

Grit, Growth Mindset and Reading Scores

One emphasis, of this study, was to examine a possible relationship between grit
and growth mindset scores and reading scores by testing the following hypotheses.

Null hypothesis 1: There is no relationship between pre-Grit score, post-Grit
score and reading scores.

The researcher selected the PPMC to analyze for a possible relationship between
grit scores and reading scores by grade level (see Table 14).

Table 14

Correlation Between Pre-Post Teacher Instruction on Grit and Post-Reading scores

	Pre-grit and post-grit scores		Post-grit and post-reading scores	
	R	R2	R	R2
3rd Grade	-0.456	0.208	-0.067	0.005
4th Grade	-0.449	0.202	-0.146	0.021
5th Grade	-0.760	0.578	-0.091	0.001

Note: R = Correlation Value. R2 = Coefficient of Determination. Critical value = 0.195

Moderate negative relationships, some statistically significant, existed for third, fourth, and fifth grade pre-post instruction of grit scores. A strong negative relationship existed between pre-post instruction of grit scores for fifth graders. Post-grit instruction scores compared to post-reading scores indicated weak negative relationships for all grades. A comparison of the test values (R) of -0.456 and -0.067 (third grade) to the critical value of 0.273, the test values of -0.449 and -0.146 (fourth grade) to the critical value of .250, and the test values of -0.760 and -0.091 (fifth grade) to the critical value of .349 resulted in rejection of the null hypothesis for pre-test scores for all grade levels and a failure to reject the null hypothesis for post-test scores for all grade levels. Therefore, there was no relationship between delivery of instruction of grit and reading scores following instruction.

Null hypothesis 2: There is no relationship between pre-Growth Mindset score, post-Growth Mindset score and reading scores.

The researcher used the PPMC to identify a possible relationship between pre-post teacher instruction on growth mindset scores and post-reading scores by grade level (see Table 15).

Table 15

Correlation Between Pre-Post Teacher Instruction on Growth Mindset and Post-Reading

	Pre-growth mindset and post-growth mindset scores		Post-growth mindset and post-reading scores	
	R	R2	R	R2
3rd Grade	0.132	0.017	-0.114	0.013
4th Grade	0.254	0.064	0.157	0.025
5th Grade	0.278	0.077	0.219	0.055

Note: R = Correlation Value. R2 = Coefficient of Determination

Weak positive relationships existed for third, fourth, and fifth grade pre-growth mindset and post-growth mindset scores. A weak negative relationship also existed between post-instruction mindset scores and post-reading scores for third grade. Post-teacher instruction on growth mindset scores compared to post-teacher instruction on reading scores indicated weak positive relationships for fourth and fifth grade. A test value of 0.254 for pre-teacher instruction growth mindset scores and post-teacher instruction growth mindset scores in fourth grade compared to the critical value of .250 supported the rejection of the null. However, a comparison of the test values of 0.132 and -0.114 (third grade) to the critical value of 0.273, the test value of 0.157 (fourth grade) to the critical value of .250, and the test values of 0.278 and 0.219 (fifth grade) to the critical value of .349 resulted in a failure to reject the null hypothesis for pre-test scores for all grade levels except third grade, and a failure to reject the null hypothesis for post-test scores for all grade levels. Therefore, there was no relationship between delivery of instruction of growth mindset and reading scores following instruction.

Teaching Grit and Growth Mindset

Teachers recorded the frequency of instruction on grit and/or growth mindset (see

Table 16). The study examined a possible relationship between the frequency of teacher

instruction on grit and growth mindset and grit and growth mindset student scores.

Table 16

Frequency of Teacher Instruction on Grit and Growth Mindset

		Grit	Growth Mindset
3rd Grade			
	Teacher 1	27	20
	Teacher 2	24	13
	Teacher 3	34	27
	Teacher 4	30	23
4th Grade			
	Teacher 1	23	3
	Teacher 2	40	4
	Teacher 3	127	126
	Teacher 4	13	14
5th Grade			
	Teacher 1	7	5
	Teacher 2	12	20
	Teacher 3	14	18

Note: Frequency recorded in number of days taught from September 2015 – April 2016.

Null hypothesis 3: There is no relationship between the frequency of teacher

instruction of concepts of Grit and student Grit scores.

The PPMC analysis included a comparison in the number of days each teacher

instructed on the concept of grit with the average student post-grit scores for each

teacher's class. The correlation value (R) -0.102 indicated a weak negative relationship

between the frequency of teaching instruction on the concept of grit and student post-grit

scores. A scatterplot summarized the results (see Figure 3). The test value of -0.102

compared to the critical value of 0.602 resulted in a failure to reject the null hypothesis.

Figure 3. Scatterplot comparing frequency of teacher instruction on grit and student
post-grit scores.

Table 17 further demonstrated the lack of a relationship between teacher

instruction on grit and student post-grit scores. The data shows fourth grade had the

highest average number of days on grit instruction yet the fourth grade post-student grit

scores were the lowest out of all three grade levels. The fifth grade teachers only taught

grit an average of eleven days, yet the fifth grade students had a high average of post-grit

scores.

Null hypothesis 4: There is no relationship between the frequency of teacher

instruction of concepts of Growth Mindset and student Growth Mindset post-scores. The

researcher selected the PPMC and compared the number of days each teacher instructed

students on the concept of growth mindset with the average student post-growth mindset

score for each teacher's class.

