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Dedication

To my wife, Dana: thank you for your never-ending support of my career and life aspirations. I truly could not have done it without you by my side. To my children, Jordan and Wes: nothing in life makes me prouder than being your dad. Always remember to chase after your dreams with everything you have.

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Finally, to the numerous mentors I have had throughout my career: thank you for encouraging me to push my skills to the next level. I am forever grateful for the wisdom and guidance each of you has shared.

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Abstract

There is growing research on traits and motivation that explore the non-cognitive factors that are found in high achieving individuals. There has been limited research on the school factors that develop grit in students. Through a non-experimental, cross-sectional research, this study examined the perceptions of the teaching and learning environment to examine the relationships between self-reported grit and the three psychological needs identified by the Basic Psychological Needs Theory of autonomy support, competence support, and relational support. The purpose was to measure student attitudes and perceptions to the teaching and learning environment and assess the connections with self-reported levels of grit. The study found that when analyzed individually, autonomy supportive instruction showed the strongest effect ($\beta=.49$, $p<.001$), followed by competence support ($\beta=.46$, $p<.001$) and student trust in teachers had a slightly weaker effect ($\beta=.39$, $p=.002$). When the variables were entered as a group, autonomy supportive instruction had the strongest effect on grit ($\beta=.38$, $p<.001$), followed by competence supportive instruction ($\beta=.20$, $p<.001$) and student teacher trust had a small negative effect ($\beta=-.04$) and was not statistically significant.

Chapter 1: Introduction

Evidence from multiple sources continues to suggest that state testing, accountability, and the traditional approaches of public school may not be successfully preparing students for a knowledge and information-driven society (Shechtman et al., 2013). In a nationwide survey of high school dropouts, 69 percent of the students stated that school did not motivate or inspire them to work hard (Bridgeland et al., 2006; Dweck et al., 2014). More recent survey data from Education Insights (2025) report teachers' perception of student engagement is at 51 percent at the elementary level and declines in high school to 36 percent. Inevitably, such a decline reflects that the use of external accountability systems no longer serves our schools and more importantly no longer serves our students. Now is the time to shift from external accountability systems to examining the internal psychological factors and conditions that foster long-term passion and perseverance in students.

Shechtman et al. (2013) claim students need more than knowledge and technical skills if they are to excel personally and professionally. Adequate preparation for college, careers, and citizenship also involves developing sets of behaviors, skills, attitudes, strategies, attitudes, intrapersonal resources and attributes that high achieving individuals rely on to succeed (Shechtman et al., 2013; Farrington et al., 2012). Some studies indicate the leading factors to student academic success include cognitive measures such as high school rank (Noble & Sawyer, 1987), high school GPA (McLaughlin, 2006), and standardized assessment scores (Adebayo, 1993; Pascarella et al., 1981). However, cognitive factors alone cannot adequately predict the academic success of students (Ting,

2001; Pike & Saupe, 2002). A growing body of evidence suggests noncognitive factors can have a strong influence on academic achievement and life success (Poropat, 2009).

Since the rollout of No Child Left Behind (NCLB) in 2001, the central mandate of public education has been raising student test scores, especially in the areas of reading and math. The Every Student Succeeds Act (ESSA), the latest reauthorization of the 1965 Elementary and Secondary Act of Education, sets a direction and establishes parameters for how school systems organize and coordinate teaching and learning. While ESSA made considerable changes to NCLB, it remains reliant on test-based accountability as a policy mechanism to regulate schools (Penuel et al., 2016). Farrington et al. (2012) argues, “Education policymakers have attempted to ensure students’ qualifications for college by ratcheting up academic demands through more rigorous high school graduation requirements, increasing participation in advanced coursework, and raising standards within courses” (p. 3).

While improved student achievement is recognized as a valuable goal, the emphasis on evaluating students, teachers, and schools based solely on test scores has led to unintended consequences (Baker et al., 2010; Shechtman et al., 2013; Dweck et al., 2014). One such consequence is that schools have struggled to teach in ways that develop non-cognitive traits that underlie adaptive and high functioning behaviors (Shechtman et al., 2013; Dweck et al., 2014). As Easton (2012) argues, “The test accountability movement has pushed aside many of these so-called non-cognitive traits or soft skills, and they belong back on the front burner” (p. 19). Students must have opportunities to engage and develop a more productive set of skills to achieve their full potential (Shechtman et al., 2013; Dweck et al., 2014).

For students to reach their full potential, they need opportunities to develop the executive functions and social and emotional dispositions required for successful adjustment in modern society (Farrington et al., 2012; Shechtman et al., 2013). The lack of motivation to do well in school is a loss of human potential, with future implications affecting individual's well-being later in life and economic growth for communities (Dweck et al., 2014). As evident in the growing research on traits and motivation, there is a growing movement to explore the potential of non-cognitive factors that high achieving individuals draw on to accomplish success (Shechtman et al., 2013). In fact, a student's *belief* in her own ability to learn is a powerful driver of academic accomplishments (Dweck et al., 2014).

