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The Impact of Noncognitive Skills on Student Achievement in Elementary-age Students During the COVID-19 Pandemic

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THE IMPACT OF NONCOGNITIVE SKILLS ON STUDENT ACHIEVEMENT IN ELEMENTARY-AGE STUDENTS DURING THE COVID-19 PANDEMIC

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Approval Page

This dissertation was submitted by Karen Garmon under the direction of the persons listed below. It was submitted to the Gardner-Webb University College of Education and approved in partial fulfillment of the requirements for the degree of Doctor of Education at Gardner-Webb University.

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Acknowledgments

The primary inspiration for this research is my favorite childhood fable, *The Tortoise and the Hare*. I frequently asked my mom to read this story to me as a child, so one day she was clever enough to record herself reading it aloud on a cassette tape. Each morning, I would insert the cassette tape, press play, and follow along with every word in the book, never tiring of the plot twist and artwork. I hope you will take a few minutes to read *The Tortoise and the Hare* and reflect on how we are at times both the tortoise and the hare in this race we call life.

I want to thank both of my dissertation chairs for their guidance on this journey, Dr. Kelly Clark and Dr. Mitch Porter. Dr. Clark allowed me to venture down the rabbit holes in research, while subtly bringing me back to my original questions. Dr. Porter stepped in as my chair and helped me set small achievable goals until I completed the last two chapters of this dissertation. Dr. Porter also made research methodology make sense for the first time, which is a miracle. I thoroughly enjoyed my professors at Gardner-Webb University; I can honestly say that I walked away each semester with new knowledge and skills that shaped me into a better educator. Thank you for sharing your time and wisdom with me, Dr. Parker, Dr. Wesson, Dr. Greer, Dr. Palermo, and Dr. Lamb. Another big thank you to my dissertation committee of Dr. Parker, Dr. Greer, and Dr. Clark for the hours you spent reading and editing my work. I know you had better things to do than read amateur research!

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Abstract

THE IMPACT OF NONCOGNITIVE SKILLS ON STUDENT ACHIEVEMENT IN ELEMENTARY-AGE STUDENTS DURING THE COVID-19 PANDEMIC. Garmon, Karen, 2022: Dissertation, Gardner-Webb University.

The COVID-19 pandemic has created one of the largest disruptions in educational history. The impact on learning loss and social-emotional well-being from the pandemic threatens to compromise achievement outcomes for an extended number of years. Previous research has proven relationships between grit, growth mindset, self-efficacy, and academic achievement (Duckworth, 2016; Duckworth et al., 2007; Dweck, 2008), but little is known about the validity of noncognitive constructs and academic achievement in elementary-age students, particularly how the relationship between these variables affected student achievement during the COVID-19 pandemic. The purpose of this study was to determine if noncognitive traits had a relationship with achievement in elementary-age students during the COVID-19 pandemic. In this study, the noncognitive constructs of grit, growth mindset, self-efficacy, and self-management were analyzed for correlation with the achievement variables in the universal screeners, i-Ready math and English language arts (ELA). It was found that students with higher self-management were more likely to have higher math achievement. Self-management was the only statistically significant variable with achievement of the noncognitive constructs measured. It was also found that students with higher self-management typically had higher self-efficacy. A significant change in i-Ready math achievement was found resulting in an average 5-point decrease in scores over time. Change was also found in i-Ready ELA over time, resulting in a 22-point increase in the average scores. This

research adds to the understanding that cognitive abilities alone do not fully predict a student's academic achievement (Micceri, 2010; Nichols & Clinedinst, 2013).

Keywords: grit, growth mindset, self-efficacy, self-management, universal screeners.

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Chapter 1: Introduction

Since the birth of the childhood fable, *The Tortoise and the Hare*, in 1912, the story has been retold for over a century. Fables are often told to teach morals or lessons. The moral of this story and the lessons learned vary by culture. An ancient Greek source shared that "many people have good, natural abilities which are ruined by idleness; on the other hand, sobriety, zeal, and perseverance can prevail over indolence" (Gibbs, 2002, p. 11). Most readers of this historical tale think that a hare, known to be a fast and agile animal, could easily defeat a tortoise in a long race of speed and endurance.

Instead of believing that she was too slow for the race, the tortoise accepted the challenge. The plot twist of the story unfolds that the hare was outmatched when compared to the tortoise in an endurance race. As the story goes, the hare was overconfident that he would win the race, so he stops during the race to rest and falls asleep. The hare's confidence in his natural ability led him to be distracted and lackadaisical about the end goal. While the hare is resting, the tortoise continues to move slowly and steadily without stopping. As a result, the tortoise wins the race.

In this allegorical tale, the hare is a symbol of overconfidence, while the tortoise teaches the reader to accept challenges and never give up, giving the story a moral code. The moral code suggests a likeness to noncognitive traits such as self-efficacy, grit, growth mindset, and self-management. Duckworth (2016) defined grit as "passion and sustained persistence applied towards long-term achievement, with no particular concern for rewards or recognition along the way" (p. 76). Duckworth (2016) continued that individuals who have grit never tire in situations where others may give up. Perhaps the moral code suggests that having self-confidence and a positive mindset for growth amid

challenges is what pushes one to achieve (Dweck, 2008). This concept of how noncognitive indicators can influence achievement is what led me to this research study. I have examined educational achievement under harsh environmental conditions through the COVID-19 pandemic.

Impact of COVID-19 Pandemic on Public Education

In early January 2020, the World Health Organization acknowledged a deadly coronavirus-related pneumonia in Wuhan, China (AJMC, 2021). By January 21, the Centers for Disease Control and Prevention (CDC) confirmed the first U.S. coronavirus case. The CDC warned schools about the need to prepare for the coronavirus on February 25, 2020 (Education Week Staff, 2020). The COVID-19 virus was heading toward pandemic status. Nancy Messonnier, one of the medical directors for the CDC stated that COVID-19 met two of three required factors for being a pandemic: illness resulting in death and sustained person-to-person spread (AJMC, 2021). Worldwide spread, being the third criterion, had not yet been met.

By March 2020, federal agencies were providing guidance, but ultimately decisions about school closures were made at the local level (Education Week Staff, 2021). On March 11, 2020, the World Health Organization declared COVID-19 a global pandemic (Education Week Staff, 2021). By mid-March, 27 states completely shut down schools and stopped all in-person instruction. This change happened so quickly that school leaders struggled to provide learning materials. Some sent home packets of materials, while others quickly shifted into a virtual format. Educators seemingly became online teachers overnight. School districts worked to keep essential services available to students during the closure process, especially child nutrition services. By early April,

Education Week Staff (2021) collected data to check in on teacher morale; it was slowly plummeting. Up to 66% of teachers reported that their morale level is lower than prior to the COVID-19 pandemic (Education Week Staff, 2021). By mid-April, over half of all U.S. public schools decided to shut down due to COVID-19 for the remainder of the 2019-2020 school year. This impact left approximately 50.8 million public school students closed off from their traditional in-person education (Education Week Staff, 2021).

Due to COVID-19 school closures, a remote learning plan was created for nearly 50 million students nationwide (Education Week Staff, 2021). School districts across the country begin battling the digital divide. Teachers and students were not adequately prepared for the demands of online learning. Districts found that devices and connection to the Internet were major obstacles. Education Week Staff (2021) produced statistics stating that "16 million K-12 students and 400,000 teachers prior to the pandemic weren't adequately connected at home for remote learning" (p. 44). Educational systems across the nation raise concerns about the digital divide and go to great lengths to get students and teachers more adequately connected.

As summer began in June 2020, the number of COVID-19 cases hit 2 million in the United States, and new infection rates were on the rise because of eased social distancing restrictions (AJMC, 2021). Research showed that the mental health of students and teachers was slowly deteriorating. Surveys by Common Sense Media demonstrated an uptick in students feeling disconnected from school and increased bouts of depression due to the pandemic (Education Week Staff, 2021). To battle this issue, parents began banding together to develop another plan. Learning pods became very popular in some

communities. Learning pods displayed the divide in equity and opportunity, as some families did not have the financial means to be part of the community learning pods.

The first month of the traditional school calendar (August) was concluded with news about the first known case of reinfection reported in the U.S. The previous assumption was that COVID-19 could only be contracted by an individual once. In the second month of the traditional school year, a new, more contagious strain of COVID-19 was discovered (AJMC, 2021). By October 2020, hybrid learning would dominate, with a combination of face-to-face and online learning, otherwise known as a hybrid model (AJMC, 2021). The approaches to hybrid learning varied widely; some school districts allowed students to choose between in-person and remote instruction, while other schools operated in cohorts. In cohorts, schools would open to certain groups of students for a set number of days per week. The days students were not in-person, they were remote or online with their same cohort. Teachers had to learn very quickly how to juggle in-person and remote instruction. Most districts led with a concurrent classroom setup, allowing students at home to utilize a platform to access live instruction while in-person students were in the physical classroom. By late October, Education Week Staff (2021) reported that teacher morale was hitting its lowest point. At the start of November 2020, pressure to reopen schools trickled out from leading health experts. Many were stating that evidence showed that schools could operate safely with vigilant mitigation measures. During this push, COVID-19 infection rates were on the rise once again, and many school districts followed in the pullback from in-person learning.

In December 2020, the presidential administration vowed to have schools fully reopened within 100 days (Education Week Staff, 2021). Following this announcement,

vaccines for the country became a beacon of hope as Pfizer-BioNTech provided the first available dosage. Vaccinations of health care workers and older (65 and up) adults were mandated first in line for the COVID-19 vaccinations; this included educators in that age range. In early February 2021, reopening tension mounted, as teachers are considered essential workers and were asked to return to in-person instruction. Approximately 70% of K-12 personnel in the state had agreed to take the vaccine (Education Week Staff, 2021). On February 22, 2021, the CDC gave some long-awaited guidance to school districts. CDC directors made a plea to the community that the safest way to open schools was to ensure that there was as little disease as possible in the community. This message portrayed that schools opening and remaining open was a shared responsibility.

On March 2, 2021, states were directed to prioritize COVID-19 vaccinations with a larger focus on educators. The goal was for all school staff to have at least one dose of the vaccine by the end of March (Education Week Staff, 2021). The CDC then updated mask mandates, stating that fully vaccinated individuals can go outside without a mask for outdoor activities. Masks were still recommended for crowded outdoor or indoor spaces. COVID-19 cases were on a steady decline. In May 2021, more than one in five COVID-19 cases involved children (Education Week Staff, 2021). Teenagers between the ages of 12 and 17 were eligible for vaccinations, and it proved to be 96% effective (Education Week Staff, 2021). Leading experts and educators stood with hope that the positive data would lead to a more normalized 2021-2022 school year for students and families.

Leading into the summer months of 2021, high vaccination rates and lower COVID-19 infection rates seemed like an end in sight with the pandemic. By late June,

July, and all of August, a new variant of COVID-19 was on the scene and wreaking havoc on community spread. The Delta variant swept through communities, and hospitalizations for children hit record highs (AJMC, 2021). All North Carolina school districts reopened in the fall of 2021 with guidance from the CDC stating that students benefit from in-person learning, and safely returning to in-person instruction was a priority (CDC, 2022). The CDC stated that vaccinations were the single most important public health prevention strategy available to end the COVID-19 pandemic (CDC, 2022). School districts across the state of North Carolina promoted free vaccinations for all employees and eligible students. Due to the highly contagious Delta variant, indoor masking was required for all staff, teachers, visitors, and students, regardless of vaccination status. Prevention strategies were strongly encouraged and included screening testing, ventilation upgrades, increased hand washing routines, staying home when sick, proactively getting tested, contact tracing, and quarantining, along with daily cleaning and disinfection (CDC, 2022). Outbreaks were closely monitored. Recommendations were in place asking that vaccinated people with a known exposure be tested 3 to 5 days after exposure, regardless of symptoms. Face-to-face instruction was challenging, but school districts were determined to offer quality educational opportunities for all students during the 2021-2022 school year.

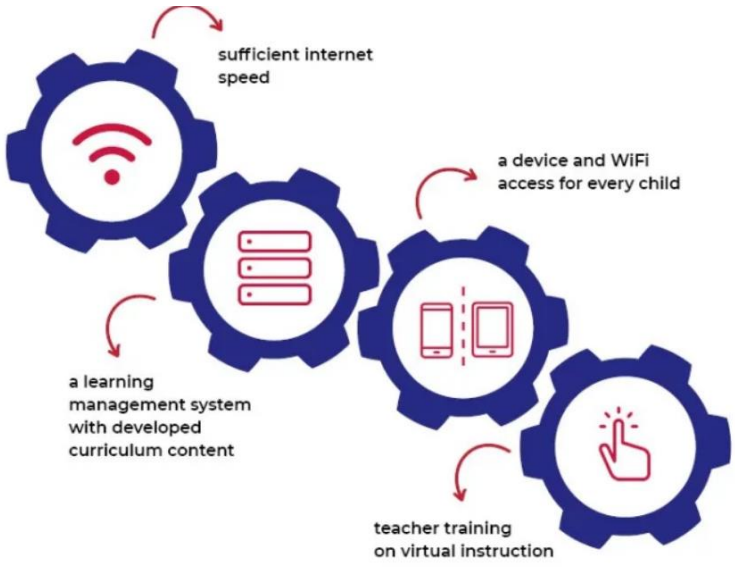
The Impact of COVID-19 on Student Learning and Well-Being

The COVID-19 pandemic disrupted the spring of the 2019-2020 school year and the entirety of the 2020-2021 school year. The virus was still looming in the 2021-2022 school year. Educational institutions across the country worked endlessly to meet the needs of teachers, students, and families when the pandemic arose. It seemed like an

overnight transition where teachers became online instructors, learning new platforms and a completely new method of delivery to students. Students were forced to adjust to remote learning. Districts used various technological devices with new platforms and found major gaps in providing the materials needed for all students to succeed. The large gaps in technology access posed problems across the country (Kuhfeld et al., 2020). Not only was it problematic to provide technology to students, teachers, and staff, but the data connection capability provided hurdles. Figure 1 displays the order of readiness for school districts in the United States.

Figure 1

Order of Readiness for Remote Learning



Note. From the Mississippi Department of Education (2020).

To provide access for students and to continue preparing for what was to come, school districts had to prepare teachers for two models of delivery, online and face-to-face. This task came with limited guidance, and district leaders were uncertain about which model students would need to be successful and how long they would be in this

mode of delivery (Zhou, 2021). School districts were forced to operate in this state of uncertainty, with financial sustainability concerns in addition to apprehension about the ability to consistently meet all student needs.

The learning loss from the COVID-19 pandemic could have lasting implications for more than just students. Communities are facing new unique challenges due to the pandemic that are coupled with existing stressors creating multiple hardships. Increases in learning loss and an increase in the dropout rate will impact future employment opportunities and earning potential for students well into adulthood (Zhou, 2021). The unexpected loss of loved ones, childcare burdens, and unemployment alter the mental and emotional well-being of families, students, and teachers (Weisbrot & Ryst, 2020). Communities and school systems are working to increase access to mental health services and support services. District leaders are engaging in additional training and resources to support students at risk of falling behind their grade level.

COVID-19 caused an extended period out of the regimented school cycle. This absence will likely affect student achievement, though that impact is hard to estimate given all the unique aspects of COVID-19 on communities and schools (Zhou, 2021). We have limited available data on how school closures and the shift in instruction have impacted learning. It also remains unclear how academic achievement and social-emotional learning (SEL) were affected over this close to 2-year period. Strategies to support these areas of weakness amid the pandemic require creative thinking, collaboration, and hefty funding for resources.

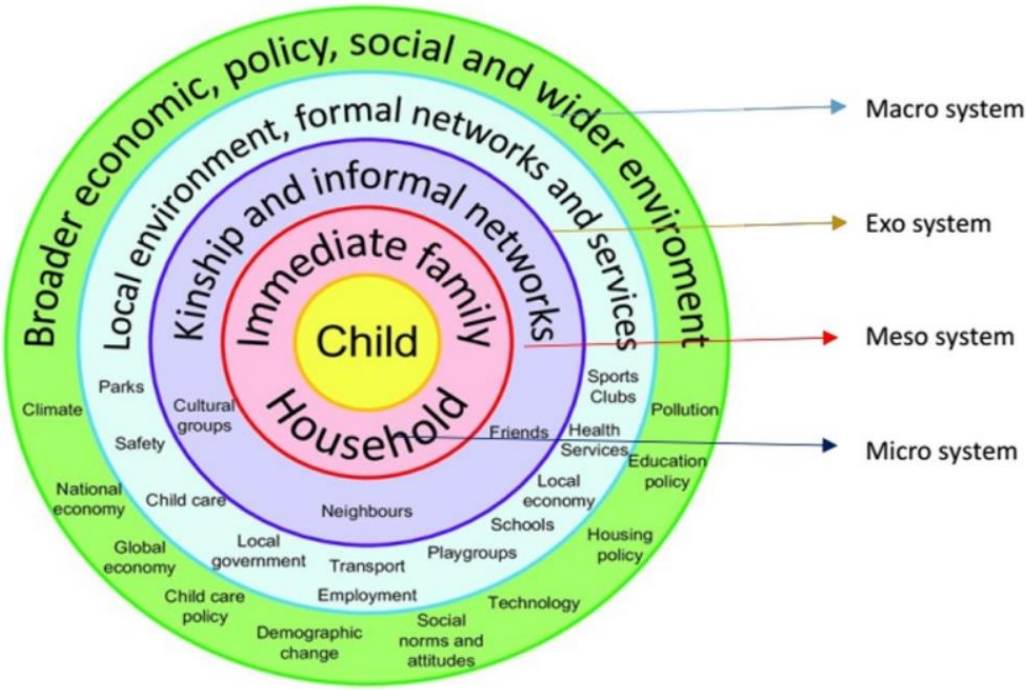
Theoretical Framework

Ecological Systems Theory

The theoretical framework for this study was influenced by two theories. First is Bronfenbrenner's (1990) ecological systems theory. This theory describes the dependency of humans on their surroundings. For children, this means that their growth and development are influenced by the different areas within their environmental system. The four systems established by Bronfenbrenner (1990) are microsystem, mesosystem, exosystem, and macrosystem (Bronfenbrenner, 1990). Each system is detrimental to stages of development. Figure 2 displays Bronfenbrenner's ecological systems model.

Figure 2

Bronfenbrenner's Ecological Systems Model



Note. Diagram based on Bronfenbrenner's (1990) Ecological Systems.

The stressors on each of the ecological systems determine how human

development is influenced through the varying environments (Bronfenbrenner, 1990). The more nurturing the relationships are in each of these systems, the better a child will grow (Haleemunnissa et al., 2021). An ecological perspective demonstrates how differently students are impacted or influenced by their environments as compared to their peers (Bronfenbrenner, 1995). Due to the COVID-19 pandemic, educational systems are seeing students react to and be influenced by the stressors in their environment to varying degrees.

Noncognitive Skills and Success

The second theory in this framework is the research on noncognitive skills and success. Specifically, Duckworth's (2016) theory on grit, Dweck's (2008) works on growth mindset, Bandura's (1997) self-efficacy research, and the many studies on self-management. Grit in psychology is a positive, noncognitive trait, based on an individual's perseverance of effort combined with the passion for a long-term goal or end state (Duckworth et al., 2007). Essentially, it is more the ability to stay on track in the face of adversity while maintaining a consistently high level of interest in achieving one's goals. A growth mindset is based on believing that success is based on arduous work. Students who exhibit these behaviors are curious about learning new skills and work to improve their understanding and competence (Dweck, 2008). Bandura's work led me to discover the effect of academic self-efficacy on academic performance. A student's beliefs and attitudes toward their own capabilities determined much of the path to their academic achievement. If students believe in their abilities to fulfill academic tasks, they are more likely to be successful at learning new materials (Bandura, 1997). Self-management pertains to how a student manages their behaviors, thoughts, and emotions. If this is done

consciously, students are proven to be more productive in the face of adversity (Klassen et al., 2008). Students with strong self-management skills know what to do and how to act as situations change.