Table 17

Average Frequency of Teacher Instruction on Grit and Average Post-Grit Scores

	Average days of grit instruction	Average student post grit score
3rd	28.75	3.679
4th	50.75	3.569
5th	11	3.622

The correlation value (R) 0.102 indicated a weak positive relationship between the frequency of instruction on growth mindset and student post-growth mindset scores. A scatterplot summarized the results (see Figure 4). The test value of 0.102 compared to the critical value of 0.602 supported a failure to reject the null hypothesis. Therefore,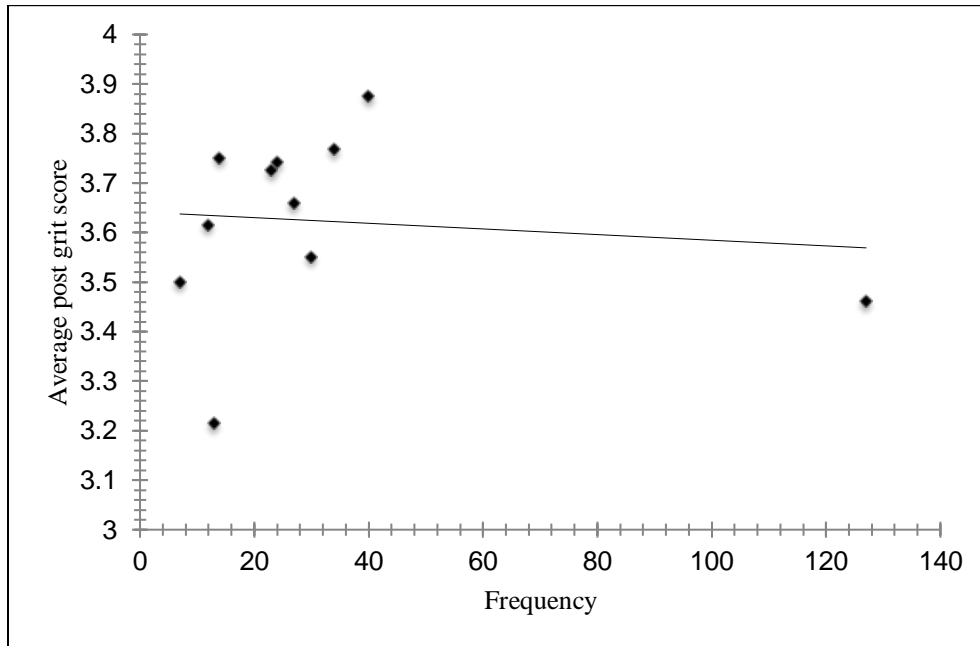 there is no relationship between frequency of teacher instruction of concepts of Growth Mindset and student post-scores
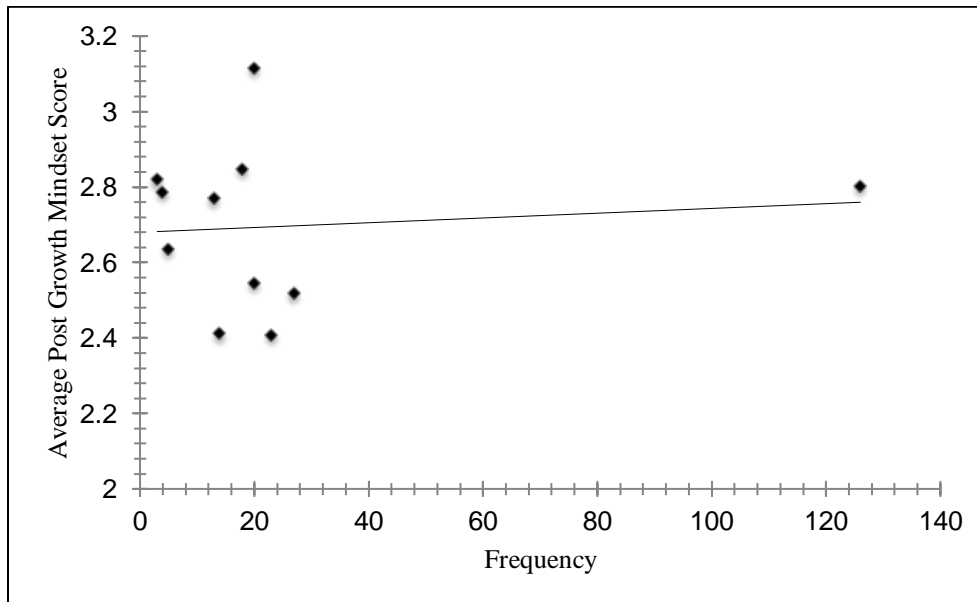
Figure 4. Scatterplot comparing frequency of teacher instruction on growth mindset and student post-growth mindset scores.

Table 18 further demonstrated the lack of a relationship between teacher instruction on growth mindset and student post-growth mindset scores. Fifth grade had the highest average post-student growth mindset scores, despite teachers in fifth grade only providing instruction on growth mindset an average of 14 days; the lowest number of days of instruction out of all three grade levels.

Table 18

Average Frequency of Teacher Instruction on Grit and Average Post-Grit

	Average days of growth mindset instruction	Average student post-growth mindset score
3rd	20.75	2.560
4th	36.75	2.705
5th	14.33	2.866

Grit and Growth Mindset Scores

In the fall of 2015 and spring of 2016, students completed a grit and growth mindset survey, which resulted in a score. The study examined a possible relationship between grit and growth mindset scores.

Null hypothesis 5: There is no relationship between the Grit scores and Growth Mindset scores.

The researcher used the PPMC to identify a possible relationship between pre-teacher instruction on grit and growth mindset scores and post-teacher instruction on grit and growth mindset scores by grade level (see Table 19).

Analysis resulted in weak positive relationships for third, fourth, and fifth grade pre-grit and pre-growth mindset scores. A weak negative relationship existed between post-grit and post-growth mindset scores for third grade. Post-grit scores compared to

post-growth mindset scores indicated weak positive relationships for fourth and fifth

grade.