One such non-cognitive factor is grit: a state of mind found in people who persevere and persist through the daily struggles associated with nearly any endeavor (Duckworth et al., 2007). Whether a musician, athlete, doctor, actor, inventor, business leader, etc., high achievers get to the top of their profession or craft by exhibiting grit throughout the process (Farrington et al., 2012). Grit is like calories for the human body; it supplies energy to sustain focus and effort over a sustained period of time (Robertson-Kraft & Duckworth, 2014; Duckworth et al., 2007; Doskoch & Flora, 2005; Duckworth & Gross, 2014; Maddi et al., 2013). Duckworth et al. (2007) argue that

“Grit entails working strenuously toward challenges, maintaining effort and interest over years despite failure, adversity, and plateaus in progress. The gritty individual approaches achievement as a marathon; his or her advantage is stamina. Whereas disappointment or boredom signals to others that it is time to

change trajectory and cut losses, the gritty individual stays the course” (pp. 1087-1088).

Individuals that stay focused on long-term goals even through setbacks, adversity, and lack of positive reinforcement are considered gritty (Duckworth et al., 2007). Gritty individuals tend to work steadfastly on a significant goal over a prolonged period.

With evidence emerging on the generative nature of grit for optimal human functioning (Farrington et al., 2012), this study explored how school conditions may play a role with the emergence of grit in students. This study is unique because it examines how grit might develop in students rather than measuring successful individuals’ grit level as other researchers have done. Most current research addresses the later phenomenon – grit effects – while neglecting the former – grit development (Eskreis-Winkler et al., 2014).

Statement of the Problem

This study addressed both a problem of practice and a research problem. From a practice perspective, the study used theory and evidence to identify conditions in the school environment that may have a relationship to student grit. With society calling for more development of social and emotional competencies (Farrington et al., 2012), educators need greater knowledge of structures, processes, and practices that have the potential for building the psychological capacity of students. National data on student engagement reveal that schools are not adapting to student’s developmental needs in ways that foster interest and curiosity (Taylor & Parsons, 2011). To illustrate, data released by Quaglia (2016) showed 43 percent of students surveyed nationwide reported school is boring. This diminished student capacity is a problem school leaders need to

acknowledge. Students that are engaged and believe their learning will benefit their future are fourteen times more academically motivated (Quaglia School Voice Report, 2016), but how school leaders can shift the student engagement trend remains a significant problem for educators.

The research problem relates to the lack of theoretical and empirical evidence on school features or individual states that relate to grit. Evidence exists on the effects of grit for academic achievement (Eskreis-Winkler et al., 2016; Duckworth & Quinn, 2009), goal attainment (Duckworth et al., 2007; Duckworth & Quinn, 2009), effective performance (Eskreis-Winkler et al., 2014), and professional success (Baum & Locke, 2004; Locke & Latham, 2013; Vallerand et al., 2014; Wrzesniewski, 2012). The current research on grit has largely taken determined and successful individuals to measure their level of grit (Eskreis-Winkler et al., 2016; Duckworth & Gross, 2014; Duckworth & Quinn, 2009). Education leaders need the tools to nurture and support students as they pursue future academic and professional success. Currently, the evidence on the formation of grit lacks an understanding of the conditions that cultivate grit as well as understanding the school factors that aid in the development of student academic grit (Shechtman et al., 2013; Farrington et al., 2012; Tang et al., 2019). While much of the existing literature examines grit as a predictor of academic success, this study investigates the underlying factors that foster its development within the school environment. It looks at students in an urban school district to measure their level of grit and what conditions that could contribute to their development of grit. One possible connection to the development of grit could come from the Basic Psychological Needs Theory element within Self-Determination Theory. Basic Psychological Needs Theory

(BPNT) could explain some of the psychological factors that explain some school factors that could assist in the development of grit. Psychological factors such as non-cognitive traits can make a difference in student beliefs about themselves, their view of school, and their habits of self-control (Dweck et al., 2014; Dweck, 2006; Tough, 2012). This study examined the degree to which grit relates to autonomy support, competence support, and relational support as described in Basic Psychological Needs Theory.

Statement of the Research Purpose

To address the lack of research on educational antecedents of grit, the purpose of this study was to measure student attitudes and perceptions of the teaching and learning environment to see how they may or may not relate to their self-reported grit. Prior to the empirical test, evidence on the nature of grit and its properties are examined in order to determine what type of school conditions may function as supports for grit formation.

This study addressed the following questions:

1. Is student perceived autonomy supportive instruction significantly associated with the development of grit in a school setting?
2. Is student perceived competence supportive instruction significantly associated with the development of grit in a school setting?
3. Is student perceived relational supportive instruction significantly associated with the development of grit in a school setting?

To address these questions, this study explored conceptual evidence on the meaning and nature of grit and reviewed evidence on the effects of grit. Based on literature, Basic Psychological Needs Theory element of the Self-Determination Theory was used to identify plausible social antecedents of grit.

Definition of Key Terms

The following key terms related to this research are used throughout this dissertation as defined in this section.

Grit. Grit is defined as a personality trait characterized by the perseverance and passion to pursue long-term goals with sustained zeal and hard work (Von Culin et al., 2014; Duckworth et al., 2007; Robertson-Kraft & Duckworth, 2014; Duckworth et al., 2009; Duckworth & Quinn, 2009; Eskreis-Winkler et al., 2014).

Perseverance. Perseverance is defined as initiating and sustaining a high level of focus and effort in the pursuit of academic goals, despite obstacles, setbacks, and distractions (Farrington et al., 2012).

Persistence. Persistence is defined as students' intentions to voluntarily continue to strive towards a goal in spite of obstacles, difficulties, or discouragement (Peterson & Seligman, 2004).

Self-Control. Self-control is defined as having the self-discipline and the ability to self-regulate one's own behaviors, attention, and emotion while avoiding other temptations (Duckworth et al., 2014).