Connections in the noncognitive theories show that individuals with elevated levels of grit are more self-controlled and less likely to be set back by failures, adversity, and lulls in progress (Duckworth, 2016; Duckworth et al., 2007). Subsequent research has shown positive relationships between grit, mental well-being, and emotional stability during stressful or negative life events (Duckworth et al., 2011). It has also been found that grit scores are positively related to self-efficacy and self-regulation scores in math and reading (Duckworth et al., 2011). This same research team found positive correlations between grit scores and students' perceptions of their relative ability, effort, and enjoyment in the two core subjects (Duckworth et al., 2011). Grit, growth mindset, self-efficacy, and self-management are yet to be studied in the context of the environmental stressors caused by the COVID-19 pandemic. I sought to determine if these two motivational theories about the influence within a student's ecosystem and their level of noncognitive skills are influential in how much or how little they achieve during the COVID-19 pandemic.

Statement of the Problem

The ways different people utilize their cognitive and motivational resources have always been a strong interest of researchers (Bashant, 2014). What motivates each student is not only difficult to determine but hard to measure. The relationship between personality and motivational factors varies greatly (Tough, 2014). Administrators, teachers, and parents alike often ponder what the secrets are to helping each student

achieve their full potential in the face of adversity.

According to Duckworth (2016), students may possess the wrong beliefs and have misunderstandings about their personal skill development. These beliefs, or lack of them, could be what is standing in the way of their academic success. For example, research suggests that students who are working to meet the threshold of making an A in a class will study just enough to accomplish that level of proficiency. On the other hand, working beyond a certain cut point by trying to learn as much as possible and doing as much as they can leads to no limit in what they could accomplish (Bashant, 2014). It is safe to assume that the students who work to "perform good enough" work less hard than their peers who are eager to find relevance in content. The presence of or lack of a positive mindset, work ethic, and drive impacts overall success (Bashant, 2014).

Cognitive abilities alone do not fully predict a student's academic performance (Micceri, 2010; Nichols & Clinedinst, 2013). A movement towards cultivating noncognitive traits at a young age could make a huge impact on the path students take in the educational system (Martarelli et al., 2020). This noncognitive trait in education is gaining momentum in school districts, and it is referred to as SEL. Years prior to the pandemic, educators had not been trained to incorporate noncognitive development into content nor had the state established it as a positive supplemental curriculum. Due to the pandemic, schools anticipate that the number of students needing social-emotional support will increase. Early and consistent education on noncognitive skills could potentially remove barriers and lead students to more success (Farrington et al., 2012).

SEL must become a priority and must lead to a well-communicated plan to help bridge the gaps in trauma and learning loss (Weisbrot & Ryst, 2020). Despite the

advancements in studies around noncognitive traits, including SEL, there are limits to the existing research on whether a student's level of grit, growth mindset, self-efficacy, and self-management has a direct relationship with achievement outcomes in the face of harsh environmental stressors, such as the COVD-19 pandemic.

Purpose of the Study

The COVID-19 pandemic has created one of the largest disruptions in educational history. The crisis has exacerbated disparities in education for those who are most vulnerable; those living in low socioeconomic communities and students with disabilities (United Nations, 2020). The learning loss and impact on social-emotional well-being from this pandemic threaten to extend beyond the 2021-2022 school year.

As a beacon of hope, the lingering pandemic crisis has been met with technological innovation and partnerships for SEL. Educators are delivering high-quality lessons by utilizing technology in the classroom via multiple platforms, and SEL lesson infusion has become a core practice in all content areas. This systematic approach to teaching is the new model and is widely expected from school district leaders in the 2021-2022 school year.

Previous research demonstrates relationships between grit, growth mindset, self-efficacy, and academic achievement (Duckworth, 2016). Duckworth et al. (2007) provided studies on how a collection of noncognitive factors can predict overall success; however, little research has been found to add incremental validity to the relationship between grit, growth mindset, self-efficacy, self-management, and academic achievement during a global pandemic. The purpose of this study was to determine if the noncognitive traits in this cohort of students would show correlations to achievement. Also, by

examining repeated measures of the same cohort of students prior to and through the COVID-19 global pandemic, I wanted to determine if there were significant changes over time. The variables used to determine the relationship between noncognitive traits were grit, growth mindset, self-efficacy, and self-management. I wanted to know if these variables influenced variance in achievement despite the harsh environmental factors of the COVID-19 pandemic.

Significance of the Study

As school districts analyze data to capture the full size of learning loss experienced by students during COVID-19, the harsh reality is that loss varies by subgroup, socioeconomic status, and various other factors. McKinsey & Company (2022) estimated that students began the 2020-2021 school year about 3 months behind in math and 2 months in reading. If the pandemic persists, the total learning loss will be around 7-12 months for students in math and reading (McKinsey & Company, 2022). In addition to the impact academically, COVID-19 has increased students' need for social and emotional support. The National Association of School Psychologists anticipates that the percentage of children exhibiting social-emotional or behavioral concerns has doubled or tripled because of COVID-19 (McKinsey & Company, 2022). The impact of COVID-19 will extend over multiple years, leading to more resources needed academically and social-emotionally for students (Zhou, 2021). The significance of this study is to enhance the lens on student achievement and the influence of noncognitive curriculum.

Definition of Terms

The following definition of terms will assist the reader in operationalizing key terms for the research study.

Mindset

The way someone feels about their personal ability to do or achieve something (Dweck, 2008). Dweck (2008) believed in two mindsets, fixed and growth. Someone with a fixed mindset believes that they are born with their ability and that no matter how much they work cognitively, intelligence cannot be increased. In contrast, a growth mindset is when the individual believes their intelligence and abilities can be enhanced by cognitive challenges (Dweck, 2008).

Grit

The ability to stay on course with one's goals, despite setbacks (Duckworth, 2016).

Growth Mindset

The belief that intelligence and ability can be enhanced by cognitive challenges (Dweck, 2008).

Self-Efficacy

The positive belief that one has in their inner self when they approach a situation or task (Bandura, 1997).

Self-Management

The ability to manage one's thoughts, emotions, and behaviors in various situations (Panorama Education, 2022).

Research Questions

As an educational leader in the public school system, I have a strong curiosity to investigate levels of student achievement as correlates of grit, growth mindset, self-efficacy, and self-management through the COVID-19 pandemic. The lack of research

regarding the relationship between noncognitive construct and academic achievement in elementary-age students during a pandemic led to the development of the research questions in this study.

1. What are the relationships between grit scale scores; growth mindset; self-efficacy; self-management; and universal achievement measures, specifically i-Ready math and i-Ready ELA, during COVID-19?
2. How do self-efficacy, self-management, i-Ready math, and i-Ready ELA change over time due to COVID-19?

Summary

According to Duckworth (et al., 2007), people are capable of success if they can persevere through challenges and remain passionate about the pursuit of their success (Duckworth & Gross, 2014). Students possess a range of cognitive and noncognitive traits that could be influential predictors of their achievement. I sought to discover if grit, growth mindset, self-efficacy, and self-management are the unique variances in academic achievement measures during the COVID-19 pandemic. This research is unique as it examines elementary-age students in third through fifth grades.

Chapter 2: Literature Review

Overview and Framework

One's intelligence quotient (IQ) and talent have always been popular indications of how much you achieve in life; however, researchers have become increasingly focused on SEL and noncognitive domains as they relate to success. This concept is not a new topic of scholarly interest; it has just become more prevalent in educational literature since the onset of the COVID-19 pandemic. Research on high achievers has revealed that they all possess common threads of noncognitive traits, such as emotional stability, emotional intelligence, growth mindset, gratitude, creativity, self-confidence, and creativity (Duckworth et al., 2007; Dweck, 2008). The noncognitive traits in high achievers have been found to positively impact academic outcomes, social relationships, and even psychological and physical well-being (Duckworth & Gross, 2014; Duckworth & Yeager, 2015).

The framework for this study included Bronfenbrenner's (1995) ecological systems theory and research on how noncognitive traits influence achievement. Bronfenbrenner (1995) provided one of the most accepted theories regarding the influence of social environments on human development. Simply stated, the environment that you experience as a child will affect every facet of your life. The focus of the second portion of this literature review examines noncognitive variables associated with achievement outcomes.

Influence of Ecological Systems

In the early 1960s, Bronfenbrenner co-founded a program called Head Start that provided comprehensive education on health and parental involvement services to low-

income children and their families in the United States (Bronfenbrenner, 1990). His work in this program influenced the development of the ecological systems theory of social development, recognizing the complex layers of the environment that interplay with a child's own biological development (Bronfenbrenner, 1990). The relationships between environmental influences are the basis of Bronfenbrenner's (1990) ecological systems theory. "A student's biology, immediate family, community environment, and societal interactions fuel and steer their development" (Bronfenbrenner, 1990, p. 99). Changes or conflict in any area of one layer causes ripples through the other layers.

The amount of time students spend in school should be considered when it comes to the environmental influence of relationships. Students spend 7 hours a day, 5 days a week in school, not counting if they participate in extracurricular activities. At the very least, students are in school for 35 hours a week. A traditional school calendar is 185 days or approximately 26 weeks. Twenty-six weeks multiplied by 35 hours a week calculates approximately 910 hours of environmental influence from a school setting in just 1 calendar school year. This is a significant amount of time spent in school, and the relationships fostered during that time are very influential.

When children begin school, they begin to trust and develop relationships with adults outside of their immediate family. Some students come to school with strong external relationships from their social experiences (i.e., church, community groups, preschool, camps, etc.), while other students have had extraordinarily little exposure to trusting adult interactions. These connections are important because they help students to develop cognitively and emotionally (Bronfenbrenner, 1990). Bronfenbrenner (1990) discussed the importance of such a support system. He outlined five propositions that

highlight the potential impact of environment on a child's evolving state of being (Bronfenbrenner, 1990).

1. Proposition 1: A child must engage in a mutual, long-lasting relationship built on trust with at least one adult who has the best interest of the child in mind. It is best if the relationship provides unconditional love and support (Bronfenbrenner, 1990).
2. Proposition 2: This deep relationship will positively influence the child's ability to find success in a variety of relationships, ranging from family to those in their community (Bronfenbrenner, 1990).
3. Proposition 3: The child's relationships with secondary adults and the social skills they learn with those adults will directly impact their relationships with the primary adults in their life in a positive way (Bronfenbrenner, 1990).
4. Proposition 4: Developing mutual and open relationships between the child and the primary adult in their life is necessary for growth. These healthy relationships will impact children at home and school, while parents will be impacted at work and in the community (Bronfenbrenner, 1990).
5. Proposition 5: On a broader level, society should cultivate spaces and resources in a public way for these relationships to thrive and be successful, which extends through family, community, and beyond (Bronfenbrenner, 1990).

Bronfenbrenner's (1990) propositions led to understanding how instability in a student's environmental relationships (microsystem and mesosystem) can be detrimental and affect their ability to be successful in school. He suggested that some students do not

have the constant, healthy interaction with adults that is necessary for proper development (Bronfenbrenner, 1990). This research has direct implications for the relationship students foster at their school site. Bronfenbrenner (1990) shared that it is important for student success that schools and teachers create an environment that welcomes and nurtures students and their families; therefore, a school's climate must provide support for stable, long-term relationships between students, parents, mentors, counselors, administrators, coaches, teachers, and community stakeholders. The goal is to create a positive learning environment for all students regardless of their evidence of support.

The ecological system of support also embodies aspects of school campus ecology. It is important that students feel a sense of belonging on their school campus. Part of this is created through the power to choose their involvement in aspects of the school, such as the academic and social life of the school (Zhou, 2021). Research suggests that the feelings associated with the school environment can be internalized by students and if negative, they can interrupt positive cognitive behaviors such as engagement, optimism, and information recall or transmission (Birch & Videto, 2015; Zhou, 2021). Students who feel they have no connection to their school environment have lower levels of engagement, less desire to learn, and lower overall achievement (Zhou, 2021). Further research has proven that academic success is related to meaningful relationships with friends, teachers, and school-related activities (Rumberger & Lim, 2009). Bronfenbrenner's (1990) demonstrated how important each ecological layer is to one another. Changes or conflicts in any one layer will ripple through the other layers. The change can be a positive or negative ripple, and it directly impacts student

engagement, desire to learn, and overall achievement.

History of Noncognitive Trait Research

Galton (1998) studied the lives of extraordinarily successful people. Galton recorded his findings in the book *Hereditary Genius* where he discussed his belief in the genetic inheritance of intelligence. His studies led to discussions about people whom he labeled as outliers. Galton stated that "outliers are remarkable in three ways: they demonstrate unusual ability in combination with exceptional zeal and the capacity for hard labor" (Galton, 1998, p. 43). Outliers were individuals who found extraordinary success in life. Outliers were, in fact, very intelligent, but Galton also concluded that the ability to regulate one's behavior is critical to success (Simonton, 1999).

Philosopher and psychologist William James led research on how people take different paths in their pursuit of goals. James (2015) stated that the human individual lives usually far within their limits; they possess powers of various sorts that they habitually fail to use. He further expressed his belief that people energize below their maximum and behave below their optimum (James, 2015). James declared that there was a gap between potential and actualization. He was the First to introduce the phenomenon of the "second wind," the euphoria that gives new strength and confidence to push beyond self-imposed limits. When James published *Energies of Men,* it was pivotal in leading others to think outside of critical intelligence and natural talent.

In 1947, Terman and Oden's longitudinal study of the mentally gifted showed that noncognitive qualities such as perseverance, self-confidence, and integration toward goals were found in men who grew up to gain accomplished careers. Terman and Oden's inquiry revealed why intelligence does not always translate into achievement. This

concept opposed previous research that intelligence is the best-documented predictor of achievement (Darwin, 1958). Measures of IQ have made it possible to document a wide range of achievement outcomes. The most studied and collected measures of students affected by high IQ are grade point average (GPA), Scholastic Assessment Test (SAT) scores, ACT scores, and college acceptance. Charles Darwin (1958), who had gained prestige in various areas of research during this time strongly disagreed with this school of thought about intelligence. Darwin's opinion on the determinant of achievement was that zeal and hard work are ultimately more important than intellectual ability (Duckworth, 2016). In Darwin's autobiography, he praised his power to observe things with his understanding of the laws of nature. He stated, "I think I am superior to the common run of men in noticing things which easily escape the attention, and in observing them carefully" (Darwin, 1958, p. 22). Darwin was making the point that his excitement for a subject and ability to think on a topic long after others would have lost interest led to some of his best work.

Stibic (1983) believed that skills such as self-regulation led to more positive outcomes for students. The theory weighs heavily on students being able to control impulses, stay focused for extended periods, avoid distractions, manage emotions, and organize their thoughts (Stibic, 1983). The *Tools of the Mind* concepts reveal that children should be naturally taught how to follow rules and regulate impulses at a young age (Stibic, 1983). Stibis's logic was that these abilities will follow them throughout life and make a big difference in their ability to achieve positive outcomes.

Ericsson (2017 shared that he believed there was a 10,000-hour rule of exceptionality. Mathematically, the equation represents 20 hours a week for 50 weeks a

year for 10 years equals 10,000 hours. This rule established that it was only the elite performers who practiced the most who found high levels of success (Ericsson, 2017). The hours combined with deliberate practice during those hours are what made the difference. Ericsson further explained how deliberate practice was different than just practicing. He stated that when most people practice, they repeat things they already know how to do or perform. Deliberate practice is different in that it requires considerable, specific, and sustained effort to do something you cannot do very well. Ericsson believed that 10,000 hours of deliberate practice is how you could become an expert in almost anything.

A renowned economist, James Heckman (2011) from the University of Chicago began asking questions about which skills and traits lead to success and how they develop throughout childhood. Heckman spent time studying what traits successful students retain in their journey through school. He found that it was not largely about cognitive ability but more about the psychological traits that led to success (Heckman, 2011). Heckman concluded that traits such as the ability to delay gratification and the tendency to follow through on a plan turned out to be valuable in college, the workplace, and in life (Heckman, 2011; Tough, 2014). In his research, Heckman advanced the argument that persistence is critical to educational and labor market success (Heckman, 2011; Tough, 2014).

In 2012, the Consortium for Chicago School of Research published a report arguing that grades were a better measure of academic performance than test scores, in large part because they encompassed noncognitive factors such as academic behaviors and persistence (Farrington et al., 2012). Of similar thought, Duckworth and Gross

(2014) introduced a simple equation to produce achievement that focused on noncognitive factors: Talent x Effort = Skill and Skill x Effort = Achievement (Duckworth, 2016). Through this research, Duckworth (2016) explained that talent alone does not lead to achievement and that the key component to achievement is the effort behind all practice. The last several decades of research confirm that success and achievement are about more than just intelligence. Common themes in literature continue to point to noncognitive domains that are correlates of achievement.

Goal Orientation

Edlund (1979) conducted an experiment with 79 children, all from low to middle-class homes. Edlund administered baseline IQ tests and then encouraged the children to improve their scores by using M&M candy as the incentive. Edlund found that candy motivated the groups to improve their baseline IQ scores by 12%. Several years later, this experiment was extended by two researchers from the University of South Florida. They gave an initial IQ test and divided the children into three groups according to the scores on their baseline IQ test (high, medium, low). At the start of the second IQ test, Edlund promised half of the students in each group an M&M for every correct answer. The results of the test showed that the high-IQ and medium-IQ students did not improve at all (Tough, 2014); however, "the low-IQ students who were given M&Ms for each correct answer raised their IQ scores to about 97 (from 79 average) and almost erased the gap with the medium-IQ group" (Tough, 2014, p. 65). Offering a reward of M&Ms to students had no impact on IQ scores. The motivation to do better on the test and knowing that the number of M&Ms depended on the correct number of answers motivated the students to work harder (Tough, 2014). Educators are tasked with helping students

discover and demonstrate their potential daily. This research raises questions about conventional IQ tests and extrinsic motivators but even more about goal orientation and student achievement.

The reasons why a person chooses to engage in academic and learning tasks and their beliefs about their abilities to do that task are known as achievement goal orientation (Covington, 2000). This means that students' motivation and achievement-related behaviors can be understood by considering "the reasons or purposes they adopt while engaged in academic work" (Covington, 2000, p. 174). Covington discussed that this theory is important in education because it allows teachers to support and reinforce student goals, which can influence or change the reasons why students learn. Once students discover the "why" in their educational experience, it can positively influence their motivation.

In early research, goal orientations were identified based on personal competence, termed task, and ego goals (Nichols & Clinedinst, 2013). A few years later, Dweck (2008) and Leggett (1988) expanded the work to the terms mastery (achievement) and performance goals. They found that students who show an adaptive reaction in the face of failure and use the failure as an opportunity to better themselves had high achievement goal orientation (Dweck 2008; Leggett, 1988). Students who exhibit these behaviors are curious about learning new skills to improve their understanding and competence (Dweck, 2008; Leggett, 1988). Students with achievement goal orientations will adopt learning goals, attempt to gain knowledge, give preference to more difficult tasks, and show resilience when they fail (Akin & Arslan, 2014).

Motivation and Volition

Duckworth (2016) provided research evidence that allows us to divide the mechanics of achievement into two separate dimensions: motivation and volition. Duckworth stated that motivation and volition are necessary to achieve long-term goals. Goals cannot be achieved with just one or the other. Duckworth's simple example is that each year thousands of people make a New Year's resolution to lose weight. They are all initiative-taking to get new gym memberships, fill the kitchen with healthy foods, and dig out their favorite workout clothes. The reason people fail, even though they are motivated, is the lack of volition, willpower, and self-control to keep up this new, healthy lifestyle (Duckworth, 2016; Tough, 2014). Most motivational theories "are concerned with the energization and direction of behavior" (Pintrich, 2003, p. 669). This example leads to the understanding that goals are accomplished when a person is first motivated and then disciplined enough to follow through over some time.