Table 19

Correlation Between Pre-Teacher Instruction on Grit and Growth Mindset Scores and Post-Teacher Instruction on Grit and Growth Mindset Scores

	Pre-grit and pre-growth mindset scores		Post-grit and post-growth mindset scores	
	R	R2	R	R2
3rd Grade	0.236	0.056	-0.184	0.034
4th Grade	0.174	0.030	0.033	0.001
5th Grade	0.010	0.000	0.252	0.064

Note: R = Correlation Value. R2 = Coefficient of Determination

A comparison of the test values (R) of 0.236 and -0.184 (third grade) to the

critical value of 0.273, the test values of 0.174 and 0.033 (fourth grade) to the critical

value of 0.250, and the test values of 0.010 and 0.252 (fifth grade) to the critical value of

0.349 resulted in a failure to reject the null hypothesis for all grade levels. Therefore,

there is no relationship between Grit scores and Growth Mindset scores. Students who

score high on growth mindset scores do not necessarily score high on grit scores.

Achievement Gap

The study examined a possible achievement gap by comparing the super subgroup

of students to the general population.

Null hypothesis 6: When comparing the Super Subgroup of students to the

general population, there is no difference in, Grit score, Growth Mindset score, and

percentage of students at or above the grade-level reading benchmark.

A two-sample *t*-test was conducted comparing grit scores and growth mindset

scores of students in the super subgroup to the grit and growth mindset scores of the

general population of students for grades three through five. No significant difference

existed between the super subgroup of students' grit scores or growth mindset scores and

the grit and growth mindset scores of the general population of students (see Table 20).

The *p*-value of 0.780 (grit) and 0.27 (growth mindset) compared to the alpha value of

0.05 resulted in a failure to reject the null hypothesis. This suggested the super subgroup

students' grit scores and growth mindset scores were not significantly lower than the

general population of students in grades three through five.

Table 20

t-Test of Two Independent Means for Difference in Grit and Growth Mindset Scores

	Super Subgroup	Non-Super Subgroup
Grit		
Mean	3.60	3.63
Standard Deviation	0.51	0.61
d.f. (degrees of freedom)	155	155
P-value	0.780	0.780
T-score	-0.280	-0.280
Growth Mindset		
Mean	2.61	2.73
Standard Deviation	0.57	0.59
d.f. (degrees of freedom)	155	155
P-value	0.27	0.27
T-score	-1.11	-1.11

Note: alpha = 0.5

        To analyze for a difference in the percentage of students in the super subgroup

who were at or above grade level in reading and the general population of students, the

researcher selected the percentage of students who were at or above grade level reading

benchmark for both groups and performed a *z*-test for difference in proportion for grades

three through five. The results indicated a statistical difference in the percentage of

students in the super subgroup who scored at or above reading benchmark and the general

population of students (see Table 21). The *p*-value of 0.010 (third grade), 0.004 (fourth

grade), and 0.000 (fifth grade) compared to the alpha value of 0.05 resulted in the

rejection of the null hypothesis. This result suggested a difference in percentage of

students at or above grade level reading benchmark in the super subgroup and the general

population. Therefore, the proportion of students in the super subgroup who scored at or

above reading benchmark was not significantly lower than the proportion found for the

non-super subgroup.

Table 21

z-Test for Difference in Proportion Between Two Groups

	Super Subgroup			Non-Super Subgroup		
Grade	3rd	4th	5th	3rd	4th	5th
Proportion	0.846	0.765	0.500	1.000	0.980	1.000
P-value	0.0095	0.0036	0.0001	0.0095	0.0036	0.0001
Z-score	-2.592	-2.914	-3.904	-2.592	-2.914	-3.904

Note: alpha = 0.5

Grit and Growth Mindset Instruction

The researcher conducted teacher interviews in December 2015 and May 2016 on

how teachers developed and implemented lessons on grit and growth mindset. Teachers

also self-recorded anecdotal information about each lesson on growth mindset and grit

lessons to answer the following research question.

Research Question: How do teachers develop and implement lessons/activities

on growth mindset and grit?

Eleven classroom teachers of grades three through five at the researched school

participated in the study and completed interviews, along with the recording of anecdotal

notes. The data indicated seven out of the 11teachers (65%) did not develop lessons on

grit or growth mindset. These seven teachers referred to the concepts of grit and growth

mindset through discussions and vocabulary. One third grade teacher stated, 'I really

have not developed any particular lessons or activities. I generally referred to the

concepts in class meetings and when I feel that it has come up naturally.' A fourth grade

teacher made similar statements, 'A lot of what we do is on an as needed basis when it

fits into what we're doing at the moment. We do a couple of minutes here or there

depending on the lesson.' The remainder of the seven teachers who did not develop

lessons shared similar statements. One stated, 'We talk about those two words and what

they mean,' and another teacher stated, 'I wouldn't say I create lessons, I use teachable

moments to talk about grit and growth mindset.'

The four teachers who developed lessons taught the concepts of grit and growth

mindset in addition to referring to the concepts in discussions. A third grade teacher who

participated in the study developed lessons inclusive of videos, books, and activities to

teach the concepts of grit and growth mindset. A fourth grade teacher shared, 'We've

used physical movement to help [students] understand what it feels like to feel that

uncomfortable piece of when you're learning a new dance move. That was a great way

to take the concept of grit and perseverance out of the abstract and put it into something

concrete that they could manage.' Another fourth grade teacher taught mini lessons on

the concepts of grit and growth mindset using videos, motivational quotes, and

highlighted students who demonstrated grit or a growth mindset, and used books.

The teachers who participated in the study implemented the concepts of grit and

growth mindset in a variety of ways, including class meetings, discussions/reflections,

mini lessons, using books and videos, activities and challenges, using consistent

language, projects, using songs, and sharing examples. Five out of 11 (45%) teacher

participants implemented grit and growth mindset concepts solely by having class

meetings and discussions. During class meetings and discussions one teacher shared the

importance of having 'consistent language.' The teacher stated, 'As I'm continually

using that language throughout the year I think that helps as a good verbal reminder for

the students.' One teacher implemented a writing project with third graders to teach the

concepts and shared, 'We wrote a persuasion piece and you had to try to persuade people

to think that grit and growth mindset are very important to be successful in life.'