Resiliency. Resiliency is defined as the heightened likelihood of success in school, and other life accomplishments despite environmental adversities brought about by early traits, conditions, and experiences (Wang et al., 1994).

Organization of Dissertation

This dissertation is organized into five chapters. The first chapter presents an introduction to the research, including the statement of the research problem, statement of the research purpose including the research questions, a definition of key terms and a

discussion of the organization of the dissertation. The second chapter provides an overview of the literature on grit by examining the nature of grit, criticism of grit, and similar constructs such as perseverance, persistence, self-control, and resilience. It concludes by exploring the study's theoretical framework including a theory overview of the Basic Psychological Needs Theory and explains its use in the research. Chapter three investigates the study's research methods and its research design, data source, data collection, measures, and analytical technique. Chapter four reports findings of the empirical test with specific attention given to reports on the descriptive analytics, bivariate correlation results and stepwise regression results. Chapter five focuses on the evidence as it applies to grit and BPNT along with some recommendations for school leaders on how to implement best practices in schools and classrooms to foster the development of grit in students. The study culminates with references and appendices.

Chapter 2: Review of Literature

Grit, as a type of positive personality trait, has garnered the attention, interest, and in some cases cynicism of individuals from different sectors of society (Denby, 2016; Ris, 2015; Crede et al., 2017). Before empirically investigating sources of grit in school settings, it is necessary to define it and to review evidence on its nature and function. The literature review serves to define the key constructs relevant to this study and establish the theoretical framework of Basic Psychological Needs Theory within the Self-Determination Theory to guide the current study. The literature review begins by defining the key construct of grit including the historical context and reviewing the differentiation and comparison to other constructs such as perseverance, persistence, self-control, and resilience. Next, this study reviews the effects of grit in academic settings and examines current literature on the formation and development of grit. The chapter concludes by establishing the theoretical framework which will guide the methodology of this study.

Defining Grit and Historical Overview

Why do some people succeed while others seem to lack the drive, want or need for success? Some researchers have argued that certain factors such as self-confidence and motivation (Tavani & Losh, 2003), self-esteem (Joshi & Srivastava, 2009), self-efficacy (Shkullaku, 2009), intelligence (Laidra et al., 2007), emotional intelligence (Parker et al. 2004), and family background (Aremu, 2004, Zellman & Waterman, 1998) contribute at varying degrees to individual success in a given activity. Consistent with this evidence, a growing body of knowledge suggests that accomplishment and attainment may partly depend on the inner drive found in one's level of grit (Duckworth et al., 2007; Robertson-Kraft & Duckworth, 2014; Duckworth & Gross, 2014; Maddi et

al., 2012; Duckworth et al., 2009). According to research, gritty people tend to work harder than their peers do, they struggle through failure, and they remain committed to chosen pursuits over a sustained period of time (Robertson-Kraft & Duckworth, 2014). Grit leads to working vigorously toward challenges, sustaining effort and interest despite failure, adversity, and stagnant progress (Duckworth et al., 2007; Doskoch & Flora, 2005; Duckworth & Gross, 2014; Maddi et al., 2013).

Grit, as a psychological construct, has emerged in the last couple of decades through empirical work on positive personality characteristics of adaptive people (Ris, 2015; Tough, 2012; Denby, 2016; Von Culin et al., 2014; Duckworth & Gross, 2014). It is defined as a personality trait and state characterized by the perseverance and passion to pursue long-term goals with sustained zeal and hard work (Von Culin et al., 2014; Duckworth et al., 2007; Robertson-Kraft & Duckworth, 2014; Duckworth, et al., 2009; Duckworth & Quinn, 2009; Eskreis-Winkler et al., 2014). As a personality trait, grit can be relatively stable across time and situations based on desires, values, goals, and preferences (Von Culin et al., 2014).

As a state of mind, grit can also vary by circumstances and events in one's life (Duckworth & Gross, 2014; Eskreis-Winkler et al., 2014). Doskoch and Flora (2005) define grit as the determination to accomplish an ambitious, long-term goal despite the inevitable obstacles that a person might face in life. Duckworth et al. (2007) describe the gritty individual as a person who approaches a long-term achievement as a marathon. His or her advantage is the stamina to see the long-term goal to completion. A person's drive to focus on long-term desires, values, goals, and preferences will remain constant over months and even years (Von Culin et al., 2014). The gritty individual will continue to

work toward challenges, maintaining effort and interest over years despite setbacks, failures, and adversity (Duckworth et al., 2007; Maddi et al., 2013; Doshier & Flora, 2005; Duckworth & Gross, 2014).

Grit has gained attention since the publication of an article in 2007 in the *Journal of Personality and Social Psychology* (Duckworth et al., 2007). What might seem to be the emergence of a new construct, is actually the manifestation of a phenomenon alluded to in research going back to the late 19th Century. Grit has ties to research conducted by Sir Francis Galton. In his book, *Hereditary Genius*, Galton reviewed biographies of eminent individuals and concluded that ability alone did not bring success in any area, but it was zeal and hard labor (Galton, 1892). Duckworth seeks a parallel between Galton's notion of zeal and capacity with the essence of grit (Duckworth & Gross, 2014; Duckworth et al., 2007).