Self-Efficacy

Bandura (1997) defined self-efficacy as "an individual's belief in his or her capacity to execute behaviors necessary to produce specific performance attainments" (p. 6). Having self-efficacy means one has confidence in their ability to manage their social environment, behavior, and motivation (Bandura, 1997). Self-efficacy works like a feedback loop, as it is a personal judgment of accomplishments in a perceived task. This feedback loop suggests that robust performance in an area leads to higher self-efficacy, which leads to even stronger performance. Feeling confident about multiple positive performances helps develop passion in that area of interest.

Bandura (1997) discussed how self-efficacy guides behaviors both directly and

indirectly. He believed that self-efficacy had the most influence on effort and persistence than any other noncognitive trait **(**Bandura, 1997). Past successes inform students and build their self-efficacy, which leads to a more perseverant effort. This effort or higher perceived grit (Duckworth, 2016) will result in success that then informs and supports one's self-efficacy and grittiness. "In undertakings strewn with daunting obstacles, such as academic performance, students need both the staying power of their dispositions and efficacy beliefs in their capabilities to succeed" (Stajkovic et al., 2018, p. 238). This perseverance of effort will lead students to higher achievement in all performance tasks (Farrington et al., 2012). Some of the findings about self-efficacy suggest that grit may be a trait-like characteristic combined with a self-efficacious state-like characteristic jointly explaining how students perform well in challenging academic contexts (Farrington et al., 2012).

Research indicates that students will find time to practice when they are passionate about a topic (Duckworth, 2016. Kaufman and Duckworth (2015) confirmed that passion stems from feelings of self-efficacy. This means that passion does not suddenly strike a student and they are immediately interested. Passion involves interest, ability, time, resources, and commitment (Kaufman & Duckworth, 2015). "It is impossible to figure out where passion starts and ends because all the components operate simultaneously" (p. 31). Kaufman and Duckworth found that passion is tied to productivity. It is believed that educators can cultivate the passion for learning in students by helping them build a capacity to persevere through challenges and maintain focus (Kaufman & Duckworth, 2015).

Romer et al. (2010) conducted a study to investigate the psychometric properties

of grit as a correlate of self-efficacy and self-regulation. Middle school students completed surveys related to math and reading in addition to the grit scale (Duckworth, 2016) and self-efficacy scale adapted from Bandura (1997). The results showed that grit scores were positively related to self-efficacy and self-regulation scores in both reading and math (Romer et al., 2010). Romer et al. also found positive correlations between grit scores and students' perceptions of their relative ability, effort, and enjoyment in the two core subjects. Bandura named this belief in one's abilities as perceived self-efficacy.

Self-Management

In the later part of the 1980s, researchers focused on enhancing the independent work habits of mildly handicapped students (Hughes et al., 1988). Self-management was the noncognitive trait focus of the studies (Hughes et al., 1988). Teaching students to regulate their own behaviors was taught through self-recording, self-evaluation, and self-reinforcement (Hughes et al., 1988). When practicing self-recording, students counted and made formal notes about their own behaviors (Hughes et al., 1988). Self-evaluation allowed students to make a judgment of their own work based on a criterion, while self-reinforcement provided a means for rewarding oneself for meeting goals (Hughes et al., 1988). It was thought that a combination of all three techniques was the best practice for students with mild handicaps. Research revealed that the combination method did not prove to be effective (Hughes et al., 1988). Instead, a direct instruction procedure providing rationale, then modeling the strategy, and providing practice feedback was adopted (Hughes et al., 1988).

For students to learn, they will need to have a combination of the skills to self-regulate and self-manage. All these components are necessary for metacognition (Mezo,

2008) as students proactively think, perform, and self-). In 2008, Mezo developed the self-control and self-management scale. The self-control and self-management scale is scored through a 6-point Likert scale with 16 items that can total between 0 to 80 points (Mezo, 2008). The self-control and self-management scale consists of three subscales.

1. *Self-Monitoring (SM)*- The individual monitors some behavior targeted for change or maintenance and draws attention to informative stimuli.
2. *Self-Evaluating (SE)*- The individual compares the target behavior and internalized standard. The individual passes judgment on whether the monitored stimuli progress towards valuable targets or not.
3. *Self-Reinforcing (SR)*- The individual engages in self-rewarding or self-punishment. This can be open or private behavior (Mezo, 2008).

The reliability and validity of the scale were proven by (Ercoskun, 2016). Self-management is defined as the ability to successfully regulate your own thoughts, emotions, and behaviors in various situations. Research has proven that when you practice self-management, you more effectively handle stress, control your impulses, and have better self-motivation (CASEL, 2022). Interchangeable terms for self-management are self-regulation and self-control (CASEL, 2022). Students who know how to self-manage in the school setting come to classes on time and prepared, pay attention and follow directions during class, and allow others to participate without interrupting them. The last part of this behavior pattern is that they can work independently with focus for longer periods of time (CASEL, 2022).

Research shows that teaching self-management can help students increase overall academic performance (Miller & Byrnes, 2001). PBL Works partnered with Edutopia to

create tools for students to self-manage (Miller & Byrnes, 2001). The idea was that students should be invited into the process of managing their learning in the classroom. One way to help students self-manage is to create team operating agreements or contracts to guide group work. The agreements or contracts are co-created with students as a tool to help them own their challenges in self-management (Miller & Byrnes, 2001). One group may set a goal to keep their hands and feet to themselves, while another group may set a goal for open expression and listening to one another. The agreements are tailored to each group of students as the group is responsible for assessing what is needed to meet the goals of the assigned task (Miller & Byrnes, 2001).

Another PBL tool was to create task lists and checklists with rubrics for individual student work and group work. A task list is a great way for students to organize their thinking, planning, and overall product (Miller & Byrnes, 2001). This process provides clear assignment of specific tasks to certain team members. The team members, team leaders, and teachers then sign off when a task is complete. Task lists are also great tools for conversation and equitable collaboration (Miller & Byrnes, 2001). The use of a checklist and rubric will help promote reflection, goal setting, and ownership of the work (Miller & Byrnes, 2001). They are best utilized when teachers allow ample time for students to assess themselves and their peers (Miller & Byrnes, 2001). This tool helps keep a constant forward momentum in the learning process.

Time management logs and flexible seating are another set of tools designed for self-management in the classroom. When students document how long they spend on a specific task, it provides a tangible document for them to reflect upon how they spend their time learning (Miller & Byrnes, 2001). Providing flexible seating and spaces to

learn will help students explore ways to focus on learning through movement (Miller& Byrnes, 2001). This tool helps promote ownership of how and where a student works on tasks and learns. The teacher will monitor and help students make the right choices in these flexible spaces, which is part of self-management, understanding choices have consequences. All the tools provided by PBL are best used with reflection and goal setting (Miller& Byrnes, 2001). Self-management is about learning to set goals, be motivated, and have initiative while practicing self-discipline to accomplish those goals (Miller & Byrnes, 2001). When students learn to self-manage, behaviors change from impulsive emotions and actions to a student who appropriately expresses feelings and controls their behaviors.

Self-Management as Self-Discipline

Many studies suggest that self-discipline is the most important character trait in achieving positive outcomes (Miller & Byrnes, 2001). Positive outcomes are things such as academic success, happiness, and overall competence (Miller & Byrnes, 2001). Duckworth et al. (2011) defined self-discipline as "the capacity to do what you want to do" (p. 45). Duckworth et al. (2011) added to that definition in later research as knowing how to manage your thoughts, emotions, and reactions in order to follow your plan of goal achievement. A disciplined student knows how to do things such as eliminate distractions, set their own personal deadlines for tasks, and set up a good study space area at home.

Wolfe and Johnson (1995) conducted a study of 32 personality traits. They found that self-discipline, a noncognitive trait, predicted what a student's college GPA would be better than analyzing their high school SAT score. Student self-discipline, correlated IQ

scores, SAT, and final GPA were each analyzed in this study. Students with higher IQ scores and high GPAs did not outperform their peers when it came to predicting more achievement than self-discipline (Duckworth & Seligman, 2005).

Duckworth and Seligman (2005) conducted further research in this area and found that self-discipline predicted which students would improve academic measures throughout a school year. Students with self-discipline outperformed their peers in attendance, grades, standardized test scores, and college acceptance (Duckworth & Seligman, 2005). Self-discipline has an astounding amount of influence over student achievement. Students have control over how they respond to obstacles they experience, and at that moment, they have the power they need to build grit (Sanguras, 2018). Duckworth (2016) discussed how grit is the ability to stay focused on a goal, regardless of distractions and setbacks. People who possess some level of self-discipline and grit are more likely to graduate from high school, keep their jobs, and stay married (Duckworth & Seligman, 2005).

Self-Management as Self-Regulation

A person who can self-regulate will set attainable goals and take action to achieve those goals. They will also be aware of their limitations and know how to utilize their resources to attain their goals (Miller & Byrnes, 2001). Self-regulation presents as an ability to function as an autonomous individual. Autonomy relies heavily on the ability to make good decisions for oneself. This requires the ability to adapt to their environment and keep strong control over psychological processes (Schunk & Zimmerman, 1994). Self-regulation represents deliberate goal setting, and self-discipline (Schunk & Zimmerman, 1994). Students who believe in their ability to self-regulate will exhibit

positive connections to their self-efficacy with academic achievement and task goal orientation (Usher et al., 2018).

Social cognitive theory supports the benefits of self-regulated learning. Students who can self-regulate will exhibit the ability to engage in academic tasks cognitively, behaviorally, and motivationally (Zimmerman, 2013). This theory provides a flexible approach to how students achieve; they are allowed to set their own goals and determine strategies to achieve those goals (Zimmerman, 2013). Students who have learned to self-regulate can identify when a strategy is not working and are able to adapt their approach (Usher et al., 2018).

Self-Management as Self-Reflection

Human beings can learn to self-reflect and self-regulate. In that self-reflection, those who think they are capable tend to preserve longer, put in more effort to reach their goals, and are engaged in monitoring their progress to ensure success (Bandura, 1997; Zimmerman, 2013)**.** This enables them to be creators of their environments, reducing the tendency to be a product of one's environment (Bandura, 1997). Bandura (1997) stated that "efficacy beliefs are the foundation of the human agency unless people believe they can produce desired results and forestall detrimental ones by their actions, they have little incentive to act or to persevere in the face of difficulties" (p. 10).

Educators work daily with students who doubt their abilities, and it is a common behavior response for them to give up easily in the face of a challenge. Students who struggle with self-regulation and self-reflection tend to set less ambitious goals for themselves (Zimmerman, 2013). Learning how to self-reflect is a conscious mental process. This process relies on thinking, reasoning, and examining one's emotions

(Bandura,1997; Zimmerman, 2013). When students lack the ability to properly self-regulate and self-reflect, it leaves them to rely heavily on their natural talent or IQ as one of the determinant factors of their success (Zimmerman, 2013).

Self-Management as Self-Control

Self-control is determined by how much someone can control their attention, emotions, and behaviors when faced with temptation (Duckworth & Gross, 2014). Grit and self-control have strong correlations according to Duckworth and Gross (2014), but they are not perfectly aligned. “Self-control entails aligning actions with any valued goal despite momentarily more-alluring alternatives; grit, in contrast, entails having and working assiduously toward a single challenging superordinate goal through thick and thin, on a timescale of years or even decades” (Duckworth & Gross, 2014, p. 319). People can have high levels of self-control and handle multiple types of temptation, but they are unable to consistently pursue a goal (Duckworth & Gross, 2014). This is the trait that separates self-control and grit; you must be able to align actions with intentions.

In 2013, Compton and Hoffmann and researched how self-control relates to happiness. They found that people with higher self-control are not only happier with their lives but happier at the moment they made the controlled choice (Sanguras, 2018). Sanguras (2018) believed that teachers can help students develop more self-control by rewarding students for desired behaviors. “The point is that you recognize and reinforce what you want to see in your students” (Sanguras, 2018, p. 5). Compton and Hoffmann reported that people with higher self-control tend to put themselves into fewer positions where they would have to make a difficult choice. A great example of this would be not purchasing unhealthy snacks at the grocery store, therefore you will not have the

immediate temptation to consume them at home.

During the COVID-19 global pandemic, Martarelli et al. (2020) conducted a study to examine self-control and boredom proneness in a group of homeschooled students. Their ages ranged from 6 to 21 years old. The students with higher levels of self-control perceived homeschooling as less difficult, which in turn increased their homeschooling adherence (Martarelli et al., 2020). In contrast, homeschoolers with higher levels of boredom proneness perceived homeschooling as more difficult, which reduced homeschooling adherence (Martarelli et al., 2020). The results of this study indicate that boredom proneness is a critical construct to consider when educational systems switched to homeschooling during the pandemic (Martarelli et al., 2020).

Talent

Bloom (1985) conducted research on immensely talented young people in six fields: concert pianists, sculptors, Olympic swimmers, world-class tennis players, research mathematicians, and research neurologists. Twenty of the most elite individuals participated in the study, each under the age of 40. They were interviewed along with their parents, coaches, teachers, and mentors. Bloom (1985) was looking for trait commonalities or similarities within each field. Interviews revealed that "the child who made it was not always the one who was considered the most talented" (Kragen, 2004, p. 77). Bloom discovered that the characteristics that distinguished high achievers in each field were the willingness to work and a desire to excel. The terms persistence, competitiveness, and eagerness were the most used terms to describe the elite participants (Kragen, 2004). Bloom's participants discussed those who impacted their success along the way, stating that certain teachers made them feel loved, admired, and respected.

Teachers who were dedicated to their field and student development were very influential (Bloom, 1985).

This analysis of elite individuals of various backgrounds led to Bloom's (1985) description of three stages of development. The first stage involves parents and teachers praising the child and providing external rewards for their pursuit and interest (Bloom, 1985). In the second stage, the interest becomes part of the child's identity (Bloom, 1985). The child may identify themselves by the thing that they pursue (i.e., baseball player, writer). In this stage, parents and teachers continue to support the excitement of the pursuit and find the child more opportunities to work on the craft. Parents show support by signing the child up for leagues and additional classes. In the last stage, the pupil begins to find a lasting meaning of their pursuit and work towards mastery (Bloom, 1985). "They love the competition and the demands placed upon them" (Sanguras, 2018, p. 30). This stage is when students begin to identify careers linked to the area they have grown to love. Teachers continue to share in the excitement and foster ideas on how the interest fits into the adult world while parents continue to fund outside support for their child.

Michaels et al. (2009) published *The War for Talent*, a book focused on the competitive process of finding and employing talented people. Michaels et al. suggested that successful companies are the ones that promote the most talented employees and cut the least talented. The book portrays talent as more of a mindset than a concept. This is known as the "talent mindset" approach to management (Duckworth, 2016).

Olszewski-Kubilius et al. (2015) uncovered a talent development process. They revealed that the four tenets of talent are ability, domain, opportunities, and psychosocial

skills (Olszewski-Kubilius et al., 2015). Ability is a natural talent that a person possesses, and the domain is what an individual chooses to focus on. This development process states that a student's opportunities vary by how much effort they choose to dedicate to a task (Olszewki-Kubilius et al., 2015). According to this research on talent development, high effort, self-efficacy, motivation, drive, grit, and other psychosocial skills combined with talent lead to achievement.

Duckworth (2016) defined talent as "the sum of a person's abilities- his or her intrinsic gifts, skills, knowledge, experience, intelligence, judgment, attitude, character, and drive" (p. 98). She identified components of grit that align with Bloom's (1985) theory on talent (Duckworth, 2016). Her research revealed stages of development in four areas: interest, practice, purpose, and hope (Sanguras, 2018). In the early stages, interest and practice are guided by a child's natural talent. The latter two stages, purpose and hope, are the stages where achievement and talent become separate. Duckworth (2016) suggested that by explaining achievement, or lack of by way of talent, we are being lazy. Duckworth (2016) believed that talent is shown in how quickly you can improve your skills when you invest time and training. Duckworth (2016) led researchers to understand that great successes or wins are those achievements that we work hard to obtain, not those we have the innate talent to gain.

> Without effort, your talent is nothing more than your unmet potential. Without effort, your skill is nothing more than what you could have done but didn't. With effort, talent becomes a skill, and, at the very same time, effort makes skill productive. (Duckworth, 2016, p. 51)

Talent plus what a student believes they can do will take them farther than what

they believe they cannot do (Duckworth, 2016). Duckworth (2016) continued that great things can be accomplished when a student's thinking is active in one direction and they employ everything as material, striving to observe their own life as well as others around them. The student never tires of combining the means available to them (Duckworth, 2016). This type of active thinking in one direction or mindset of a student is detrimental to how they perceive and navigate adversity (Duckworth, 2016).

Growth Mindset

Dweck (2008) argued that mindset, "one's beliefs about whether ability is fixed or mutable, is a stronger predictor of success than ability, and that mindset can be taught and learned" (p. 3). Dweck's work on mindset offers insight into student behaviors; there are some who intentionally choose to learn and those who are less motivated to learn. All students experience setbacks; it is how they respond to the setback that makes a difference. Many students who have experienced failure develop a sense of hopelessness toward their academics (Dweck, 2008). An intentional non-learning response will present like a student being unwilling to take on academic challenges while their classmates remain open to new concepts and learning. It has been proven through the work of Dweck that students do much better academically if they believe their intelligence is pliable. Dweck taught that mindset is a choice; individuals must choose between a fixed or growth mindset.

Dweck (2008) used the knowledge gained from 20 years of research to explain how to recognize, understand, and change your mindset. In this research, Dweck identified people in two ways. Those who have a fixed mindset believe that they are born with intelligence and other skills. The other group identified has a growth mindset and

believes that their intelligence can be improved (Dweck, 2008). Dweck demonstrated in her research that students who believe they can increase their intelligence improve their academic standing.

One staggering takeaway from the research is that constantly praising children for their intelligence and talent only sets them up for failure (Dweck, 2008). Dweck (2008) explained that praise can give them a boost and make them feel special, but the mindset it produces will not help them with how they handle setbacks. Dweck suggested that this type of learning environment teaches students that only success means you are smart; if you fail at things, then you must be dumb.

Dweck (2008) explained that what children get attention for being good at or not good at a young age can influence their life path. Some kids grow up believing they are going to be great athletes or world-renowned scientists, and this belief system is typically established by the environmental influences around the child. The power of positive or negative affirmations at a young age can guide a student's path. This influence can also trend in a negative direction, leaving some feeling hopeless (Sanguras, 2018). Achievement is all about the mindset toward the task at hand (Dweck, 2008).

The most powerful influence is known as a student's internal monologue; it voices their mindset (Dweck, 2008). Those moments when we are alone and in discussion with ourselves are the voice of our self-esteem, and we can control this voice (Dweck, 2008). Dweck (2008) believed that with the right kind of intervention, a student's mindset can be changed and shaped from a fixed mindset to a growth mindset.

Ricci (2017) collected growth mindset data from kindergarten through third-grade students, specifically asking them what they believe about their intelligence. It was found

that 100% of kindergarteners had a growth mindset, believing they could learn anything (Ricci, 2017). A drastic shift in mindset manifested over the first 4 years of school, showing that by fourth grade, 42% of students demonstrated a fixed mindset (Laursen, 2015). These data suggest that students stop believing intelligence is malleable as they progress in grade level. Table 1 displays the actual data from Ricci's research on the impact of mindset on school-age children.

Table 1

Changes in Fixed and Growth Mindset Across Grade Levels

Grade level	Fixed mindset	Growth mindset
K	N/A	100%
1	10%	90%
2	18%	82%
3	42%	58%

Laursen (2015) suggested interpretation of those data, that the traditional methods in education could be curbing a student's curiosity for learning in almost half of elementary-age students. If students could maintain a growth mindset, they will view their education, including experiences and practice, as an opportunity to learn and better themselves. A student with a growth mindset finds pleasure in practicing because they view it as an opportunity to improve (Laursen, 2015). Most importantly, a student with a growth mindset will own the control they have over their performance, thriving on challenges and seeking growth opportunities (Dweck, 2008). Educational practices need

transformation, producing students who can overcome setbacks, accept all challenges, and believe that they can succeed.