Another project completed in fourth grade implemented the concepts of grit and

growth mindset. The class completed a project on famous African Americans from

history described as motivational and explained how the famous people displayed the

characteristics of grit and growth mindset. A fifth grade teacher implemented the

concepts of growth mindset and grit by having students create 'data binders.' The

students created academic, behavior and social goals for themselves and created a plan to

achieve the goals. The teacher shared, 'It was all about going and creating that plan so

that the students understood that it was about something they could control. So my kids

are very aware that they are in complete control of the outcome as long as they do the

things in the plan.' A final example of how teachers implemented the concepts of grit

and growth mindset was a third grade teacher who had 'Mindset Monday' each week in

the classroom. Every Monday the teacher implemented a lesson about grit or growth

mindset designed to 'restart' the class.

Summary

Chapter Four presented the quantitative and qualitative data gathered for this study. The use of the PPMC determined a possible relationship between grit, growth mindset, and reading scores. The PPMC determined if a linear relationship existed between two variables. The researcher investigated if students with a higher grit and/or growth mindset score also had higher reading scores. A t-test and a z-test determined if there was a difference in grit, growth mindset, and reading scores between students in the super subgroup and students in the general population. The researcher further examined if an achievement gap existed between students in the super subgroup and the general population of students.

Null hypotheses were not rejected after completing data analyses on the relationship between grit, growth mindset, and reading scores. The researcher concluded no relationship existed between pre-post teacher instruction on grit scores and no difference existed between post-teacher instruction on grit scores and post-reading scores. The researcher also found no relationship between pre-post teacher instruction on growth mindset scores, with the exception of fourth grade. In fourth grade, the researcher found a test value of 0.254, slightly higher than the critical value of 0.250, which indicated a weak relationship existed between pre-post teacher instruction of growth mindset scores in fourth grade. No relationship existed between post-teacher instruction of growth mindset scores and post-teacher instruction reading scores in all three grades.

The PPMC determined if a relationship existed between the frequency of teacher instruction of the concepts of grit and growth mindset and student grit and growth mindset scores. The data supported non-rejection of both null hypotheses. There was no

relationship between the frequency of teacher instruction of the concepts and student grit and growth mindset scores in grades three through five.

The researcher examined the achievement gap between students in the super subgroup and students in the general population. A *t*-test analysis revealed a difference in grit and growth mindset scores between the two different groups. The data indicated no difference between the post-grit and growth mindset scores for students in the super subgroup and the rest of the students. The researcher utilized a *z*-test to analyze for a difference in the percentage of students at or above grade level reading benchmark in the super subgroup and general population of students. The results indicated evidence a difference existed between the percentage of students in the super subgroup who were at or above grade level reading benchmark and the general population of students.

The next chapter discussed the results of the study. The researcher discusses implications based on the study results and make recommendations for future studies.

Chapter Five: Discussion, Implications, and Recommendations

The purpose of this study was to determine if a relationship existed between grit, growth mindset, and reading scores. The data participant pool consisted of students in grades three through five at a public elementary school in the Midwest. Data collected included student grit and growth mindset surveys, reading benchmark scores, teacher frequency and anecdotal data, and teacher interviews. The students at the researched school completed a grit and growth mindset survey in August 2015 and again in May 2016. This survey resulted in pre and post-grit and growth mindset scores for each student. Reading level assessment of each student occurred in August 2015 and again in May 2016, which resulted in a pre and post-reading benchmark level for each student. To understand the frequency and how teachers provided instruction on the concepts of grit and growth mindset, anecdotal data collected along with teacher interviews occurred in December 2015 and May 2016. The results indicated no relationship between grit, growth mindset, and reading scores at the researched school.

Research Question and Hypotheses

The researcher investigated the following research question: How do teachers develop and implement lessons/activities on growth mindset and grit?

This study tested the following hypotheses:

Hypothesis 1: There is a relationship between pre-Grit score, post-Grit score and reading scores.

Hypothesis 2: There is a relationship between pre-Growth Mindset score, post-Growth Mindset score and reading scores.

Hypothesis 3: There is a relationship between the frequency of teacher instruction of concepts of Grit and student Grit scores.

Hypothesis 4: There is a relationship between the frequency of teacher instruction of concepts of Growth Mindset and student Growth Mindset post-scores.

Hypothesis 5: There is a relationship between the Grit scores and Growth Mindset scores.

Hypothesis 6: When comparing the Super Subgroup of students to the general population, there is a difference in, Grit score, Growth Mindset score, and percentage of students at or above the grade-level reading benchmark.

Results and Discussion

A PPMC analysis revealed no relationship between grit and reading scores at the researched school. The data concluded a relationship between post-teacher instruction on grit and post-reading scores did not exist for students in grades three through five. The researcher believed students with a higher grit score would also have a higher reading score.

The research indicated a correlation between grit and student success (Pappano, 2013) because students who had grit would persevere, overcome setbacks and continue to work towards a goal. One reason why grit was a predictor for success in school was because academic achievement required students to sustain effort on difficult tasks (Dweck et al., 2014). Research recent to this writing found grit positively correlated with increased mathematics and ELA test scores, attendance, and behavior (West et al., 2016). The researcher attempted to further support the research by finding evidence at the researched school of students with a high grit score having high reading scores.

However, a relationship at the researched school could not be supported with the data.

Tough (2016) gave a possible reason for the results found in the current study; Tough

indicated a reliable method to teach children how to have grit has yet to be found.

Teachers at the researched school chose different methods to provide instruction on grit

and provided the instruction with different frequencies. The researcher believed the

inconsistent teaching of grit influenced the correlation between grit and reading scores at

the researched school. A specific method and schedule to implement grit was deemed an

area of improvement. The literature stated a promising way for schools to support

academic success for students was to make an effort to influence student grit by creating

an interventions that target grit (West et al., 2016).