First identified by Galton in the late 19th Century, this zeal and hard labor was then explored further in the early 20th Century by William James. James proposed in 1907 that most individuals make use of only a small part of their resources, and few exceptional individuals actually push themselves hard enough to their limits (Duckworth et al., 2007). In addition to cognitive ability, high achieving individuals have attributes such as grit that push them to strive for long-term achievement (Duckworth et al., 2007). Continuing James' work, C. M. Cox (1926) concluded that traits in childhood such as persistence of motive and effort, confidence in their abilities, and great strength of character predicted lifetime achievement (Eskreis-Winkler et al., 2016). The study of grit in recent years continues the investigation of James' inquiry into why some individuals accomplish more than others given similar intelligence levels.

What partly contributed to the formal conceptualization and measurement of grit was psychologist Martin Seligman's push to steer psychology toward a positive viewpoint of behavior and life. Seligman was convinced that finding positive attributes in children helps them to become more successful (Duckworth et al., 2009). Such positive traits include, but are not limited to, the capacity of love, courage, interpersonal skill, perseverance, forgiveness, spirituality, talent, and wisdom (Seligman & Csikszentmihalyi, 2000). People who have a drive and focus to reach goals may experience periods of self-doubt and discouragement but find ways to overcome those barriers in their determination to succeed. Gritty individuals continue on their journey to success even without support (Duckworth et al., 2007; Duckworth & Quinn, 2009). As Duckworth and Quinn (2009) assert, individuals high in grit continue on their journey to accomplish their goals, even with the lack of positive or supportive feedback. They may experience challenges and may question their ability to accomplish a challenging goal, but they end up working through difficulties to accomplish desired outcomes.

Comparison of Grit to Other Personality Behaviors

In defining and describing characteristics of grit, the objective is to address what Reschly and Christianson (2012) refer to as the jingle/jangle problem in social and behavioral science. Jingle occurs when the same term is used to refer to different concepts. Jangle occurs when different terms are used for the same concept. With the recent popularity of grit, tautology with other concepts can be understandable. Grit shares common attributes with perseverance, persistence, self-control, and resilience, but as described next, grit is substantively different from these traits and states. These differences are highlighted by comparing and contrasting characteristics of grit and other

closely related personal characteristics. After addressing the differences between grit and other personality constructs, an explanation of how grit works with these characteristics or traits provides another layer of understanding.

Uniqueness of Grit

To establish conceptual clarity, this section distinguishes between perseverance, persistence, self-control and resilience as they relate to the present study. After describing the characteristics of each construct, they will be contrasted with grit to identify any similarities and differences. Grit represents a core cognitive belief system while the other concepts are distinct in how they are manifested as behaviors.

Perseverance

Academic perseverance is defined as initiating and sustaining a high level of focus and effort in the pursuit of academic goals, despite obstacles, setbacks, and distractions (Farrington et al., 2012; Peterson & Seligman, 2004; Shechtman et al., 2013). It is the tendency to complete school assignments on time, to the best of the student's ability "despite any distractions, obstacles, or challenges" (Farrington et al., 2012). To persevere academically requires that students stay focused on a goal despite obstacles and forego distractions or temptations to prioritize higher pursuits over lower pleasures (Farrington et al., 2012). Farrington et al. (2012) report that academic perseverance "requires not only an initial surge of momentum in a focused direction but also the ability to maintain that momentum regardless of what gets in the way" (p. 20). As noted by Shechtman and colleagues (2013) "Scholars and practitioners are exposing concerns that children in the middle and upper classes are learning how to work hard to 'do school' but

are not developing the life skills to persevere in the face of the challenges they will face in the real world” (pg. 18).

The definition and description of perseverance offered by Farrington et al. (2012) include similar features as grit. In a study of grit, Komarraju et al. (2011) determined that both grit and perseverance were predictive of academic performance. Students with academic perseverance continue working hard for a good grade in the challenging class even after failing several tests and looking for new ways to understand the difficult material (Farrington et al., 2012; Shechtman et al., 2013). The academic perseverant student is more likely to achieve academic goals such as earning high grades across his/her academic career, graduating from high school with a high GPA, being admitted to a desired college or university, or completing a college degree (Nagaoka et al., 2013). Grit and perseverance are similar in that both constructs stress staying focused on a goal despite setbacks, obstacles, and other distractions (Farrington et al., 2012).

Grit differs from perseverance, however, in two important ways. First, grit describes a long-term focus whereas perseverance is associated with shorter-term goals which is necessary to overcome immediate hurdles such as successfully finishing a module for a class. Grit is associated with working hard towards a goal over years despite setbacks and failures (Duckworth et al., 2007; Duckworth & Quinn, 2009; Singh & Jha, 2008; Daskoch & Flora, 2005; Von Culin et al., 2014). The presence of sustained effort is supported by other cognitive factors such as growth mindset. Growth mindset might be a contributing factor to grit (Myers et al., 2016). Growth mindset has the belief that intelligence grows through hard work and dedication (Dweck, 2006). By contrast, a fixed mindset is having the belief that talent and intelligence cannot be changed (Dweck,

2006). Having a gritty perspective often implies that sustained effort leads to gradual improvement which reinforces the growth mindset (Duckworth, 2016). The growth mindset serves a foundation that enables the sustained effort and perseverance that define the trait of grit.

Second, perseverance manifests itself as a behavioral characteristic exhibited, to a greater or lesser degree, when an individual confronts a challenge or experiences a setback (Farrington et al., 2012; Shechtman et al., 2013). Grit, in contrast, is a cognitive belief infused with a growth mindset about growing, adapting, and changing, as needed, to accomplish long-term goals. The gritty person is undoubtedly persevering, but grit is not defined by perseverance alone (Von Culin et al., 2014). It reflects the disposition or trait that fuels the behavior to persevere through challenges on the path to goal achievement.