Persistence in the face of a challenge has been called grit (Duckworth et al., 2007). Students who have a growth mindset tend to be grittier, resulting in a sustained work ethic and reaching their goals (Bashant, 2014). Ultimately, educators want students to maintain a mindset and attitude that they can accomplish anything if they work hard enough and stay the course. When teachers teach students how to persist, a growth mindset can be developed, thus improving grit to overcome any type of challenge (Hochanadel & Finamore, 2015). The works of Duckworth (2016) and Dweck (2008) are closely intertwined and offer valuable insight into how students operate when they are challenged academically.

Grit Origins as Perseverance and Resilience

Perseverance was of interest to Walter Clark and the Lenox School in Massachusetts as early as 1935 (Sanguras, 2018). Clark (1935) and a team of administrators developed two methods to test student applicants' levels of perseverance (Sanguras, 2018). Students were asked to create words from a given set of letters and follow the same setup for numbers. Teachers then filled out ratings on the level of perseverance observed in student behaviors during class and extracurricular activities. The major limitation of the study was the fact that researchers could not control motivation; they just expected that students would be motivated (Sanguras, 2018). Motivation is important as it drives the level of sustained perseverance of an individual (Duckworth, 2016). Although Clark's (1935) tests for perseverance may have initially detected a certain level of "stick-to-itiveness" they likely did not reveal information

administrators found useful (Sanguras, 2018). Several scholars have pursued this same foundational research in other ways.

Catherine Cox (1926), a Stanford psychologist, conducted a study of the most intelligent people in the world. For a subset of 100 geniuses, Cox computed ratings on 67 character traits. She was able to conclude that motivation, determination, and persistence were critical to high achievement (Duckworth, 2016). Duckworth (2016) discovered that "high, but not the highest intelligence, combined with the greatest degree of persistence, will achieve greater eminence than the highest degree of intelligence with somewhat less persistence" (p. 78). This research suggests that one's internal drive, motivation, and persistence make the difference in levels of achievement over those who rely solely on natural intelligence.

A researcher from the University of Pennsylvania, Martin Seligman, created an evidence-based resilience program focused on increasing students' abilities to manage day-to-day problems (Seligman et al., 2009). Seligman's team wanted students to develop the ability to appraise situations without distorting them and think about the positive changes that are possible (Perkins-Gough, 2013). Seligman et al. (2009) provided evidence through multiple studies that skills that increase resilience, positive emotion, engagement, and meaning can be taught to students in school. Seligman et al. revealed the prevalence of depression in adolescents and the synergy between learning and positive emotions. This research leads educators to believe that happy students would choose to spend time and energy on their academic craft, showing resilience to setbacks. Resilience is a very similar trait to grit because "part of what it means to be gritty is to be resilient when challenges present themselves" (Bashant, 2014, p. 14). This form of

positive education involves teaching traditional skills for how to manage setbacks and find happiness in academic growth.

Grit as a Noncognitive Construct

At the University of Pennsylvania, Duckworth et al. (2007) conducted interviews with professionals in a variety of fields. They were specifically looking for the characteristics that lead individuals to be successful in their professions. Terms like tenacity, perseverance, and ambition defined the intrinsic qualities of the top performers (Duckworth et al., 2007). Duckworth et al. (2007) used the results of the research to propose a new term, grit. Duckworth (2016) explained grit in terms of being loyal to something that you care a great deal about accomplishing. Grit would encapsulate what all the professionals and their characteristics seemed to have in common: "a sustained commitment to ambitions" (Duckworth et al., 2007, p. 54).

Grit became a measurable trait when Duckworth et al. (2007) created and validated the Short Grit Scale (Grit-S). The desire to create a comprehensive tool to measure grit was due to research showing that this noncognitive trait seemed to be what drives individuals to work hard and stick to their long-term passions and goals (Duckworth et al., 2007). Duckworth et al. (2007) developed the noncognitive trait grit, in three valid steps. First, Duckworth et al. (2007) advanced research by creating a test to measure an individual's level of grit, termed the Grit Scale or Grit-S. Next, the team began comprehensive theoretical digging into the concept to determine how it differs from other personality traits. Finally, the team was able to test grit's predictive validity for specific samples (Duckworth et al., 2007).

Duckworth (2016) outlined how studying passion and perseverance became the

term grit. Duckworth began with a discussion of the beast barracks at West Point. Duckworth discussed how rigorous it is to get into the program and how difficult it is to be successful at completing the program. The admissions program only accepts students who they believe will thrive, meaning high cognitive ability and elite physical standards. Despite the stringent screening process, one in five students drop out and never complete the program (Duckworth, 2016). Duckworth gave over 1,000 West Point cadets the Grit Scale test, and she quickly noticed that the score did not correlate with the talent of the cadets. She began to see that the presence of talent was no guarantee that the individual possessed grit. As cadets dropped out, she observed a pattern in her theory of which traits lead to success. Grit became a reliable predictor of who made it through and who did not (Duckworth, 2016). This study suggested that a cadet's level of grit was more accurately a predictor of retention and attrition than one's talent (Duckworth, 2016).

An individual with grit approaches achievement like a marathon, and their advantage above all others is their stamina. Grit only exists when sustained perseverance is paired with passion (Duckworth, 2016; Sanguras, 2018). Research indicates that students will find time to practice when they are passionate about a topic (Duckworth, 2016). Educators can motivate students by helping them develop a passion for learning. Passion for learning is when a child's time is captivated with a consistent focus on certain interests (Sanguras, 2018). Coleman and Guo (2013) examined six middle school students who were able to maintain a passion for learning in one subject area for 12 months. The students found ways to study their passion in school, at home, and in the community. This consistent behavior to seek more about a topic reveals a true passion for learning, and it is an intricate component of grit (Sanguras, 2018).

Strayhorn (2013) conducted a study with a sample of Black male students who attended a predominantly White college. He wanted to test the importance of grit and determine if it could predict academic achievement. Students in the study took the grit scale along with other research-based predictive metrics. The results showed that Black males with higher grit earned higher grades in comparison to their peers with similar academic achievements. Strayhorn concluded that grit may be the most important noncognitive trait in raising Black male students' academic success. These results added to the validity of Duckworth's earlier studies about how grit predicts achievement in challenging environments better than talent alone (Duckworth & Quinn, 2009; Strayhorn, 2013).

Research continues to reveal the psychological assets of grit. People with high levels of grit tend to develop it in four fundamental phases over their lifespan: passion, practice, purpose, and persistence (Duckworth, 2016). Duckworth (2016) explained that developing interest and intrinsically enjoying what you do, or having great passion, is the first phase. This can be described as that feeling of excitement when you are in your element (Duckworth, 2016). Finding your interest is the result of trying a lot of different things. As you discover those things, you figure out where your natural talent and interest develop. Interest is not always the area where we find we are successful; it can be meaningful to you despite your level of skill (Duckworth, 2016). Sanguras (2018) reminded us that interest is at the heart of passion. This concept is very similar to the passion for learning study of Coleman and Guo (2013).

Duckworth (2016) continued to explain that once you develop passion, it should be followed by practice, practice with the attitude that you want to improve no matter

what it takes. People who are gritty never get comfortable with what they have accomplished (Sanguras, 2018). Educators who are passionate about their content area are more likely to pursue personal growth and actively engage students in developing ownership of their learning. The goal is for students to pursue the content after the class ends; this action would represent a contagious passion for the content (Duckworth, 2016). Passion leads a student to practice during school but more importantly outside of school. Duckworth (2016) described this type of practice as focused, challenge-exceeding skill practice that leads to mastery, also known as persistence. A persistent student may choose to focus on an area of study that they are struggling in academically to increase their grade and overall competence (i.e., commitment to tutoring a few days a week). Duckworth (2016) praised this behavior and applauded people for being comfortable with their weaknesses and understanding that they must attack those weaknesses to reach their goals.

Once rigorous practice is established, a conviction that your work matters and finding your purpose are important (Duckworth, 2016). This established purpose is what makes challenges bearable and is enough to sustain focus when you may want to give up (Sanguras, 2018). Strong feelings about the purpose of your work are essential to staying the course despite setbacks. This is a common theme among school-age students as they ask the teacher, “What is the purpose of this class, will I ever use this stuff?” This question is typically asked by students who are struggling to connect with the course content and relevance.

The last phase is simply hope and rising to the occasion type of persistence (Duckworth, 2016). “Passion for your work is a little bit of DISCOVERY, followed by a

lot of DEVELOPMENT, and then a lifetime of DEEPENING" (Duckworth, 2016, p. 103). To continue through the practice stage, despite setbacks, you must be driven by a deep hope that what you pursue matters (Duckworth, 2016). Duckworth (2016) suggested that hope accompanies a feeling of power. Hope is feeling like you are in control of your success and therefore, you push to achieve. Hope can be closely linked to one's growth mindset (Dweck, 2008). Grit research guides educators to understand that academic achievement is strongly linked to a passion for learning, practicing in multiple settings, defining purpose, and maintaining hope (Duckworth et al., 2011).

Grit differs from a need for achievement; individuals with a high need for achievement pursue goals that are neither too easy nor too hard. Individuals with high levels of grit deliberately set for themselves extremely long-term objectives and do not swerve from them, even in the absence of positive feedback (McClelland et al., 2007). This level of grittiness can be interpreted as an innate drive to accomplish one's goals (Duckworth, 2016). Some of the research findings on grit have led educators to believe that allowing students to fail and deliberately exposing them to self-regulation will help them foster the level of grit that is necessary to overcome obstacles (Duckworth et al., 2011).

Christopoulou et al. (2018) identified 29 studies between 2012 and 2018 that assessed grit in an educational context. The two facets of grit, passion and perseverance, displayed varying determinations in research findings and revealed that perseverance is a stronger positive predictor of academic performance (Christopoulou et al., 2018). Christopoulou et al. identified additional positive variables that can foster grit: hope, positive affect, and family relationships. Christopoulou et al. added valuable holistic

support for the field of education and achievement measures such as grit.

Environment and Grit

When Duckworth et al. (2007) was interviewed about environmental factors and grit, she explained it by describing her personal experiences.

> Caring about how to grow grit in our young people—no matter their socioeconomic background—doesn't preclude concern for things other than grit. For example, I've spent a lot of my life in urban classrooms, both as a teacher and as a researcher. I know how much expertise and care of the adult at the front of the room matter. And I know that a child who comes to school hungry, or scared, or without glasses to see the chalkboard, is not ready to learn. Grit alone is not going to save anyone. (Duckworth, 2016, p. 78)

Duckworth (2016) then explained that the importance of the environment is two-fold. Duckworth believed that if someone is committed to building a culture of grit, you must be committed to providing social-emotional support to students, especially those who are disadvantaged (Duckworth, 2016; Duckworth et al., 2007; Sanguras, 2018). Duckworth believed the environment that children grow up in profoundly influences all aspects of character development and their overall achievement in school.

Researchers have grown increasingly interested in noncognitive traits that are linked to achievement; interest has even spread to practitioners and lay public members who seek more information about attributes other than cognitive ability (Heckman, 2011). These so-called noncognitive qualities are diverse and collectively facilitate goal-directed effort (e.g., grit, self-control, growth mindset), healthy social relationships (e.g., gratitude, emotional intelligence, social belonging), and sound judgment and decision-making (e.g.,

curiosity, open-mindedness; Duckworth et al., 2011). Research has confirmed that such qualities powerfully predict academic, economic, social, psychological, and physical well-being (Heckman, 2011; Farrington et al., 2012). Grit is highly associated with consciousness and is linked to the substantial research and findings of the Big Five personality traits.

Big Five Personality Traits

Personality psychologists state that the most effective way to analyze the human personality is to consider it along five dimensions known as the Big Five (Komarraju et al., 2011). The Big Five model is a framework for studies on traits that predict success. The five factors are conscientiousness, agreeableness, extraversion, emotional stability, and openness to new experiences (Komarraju et al., 2011). Conscientiousness is the trait that has been cited as predictive of academic and job-related success (Judge et al., 1999). In an educational setting, students who exhibit a high level of self-control and high conscientiousness tend to be more organized and responsible (Judge et al., 1999).

Conscientiousness

Brent Roberts, formerly a professor at the University of Illinois, is known as the expert on conscientiousness. In the late 1990s, industrial and organizational psychology or I/O became a large part of human resource management. Management in large corporations was looking to hire the "most productive, reliable, and diligent workers" (Roberts et al., 2009, p. 116) they could find. The use of the Big Five personality tests over time showed that the workers who scored the highest in conscientiousness best predicted workplace success (Tough, 2014). According to Roberts et al.'s (2009) research, people with high conscientiousness performed better academically in high

school and college. Research also revealed that students with high conscientiousness share common characteristics such as working hard and being reliable, orderly, and respectful of social norms (Tough, 2014).

Grit has been closely related to the behaviors of self-control and conscientiousness. Someone who has high conscientiousness and high self-control is very likely to score high on the grit scale (Duckworth et al., 2007). Duckworth's (2016) study of longevity in West Point cadets' military training found that grit can predict the achievement of challenging goals even when other noncognitive characteristics are held constant. Grit is a more reliable predictor of making it through the first, tough summer of West Point military training than either self-control or conscientiousness (Duckworth, 2016). As all cadets entered the program with very similar traits that qualified them as the "best" for the West Point program, only those with higher grit made it through to the end and graduated (Duckworth, 2016).

In analyzing psychoeducational tests around these constructs, Duckworth's Grit-S is very similar to the constructs measured by the Big Five conscientiousness and the Brief Self-Control Scale (Duckworth et al., 2007; Duckworth & Quinn, 2009; Weston, 2014). In Table 2, a display of comparison items shows detailed similarities.

Table 2

Grit-S, Brief Self-Control Scale, and Conscientiousness Subscale of the Big Five Inventory Comparison

Grit S Eight questions	Brief Self-Control Scale (BSCS) 13 questions	Big Five Inventory Nine questions "I am someone who"	Thematic overlap
New ideas and projects sometimes distract me from previous ones.	I am good at resisting temptation.	Does a thorough job.	Distraction OR trouble concentrating OR difficulty maintaining focus.
Setbacks don't discourage me.	I have a hard time breaking a bad habit.	It can be somewhat careless.	Lazy vs. hard worker.
I have been obsessed with a certain idea or project for a short period but later lost interest.	I am lazy.	She/He is a reliable worker.	Perseverance OR finishing what has begun.
I am a hard worker.	I say inappropriate things.	Tends to be disorganized.	Pursuing long-term goals OR following through on plans vs. abandoning goals.
I often set a goal but later choose to pursue a different one.	I do certain things that are bad for me if they are fun.	Tends to be lazy.	
I have difficulty maintaining my focus on new projects that take more than a few months to complete.	I refuse things that are bad for me.	Perseveres until the task is finished.	
I finish whatever I begin.	I wish I had more self-discipline.	Does things efficiently.	
I am diligent.	People would say that I have an iron self-discipline.	Make plans and follow through with them.	
	Pleasure and fun sometimes keep me from getting my work done.	Is easily distracted.	
	I have trouble concentrating.		
	I can work effectively toward long-term goals.		

(continued)

Grit S Eight questions	Brief Self-Control Scale (BSCS) 13 questions	Big Five Inventory Nine questions "I am someone who"	Thematic overlap
	Sometimes I can't stop myself from doing something, even if I know it is wrong. I often act without thinking through all the alternatives.		

Four themes overlap with the psychoeducational tests (Grit-S, Brief Self-Control Scale, and the Big Five Inventory) displayed in Table 2. The first overlapping theme is how much one can maintain focus and avoid distractions (Weston, 2014). Second is the ageless debate over laziness versus being a hard worker. The ability to finish what you start and exhibit perseverance is the third overlap in this study. Last is the terminology that sums up a large portion of Duckworth's (2016) research on grit, the ability to pursue long-term goals and follow through on plans, not aborting them when it becomes difficult. Duckworth et al. (2007) proposed that grit is distinct from traditionally measured facets of Big Five conscientiousness because of its emphasis on stamina. Grit requires that a person sustain both effort and interest for a long period of time.

Support for Psychoeducational Studies in Educational Settings

As school districts work to increase achievement and expand the level of influence on student success during and after COVID-19, it is important to provide both cognitive and noncognitive support, or SEL, for students. Noncognitive traits are linked to personality traits, self-discipline, character, goal orientation, grit, growth mindset, and self-efficacy (Usher et al., 2018). Some research suggests that all these variables can be learned, practiced, and cultivated (Usher et al., 2018).

The work of David Levin in 1999, with his Knowledge is Power Program (KIPP)

in a South Bronx middle school provides data to support how important noncognitive cultivation is for students in adverse environments (Tough, 2014). The basis for the program was for students to focus on personal and academic growth. The program "combined long days of high-energy, high-intensity classroom instruction with an elaborate focus on attitude adjustment and behavior modifications" (Tough, 2014, p. 77). Educators at the South Bronx middle school made it a priority to provide individual feedback on cognitive and noncognitive (SEL) growth measures daily. Each student was assessed on self-control, gratitude, optimism, curiosity, grit, zest, and social intelligence (Tough, 2014). At the end of a semester, students received report cards displaying both academic and character scores. Levin's eighth-grade students had higher academic achievement scores than any other school in the Bronx and the school was ranked fifth highest in all of New York City (Tough, 2014). Levin believed that this program's focus on noncognitive character education (SEL) directly impacted the results of student achievement scores. The results from this one program that started in the Bronx led to the development of over 100 KIPP charter schools all over the country that followed this model of education (Tough, 2014). This research suggests that perhaps educators have had the wrong focus when it comes to skills and abilities in students, which means we have all been using the wrong strategies to nurture and teach those skills (Tough, 2014).

Summary

The focus of the literature review was to examine the history and theories in research associated with achievement. I provided an overview of specific noncognitive variables found in research associated with achievement outcomes. In the next phase of this study, a cohort of third- through fifth-grade students was tracked over time. The

connection between achievement and noncognitive traits was examined. I first sought to determine if achievement and noncognitive traits had a relationship in the cohort of students in the study. Next, I examined if the variables were affected or changed over time due to the environmental stress of the COVID-19 pandemic. Chapter 3 provides the methodology used to conduct the study.

Chapter 3: Methodology

This study used a quantitative approach to investigate the relationships between noncognitive indicators such as grit, growth mindset, self-efficacy, and self-management and student achievement during the COVID-19 pandemic. In the first phase of the study, I examined the relationships between grit, growth mindset, self-efficacy, and self-management and achievement measures (i-Ready math and i-Ready English language arts [ELA]), despite the harsh environmental factors of a global pandemic. Second, I conducted a repeated measures study to examine changes over time in self-efficacy, self-management, i-Ready math scores, and i-Ready ELA scores of a cohort of elementary-age students during the COVID-19 global pandemic. Based on existing literature, there is evidence that grit, growth mindset, and self-efficacy demonstrate positive associations with educational outcomes related to academic achievement in education (Duckworth et al., 2007). Questions remain about whether noncognitive indicators such as grit, growth mindset, self-efficacy, and self-management have a relationship with academic achievement amid a global pandemic.

Participants

A single-stage sampling procedure was used as I gained access to samples and data in the population (Creswell, 2014). The selection method was determined by student age, group/cohort, and 100% of the participants being in the third grade in the 2019-2020 school year. Multiple independent data sets of the same population were used in the study.

Participants were sampled from 44 elementary schools in the district**.** There were 8,895 third graders at the start of the research cohort. Participants were in the third grade

in the 2019-2020 school year. All students in the district who had Grit-S, growth mindset, self-efficacy, and self-management scores (Panorama) and universal screener scores (i-Ready) for math and ELA were included in this study. Students who transferred from other districts or may have been absent during the time of the Panorama survey were not included in the sample size.