An additional PPMC analysis also revealed no relationship between growth

mindset and reading scores at the researched school. Research on growth mindset proved

students with a growth mindset outperformed students with a fixed mindset (Dweck,

2015). Students with a growth mindset were more motivated to learn and put more effort

into learning. Evidence indicated academic success not only influenced students' ability,

but also the students' belief about intelligence (Dweck et al., 2014). The study conducted

by the researcher did not find the same evidence. There was no evidence that a

relationship existed between growth mindset scores and reading scores at the researched

school. In Sparks' (2013) article, Dweck (2006, 2007, 2008, 2009, 2010) stated teachers

were often confused about teaching a growth mindset; teachers encouraged students to try

hard, but did not support student effort or provide students with the needed strategies.

The researcher believed many of the teachers at the researched school encouraged

students to have a growth mindset, but did not teach students how to develop a growth

mindset. The literature on growth mindset provided methods to teach growth mindset including: Praise student effort, improvement, and use of strategies, as opposed to praising intelligence, provide feedback and allow students to revise their work, present challenging tasks as fun and exciting and easy tasks as boring and less useful, and teach students that intellectual abilities can change (Blazer, 2011; Dweck 2015; Fensterwald, 2015; Sparks, 2013). The researcher believed teachers needed to teach growth mindset using the methods mentioned above in order to influence student growth mindset scores. Most of the teachers at the researched school (65%) referred to the concept of growth mindset through discussions and vocabulary, rather than using the methods, which most likely led to the lack of relationship between growth mindset and reading scores at the researched school.

The researcher found an interesting piece of data when pre and post-grit and growth mindset instruction scores were examined. The data indicated several students had a decrease in their grit and/or growth mindset score from the beginning of the school year to the end of the school year (see Table 22). Dweck (2016) stated, "The path to a growth mindset is a journey" (para. 11). The literature also indicated individuals were a mix of fixed and growth mindset and will probably always be a mixture (Dweck, 2016). In Duckworth's (2016) book, *Grit: The Power of Passion and Perseverance,* Duckworth explained an individual's grit score was a reflection of the individual at that time and an individual's grit score may change. This could explain why the average growth mindset scores decreased or minimally changed in some grade levels.

Table 22

Average Pre-Post Grit and Growth Mindset Instruction Scores

	Average pre-grit scores	Average post-grit scores	Average pre-growth mindset scores	Average post-growth mindset scores
3rd Grade	3.55	3.68	2.6	2.56
4th Grade	3.58	3.57	2.58	2.72
5th Grade	3.54	3.61	2.78	2.87

Note: The maximum grit score was 5 and the maximum growth mindset score was 4.

Another interesting piece of data was the pre-post instruction growth mindset scores in fourth grade. The *r*-value of 0.254 was slightly higher than the critical value of 0.250, which indicated a rejection of the null hypothesis and suggested a relationship between student's pre-post teacher instruction on growth mindset scores in the fourth grade (see Figure 5). The fourth grade teachers had the highest frequency of teacher instruction of growth mindset (an average of 50.75 days), and that could explain why there was a relationship between the pre-post instruction student growth mindset scores.
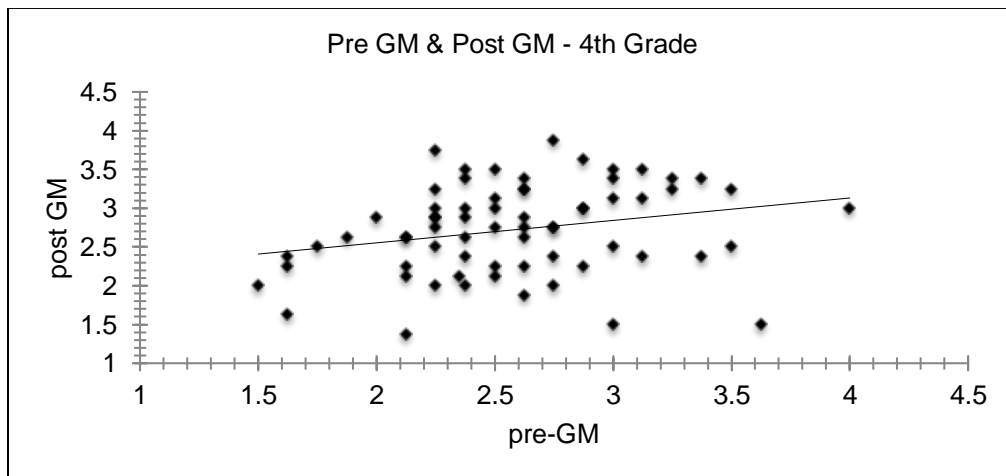

Figure 5. Scatterplot of pre-post instruction on 4th grade growth mindset scores.

Hypothesis 3 examined a possible relationship between the frequency of teacher instruction on grit and student grit scores. Duckworth (2009, 2016), believed people could learn to have grit and many studies suggested ways educators could help students develop grit (as cited in Goodwin & Miller, 2013; Hanford, 2012). Non-cognitive skills such as grit were found to be more responsive to intervention than cognitive abilities (West et al., 2016). Based on the literature, the researcher believed students would have higher grit scores if the teacher frequently taught the concept of grit. The data from the study indicated no relationship between frequency of teacher instruction on grit and student grit scores. This conclusion did not support the research on teaching grit. Upon reflection, the researcher determined many variables that might have influenced student grit scores and realized frequency might not have been the optimal way to determine if a relationship existed.

Research indicated if teachers encouraged students to develop a growth mindset then academic achievement would increase regardless of the curriculum and instructional strategies (Blazer, 2011) and research indicated a growth mindset could be taught (Parker, 2015). However, the data from the study indicated no relationship between frequency of teacher instruction on growth mindset and student growth mindset scores. The literature suggested teacher mindset had a large influence on student mindset and student achievement (Dweck, 2010a). Teachers with a fixed mindset believed that some students were not capable of learning and therefore did not take steps to help students develop their potential. Teachers with a growth mindset were committed to finding ways to ensure all students learned (Dweck, 2010a). Teacher mindset was an interesting variable that not addressed in the current study. In the future, the researcher would

suggest collecting data on teacher mindset to determine if a relationship existed between teacher mindset and student growth mindset scores.