Persistence

Persistence, like perseverance, is often misinterpreted as grit; however, these terms represent distinct psychological characteristics (Shechtman et al., 2013).

Persistence is defined as students' efforts to strive towards a goal despite obstacles, difficulties, or discouragement (Peterson & Seligman, 2004; Bonneville-Roussy et al., 2013). When one graduates from college, he or she is not likely to be hired for his or her ideal first job nor make his or her ideal salary. However, through persistence and hard work, the individual can reach the ideal job he/she desires. Educational persistence is described as the likelihood of success in school, and other life accomplishments, despite environmental adversities brought about by early traits, conditions, and experiences (Wang et al., 1994). Educational persistence indicators, such as student motivation, study

skills, and study habits, show enhanced academic learning, performance, and persistence (Black & Deci, 2000; Vansteenkiste et al., 2004).

Persistence and grit share some features, but they also differ. Persistence and grit are similar in their focus on accomplishing goals regardless of setbacks or adversity. Grit differs from persistence in two ways. First, persistence is striving toward a shorter-term goal such as motivation towards completing a class or obtaining a good grade. Grit is a disposition that focuses on a generic desire to achieve a long-term goal as well as a fulfilling life (Duckworth et al., 2007; Duckworth & Quinn, 2009; Duckworth et al., 2009). Second, persistence establishes itself as a behavioral characteristic as an individual experiences a challenge or setback. The task or challenge requires an individual to generate the energy to act. Persistence is the action or behavior. Grit, in contrast, is a cognitive belief in accomplishing long-term goals. The general disposition reflects an attitude of goal fulfillment and aspiration that fuels the behavior (Duckworth et al., 2007).

Self-Control

Grit and self-control share some similar conceptual characteristics which often can be misinterpreted with one another; however, they are similar yet distinct constructs. Human behavior is goal-directed (Locke & Latham, 2013). Similar to grit, self-control predicts achievement-related outcomes such as school performance, income, and employment (de Ridder et al., 2012; Duckworth & Carlson, 2013; Moffitt et al., 2011). Self-control has an array of terms used synonymously, including self-regulation, self-discipline, willpower, effortful control, and ego strength (Depue & Collins, 1999; Evenden, 1999; White et al., 1994; Whiteside & Lynam, 2001). Self-control is the “exertion of control over the self by the self” (Muraven & Baumeister, 2000, p. 247).

Self-control is also defined as “the voluntary regulation of attentional, emotional, and behavioral impulses when immediate temptations conflict with more enduringly valued goals” (Duckworth et al., 2014, p. 200). According to Duckworth et al. (2014), self-control requires doing what one knows to be best in the end, and it must be self-initiated. Self-control is the ability to discourage or revoke immediate urges to realize a long-term goal (de Ridder et al., 2012; Metcalfe & Mischel, 1999).

In studies conducted with cadets at West Point Military Academy and competitors at the Scripps Spelling Bee, self-control and grit were two determinants of success that were highly correlated, and both predicted success outcomes beyond intelligence (Duckworth et al., 2007; Duckworth & Seligman, 2005; Moffitt et al., 2011). In studies of grit, self-control was a better predictor of academic performance at West Point; however, grit was the better predictor in cadet retention during the first arduous summer (Duckworth et al., 2007). Self-control along with other related constructs such as ego strength, effortful control, and Big Five Personality Trait conscientiousness are related to positive life outcomes (Duckworth & Gross, 2014). Self-control predicts social competence and positive relationships with both adults and peers (Eisenberg et al., 2014), better health (Tsukayama et al., 2010), and success and well-being in adulthood including income, savings, physical and mental health (Moffitt et al., 2011).

Self-control complements grit in two ways (Duckworth & Gross, 2014). First, self-control is needed on the individual’s part to stay focused on the long-term goal despite the adversity or setbacks that the individual may face. Second, the self-controlled individuals are more adept at regulating their behavioral, emotional, and attentional impulses to achieve long-term goals (Duckworth, 2011). The gritty person continues

working towards the set goal working through obstacles and setbacks that could last years or possibly decades (Duckworth et al., 2014).

Self-control and grit are related to one another, but they should not be confused as being the same phenomenon (Duckworth et al., 2014). Similar to the other constructs, self-control and grit share features, but they capture distinct states of minds. Self-control is having the self-discipline and the ability to regulate one's own behaviors, attention, and emotion while avoiding the other temptations (Duckworth & Gross, 2014; Duckworth et al., 2014). Grit is a mindset and orientates toward working tenaciously toward that purpose even in the face of obstacles, adversity, or setbacks that could take years or even decades to complete (Duckworth & Gross, 2014). Self-control takes on more lower-order goals that are short-term and more numerous. It will take self-control to focus on the short-term goal instead of concentrating on another conflict that could get in the way of achieving the goal. In contrast, grit manifests a long-term commitment to work towards the goal.

Resilience

Like other traits, grit shares important features with resilience, especially when in the face of adversity. While grit describes an individual focused on achieving long-term goals despite any setbacks (Duckworth et al., 2007), resilience refers to the individuals who can produce positive outcomes while avoiding negative influences in adverse situations such as home, school, and community (Wyman et al., 1999). Educational resilience is defined as “the heightened likelihood of success in school and other life accomplishments despite environmental adversities brought by early traits, conditions, and experiences” (Wang et al., 1994, p. 46). Resilience produces positive developmental

outcomes among children who live in high-risk situations, sustained competence under long-term stress situations, and recovery from trauma (Henderson & Milstein, 2003).