Table 3

District Participant Demographic Data 2020-2021

Demographics	Number of students
Students in third grade	8,895
Female	4,438 (49.9%)
Male	4,457 (50.1%)
American Indian	88.95 (1%)
Asian	266.85 (3%)
Black	2,579 (29%)
Hispanic	2,312 (26%)
Multi-racial	356 (4%)
White	3,380 (38%)
English Language Learners	534 (6.7%)
Students With Disabilities	1,156 (13.2%)

Demographic data from the district illustrate that students in the study were 38% Caucasian, 29% African American, 3% Asian, 26% Hispanic, and 4% identified as multi-racial/other. Of the 8,895 students in the study, 6% were English language learners, and 13.2% were students with various disabilities.

Table 4

Cohort Grade and COVID-19 Pandemic Status

School year	Grade level	COVID-19 pandemic
2018-2019	2	Pre-Pandemic
2019-2020	3	COVID-19, onset in spring semester (March 2020).
2020-2021	4	Full COVID-19, remote and small cohort rotations for F2F.
2021-2022	5	Full COVID-19, F2F, and remote options available.

Table 4 displays the cohort of students by grade level and status of the COVID-19 pandemic. During the 2018-2019 school year, the cohort of students in this study was in the second grade. In 2019-2020, the onset of the COVID-19 pandemic caused students in the third grade to lose face-to-face instruction for the spring semester. Continuing into the 2020-2021 school year, fourth-grade students were given an opportunity to return to school in small cohorts or stay completely online for instruction. The final year of the study was 2021-2022, and most students in the fifth grade were able to fully return to school with COVID-19 protocols. The district still offered a virtual academy to students who did not return to physical school sites.

Research Setting

The setting of this research study was a large, diverse school district in an innovative community rich in art, history, and development in central North Carolina. In the 2021-2022 school year, the student population amassed 52,000 students. After months of construction, the heavily populated district opened the 2021-2022 school year with 78 schools. Of the 78 schools, the district maintains 44 elementary schools, 14 middle schools, 13 high schools, and seven specialty schools. Table 5 displays the demographics

of the school district.

Table 5

District Demographics

Demographic	Percentage of students in district
White	34.5%
African American	29.4%
Hispanic	28.4%
Multi-racial	4.7%
Asian	2.7%
American Indian and Native Hawaiian/Pacific Islander	<1%

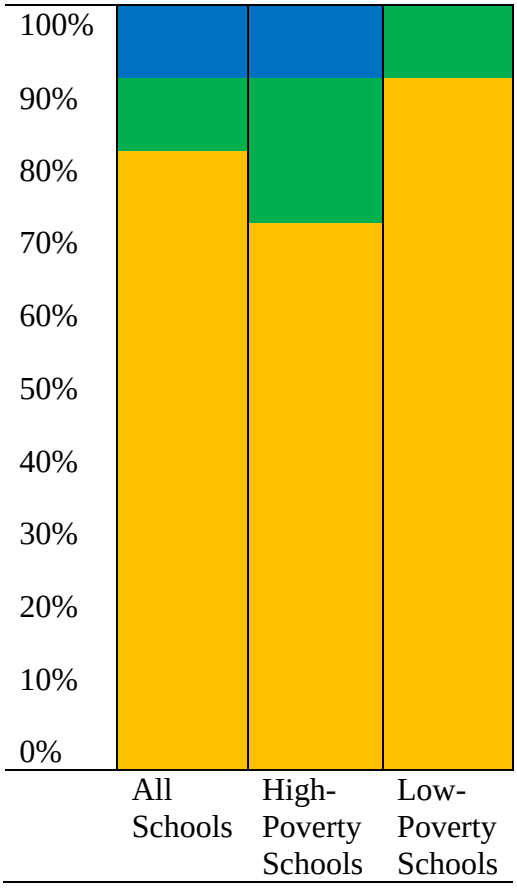
This large, diverse district is made up of 34.5% White, 29.4% African American, 28.4% Hispanic, 4.7% multiracial, 2.7% Asian, and less than 1% of students who are American Indian or Native Hawaiian/Pacific Islander.

The district's proposed budget for the 2021-2022 school year was $582.3 million. This includes capital projects and child nutrition services. The budget is provided from three resources: 62% from the state, 27% from the county, and the rest from federal or other sources.

The district manages over 7,400 employees, including more than 1,500 part-time and contract employees. Figure 3 shows the level of teacher qualifications in the district.

Figure 3

Teacher Qualifications in School District 2021



Note.

Experienced Teachers

Beginning Teachers

Provisional Teachers

In the 2021 school year, approximately 80% of the district's educators were experienced teachers. In high-poverty schools, 70% of the teachers were experienced, while the remaining 30% were beginning and provisional teachers. In low-poverty schools, 90% of the educators were experienced teachers.

Measures and Instruments

Grit

The first measure for this study is grit. Duckworth et al. (2007) introduced the construct of grit. Duckworth et al. (2007) defined grit as "trait level perseverance and passion for long-term goals and showed that grit predicted achievement in challenging domains over and beyond measures of talent" (p. 166). To measure grit, the team worked to continue defining and calibrating grit. The team validated two scales of measurement: a 12-item grit scale and the 8-item Grit-S (Duckworth et al., 2007; Duckworth & Quinn, 2009). The two scales were modified to produce valid scores for both adults and adolescents.

Duckworth (2016) stated that she and her colleagues developed the Grit scale from a scientific standpoint because you cannot study what you cannot measure. The questionnaire was to be used as a prompt for self-reflection and is primarily about evolving passion and perseverance. The statistical measures of validity for grit scale scoring range from 1 to 5. The maximum score on the scale is 5, and it represents someone who is extremely gritty. A 1 on the scale represents someone who is not at all gritty (Duckworth et al., 2007).

The Grit S was administered in the school district in this study once a year to students through Panorama surveys. The Panorama survey that contains questions about grit is known as Panorama's Social and Emotional Learning Survey. For students in third through fifth grade, the grit scale includes four questions that they answer on a Likert scale of answer options. The participants read each question and indicate their agreement with each item on a scale of 1-5.

1= Almost never, Not at all likely, Not at all focused, Not well at all

2= Once in a while, Slightly likely, Slightly focused, Slightly well

3= Sometimes, Somewhat likely, Somewhat focused, Somewhat well

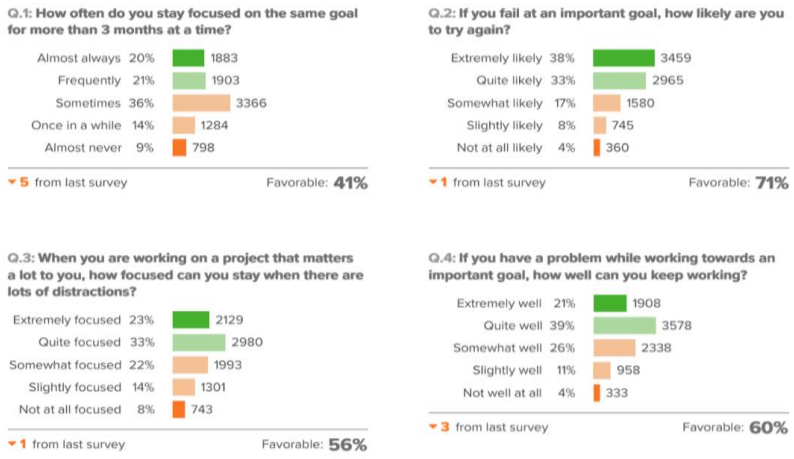
4= Frequently, Quite likely, Quite focused, Quite well

5= Almost always, Extremely likely, Extremely focused, Extremely well

The district in this study stopped surveying students under the SEL indicator, grit in the 2018-2019 school year. Each year, a team collaborates on what SEL indicators should be surveyed, hence the changes to survey data sets in this study. Figure 4 provides an example of the Panorama questionnaire for students in Grades 3-5 in the researched school district. Each question gives an overall percentage favorable for the cohort of students.

Figure 4

Examples of 2019 Panorama Questions on Grit, Grades 3-5



The Panorama survey about grit "seeks to determine how well students can persevere through setbacks to achieve important long-term goals (not limited to academics), considering their experiences and identities" (Panorama Education, 2022, p. 5). The results of the survey questions provide school leaders with data about the SEL at

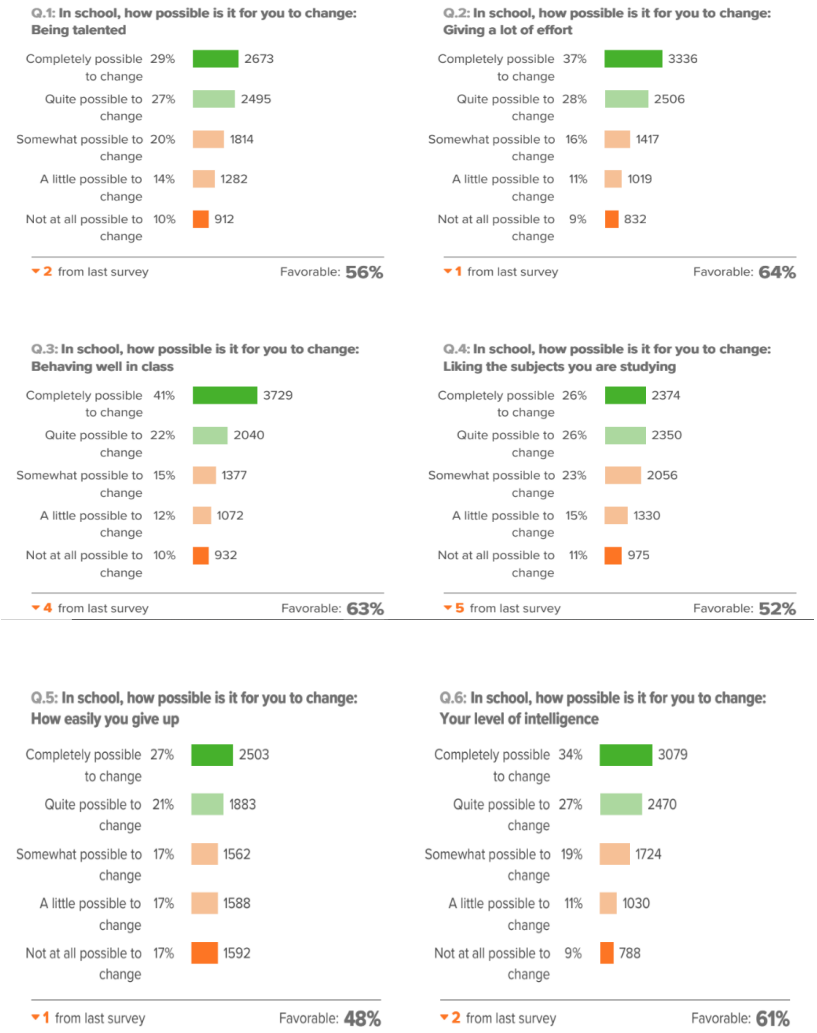
their school site and how to provide better support for individual students (Panorama Education, 2022).

Growth Mindset

The next measure in this study was growth mindset. Research by Stanford Professor Carol Dweck and many others has proven the impact of having a growth mindset on students' learning and academic achievement (McDermott, 2021). To measure mindset, the school district used the Panorama survey tool. Panorama Education collects data nationwide from survey measures of SEL, which includes growth mindset. Figure 5 displays the 2019 Panorama social-emotional survey for growth mindset for students in Grades 3-5.

Figure 5

Example of 2019 Panorama Questions on Growth Mindset, Grades 3-5



Note. Student perceptions of whether they have the potential to change those factors that are central to their performance in school.

Dweck's (2008) research led educators to understand that students with a growth mindset tend to set and work toward personal learning goals. They are also more likely to view challenges as learning opportunities and are more persistent when faced with difficulties or setbacks (Dweck, 2008). Students who not only work hard but love the

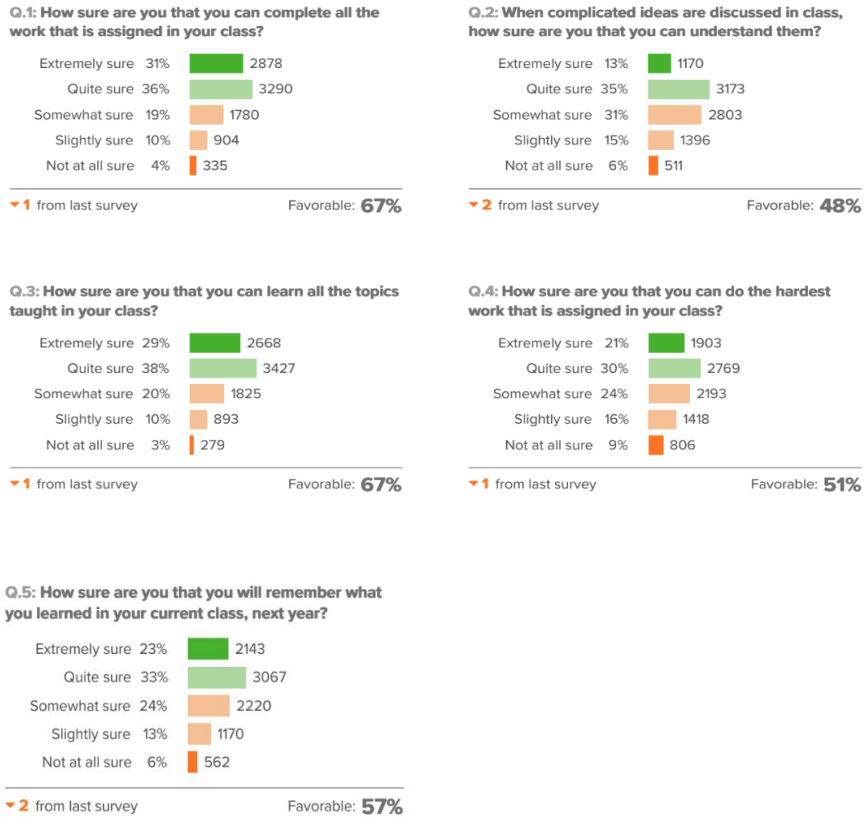
content or the process of learning are more likely to overcome barriers and perform better (Dweck, 2008). These are the reasons educators want to know about a student's mindset when it comes to measuring academic achievement.

Self-Efficacy

The next construct measured is self-efficacy. Panorama defines self-efficacy as the belief that you can achieve a goal or an outcome (Panorama Education, 2022). Research indicates that students who self-report higher levels of self-efficacy tend to do better in school. Self-efficacy is often referred to as one's self-confidence; therefore, it plays an important role in student performance (Panorama Education, 2022). To measure self-efficacy, items were administered in the Panorama survey at each school site. Figure 6 shows example items from the Panorama survey that students received.

Figure 6

Example of 2019 Panorama Questions on Self-Efficacy, Grades 3-5



Panorama's national data show that "students with gifted status respond 15% more favorably to questions in the self-efficacy scale than students without gifted status" (Panorama Education, 2022). These statistics outline why it is so important for educators to work to instill a sense of self-efficacy in all students.

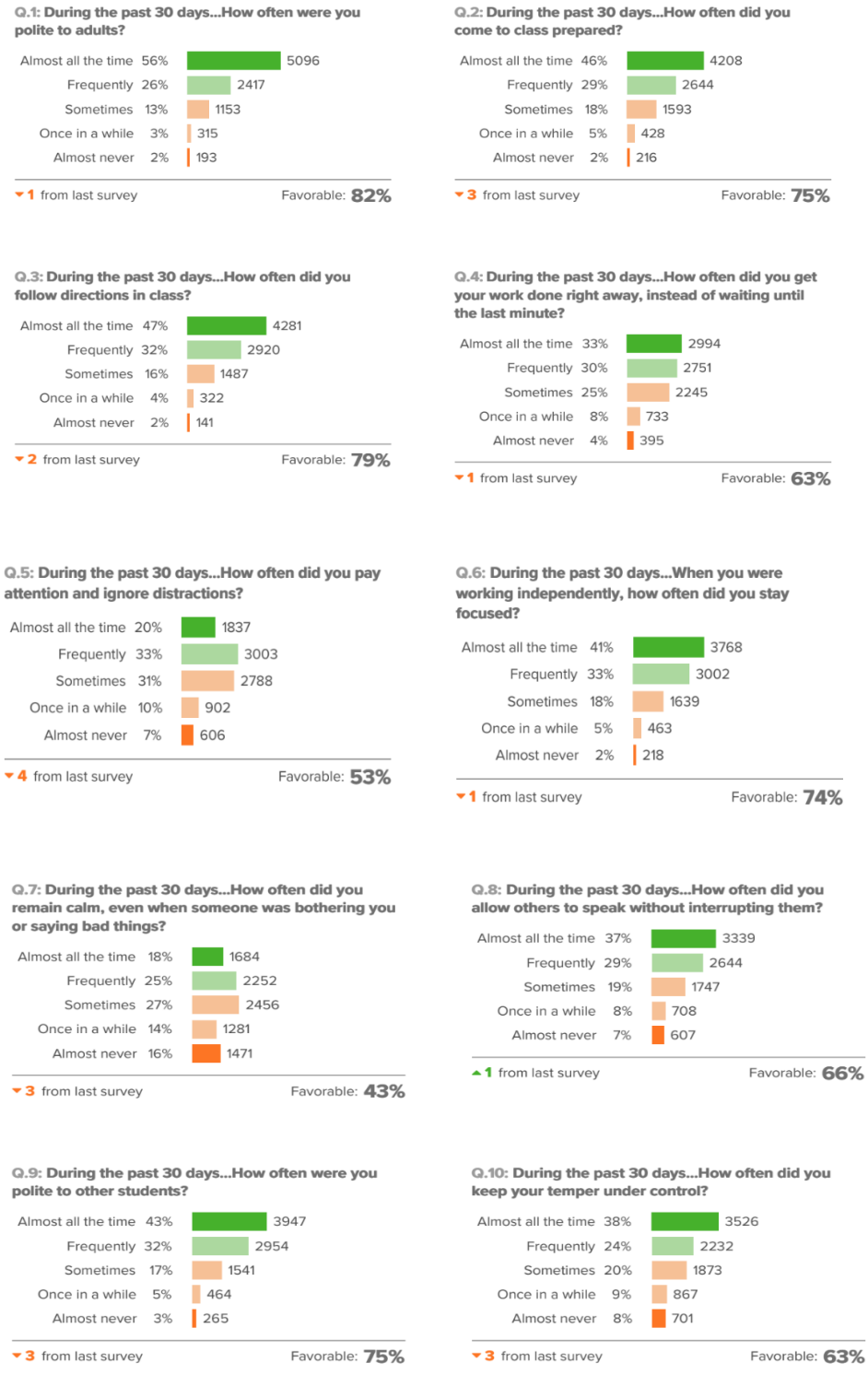
Self-Management

The last noncognitive measure in the study was self-management. Self-management is "the ability to manage one's emotions, thoughts, and behaviors effectively in different situations to achieve goals and aspirations" (CASEL, 2022, p. 15). Self-management includes the ability to manage stress, delay gratification, and feel

motivated to accomplish goals (CASEL, 2022). This measure was collected through the district-wide Panorama survey tool. Figure 7 provides the questions that students answered to measure self-management in Grades 3-5.

Figure 7

Example of 2019 Panorama Questions on Self-Management, Grades 3-5



Grit-S scores, growth mindset, self-efficacy, and self-management are collected from the district-wide Panorama data under the "Student SEL Skill & Competencies" category. It was important that students were aware that there are no right or wrong answers when taking the survey. These measures were collected twice during the school year. The data were input into SPSS (statistical software) to initially determine correlation and then if noncognitive factors, self-efficacy, and self-management changed over time in the cohort of elementary-age students amid the COVID-19 pandemic.

Panorama Survey Tool

The school district in this study is committed to the social and emotional well-being of staff, students, and families. To learn how to best support the entire school community, the district launched the online Panorama Social and Emotional Learning Survey. Panorama surveys are given to school district staff, third- through 12th-grade students, and all families in the school district. Panorama's Social-Emotional Learning Survey is designed for students to reflect on their self-growth, school environment, and experiences to inform educators to better support students' needs.