There was a gap in the then-current research on the relationship between grit and growth mindset and how incorporating the two concepts could increase student achievement. Some literature began to make a connection between the concepts of grit and growth mindset by suggesting growth mindset helped to build grit (Elish-Piper, 2014) while some researchers suggested teaching both concepts (Laursen, 2015). In an interview, Duckworth (2009, 2016) stated she was collaborating with Dweck (2006, 2007, 2008, 2009, 2010), lead researcher on growth mindset, on a couple of projects (as cited in Perkins-Gough, 2013). The researcher wanted to determine if a relationship existed between student grit and growth mindset scores at the researched school. If growth mindset helped build grit as the literature suggested then the data should have indicated a correlation. The researcher compared pre-grit and pre-growth mindset instruction scores and post-grit and post-growth mindset instruction scores. The data obtained from the study indicated there was no relationship between pre-grit and pre-growth mindset instruction scores or between post-grit and post-growth mindset instruction scores. There are many reasons that may explain why the current study was unable to establish a relationship between grit and growth mindset scores. Teachers chose when and how to teach the concepts of grit and growth mindset. As a result, the frequency of teaching the concepts varied (see Table 23). The data from teacher interviews also indicated 45% of the teacher's implemented grit and growth mindset concepts solely by having class meetings and discussions. These variables most likely

influenced the study data and therefore the researcher believed the relationship between grit and growth mindset should be examined in more depth.

Table 23

Average Number of Days for Grit and Growth Mindset Instruction

	Grit	Growth Mindset
3rd 4th & 5th Grade	31.91	23

Lastly, the researcher examined the achievement gap between students in the super subgroup and the general population of students. Researchers indicated having a growth mindset decreased achievement gaps (Blazer, 2011) and non-cognitive factors such as grit and growth mindset raised academic achievement of underprivileged children and closed achievement gaps (Dweck et al., 2014). The researcher used a *t*-test to compare the grit and growth mindset scores of students in the super subgroup to the general population of students to see if a gap existed. The data from the study revealed no difference in grit and growth mindset scores between the two groups. The average post-grit and growth mindset instruction scores were similar for each group (see Table 24). According to the literature, the data should have also demonstrated no difference in readings scores between students in the super subgroup and the general population of students.

Table 24

Average Post Grit and Growth Mindset Instruction Scores

	Average post grit score	Average post growth mindset score
Super Subgroup	3.60	2.61
General Population	3.63	2.73

The literature specified non-cognitive skills such as grit and growth mindset appeared to make a difference in student academic success (Fensterwald, 2015; Tough, 2016). Since the study data indicated no difference in grit and growth mindset scores between students in the super subgroup and the general population of students the researcher also expected to find no difference in reading scores between the two groups. When reading scores were compared utilizing a *z*-test, the data indicated a difference in the percentage of students in the super subgroup who were at or above the grade level reading benchmark and the percentage of students not in the super subgroup who were at or above the grade level reading benchmark. This led the researcher to the conclusion an achievement gap existed in reading between students in the super subgroup and the general population of students despite there not being a gap in grit and growth mindset scores.

Implications Regarding Grit and Growth Mindset

The researcher believed school leaders, teachers, and school districts could benefit from the information found in the study. The study provided useful information regarding how teachers implemented the concepts of grit and growth mindset and what teachers found as a result of incorporation of the concepts. Many of the teachers shared students who demonstrated grit and growth mindset were more successful in school. School districts and school leaders could use this information when developing a non-cognitive skills curriculum. The information in this study could be used along with the other data collected to make informed decisions about how to teach the concepts of grit and growth mindset in the future at other "like" schools. In addition, the researched

school now has information to make adjustments regarding how teachers provided

students with instruction on grit and growth mindset.

The implications of this study for school leaders and districts who attempt to

measure grit and growth mindset suggested grit and growth mindset surveys are measures

to examine further. Data from the grit and growth mindset surveys provided a reliable

score used to understand the grittiness and mindset of students. The scores indicated

which students had a growth mindset and which ones favored a fixed mindset and

identified the grittiness of students. The surveys assessed students using self-report and

were quick and easy to administer. The information on measuring student grit and

growth mindset was beneficial for teachers as well. Teachers could use the information

from the study to implement grit and growth mindset surveys in the future and assess

their students' level of grit and growth mindset. This information could be used to guide

teacher instruction on grit and growth mindset.

There were implications for the researcher and the researched school as well. The

researched school benefited from the data gathered on the number of students who were

at or above grade level reading benchmark. This data could be used in a number of ways

to increase student achievement. Results indicated no relationship between grit scores,

growth mindset scores, and reading scores and was unexpected by the researcher. The

researcher hoped to prove grit and growth mindset would increase student achievement.

However, the researcher learned useful information from this study that could ultimately

relate to student achievement. The researcher learned the frequency of incorporating the

concepts of grit and growth mindset did not increase grit and growth mindset scores,

which led the researcher to other factors that could increase scores. The researcher also

understood teachers implemented the concepts using a variety of methods and perhaps

one method would be more beneficial than other methods. The teachers placed different

levels of priority on incorporating the concepts, which could have factored into the grit

and growth mindset scores. In addition, the study provided useful information on

students' understanding of the concepts of grit and growth mindset. This information

could be applied in future instructional adjustments in how the concepts are taught at the

researched school.

Implications Regarding the Achievement Gap

The study proved an achievement gap in reading continued to exist at the

researched school (see Table 25). The data provided information about reading scores

and the gap school leaders and teachers, at the researched school, could use to address the

achievement gap.

Table 25

Percentage of Students at or Above Grade Level Reading

	Super Subgroup	General Population
3rd Grade	85%	100%
4th Grade	76%	98%
5th Grade	50%	100%

Note: End of the school year reading scores were used to obtain percentage

The data from the study also provided information regarding grit and growth

mindset scores of the students who were not at or above grade level reading that school

leaders and teachers at the researched school could find helpful when addressing the gap.