Empirical research suggests personality factors that have shown to facilitate resilience under stress are grit and hardiness (Maddi et al., 2012). Duckworth et al. (2009) suggest that the positive traits that determine commitment and resilience in the face of adversity might play an essential role in determining teacher effectiveness. Other research also indicates resilient individuals are skilled at identifying others outside of the family to assist in working through the stressors in the high-risk environments (Phillips et al., 2011). Resilience serves as a contributing factor in predicting success in the rigors of school and life (Stoffel & Cain, 2018). Resilience is considered the optimism to continue when things get tough. In contrast, grit is the motivational drive that keeps a person focused on that difficult task over a period of time (Perkins-Gough, 2013).

Grit and resilience are conceptually different in two ways. First, resilient individuals can flourish despite having adverse conditions to overcome such as poverty, racism, low family cohesion, family psychiatric illness, or alcoholism (Bosworth & Earthman, 2002). Second, resilience is agnostic on the stability of an individual's interests through overcoming adversity in life (Robertson-Kraft & Duckworth, 2014). The gritty individual is resilient and stays focused working strenuously through challenges, maintaining effort and interest over years despite effort, adversity, and plateaus in progress (Duckworth et al., 2007).

In summary, the distinctions among grit, perseverance, persistence, self-control, and resilience, reveals that grit functions as a state of mind that directs long-term effort to achieve long-term goals. Unlike constructs that focus on immediate action, grit is distinct

because it requires both interest and passion as the core drivers for goal achievement. In this sense, grit is the guiding principle that determines the past and the destination. The actions such as persistence and perseverance are the behavioral fuel that drives the movement in grit. Without the belief system of interest and passion within grit, the effort would be less focused and less likely to result in successful completion as compared to highly gritty individuals. In other words, the actions are the fuel that drives grit. Interests and passion drive the path to goal achievement.

Drawing directly from the literature, this study conceptualizes grit as a construct supported by perseverance, persistence, self-control, and resilience. While these traits are distinct, they work in congruence with grit as individuals encounter challenges and setbacks (Farrington et al., 2012; Robertson-Kraft & Duckworth, 2014; Duckworth & Gross, 2014; Duckworth et al., 2014). By defining these relationships, this study distinguishes grit from similar characteristics while acknowledging the shared role these traits play in student success.

The Grit Scale was developed as a two-factor structure that measured interest and effort (Duckworth & Quinn, 2009). This structure was consistent with the theory of grit comprising of stamina with consistency of interests and consistency of effort (Duckworth & Quinn, 2009). Developing a passion for interests takes some time for discovery, followed by much development of that skill and years of deepening and sharpening that skill that takes a focus of effort (Duckworth, 2016). Grit reflects a state of mind that combines the consistency of interests and the consistency of effort to keep going despite failures, setbacks, or plateaus in progress (Duckworth et al., 2007).

Effects of Grit

Beyond the conceptual definition and differentiation from related traits, a plethora of empirical literature has sought to describe the effects of grit across variable disciplines. Research places grit as a predictor of success, often demonstrating a strong influence on long-term outcomes that is focused on a consistency of interests and consistency of effort (Duckworth et al., 2007; Duckworth, 2016; Eskreis-Winkler et al., 2016). The following sections of this chapter explore the primary findings of these effects. First, this review examines the role of grit in goal attainment. Next, the discussion shifts to review the influence of grit within academic contexts.

Grit in Goal Attainment

One reason to study the formation of grit comes from evidence on the effect of grit for goal attainment (Duckworth et al., 2007). Grit has been studied in various contexts including motivational components of long-term goals, success traits in various settings, cadets at West Point Military Academy, and other smaller studies outside of the learning environment. Together, this body of research demonstrates the predictive power of grit for success across disciplines, but it lacks an examination of the factors it takes to foster the development of grit that will then transfer outside of the structured learning environment.

Grit has been studied in many contexts, not just in the academic setting. Von Culin et al. (2014) conducted a study on motivational correlates for long-term goals as it relates to the two-component facets of grit: perseverance of effort and consistency of interests. They found that those that pursued happiness through engagement and meaning were gritty. By contrast, individuals that pursued happiness through pleasure were less

gritty as compared to their more disciplined peers. Grittier individuals were more likely to seek meaning in life compared to individuals who mainly reported seeking pleasure in life (Von Culin et al., 2014). In a separate study, Singh and Jha (2008) found that happiness, positive affect, and life satisfaction are positively correlated to grit.

Additionally, grit was tested with the Big Five Traits (Duckworth et al., 2007). The Big Five model is a framework that predicts success that includes openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism (Goldberg, 1990). Conscientiousness was related to grit, more so than neuroticism, agreeableness, extraversion, and openness to experience. Other studies concluded gritty adults tend to make fewer career changes (Duckworth et al., 2007); older individuals report higher levels of grit, suggesting that life experience is a contributing factor (Duckworth et al., 2007); gritty sales representatives were more likely to remain at their jobs long-term (Eskreis-Winkler et al., 2014); gritty men were more likely to remain married, but there was no association with women and their marital status (Eskreis-Winkler et al., 2014), grit seemed to provide some protection against internet addiction, although the relationship was not as strong (Maddi et al., 2013). All of these details add up to grit being associated with lifetime educational attainment (Duckworth & Quinn, 2009; Duckworth & Gross, 2014) and professional success (Baum & Locke, 2004; Vallerand et al., 2014; Wrzesniewski, 2012; Duckworth & Gross, 2014).