The SEL survey used nationwide was developed by Dr. Hunter Gehlback and Dr. Samuel Moulton, both researchers for Panorama. Many of the measures were validated and adapted in partnership with CORE Districts and research education at Harvard University. The Panorama Social-Emotional Learning Survey measures were checked by these teams to meet research standards of validity and reliability.

All educational leaders in school districts have been trained in how to use the Panorama survey platform. Central office SEL directors and principals have also been trained to analyze the survey responses from Panorama. These responses are shared with

school-site teacher leaders to help make data-based decisions within the school. School personnel have started receiving training on how to address the responses from families regarding school climate and safety. Panorama serves as a tool to help schools set goals and develop actionable and measurable steps to respond to the data from their families (Panorama Education, 2021).

i-Ready

The next measure in this study was student achievement, assessed in both math and ELA. I-Ready was the instrument used to collect the scores. Each school site in the district utilizes i-Ready as a universal screener. Students receive a scale score each time they take the i-Ready diagnostic assessments. The differences between the scale scores represent student growth on a continuum. These scale scores are a result from the diagnostic measure with all students on the same scale. This allows the teacher and parent to see which ELA and math skills the student has mastered, regardless of their grade level. In this study, the overall scale scores for i-Ready math and ELA were used. Overall scores are determined by an average of all scores taken during the school year.

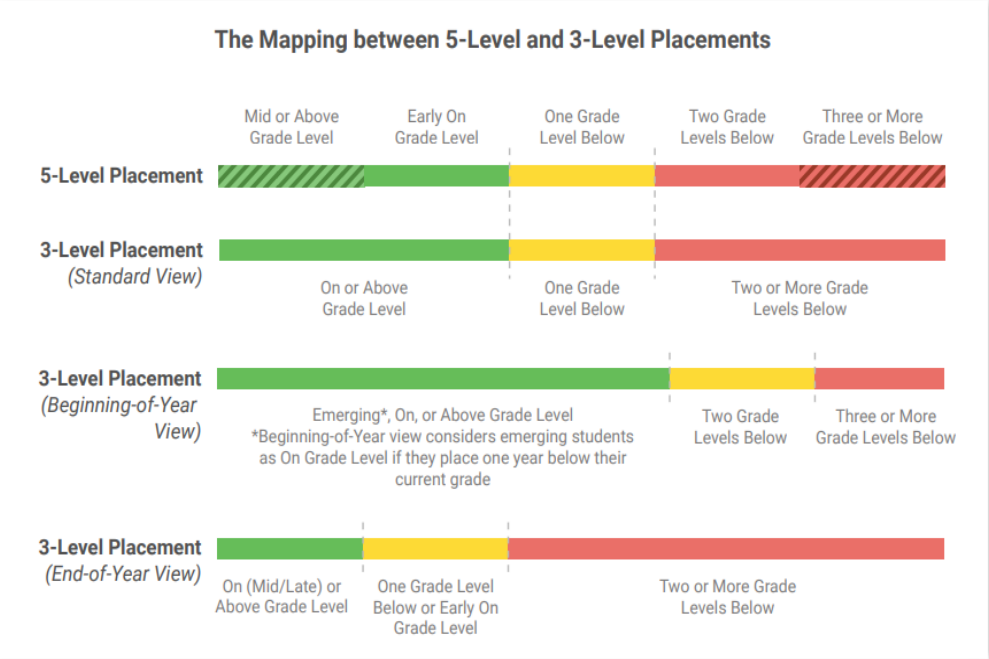
i-Ready Math and ELA Diagnostics

A student whose diagnostic norm is 90 scored better than 90% of students on a national level. Normative scores display how students performed compared to other students. I-Ready diagnostic provides normative scores together with grade-level placements for reading and math domains. These placements show what students can do against grade-level standards. These data provide a more complete picture of student performance. Student placements were developed to provide more insight into student performance and growth. Figure 8 displays the mapping between 5-level and 3-level

placements.

Figure 8

5-Level and 3-Level Placements in i-Ready



There are two placement categories, 3-level, and 5-level. Five-level placements allow for more differentiation than the 3-level placements (Curriculum Associates, 2022). Three-level placements can change based on the time of year, but 5-level placements do not change. Five-level placements are available for all grade levels except K-1, as it is not possible for those students to be two or three grade levels behind.

The diagnostic scales for math and ELA display overall placement. There are three tiers for placement: red, at risk with three or more grade levels below; yellow, one grade level below; and green, on or above grade level. There are also specific placements by domain for each content area. The placements by domain for math are numbers and operations, algebra and algebraic thinking, measurement and data, and geometry. The

placements by domain for ELA are phonological awareness, phonics, high-frequency words, vocabulary, comprehension literature, and comprehension informational text.

Diagnostic results for individual students are shared throughout the school year with teachers and parents via the i-Ready portal. Norms within i-Ready provide a way for educators to compare how their students are performing relative to other students across the country (Curriculum Associates, 2022). Norms are percentiles, comparing each student's performance with a set of nationally representative samples of students in the same grade level who took the diagnostic at the same time of year (Curriculum Associates, 2022). The i-Ready diagnostic norms for K-8 are based on common national norms, and it is expected that the norms will remain in use for several school years. Curriculum Associates (2022) with i-Ready monitor the norms each year to determine when new norms are needed.

Validity and Reliability of Panorama Survey Tool

To prove validity and reliability of the Panorama student survey, research results were shared by Panorama about how the survey minimizes measurement error and produces data that educators can trust. Three hallmarks are established for this research-backed survey. First, the items in survey topics "hang together" well (Frye, 2021). To check this, a statistic called Cronbach's alpha is used to show that the items that make up a topic really are tapping into the same topic (Frye, 2021). This tells us that the topic is reliable. Second, the correlations among survey topics are larger for more related topics and smaller for less related topics (Frye, 2021). This refers to convergent and discriminant validity. Convergent validity is when topics that are like one another have relatively strong correlations with one another (Frye, 2021). Discriminant validity is

when topics that are relatively unrelated show small or no correlation (Frye, 2021). The last measure is when the survey is designed using best practices with checking and testing built in (Frye, 2021). Ways to test this are through interviews and focus groups, expert review, cognitive pretesting, and solid survey design best practices (Frye, 2021). It is important to remember that no survey is valid and reliable in all situations.

Validity and Reliability of i-Ready

i-Ready is an online program for reading and mathematics. The program helps teachers determine students' needs, personalize their learning, and monitor progress over time. i-Ready allows teachers to determine the student's level of competence in a content area so they can tailor lessons to the needs of the students. The program provides data to increase the students' learning gains. i-Ready consists of two parts: diagnostic and personalized instruction (EdReports, 2022).

The i-Ready diagnostic is an adaptive assessment that adjusts questions to suit the needs of each student (EdReports, 2022). Each item a student sees is individualized based on their answer to the previous question. A series of correct answers will lead to harder questions, and a series of incorrect answers will yield easier questions. This is how personalized instruction is based on individual skill level and need. The purpose of this tool is to determine how to best support each individual student's learning (EdReports, 2022). Final grades and scores are not given in i-Ready programs. The lessons are meant to be fun and interactive to keep students engaged as they learn.

An analysis of i-Ready materials from EdReports (2022) showed that both math and ELA series for K-5 met expectations for alignment with the Common Core State Standards. The materials meet the expectations for focus and coherence by assessing

grade-level content and spending most of the instructional time on major work of the grade, and they are coherent with the progressions of the standards (EdReports, 2022). Additionally, the i-Ready content allows for making meaningful connections and presents all students with opportunities to engage in extensive work with grade-level problems to meet the full intent of grade-level standards (EdReports, 2022).

Data Analyses

Using quantitative research methods in education (Muijs, 2011), I addressed conceptual issues, quantitative design, and data analysis. I aimed to explore the relationship between grit, growth mindset, self-efficacy, self-management, and measures of academic achievement, using the universal screeners in i-Ready. Primary data sets of a cohort of students were collected by the large school district in this study and obtained through their approval process (Creswell, 2014). One data set collected in this study was the Grit-S, growth mindset, self-efficacy, and self-management scores from district Panorama survey data. Every school in the district collects this primary data twice a year and grants access to educational leaders. The secondary data were accessed through school site testing results and universal screeners using i-Ready data in math and ELA. Table 6 displays how I organized the process of data collection and analysis.

Table 6

Research Questions and Data Analysis

Research question	Independent variables	Dependent variable	Data collected	Data analysis
1. What are the relationships between grit scale scores; growth mindset; self-efficacy; self-management; and universal achievement measures, specifically i-Ready math and i-Ready ELA, during COVID-19?	• Time • COVID-19 pandemic	• Grit • Growth mindset • Self-efficacy • Self-management • i-Ready math • i-Ready ELA	• Grit scale scores • Growth Mindset scores • Beginning of the year, middle of the year, and end of the year i-Ready math scores and i-Ready ELA scores	Multiple correlation measure
2. How do self-efficacy, self-management, i-Ready math, and i-Ready ELA change over time due to COVID-19?	• Time • COVID-19 pandemic	• Self-efficacy • Self-management • i-Ready math • i-Ready ELA	• Panorama Survey data: Self-efficacy scores • Self-management scores • i-Ready math scores • i-Ready ELA Scores	Two-way, repeated measures

Research Question 1

To answer Research Question 1, I explored the relationship between grit, growth mindset, self-efficacy, self-management, and universal achievement measures at the onset of the COVID-19 pandemic. The noncognitive variable scores for grit, growth mindset, self-efficacy, and self-management were collected through Panorama surveys. The

surveys provided multiple qualitative answer choices that were converted to a Likert scale, and total scores for each variable were computed. Inputs ranging from least favorable to most favorable were assigned numerical 1-5 quantitative converted answer choices. This conversion allowed the qualitative data to be input into SPSS for analysis.

The achievement variables included in this study were i-Ready math and i-Ready ELA scores. i-Ready scores are collected at the beginning of the school year, the middle of the school year, and the end of the school year. Achievement measures provide data that represent the specific skills learned and used as one measure of educational output (Rice & Schwartz, 2008). I sought noncognitive correlates of achievement despite the harsh environmental factors of COVID-19.

A multiple correlation research design was chosen because there are multiple dependent variables being analyzed simultaneously (Field, 2017). The aim is to find patterns or correlations between several variables simultaneously (Field, 2017). Multiple correlation analyses consider all the outcomes at the same time. The dependent variables in this model are universal screeners, i-Ready math, i-Ready ELA, grit, growth mindset, self-efficacy, and self-management. My study determined the relationships among the variables.

The use of multiple correlation research design is popular in the behavior and social sciences (Field, 2017). There are two valuable reasons for using this design. First, individual students generate many behaviors and respond in various ways, although they tend to be related to the situations they encounter (Stevens, 2009). The causes of the behavior(s) can be complex and multivariate. The idea is to determine how the multiple variables interface simultaneously and thus reduce error (Stevens, 2009).

Research Question 2

To answer Research Question 2, I utilized a two-way repeated measures design to analyze the changes in variables over time; repeated measures assess data longitudinally rather than cross sectionally. I wanted to determine if student self-efficacy and self-management scores differ over time amid the environmental stressors of the COVID-19 pandemic.

Self-efficacy and self-management are the dependent variables in the model. Self-efficacy (Bandura, 1997) and self-management (Bandura, 1997; Kanfer, 1970) are collected biannually (fall and spring) in the school district Panorama survey data. A two-way repeated measures design was used in this research as self-efficacy and self-management were analyzed over two or more time points during the COVID-19 pandemic.

Summary

Previous research demonstrates relationships between noncognitive indicators and academic achievement (Bandura 1997; Duckworth & Quinn, 2009; Dweck, 2008), but little research has been found to add incremental validity to the relationship between grit, growth mindset, self-efficacy, self-management, and academic achievement during a global pandemic. The purpose of this study was to first examine correlation and then repeated measures of a cohort of elementary-age students prior to and through the COVID-19 global pandemic. I sought to add to the research about achievement and noncognitive domain influence during a global pandemic.

Chapter 4: Results

The COVID-19 pandemic has created one of the largest disruptions in educational history. The learning loss and impact on social-emotional well-being from the pandemic threaten to extend beyond the 2021-2022 school year. Previous research has demonstrated positive relationships between noncognitive traits and academic achievement (Bandura, 1997; Duckworth & Quinn, 2009; Dweck, 2008), but little research has been conducted to add incremental validity to the relationships between grit, growth mindset, self-efficacy, self-management, and academic achievement in elementary-age students during a global pandemic. In addition to an examination of correlation amid a pandemic, I looked at changes over time in the variables.

Participants in the study were in the third grade at the onset of the COVID-19 pandemic, during the 2018-2019 school year. Students in the study had Panorama survey data and i-Ready achievement data in the 2018-2019, 2019-2020, and 2021-2022 school years. More specifically, grit, growth mindset, self-efficacy, self-management for Panorama, and i-Ready math along with i-Ready ELA scores had to be recorded for the 2018-2019 school year. In the 2019-2020 and 2021-2022 school years, the only variables analyzed were i-Ready scores (math, ELA scale scores), self-management, and self-efficacy. This reduction of variable analysis was due to data limitations in district-altered Panorama surveys. Grit and growth mindset data were no longer measured in the school district and were found inconclusive for a year-to-year analysis. Students in the cohort for this study remained enrolled in the district for the length of the study.

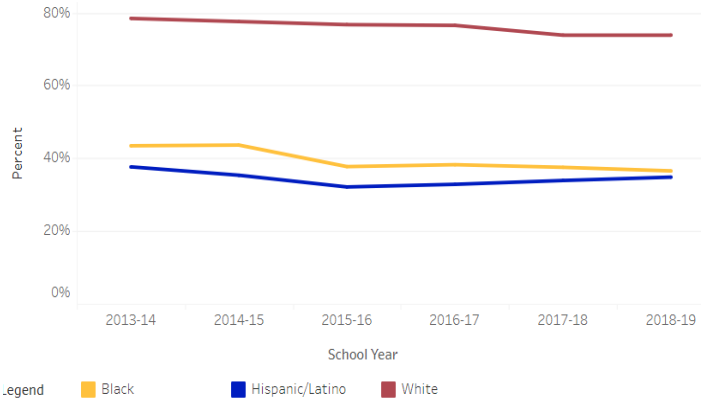
Descriptive About Population

Reading Achievement

Children are at a much greater risk of falling behind in school if they are unequipped with basic reading skills by the end of third grade (Forsyth Promise, 2021). After third grade, instruction transitions from “learning to read” to “reading to learn” (Forsyth Promise, 2021). The measure to determine readiness is taken at the end of third grade, and proficiency is defined as possessing the skills required to read at a third-grade level. Figure 9 provides a 4-year overview of reading proficiency in the school district in this study.

Figure 9

Grade-Level Proficiency by Demographic on End-of-Grade (EOG) Third-Grade Reading Test (2013-2019 School Years)



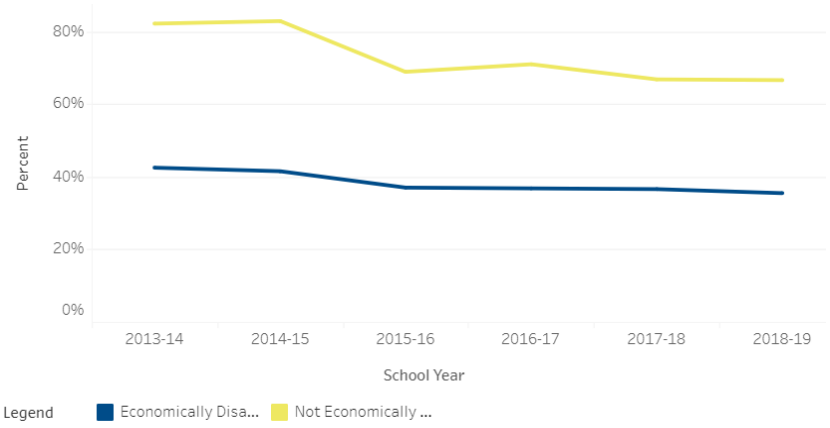
Note: Race and Ethnicity.

In the 2018-2019 school year, 52% of third-grade students were proficient in reading according to the end-of-grade (EOG) reading assessment. Disparities were present in proficiency level by race and ethnicity. Figure 9 displays that African American and Hispanic/Latino students had lower levels of proficiency on the EOG

reading assessment in the 2018-2019 school year compared to their White peers. Figure 10 provides a different lens on the same dataset by looking at a 5-year scale of how students with different economic statuses performed on the reading EOG.

Figure 10

Grade-Level Proficiency by Economic Challenge on EOG Third-Grade Reading Test (2013-2019 School Years)



Economically Disadvantaged *Not Economically Disadvantaged*

Note: Economic disadvantage is defined as students who are receiving free or reduced lunch.

Figure 10 shows disparities were also present in proficiency by student economic status. In the 2018-2019 school year, economically disadvantaged students had lower proficiency levels on the EOG reading assessment compared to students who were not economically disadvantaged. Economic disadvantage is defined as students who are receiving free or reduced lunch. These students scored consistently at the 40% proficiency range, while their peers ranged from 70% to 80% proficient.

SEL

Research suggests that SEL skills are a critical component of academic success

(Forsyth Promise, 2021). Students who participate in evidence-based SEL programs (compared to students who do not) see improved academic outcomes, better classroom behavior, an increased ability to manage stress and depression, and better mindsets and attitudes about themselves (Forsyth Promise, 2021).

There are four measures that show student SEL skills in this research study: grit, growth mindset, self-efficacy, and self-management. These measures are defined by Panorama, the assessment platform used by the school district in the study.

Grit: How well students can persevere through setbacks to achieve important long-term goals.

Growth mindset: Student perceptions of whether they have the potential to change those factors that are central to their performance in school.

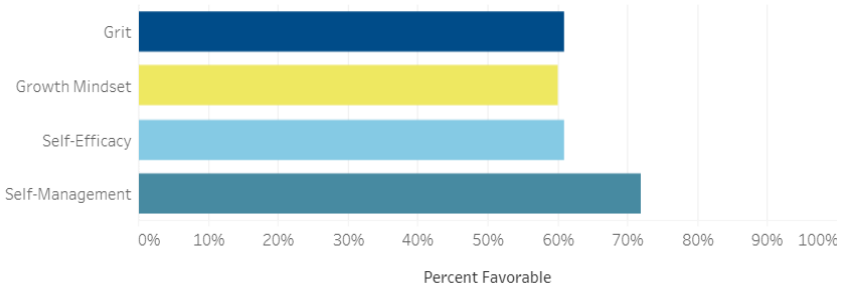
Self-efficacy: How much students believe they can succeed in achieving academic outcomes.

Self-management: How well students manage their emotions, thoughts, and behaviors in different situations.

Figure 11 displays the percentage favorable of each SEL indicator for Grades 3-5 in the 2020-2021 school year.

Figure 11

SEL Grades 3-5

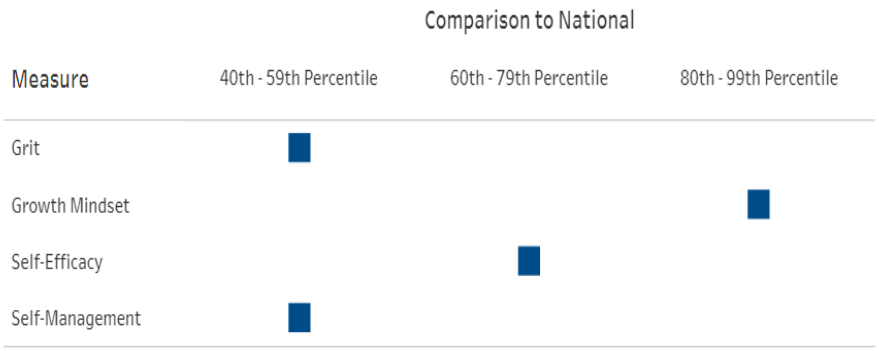


Note. Forsyth Promise, 2021 Data. Percent favorable represents the percentage of respondents who selected a favorable answer choice.