The literature in Chapter 2 supported teaching the concepts of grit and growth mindset to

increase student achievement and to close achievement gaps. As a result, the researcher

and the researched school could use the information gained from this study to make adjustments to how the concepts are currently being taught and assessed. The results from this study will be shared with teachers to foster future awareness and an increased understanding regarding how to teach the researched concepts. The researcher and the researched school should continue to focus on the relationship between non-cognitive skills (grit and growth mindset) and closing the achievement gap. The researcher also recommended the researched school build upon the study and the data collected to make adjustments and improvements. Based on the research and literature, the researcher still believed grit and a growth mindset would help to close the achievement gap. The study provided a starting point with data results and information for the researched school to build upon.

Recommendations for Research Design Reconstruction

One area recommended for reconstruction was to increase specificity regarding how teachers incorporated the concepts of grit and growth mindset to influence students and to increase student grit and growth mindset scores. Teachers in the study used a variety of methods to incorporate the concepts of grit and growth mindset and some methods used were vague and did not teach the concepts. Some teacher instruction consisted of only using grit and growth mindset terminology and definitions of the concepts, but did not teach the concepts. The literature shared specific ways to teach the concepts and to encourage students to use grit and to have a growth mindset (Dweck, 2010a; Goodwin & Miller, 2013; Hoerr, 2014; Stein, 2014). The teachers who participated in the study had professional development on teaching the concepts, but the study data indicated teaching did not occur as needed. The researcher concluded teachers

required additional professional development. Moving forward, the researcher would design and expect a specified curriculum for teaching the concepts and a schedule for how often instruction would occur. The researcher believed this structure would increase student grit and growth mindset scores.

Another recommendation for improvement was the teacher mindset; the researcher mentioned the importance of teacher mindset and the influence a teacher's mindset could have on students. Recent research revealed some teachers endorsed a growth mindset by using the terminology, but did not actually follow growth mindset practices in the classroom (Fensterwald, 2015). Teachers who truly encouraged and supported a growth mindset allowed mistakes, challenged students while teaching them strategies to meet those challenges, and provided an opportunity to revise work (Fensterwald, 2015). Teachers who influenced students' mindsets, also reflected a growth mindset through their words and actions and believed students could increase their academic ability (Dweck, 2015). As a result, a recommendation for improvement would be to work with teachers on developing their mindset and providing teachers with professional development on how to develop classroom practices to support and encourage a growth mindset. In future studies the researcher recommended assessment of the teacher mindset to determine if a relationship existed between teacher and student mindset.

Recommendations for Future Research

During data collection, the researcher's notes revealed numerous recommendations for future research to gain new information and perhaps improve the results. One recommendation would be to focus the study on fourth and fifth grade

students. The researcher had some concerns regarding the ability of the students in third

grade to understand the grit and growth mindset surveys well enough to answer the

questions accurately. The fifth graders were able to independently read and understand

the surveys, which most likely led to more accurate scores. If future researchers included

third grade students, the researcher suggested reviewing the questions with students prior

to taking the survey to ensure the students understand what the question is stating/asking.

One of the limitations of the current study was the grit and growth mindset survey

administered. The surveys were self-reported instruments, and some respondents had

difficulty understanding the questions. In addition, there was research surrounding a

need to create measurement tools that produced accurate results due to issues with self-

reported instruments (Hartnett, 2012). A recommendation for future research could be to

find a more accurate assessment tool to measure grit and growth mindset or make

adjustments on how the current assessment tools are utilized.

The researcher had several recommendations for future research due to the

unexpected results of the current study specifically not finding a relationship between

grit, growth mindset, and reading scores. The researcher recommends future research

focus on specific curriculum or methods for teaching the concepts of grit and growth

mindset. In addition, future research should focus on professional development for

teachers so the teachers are knowledgeable and prepared to teach the concepts of grit and

growth mindset. Another recommendation for future research would be to collect data on

teacher mindset and grit to analyze a possible relationship between teacher and student

growth mindset and grit. Literature indicated teacher mindset and grit would influence

student behavior and academic achievement. The current study did not examine this

relationship and the researcher believed this factor was important to consider in future research.

The last recommendation for future research was to examine the possible reasons why grit and growth mindset scores decreased from the beginning of the school year to the end of the school year. The researcher was surprised by how many students' pre and post-grit and growth mindset instruction scores decreased. The decrease in scores could be a factor as to why the study was unable to establish a relationship between grit, growth mindset, and reading scores. Future research should focus on student grit and growth mindset scores throughout a school year and factors that influence student grit and growth mindset.

Conclusion

The researcher and the researched school wanted to find a solution to the achievement gap that existed at the researched school. This study attempted to establish a relationship between grit, growth mindset, and reading scores as a possible strategy to close the achievement gap. The literature concluded students who exhibited grit and had a growth mindset earned higher grades (Laursen, 2015). Dweck (2015) stated growth mindset was developed to help close achievement gaps. Although the current study did not support the literature, the researcher obtained useful information.

The study collected data on student grit and growth mindset scores, teacher incorporation of the concepts of grit and growth mindset, and reading scores. This data did not establish a relationship between grit, growth mindset, and reading scores. The qualitative data from teacher interviews, frequency documentation, and anecdotal journal entries provided information regarding the incorporation of grit and growth mindset

along with observed characteristics in students. In the year following this study, the

researched school planned to make adjustments regarding teaching the concepts of grit

and growth mindset.

　　　The researcher was surprised a relationship was not established between grit,

growth mindset, and reading scores. The literature supported a relationship between grit,

growth mindset, and student achievement and indicated intelligence alone could not

guarantee success (Bond, 2014). Many schools (including the researched school) focused

on academic interventions as a solution to the achievement gap, but found the academic

interventions did not work and an achievement gap remained. Meta-analyses of reviewed

literature confirmed a positive link between academic achievement and non-cognitive

skills (Garcia, 2014). As a result, the researcher will continue to explore the use and

benefits of teaching grit and growth mindset at the researched school with modified

implementation.