In a separate study, Duckworth and Quinn (2009) studied cadets attending the United States Military Academy, West Point. While at West Point, candidates begin with a summer program that initiates students into the life of the military. The training includes physically tough field training and exercises requiring continuing performance

evaluations while having little sleep. After the first year of training, candidates are required to manage tough and challenging coursework, continue physical fitness training, participate in intramural sports, live to the honor code, function with fewer than five hours of sleep each night, have minimal opportunities to visit home, and participate in constant academic, military, and physical performance evaluations (Maddi et al., 2012). In this context, grit was shown to be predictive of GPA in college and retention at West Point Academy. Grittier candidates were more likely to make it through the first arduous summer as well as the ensuing four years of the academy (Duckworth & Quinn, 2009; Duckworth et al., 2007; Duckworth & Gross, 2014). Cadets higher in grit were less likely to drop out than their less gritty peers (Duckworth & Quinn, 2009). West Point cadets who were one standard deviation higher in grit had 62 percent higher odds of remaining at West Point (Eskreis-Winkler et al., 2014).

Grit in Academia

Another reason to study the formation of grit is its effect on education and success in academics. Grit has been studied in school and academic settings in various contexts. This study will review three particular contexts: studying novice teachers biographical data, Teach for America (TFA) novice teachers effectiveness, and Scripps Spelling Bee competition.

Robertson-Kraft and Duckworth (2014) studied the personal qualities of novice teachers by examining biographical data. In this investigation, Robertson-Kraft and Duckworth had coders review teachers' resumes and assign a grit score based on evidence of perseverance and passion in college activities and work experience. The grit scores were then used to predict teacher retention through the academic year.

Effectiveness was measured in terms of students' one-year academic gains. The predictive validity of grit scores was compared to other variables at the time of hiring such as college GPA, ratings of leadership experience, and demographic variables. The results indicated that grit predicted teacher retention and effectiveness in low-income public schools (Duckworth et al., 2009; Robertson-Kraft & Duckworth, 2014). Grittier novice teachers were more likely to stay in teaching. In addition, these grittier teachers were more effective in terms of student achievement than their less gritty peers (Duckworth & Gross, 2014).

There is evidence that grit is found in more effective novice teachers. Duckworth et al. (2009) studied the effectiveness of novice teachers in the Teach for America (TFA) program. TFA was an ideal program for study because new teachers are placed in challenging contexts without being able to choose their schools, classes, or teaching assignments. Duckworth et al. (2009) examined the contributions of three positive traits to the teachers' effectiveness in the classroom: grit, life satisfaction, and optimism. Teachers high in grit were more likely to outperform their less gritty peers as measured by academic gains of students (Duckworth et al., 2009). Grittier individuals worked harder and longer in challenging settings than less gritty peers and sustained effort despite adversity that had a direct effect on performance (Duckworth & Quinn, 2009).

In a third study, the 2005 Scripps National Spelling Bee, grit predicted advancement to higher rounds in the spelling bee competition (Duckworth et al., 2007; Duckworth & Gross, 2014; Duckworth et al. 2011). In this study, gritty spelling bee finalists outperformed their less gritty peers partly because the gritty individuals worked harder, studied longer and performed better (Duckworth et al., 2007). The grittier spelling

bee competitors accumulated more hours of deliberate practice over years, which explained the effect of grit on the final ranking in the spelling bee contest (Duckworth & Gross, 2014; Robertson-Kraft & Duckworth, 2014).

In summary, the evidence from different contexts and different tasks indicate that gritty individuals tend to work harder than their less gritty peers and remain committed to the chosen pursuits over a period of time (Robertson-Kraft & Duckworth, 2014). Students driven in high school will persevere to complete the tough assignment, to complete that tough course, or persevere with a tough instructor (Farrington et al., 2012). Students with academic grit continue working hard for a good grade in a challenging class even after failing several tests, and they will keep looking for new ways to understand difficult material instead of giving up (Dweck et al., 2014; Farrington et al., 2012). Behavioral research indicates that attention to the formation of grit can enhance the educational outcomes of students (Shechtman et al., 2013). Silvia et al. (2013) argue that “Grit predicts success in part by promoting self-control allowing people to persist in repetitive, tedious, or frustrating behaviors that are necessary for success” (p. 200). People high in grit are more passionate about their goals and more dedicated to accomplishing them (Silvia et al., 2013).

Criticism of Grit

Despite its widespread popularity and empirical support, the construct grit is not without its scholarly critics. To these researchers, the concept of grit may be viewed as merely another buzzword of other motivational concepts already established in psychology (Shapiro, 2013; Thomas, 2013; Isquith, 2014; Ravitch, 2014; Snyder, 2014; Ravitch, 2015). This section reviews some of the academic criticisms of the concept grit.

Angela Duckworth, researcher of the grit construct, investigated the determinants of elite success within specific professional sectors. She discovered that the highly successful had a fierce determination that was unusually resilient, hardworking and knew precisely what they wanted to achieve (Denby, 2016). Individuals with high levels of grit are thought to use their capabilities better because they are less distracted by other goals and less discouraged by the failures and setback (Crede et al., 2017). However, some warn that too much grit can be dysfunctional and counterproductive (Crede et al., 2017; Karabenick, 2003; Lucas et al., 2015). When working on the same goal but results continue to fail, a costly result could have been to seek an alternative course of action (McFarlin et al., 1984). In other words, an individual needs to stop, reassess and try something else. Alfie Kohn (2014) states it can be counterproductive and unhealthy to stay focused on one goal that is not going anywhere.