The majority of third through fifth graders scored average or above average percent favorable on SEL indicators. During the 2021-2022 school year, the percentage favorable for grit for Grades 3-5 was a little over 60%. The percent favorable for growth mindset and self-efficacy were also at approximately 60%. Scoring well above the other SEL indicators, self-management was slightly higher than 70% favorable for students in Grades 3-5.

Figure 12

National Comparison of SEL Percentiles for Grades 3-5 Students



Note. Forsyth Promise, 2021) Data of 2020-2021 school year.

Figure 12 illuminates SEL comparisons on a national level. Panorama compares each SEL indicator score to the average score for schools or districts in the Panorama national dataset. Elementary students in the research district were above average on growth mindset (80-99th percentile) and self-efficacy (60-79th percentile). The same students scored average on grit (40-59th percentile) and self-management (40-59th percentile).

Research Question 1: What Are the Relationships Between Grit Scale Scores; Growth Mindset; Self-Efficacy; Self-Management; and Universal Achievement Measures, Specifically i-Ready Math and i-Ready ELA, During COVID-19?

Multiple Correlation Analysis for the 2019-2020 School Year

For Research Question 1, Table 7 displays descriptive statistics for the six variables that were analyzed in the study. The variables that represent SEL were collected from student Panorama surveys; they include grit, growth mindset, self-efficacy, and self-management. The achievement variables were collected from a universal screener, i-Ready, which included math and ELA scores.

Table 7

Descriptive Statistics

Variable	Mean	Standard deviation
i-Ready Math_19-20	471.26	44.06
i-Ready Reading_19-20	548.98	66.72
Self-Efficacy_19-20	17.91	3.91
Self Management_19-20	38.92	6.77
Grit_19-20	14.34	3.02
Growth Mindset_19-20	21.24	5.52

Note. N= 8895.

Table 8 displays the correlation matrix for the 2019-2020 school year. The matrix summarizes the correlations or relationships between each pair of variables. The results showed that there were statistically significant relationships between the variables.

Table 8

Correlation Matrix for 2019-2020 Variables

	i-Ready math	i-Ready reading	Self-efficacy	Self-management	Grit	Growth mindset
i-Ready math	1					
i-Ready reading	.013	1				
Self-efficacy	.014	.011	1			
Self-management	.026*	.013	.539*	1		
Grit	.009	.011	.521*	.476*	1	
Growth mindset	.008	-.006	.259*	.263*	.270*	1

Note. Correlation is significant at the 0.05 level (2-tailed). *N*=8895.

The results showed that there were significant relationships between the variables. There was a positive relationship between i-Ready reading and i-Ready math; however, that relationship was not statistically significant, $r = .013$, $p < .001$. There was a nonsignificant relationship between self-efficacy and math, $r = .014$, $p < .001$. There was a statistically significant positive relationship between self-management and i-Ready math achievement, $r = .026$, $p < .001$. Students with higher self-management are more likely to have higher math achievement. There was a nonsignificant positive relationship between i-Ready math and grit scores, $r = .009$, $p < .001$. There was a nonsignificant positive relationship between i-Ready math and growth mindset scores, $r = .008$, $p < .001$.

The relationships between self-efficacy, self-management, grit, and i-Ready reading were all non-statistically significant. There was also a negative relationship between i-Ready reading and growth mindset (r = -.006, p < .001), but it was also not statistically significant.

There was a moderate positive correlation between self-efficacy and self-management, r =.539, p < .001. Higher self-management scores typically resulted in higher self-efficacy scores. There was a moderate positive correlation between self-efficacy and grit, r =.521, p < .001. Higher self-efficacy scores typically resulted in higher grit scores. There was a low positive correlation between self-efficacy and growth mindset, r=.259, p < .001. There was not a large enough consistency in the relationship between self-efficacy and growth mindset for it to be significant. There was a moderate positive correlation between self-management and grit, r=.476, p < .001. Self-management was also mildly correlated with growth mindset, r= .263, p <.001. Students who displayed an ability to self-manage also had higher scores in grit and growth mindset. Grit and growth mindset showed a low correlation, r = .273, p < .001. Grit and growth mindset as stand-alone measures showed low significance.

In the 2019-2020 subset of data, it was clear that grit had a positive correlation with self-efficacy and self-management, but it was not significant to math or reading. Growth mindset was related to self-efficacy, self-management, and grit, again with no relationship to math or reading. Of all noncognitive variables in the study, self-management was the only statistically significant variable associated with achievement.

Correlation Analysis for the 2021-2022 School Year

An additional correlation analysis was run of the data for the 2021-2022 school

year. The data for this analysis included self-efficacy, self-management, and universal screener scores for i-Ready math and ELA. Table 9 displays the relationship between the four variables collected. It is important to note that the district in this study did not collect grit or growth mindset data in the Panorama survey in the 2021-2022 school year.

Table 9

Correlation Matrix for 2021-2022 Variables

	i-Ready math	i-Ready reading	Self-efficacy	Self-management
i-Ready math	1			
i-Ready reading	.129*	1		
Self-efficacy	.001	.009	1	
Self-management	-.002	.008	.524*	1

Note. Correlation is significant at the 0.05 level.

In the 2021-2022 year, there were also statistically significant relationships between the variables. There was a weak positive relationship between reading and math achievement, $r = .129$, $p < .001$. Higher reading achievement typically resulted in higher math achievement. As reading scores increased, math also increased. There was a moderate positive relationship between self-management and self-efficacy, $r = .524$, $p < .001$. Students with higher self-management typically had higher self-efficacy scores. Due to data limitations, there was no longitudinal data for all the variables; therefore, I was unable to confirm previous research from Duckworth (2016) and Dweck (2008) that achievement is related to grit and growth mindset.

Research Question 2: How Do Self-Efficacy, Self-Management, i-Ready Math, and i-Ready ELA Change Over Time Due to COVID-19?

To answer Research Question 2, a repeated measures analysis served to determine if the variables in the study significantly changed over time. Prior to running the repeated measures analysis, the assumption of sphericity was checked. The results indicated the Mauchly's test of sphericity was nonsignificant, and therefore sphericity was assumed. Table10 displays the descriptive statistics for the variables in the 2019-2020 and 2021-2022 school years.

Table 10

2019-2020, 2021-2022 Descriptive Statistics for Repeated Measures Model

Descriptive	Mean	Standard deviation	N
i-Ready Math 19-20	471.26	44.06	7642
i-Ready Math 21-22	466.88	46.95	7642
i-Ready Reading 19-20	548.98	66.72	7642
i-Ready Reading 21-22	570.60	73.85	7642
Self-efficacy 19-20	17.91	3.91	7642
Self-efficacy 21-22	17.16	3.99	7642
Self-Management 19-20	38.90	6.74	7642
Self-Management 21-22	38.92	6.66	7642

Self-efficacy, self-management, i-Ready math, and i-Ready ELA scores were analyzed over two time points in the same subset of students. Table 11 displays the repeated measures for the 2019-2020 and 2021-2022 school years. The variables i-Ready math, i-Ready ELA, self-efficacy, and self-management were summarized as students progressed from third to fifth grade.

Table 11

Repeated Measures 2019-2020, 2021-2022 School Years

Within Subjects-Factors	Source	Type III Sum of Squares	df	Mean Square	F	Sig.
i-Ready Math 2019-2020 2021-2022	Time	477375.718	1	477375.718	264.005	<.001
i-Ready Reading 2019-2020 2021-2022	Time	5032494.808	1	5032494.808	1054.862	<.001
Self-Efficacy 2019-2020 2021-2022	Time	2349.750	1	2349.750	148.227	<.001
Self-Management 2019-2020 2021-2022	Time	1.654	1	1.654	.037	.847

The repeated measures analysis showed there was a significant change in math achievement from 2019-2022, F (49,768) = 264.01, $p < .001$. From 2019 to 2022, there was an average 5-point decrease in math achievement scores. Math decreased by 5 points post-COVID-19 suggesting that the pandemic had a negative impact on student i-Ready math scores. The repeated measures analysis showed there was a significant change in reading achievement from 2019-2022, F (21,549) = 1054.862, $p < .001$. From 2019 to 2020, there was a 22-point increase in reading achievement scores. The data suggest that the pandemic had a positive impact on student reading achievement.

The repeated measures analysis showed there was a significant change in self-efficacy from 2019-2022, F (8,360) = 148.227, $p < .001$. From 2019 to 2020, there was a 1-point decrease in self-efficacy suggesting that over time, the pandemic had a negative impact on self-efficacy. The repeated measures analysis showed there was not a

significant difference in self-management from 2019-2022, F (7,642) = .037, $p < .001$. From 2019 to 2020, there was no significance difference in self-management. The pandemic did not seem to affect self-management over time.

Summary of Findings

For Research Question 1, all six variables were analyzed for correlation in the 2019-2020 school year. There was a significant relationship between self-management and math achievement. Data results suggest that students with higher self-management are more likely to have higher math scores. There was a clear connection in the data to grit scores having a positive correlation with self-efficacy and self-management, but grit was not significant to math or reading. The same results were provided for the growth mindset measures. Growth mindset was related to self-efficacy, self-management, and grit, but again with no relationship to math or reading. Grit and growth mindset were not significant factors; they did not correlate with achievement at all in the study. For my target population of third through fifth graders, grit and growth mindset did not seem to affect their achievement. Of all noncognitive variables in the study, self-management was the only statistically significant variable to achievement. These results suggest that the higher the self-management abilities, the better a student's academic achievement will be in the elementary school setting. The second component of Research Question 1 analyzed the same variables minus grit and growth mindset for the 2021-2022 school year. The results displayed that higher reading achievement typically resulted in higher math achievement. As reading scores increased, math scores increased. Students who had higher self-management scores also had higher self-efficacy scores. This suggests that students who can manage their emotions, behaviors, and learning feel more confident in

their capacity to reach goals.

For Research Question 2, I looked at two time points for the data of the same subset of students. I looked at their scores in 2019-2020 and then again in 2021-2022. The variables were self-management, self-efficacy, i-Ready math, and i-Ready ELA. Grit and growth mindset were not part of the analysis due to the district changes in data collection. Over the two time points in the study, math decreased by 5 points post-COVID-19, suggesting the pandemic had a negative impact on student i-Ready math scores. The complete opposite results were found for reading achievement. There was a 22-point increase in reading achievement from third to fifth grade, suggesting the pandemic had a positive impact on reading achievement. Of the noncognitive variables, the change from 2019 to 2022 indicated there was a 1-point decrease in self-efficacy. Though the pandemic did not seem to affect self-management, the results of this study suggest that the pandemic caused this reduction in self-efficacy.

Chapter 5: Discussion

The COVID-19 pandemic resulted in an extended period out of the regimented school cycle for students. The time students spent out of school will almost certainly affect student achievement in many ways. The full impact of the COVID-19 pandemic will be hard to measure due to the unique ways it affected communities and schools (Zhou, 2021). This research study analyzed correlation and change over time in noncognitive and academic variables. There is still little available data on how school closures and the shift in instruction have fully impacted learning for elementary-age students. This research offers insight into how the relationship between academic achievement and noncognitive traits has been affected during the COVID-19 pandemic.

Discussion of Findings and Connections to Theoretical Framework

The goal of this research was to look specifically at a cohort of third- through fifth-grade students and analyze the correlations between achievement and noncognitive constructs at the onset and distance of the COVID-19 pandemic. This led to the development of two research questions:

1. What are the relationships between grit scale scores; growth mindset; self-efficacy; self-management; and universal achievement measures, specifically i-Ready math and i-Ready ELA, during COVID-19?
2. How do self-efficacy, self-management, i-Ready math, and i-Ready ELA change over time due to COVID-19?

The cohort of students in this study was enrolled in the third grade in the 2019-2020 school year. A correlation of the variables in this school year showed that the noncognitive variables in the study were in a low to moderate correlation to one another.

Only one construct led to more achievement. I found for Research Question 1 that self-management was a strong indicator of achievement. Students with higher self-management were more likely to have better math achievement in i-Ready. The same correlation was conducted with this cohort of students in the fifth grade, and students with higher self-management typically scored higher in self-efficacy. Also, those who had above-average reading scores typically scored the same levels in math achievement. These correlation analyses led me to conclude that self-management was the most important noncognitive variable when it came to academic achievement in this cohort of students. This indicates that there is a need for the implementation of a strong, research-based social-emotional curriculum for elementary school students. Because some students in this cohort were able to maintain and soar above normal achievement levels during a pandemic due to their self-management skills, every student needs access and opportunity to learn this noncognitive construct.

Taking a deeper dive into change over time through the pandemic, Research Question 2 resulted in some significant changes in achievement. From the 2019-2020 school year to the 2021-2022 school year, approximately 2 years difference, significant changes were found in math and reading achievement. Math achievement over the 2-year period decreased by an average of 5 points in this cohort of students. Adversely, a significant increase in reading achievement was found, adding up to a 22-point increase. Though self-management was a strong indicator in the correlation analysis, there was not a significant change in student levels of self-management over the 2-year period. The closest correlate to self-management, self-efficacy, did drop by 1 point in this population over the time studied.

Connections to Theoretical Framework

Bronfenbrenner's (1990) theory is based on relationships between various environmental influences. A student's biology, immediate family, community environment, and societal interactions fuel and steer their development (Bronfenbrenner, 1990). Changes or conflict in one layer causes ripples through the other layers. This ecological systems perspective demonstrates how differently students can be impacted or influenced by their environments (Bronfenbrenner, 1995). When calculating learning deficits in students, the mental/emotional, physical, and social stressors endured during COVID-19 must be heavily considered. By considering the varying circumstances students endured through the COVID-19 pandemic, I gathered conclusive thoughts about how changes in their microsystem affected their achievement.

Parenting is the greatest influence on the development of children than any other environmental factor in the ecological system (Bronfenbrenner, 1995). Due to the closure of schools, students experienced being in confinement with a lack of parent and peer interaction. Students who were confined in conflict-ridden homes were more exposed to daily maltreatment. These conditions only increased symptoms of anxiety and depression (Hamadani et al., 2020). Children of health care workers, front-line workers, and nuclear families were negatively impacted by the pandemic (Hamadani et al., 2020). Parents returned home tired due to prolonged hours of work under harsh conditions, causing them mental and physical stress, allowing for much less patience and attentiveness to their child's academic needs.

During the COVID-19 pandemic, children who lived in a multigenerational home may have had an advantage over those who were restricted to their nuclear family. A one-

family unit home provided fewer opportunities for them to interact with others (Hamadani et al., 2020). Socialization slowly weakened during the pandemic due to the fear of infection, as communities were completely closed off for months at a time. When families were able to leave home, stickers, signs, and sometimes police presence were reminders to maintain physical distance, keep your mask on properly, and refrain from touch. Wearing a face mask seemingly made all interactions with others feel impersonal due to the inability to show emotion through facial expressions. This new pandemic climate hampered the ability of children to learn social skills; for many, social distancing felt like emotional distancing (Yip & Chau, 2020).

During the peak of the COVID-19 pandemic, children were deprived of outdoor activities that promote physical growth and mental well-being. A fear of touching contagious surfaces like playground equipment or breathing in the air molecules of an infected COVID-19 peer provided less opportunity for activity and interaction. This restriction of access to movement and positive interaction with peers can lead to a sedentary lifestyle, irregular sleep patterns, less positive food choices, poor stamina, and bone weakness (Yip & Chau, 2020). Due to the excessive amount of time at home and lack of socialization, students turned to gadgets to fill the void (Yip & Chau, 2020). Hours upon hours spent on an electronic device has negative impacts such as speech and language delay, attention deficits, loss of interest in traditional methods of teaching and learning, loss of social skills due to less interaction with peers, sedentary lifestyle, poor moral development, exposure to inappropriate content, and mental health issues (Singh et al., 2021). The constant distraction of devices in the home pulled students away from focusing on their schoolwork. This led to lower achievement patterns in elementary-age

students across the state (North Carolina Department of Instruction [NCDPI], 2022).

Students from low-socioeconomic neighborhoods were dependent on government agencies and local education agencies to provide access to food. For some, this lack of access worsened through the pandemic as families struggled with limited income, loss of jobs, sickness, and even death in their family unit. In addition to food insecurity and limited income, many vulnerable families struggled with access to health care and vaccinations. This same population of children from low-income family units was more likely to be excluded from access to the Internet and devices that ensured success in online learning. The crisis caused by the pandemic exacerbated disparities in education for those who are most vulnerable, those living in low socioeconomic communities and students with disabilities (NCDPI, 2022). The COVID-19 pandemic did not play fair regarding the systems of support and accessibility to all. As students have returned to face-to-face instruction, educators are seeing students react to and be influenced by environmental stressors from the pandemic in varying degrees. The more encouraging and nurturing relationships are in each of the four ecological systems, the better a child will grow and develop (Bronfenbrenner,1995). Local education agencies are working hard to meet the needs of students amid this lingering pandemic, balancing the need to enhance SEL and gain ground on the unsettling learning loss in each individual student.

Duckworth explained that noncognitive constructs and the importance of the environment are two-fold (Duckworth, 2016; Duckworth et al., 2007). Duckworth believed that if you are committed to building a culture of grit, you must be committed to providing social-emotional support to students, especially those who are disadvantaged (Duckworth, 2016; Duckworth et al., 2007; Sanguras, 2018). Duckworth (2016) shared

that the environment that children grow up in profoundly influences all aspects of character development and their overall achievement in school. The environment created by the COVID-19 pandemic affected every facet of a child's life, especially their SEL and academic achievement in school.

Noncognitive Constructs in Educational Research

Previous research from Duckworth (2016) and Dweck (2008) found that there were positive relationships between grit, mindset, and student achievement. However, in my population, this correlation was not found. In relation to the ecological systems theory, I think students needed all the grit they could muster just to survive during the pandemic. Due to the intensity of the COVID-19 pandemic, students were not able to flourish and grow in various areas of their life, as some were not even getting their basic needs met. The courage and resolve to manage the daily stressors during a pandemic likely left very little strength to then apply them to educational obstacles. Many students did not have access to technology and the Internet, leaving them at a disadvantage when making the switch to online learning. Students who had consistent, positive parental support had more potential to respond to the academic challenges presented during COVID-19. As the pandemic disassembled the ecological systems around students, it was likely very hard for them to truly see and believe that they could persevere academically. Also, considering the age of the population in this research, I am not sure that it is even practical to believe that elementary school students in Grades 3-5 have had the opportunity to learn how to respond to moderate setbacks, much less those presented by a pandemic. Some of the research findings on grit have led educators to believe that allowing students to fail and deliberately exposing them to self-regulation will help them

foster the level of grit that is necessary to overcome obstacles (Duckworth et al., 2011). Perhaps a post-COVID elementary curriculum will be more inclusive of noncognitive trait development. The setbacks from the pandemic have provided a platform for directing students in SEL.

Duckworth often discusses her experiences, both as a teacher and as a researcher. She expressed that a child who comes to school without their basic needs met will not be ready to learn (Duckworth, 2016). Showing up to school hungry, scared, or without proper glasses are a few examples of these types of roadblocks. Duckworth (2016) clearly stated that "grit alone is not going to save anyone" (p. 45). Students who were able to maintain a growth mindset through the pandemic and exhibit grit academically were likely the students who experienced a healthy ecological system. My research did not display any strong correlation between grit, mindset, and achievement.