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Appendix A

12- Item Grit O Scale

Directions for taking the Grit Scale: Please respond to the following 12 items. Be honest – there are no right or wrong answers!

1. I have overcome setbacks to conquer an important challenge.
- ❑ Very much like me
- ❑ Mostly like me
- ❑ Somewhat like me
- ❑ Not much like me
- ❑ Not like me at all

2. 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

3. My interests change from year to year.*
- ❑ Very much like me
- ❑ Mostly like me
- ❑ Somewhat like me
- ❑ Not much like me
- ❑ Not like me at all

4. Setbacks don't discourage me.
- ❑ Very much like me
- ❑ Mostly like me
- ❑ Somewhat like me
- ❑ Not much like me
- ❑ Not like me at all

5. 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

6. I am a hard worker.
- ❑ Very much like me
- ❑ Mostly like me
- ❑ Somewhat like me

- ❑ Not much like me
- ❑ Not like me at all

7. 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

8. 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

9. I finish whatever I begin.
- ❑ Very much like me
- ❑ Mostly like me
- ❑ Somewhat like me
- ❑ Not much like me
- ❑ Not like me at all

10. I have achieved a goal that took years of work.
- ❑ Very much like me
- ❑ Mostly like me
- ❑ Somewhat like me
- ❑ Not much like me

11. I become interested in new pursuits every few months.*
- ❑ Very much like me
- ❑ Mostly like me
- ❑ Somewhat like me
- ❑ Not much like me
- ❑ Not like me at all

12. 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 1, 4, 6, 9, 10 and 12 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 2, 3, 5, 7, 8 and 11 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 12. The maximum score on this scale is 5 (extremely gritty), and the lowest scale on this scale is 1 (not at all gritty).

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, 9*, 1087-1101.

Appendix B

Short Grit Scale (Grit S)

*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

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

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).

Duckworth, A.L, & Quinn, P.D. (2009). Development and validation of the Short Grit Scale (Grit-S). *Journal of Personality Assessment, 91,* 166-174. http://www.sas.upenn.edu/~duckwort/images/Duckworth%20and%20Quinn.pdf

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, 9*, 1087-1101. http://www.sas.upenn.edu/~duckwort/images/Grit%20JPSP.pdf

Appendix C

Lindenwood University
School of Education
209 S. Kingshighway
St. Charles, Missouri 63301

Informed Consent for Parents to Sign for Student Participation in Research Activities

A mixed method investigation of growth mindset, grit and reading scores in a Midwest public elementary school setting**.**

Principal Investigator: Christina Wilson
Telephone: 314-213-6100 ext 4401   E-mail: Christina.wilson@kirkwoodschools.org

Participant_____

Parent Name & Contact Information_____

_____

Dear parent,

1. Your child is invited to participate in a research study conducted by Christina Wilson under the guidance of Dr. Lynda Leavitt. The purpose of this research is to seek a possible relationship between student growth mindset, grit scores and reading scores. The study will also look at the possibility of growth mindset and grit closing the achievement gap in reading between different groups of students.

2. Your child's participation will involve completing a growth mindset and grit survey at the beginning of the school year (August) and at the end of the school year (May).

    Approximately 50-250 students may be involved in this research.

    The surveys will take place at the beginning of the school day during morning work time and each survey will take approximately 10 minutes to complete.

3. There are no anticipated risks to your child associated with this research. While the researcher will do everything possible to keep your child's information completely anonymous and confidential, in cases where small sample sizes are used, there is a remote possibility of inadvertent discovery of identity.

4. There are no direct benefits for your child's participation in this study. However, your child's participation will contribute to the knowledge about the possible benefits of teaching and learning about growth mindset and grit and reading achievement.

5. Your child's participation is voluntary and you may choose not to let your child participate in this research study or to withdraw your consent for your child's participation at any time. Your child may choose not to answer any questions that he or she does not want to answer. You and your child will NOT be penalized in any way should you choose not to let your child participate or to withdraw your child.

6. We will do everything we can to protect your child's privacy. As part of this effort, your child's identity will not be revealed in any publication or presentation that may result from this study.

7. The researcher will protect the identities of the participants from the researcher by using a third party to collect and process data.

8. If you have any questions or concerns regarding this study, or if any problems arise, you may call the Investigator, Christina Wilson at 314-213-6100 ext 4401 or the Supervising Faculty, Dr. Lynda Leavitt at 636-949-4756. You may also ask questions of or state concerns regarding your participation to the Lindenwood Institutional Review Board (IRB) through contacting Dr. Marilyn Abbott, Interim Provost for Academic Affairs at 636-949-4846.

I have read this consent form and have been given the opportunity to ask questions. I will also be given a copy of this consent form for my records. I consent to my child's participation in the research described above.

Parent's/Guardian's Signature   Date   Parent's/Guardian's Printed Name

---

Child's Printed Name

Signature of Investigator   Date   Investigator Printed Name

Vitae

Christina Wilson earned her Bachelor of Arts degree in Psychology and Special Education from Webster University in 1997. Mrs. Wilson began a career in the social services field working with juvenile offenders for the state of Missouri. In 2001, Mrs. Wilson left the social services field and began her education career as a teacher in the St Louis Public School District and earned her Master of Arts in Teaching in 2003. After three years of teaching in the St. Louis Public School District, Mrs. Wilson began working for Special School District at the Family Court building in Clayton, Missouri. In 2006, Mrs. Wilson became a special education teacher at an elementary school in St. Louis County, Missouri, where she remained as a teacher until 2013. Mrs. Wilson earned an Education Specialist degree in Education Administration in August 2011, and in August 2013 became an Administrative Intern for two elementary schools in St Louis County, Missouri. Mrs. Wilson is currently serving her third year as an Administrative Intern at an elementary school and anticipates earning her Ed.D. in Instructional Leadership from Lindenwood University in 2016.