Elementary-age students need relationships with adults outside of their homes. Research has proven that academic success occurs when students have meaningful interactions with friends, teachers, and staff. It is also important that they are involved in purposeful organizations, clubs, and activities offered by the school (Strayhorn, 2013). When children begin school, they begin to trust and develop relationships with adults outside of their immediate family. Some students come to school with strong external relationships from their social experiences (i.e., church, community groups, preschool, camps, etc.), while other students have had very little exposure to trusting adult interactions. These connections are important because they help students to develop cognitively and emotionally (Bronfenbrenner, 1990). These types of relationships are where they learn trust, hear affirmations, and build confidence in themselves. During the

COVID-19 pandemic, our children witnessed the adults in their microsystem struggling, which then communicated to them that survival was the top priority. Some students had adult reassurance, and others lost the adult support provided in school, leaving them in seclusion and isolation.

The first phase of my research examined correlation for noncognitive variables, grit, growth mindset, self-efficacy, and self-management in the 2019-2020 school year. The results showed a very low, nonsignificant relationship between grit and growth mindset and no connection to achievement measures. Claro et al. (2016) revealed that students with growth mindsets perform better academically in the areas of math and literacy. I was unable to add to the research about growth mindset and achievement in my population of students. Much of Duckworth's (2016) research discussed how "working strenuously toward challenges, maintaining effort and interest over years despite failure, adversity, and plateaus in progress defines being gritty" (p. 5). Due to data limitations in the school district, there was no access to longitudinal data for grit and growth mindset variables; therefore, I was unable to determine if Duckworth's findings applied to my population of students in the study. My initial goal was to examine change and correlation as students progressed from third to fifth grade. Previous research in this area has proven positive connections between grit and mental-emotional well-being during stressful or negative life events (Bowman et al., 2015; Komarraju et al., 2011). Further research needs to be conducted on how grit and growth mindset affected achievement during the COVID-19 pandemic in elementary-age students.

This research confirmed that there were positive relationships between the noncognitive constructs self-efficacy, grit, growth mindset, and self-management in the

2021-2022 correlational analysis. Unlike previous research findings, this study provided insight into the elementary-age population of students. This research showed that grit has a relationship with self-efficacy, but it is not related to math or reading achievement. This study further showed that a growth mindset was related to self-efficacy and self-management but with no correlation to math or reading achievement. Most of the noncognitive constructs in the study showed correlation but no correlation with achievement measures, except self-management.

The summary of findings revealed that self-management was the only significant variable with achievement. Students who had higher self-management typically had higher self-efficacy scores. This part of the study aligns with Bandura's (1997) research on social learning theory, as it considers how environmental and cognitive factors interact to influence learning and behavior. When students believe in their capabilities, they are more likely to control their behaviors (Bandura, 1997). This theory of self-efficacy and self-management remained true in the population of students in my study. Despite the harsh ecological stressors of the COVID-19 pandemic, students were able to manage their own behaviors effectively enough to accomplish their academic goals. The data results showed that students who were already adept at managing their time and workload saw forward momentum and normal to higher levels of achievement, while underprepared students fell further behind. This disparity affected students' transitions from one grade to the next during the pandemic.

Universal Achievement Measures

In the 2019-2020 school year, the cohort of students in this research study had positive relationships between self-management and i-Ready math achievement. Students

with higher self-management were more likely to have higher math achievement. During the 2021-2022 school year analysis, higher i-Ready reading achievement typically resulted in higher i-Ready math achievement. The same subset of students who showed increases in math were the smaller groups who showed increases in math as well. Overall, the majority of the population in this study increased reading achievement by 20 points and lowered math achievement by 5 points. As reading scores increased, math scores increased.

To examine change over time, I compared scores longitudinally from the 2019-2020 school year to the 2021-2022 school year. There was a significant change in math achievement, averaging a 5-point decrease in scores over that period. In contrast, reading achievement increased by 22 points on average in this cohort of students. Even though the scores increased, so did the standard deviation from the comparisons. There is a larger extreme between students who did well on i-Ready reading and math and those who did poorly. This 10% increase in standard deviation indicates that students were less consistent in their i-Ready testing over time. The standard deviation in previous years did not change significantly. The decrease in math scores at 5 points is relatively consistent and not very concerning; however, a 22-point increase in reading achievement could indicate that students had parent or guardian support with the test. It is questionable whether parents thought that they were helping their children with learning by helping them with the i-Ready end-of-year assessment. This support with the test being taken from home could have caused this unexplainable variance in the standard deviation.

Implications for Practice

As legislators and school leaders seek to understand how to bridge the gaps

created by the COVID-19 pandemic, a focus on SEL must remain a priority. Test scores can only tell us so much about what students learn, while social-emotional measures help us know how to equip our students to learn. Research suggests that SEL skills are a critical component of academic success (Forsyth Promise, 2021). Students who participate in evidence-based SEL programs (compared to students who do not) see improved academic outcomes, better classroom behavior, an increased ability to manage stress and depression, and better mindsets and attitudes about themselves (Forsyth Promise, 2021).

An intervention designed to explicitly teach self-management skills to elementary-age students would foster greater student success. In this research, self-management skills were particularly important as the COVID-19 pandemic challenged students' entire ecological system. The pandemic caused students to engage in an unfamiliar online learning environment, and community health restrictions prevented students from engaging in social learning support systems. For some, this environment helped them build capacity and continue positive habits and goal setting, but for many students, that was not the case. Students who can self-manage their cognitions, behaviors, and emotions in a systematic way leads them toward the attainment of their own learning goals (Maher & Corn, 2022). In this study, students who possessed the ability to self-manage also had higher levels of self-efficacy, which helped them be successful in the new virtual learning environment. So, if the goal became to empower students to reflect on their practices and adjust their habits to meet goals at a young age, we could instill academic self-regulation in elementary classrooms.

The school district in this study has adopted a systemic SEL practice in alignment

with the district's vision to create a safe, nurturing climate and culture that maximizes student academic performance. The district has deployed an SEL team that supports schools in organizing, implementing, and improving SEL. Figure 13 displays how systemic SEL is integrated into cycles of organization, implementation, and improvement.

Figure 13

Systemic SEL

This systemic approach includes assisting each school site in planning explicit SEL instruction for students and adults. Our district has an SEL director who disseminates SEL coaches to train each school site in ongoing, embedded practices. Schools are encouraged to design and implement supportive classroom climates. SEL teams provide support for the integration of SEL within all content areas. CASEL (2022)

presents four elements of effective SEL instruction, and the acronym for the elements is known as SAFE.

> Sequenced - connected and coordinated activities to foster skill development; Active - active forms of learning to help students master skills; Focused - containing activities that clearly emphasize developing personal and social skills. Explicit - targeting specific social and emotional skills. (CASEL, 2022, p. 33)

Teachers, students, and administrators are undergoing professional development to build their SEL capacity. It is believed that one of the best ways to integrate SEL is for the adults in the school to model those characteristics in their interactions with one another and with their students. As a teacher increases their own SEL capacity, they are more equipped to grow that climate in their classrooms and ultimately the entire school. Another important aspect of systemic SEL is helping schools connect with families and community stakeholders to create authentic partnerships. These authentic partnerships allow SEL to extend beyond the walls of the school and expand into the community.

Two major meta-analyses found significant associations between positive academic outcomes and productive SEL programs (Durlak et al., 2011; Taylor et al., 2017). Children in the SEL programs showed significantly more positive outcomes in all six domains compared to peers not enrolled. The domains included social and emotional skills, attitudes toward self and others, positive social behavior, conduct problems, emotional distress, and academic performance. These programs enhanced academic achievement by 11 percentile points (Durlak et al., 2011; Taylor et al., 2017). This research shows how much SEL programs are needed, and previous research provides reason to conclude that SEL programs that are implemented well and adhere to systemic

practices promote positive outcomes.

As part of a commitment to expand upon research-based practices, the district in this study has adopted two SEL curriculums. The two programs are Second Step and Project Wayfinder. The programs are research-based and designed to help students both in and out of school. The Second Step curriculum provides units on problem-solving, kindness and empathy, emotion management, goal setting, and growth mindset. Project Wayfinder is a secondary-level curriculum based on research from Stanford education professor, Bill Damon (Damon, 2022). Wayfinder identifies six core skills that future-ready students should know to be future-ready and build lifelong success. They include adaptability, self-awareness, collaboration, empathy, agency, and purpose (Damon, 2022).

As school districts work to find the right SEL curriculum for their population of students, it is important to find a program with equity in mind. An equitable SEL curriculum will have representation of various cultural values and diverse identities. It is important that the curriculum "fosters positive identity development, promotes student agency and voice, and acknowledges issues of bias and inequality while it works to address them" (Damon, 2022, p. 89). It is rare for programs to be intentionally designed with issues of equity in mind, but educational leaders have a choice in what they choose to implement. As the COVID-19 pandemic continues to slow, SEL curriculums will continue to flood the educational systems. Great leaders will find research-based curriculums that remove barriers so all students can succeed.

State COVID-19 Impact Analysis

In March 2022, NCDPI conducted research on the impact of COVID-19 on lost

instructional time. The focus was on two core areas: comparing students' pre-COVID-19 expected performance with their actual post-COVID-19 performance in the 2021-2022 school year and the impact of lost instructional time. Data used for this analysis were EOGs, EOCs, and comparisons to historical trends.

The findings were that students on average made less progress during the pandemic than they had in previous years (Maher & Corn, 2022). There was a significant negative impact on students in all grades and almost every content area (Maher & Corn, 2022). English II was the only content area that did not show negative impacts. Math scores were significantly impacted in Grades 5-9, and science was equally distraught in eighth-grade scores (Maher & Corn, 2022). "Students who returned to the classroom for face-to-face learning with specific, targeted resources and support, did better than the students who were purely remote and disengaged from their school community" (Maher & Corn, 2022, p. 87). In the state data summary, most students progressed during the pandemic but at a much slower pace than they would have progressed during non-pandemic learning (Maher & Corn, 2022).

Disparities in subgroups were as present as in pre-pandemic times. In a typical year, females outperform males academically. During the pandemic, early predictions were that male students would have more negative impacts, and this did not prove true. Students of all backgrounds were negatively impacted by the pandemic. There were no significant disparities by race or ethnicity. The disparities that were present pre-COVID did increase and widen the gap in reading (Grades 4-8) and math (fifth grade) for economically disadvantaged students (Maher & Corn, 2022). Academically Intellectually Gifted students were significantly negatively impacted. The loss appeared most in

reading for Grades 6-8 and in math in Grade 8 (Maher & Corn, 2022). Students With Disabilities and English Language Learners were closer to their pre-pandemic learning trajectories compared to the general population of students (Maher & Corn, 2022).

NCDPI took these findings and set some goals utilizing ESSER funding. The goals include elevating student, teacher, administrator, and parent voice through qualitative research. The team also plans to study the long-term effects of the COVID-19 pandemic on students, educators, and school outcomes. The last part of the plan is to assess the long-term impacts of school extension programs on learning recovery along with the impact of local interventions to address mental-emotional well-being **(**Maher & Corn, 2022).

The results from this study indicate the significance of SEL as a correlate of achievement in elementary-age students. Strong SEL curriculums focused on self-management and self-efficacy seem to be of the utmost importance. As students increase self-management, they will feel more self-assured in their academic abilities, leading to higher achievement. Perceived self-efficacy, believing in one's abilities to exercise control over their own tasks and surroundings, is what seemed to make a difference in this cohort of students. It is expected that students would struggle with math achievement during remote learning, as the content is so hands-on in the traditional classroom setting. In contrast, the 22-point leap in reading achievement seems to be a result of standard deviation variance in the two testing points. It is concerning that parents may have helped their children with the online testing components of i-Ready during the pandemic. The large gap between those who did well and those who did not seems to point to this assumption.

Strategies to support these areas of weakness amid the continued pandemic require creative thinking, collaboration, and hefty funding for resources. Many school districts have utilized Every Student Succeeds Act funds to help close the projected gaps for students. “ESSA authorizes funds to provide all students with access to a well-rounded education and to improve school conditions for students learning” National Association of School Psychologists, 2022, p. IV). These funds were given to develop supplemental learning supports such as increased school social workers, psychological services, and nurses. Another goal was to strengthen parental support and community stakeholder engagement in the school sites. Additionally, they were to help improve climate and safety for students and staff. All these pieces were to build a strong system of learning support, helping students reach their academic potential National Association of School Psychologists, 2022). Current research is guiding educational leaders to provide access to behavioral, social-emotional, and mental health supports to promote student resilience, improve academic performance, and allow children and youth to successfully deal with the challenges they face (National Association of School Psychologists, 2022). School districts across the country are striving for school-level implementation of evidence-based, comprehensive systems of support to provide students with the skills to rise above the effects of the COVID-19 pandemic.

Limitations

Limitations of this study involved the self-reporting nature of the Panorama survey for students in the district. The instrument allowed students the freedom to judge their own character and behaviors when completing the survey. Duckworth (2016) discussed the limitation of questionnaires called “reference bias.” This can cause a

distortion of scores coming from people holding different standards by which they judge behavior. For example, “being a hard worker” is one question on the Grit-S survey, and how an individual interprets hard work determines how they will answer the question. Some students consider working hard on school assignments to be three nights a week, while others work all week including weekends. Behavior is judged by different standards in each participant and is a limitation of the research.

The data for this study were collected from a district that can be considered “backyard research.” This creates a limitation to the study because I am employed by the district in this study and work in the central office represented in the study. As a central office employee, I am privy to data sets and pre-interpreted analyses of the data by leadership in the district. I am aware that one’s strong, personal feelings toward the importance of the variables in the study are a limitation.

Research supports the claims that a student’s technical skills on a computer and internet applications are associated with learning achievement online (Gassman-Pines et al., 2020). Student knowledge and skill set certainly played a role in the varying degrees of academic achievement during the COVID-19 pandemic. An additional limitation was the varying degrees of content delivery by teachers. Students with more skilled teachers in online education received more support with the transition and better learning opportunities than those with limited technological skills, therefore creating an unbalanced set of learning opportunities across school districts for students.

Duckworth and Quinn (2009) brought a limitation to light in their studies of grit and student success. Duckworth and Quinn expounded on grit by stating that grit alone will not be the sole predictor of achievement; there are too many other variables in their

environment that contribute to success. This reflection supports the work of Bronfenbrenner (1995) and the ecological systems of support. Students have layers of support, and the healthy environment in each one of these layers is vital to success (Bronfenbrenner, 1995).

The last limitation of the study was the fact that some i-Ready tests were taken from home. The student population in this study showed a 22-point increase in reading during the pandemic. This drastic increase in scores could indicate that students were getting help from their parents, siblings, or older peers during the i-Ready exams. This support with the test being taken from home could have caused this unexplainable variance in the standard deviation.

Delimitations and Assumptions

The delimitations of this study helped to narrow the scope of the data being analyzed. Only students who were in third grade in the 2019-2020 school year were included in this study. Any student who was not enrolled in the school system for the entire 4 years of the study was not included in this study. Also, students had to have data for all the variable measures, or they were excluded from the research. This excludes students who missed an assessment, were absent, or transferred from outside of the district during the research window.

I am aware that strong personal feelings toward the importance of grit are a limitation. These personal assumptions about the motivations and influences of grit are based on my cultural lenses. To reduce the risk of confirmation bias, I utilized simple random sampling so that equal odds were given to every third-grade student enrolled in the district in the 2019-2020 school year.

A few assumptions were made while conducting this study. It was an assumption that students would be truthful in answering the Panorama survey questions. This assumption was inferred because students were given no incentive for answering one way or another. It is also an assumption that parents or older siblings in the home did help students with i-ready or Panorama surveys.

Recommendations for Future Research

Investigating the differences in variables influencing achievement in other districts in North Carolina is a starting point for future research on the topic. My research showed that noncognitive traits such as self-management and self-efficacy are correlates of higher achievement in elementary-age students. Due to changes in leadership and inconsistent data, this study was unable to analyze grit and growth mindset over time in this population of students. Additional research in school districts without the gaps in data points due to COVID-19 closures would provide more insight into change over time in a population of students. A closer look at all four noncognitive constructs in other school districts with consistent data points would further the reliability of the findings in this study.

Further research may be needed to determine the full impact of noncognitive traits on student achievement in secondary-age students. Secondary-level students have more achievement data points such as GPA, SAT/ACT scores, EOG testing, attendance, and graduation rank. The use of more achievement data would give the study more depth and validity in a correlational analysis. The same quantitative framework from my study could be used but focusing on secondary school students and achievement measures prior to and through the COVID-19 pandemic.

In addition, case studies on school districts and schools with successful systemic social-emotional programs could provide insight into what practices, characteristics, and curriculum models promote achievement based on the school's unique data. Further research is needed on schools that are continuously behind in academic achievement measures to determine what factors are keeping these schools from higher academic success. As case studies are conducted on the various SEL curriculums, the most effective research-based programs will surface, guiding districts to join high-impact SEL programs.

Conclusion

The COVID-19 pandemic has created one of the largest disruptions in educational history. The crisis caused by the pandemic has exacerbated disparities in education for those who are most vulnerable, those living in low socioeconomic communities and students with disabilities (Maher & Corn, 2022). The impact on learning loss and social-emotional well-being from the pandemic threatens to extend well beyond the 2021-2022 school year.

Previous research has proven relationships between grit, growth mindset, self-efficacy, and academic achievement (Duckworth, 2016; Duckworth et al., 2007; Dweck, 2008). Little is known about the validity of noncognitive constructs and academic achievement in elementary-age students, particularly how the relationship between these variables affected student achievement during the COVID-19 pandemic. The cohort of students in this study was in the third grade at the onset of the pandemic, and I tracked them through fifth grade. The purpose of this study was to determine if noncognitive traits had any relationship with achievement by examining a correlation of the variables

and analyzing repeated measures of this cohort of students prior to and through the COVID-19 global pandemic.

The significance of this study was to enhance the lens on student achievement and the influence of noncognitive curriculum. As school districts continue to analyze data to capture the full size of learning loss experienced by students during COVID-19, the harsh reality is that loss varies by subgroup, socioeconomic status, and various other factors. It has been estimated that students began the 2021-2022 school year 3 months behind in math and 2 months in reading (Maher & Corn, 2022). If the pandemic persists beyond our current school year, the total learning loss will be around 7 to 12 months for students in math and reading (Maher & Corn, 2022). In addition to academic setbacks, COVID-19 has increased students' needs for social and emotional support. The National Association of School Psychologists anticipates that the percentage of children exhibiting social-emotional or behavioral concerns has doubled or tripled because of COVID-19 (Maher & Corn, 2022).

An ecological perspective leads to understanding how instability in a child's environment and the relationship between them can be detrimental to their opportunities for academic success. Bronfenbrenner's (1990) research suggested that some students do not have the constant, healthy interaction with adults that is necessary for proper development. This research has direct implications for the relationship students foster in their homes, schools, and communities. A ripple in one area of a child's microsystem carries over into all domains of their life. The COVID-19 pandemic has certainly caused numerous huge ripple effects in all aspects of our children's lives. For some, those ripples were larger than others.

This research study pointed heavily to self-management as a core indicator of student achievement during the pandemic. Self-management was found to have positive correlations with self-efficacy and i-Ready math achievement. Over the 3-year period, the students within the cohort developed some achievement trends. There was a significant change in i-Ready math achievement with an average decrease by 5 points and a significant increase in i-Ready reading with a 22-point uptick in overall scores. Self-efficacy changed over time by 1 point, and that increment was a decrease in the student population.

Further research in this area is necessary to determine if grit and growth mindset could have held strong correlations with achievement in elementary-age students. The school district in this study had gaps in the data on these two constructs due to changes in leadership and data collected during the pandemic. Case studies of school districts post-COVID that have embedded strong SEL programs would lead to more evidence about its overall impact on elementary students. Additionally, guiding those studies in schools and districts that tend to fall behind in achievement measures would add to the validity of this research study. This research adds to the understanding that cognitive abilities alone do not fully predict a student's academic achievement (Micceri, 2010; Nichols & Clinedinst, 2013). A movement towards cultivating noncognitive constructs in conjunction with academic achievement could prepare elementary-age students to face adversity with the right tools in their mental and emotional backpacks to ensure success.

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