Another criticism of grit is the potential for social desirability bias from the use of self-reported surveys or questionnaires (West, 2014; Cohen, 2015). The grit survey is a self-reported questionnaire and survey. Social desirability bias is when individuals tend to report their experiences inaccurately in order to present themselves in the best possible light or what is socially acceptable (Cohen, 2015; Krumpal, 2014). There is evidence that the school climate in which a student participates in answering a self-reported survey can significantly affect the answer they give (Cohen, 2015; West, 2014). In particular, respondents seek to present themselves in a way that is socially acceptable that skews results (Cohen, 2015).

Education reformers are seeking ways to connect grit to success by exploring interventions that are designed to enhance grit. Beliefs that grit can be taught have

resulted in some schools working to nurture or support an increase in student grit levels (Perkins-Gough, 2013; Crede et al., 2017). In 2016, the State of California initiated a pilot program across nine school districts where a student survey measured the level of grit that would count for eight percent of the school's overall report card (Sloat, 2016; Moser, 2016; Zernike, 2016; Anderson, 2016). This approach to assessment is relevant because, as Duckworth argues, grit is a factor that cannot be evaluated through standardized testing (Sloat, 2016). She also states that there is not a reliable way to assess grit on a mass scale such as on a standardized student test. These self-reported questionnaires open a chance for misinterpretation and social desirability biases (Sloat, 2016; West, 2014; Anderson, 2016; Denby, 2016). High stakes character assessment cannot measure character development in the same way as measuring how many math problems a student answered correctly (Moser, 2016). So, the question remains how individuals can develop, cultivate, and grow grit. The next section explores the formation of grit.

Formation of Grit

Angela Duckworth's work with grit led her to begin interviewing leaders in business, art, athletics, journalism, academia, medicine and law to find out what made them successful (Denby, 2016; Duckworth, 2016). She discovered that highly successful individuals had a fierce determination characterized by resilience and hard work. These individuals precisely knew what they wanted to achieve (Denby, 2016). Individuals that have overcome difficult circumstances in life serve as compelling case studies demonstrating grit and its function in personal and professional accomplishment. The

open question, however, has to do with the development of grit in individuals. Are people born with grit or is grit socially engineered?

The question to consider is are people born with grit or can they develop it over time? While there has not been any empirical research that directly answers this question, some researchers have proposed ideas that could be hypothesized based on their research. Some researchers have suggested that grit might be more malleable than other traditional predictors of academic achievement like intelligence (Duckworth & Gross, 2014). In the development of grit, it has been proposed that experiences that give individuals the opportunity to develop optimism, learn deliberate practice, and develop and increase intrinsic motivation could foster an environment in which grit could grow (Duckworth, 2016).

Research on grit have studied the effects with cadets at West Point Military Academy (Duckworth & Quinn, 2009), students participating in the Scripps National Spelling Bee (Duckworth et al., 2007), novice teachers in the Teach for America (TFA) program (Duckworth et al., 2009), high school students that are more likely to graduate (Eskreis-Winkler et al., 2014), and teachers developing better academic performance in students (Duckworth et al., 2009). Grit has two components: consistency of interests and consistency of effort.

To develop grit, individuals first must advance their interests and passion. Passion is finding intrinsically enjoyable interests (Duckworth, 2016). The findings in a meta-analysis from multiple studies showed that people are more satisfied with their jobs when they do something that fits their interests (Duckworth, 2016; Morris, 2003). Also, people perform better at their job when their work is interesting. Another meta-analysis

concluded that when intrinsic personal interests fit with their chosen career paths, individuals perform better at their job, are more helpful to coworkers, and stay at their jobs longer (Duckworth, 2016; Nye et al., 2012). The consistency of interests aligns with passion (Eskreis-Winkler et al., 2016). Consistency of interests is the tendency to “invest effort in the same goal over time” (Eskreis-Winkler et al., 2016, p 3). The questions on the grit survey assess the tendency to pursue a single objective rather than multiple objectives over long periods. It takes a consistency of interest that is stable over time and situations to stay focused on the desires, values, goals, and preferences rather than a want or need in the moment (Von Culin et al., 2014).

The consistency of effort is the tendency to sustain effort towards goals. A common theme with successful individuals is the idea of deliberate practice. They must devote to a daily discipline for improving a desired skill set. If an individual sets a goal to run a marathon, he/she will need to devote themselves to a set schedule of practice to improve their run distances and their runtime. Through consistency of effort, they must commit themselves to always improving. A significant advantage to grit included people devoting more time on task while they stuck with their commitments longer than others (Duckworth, 2016). In interviews with highly successful people, journalist Hester Lacey noticed they all demonstrated a desire to excel beyond their current level of expertise; it requires a positive state of mind without looking back (Duckworth, 2016). Experts not only log more hours of practice, but they also practice differently by focusing on deliberate practice (Duckworth, 2016; Ericsson et al., 1993). Grittier kids reported working harder than other kids did when doing deliberate practice (Duckworth et al., 2007; Duckworth, 2016; Duckworth et al., 2011). In the study of students at the 2005

Scripps National Spelling Bee, students that made it to the final round studied longer.

“Weekend hours of practice mediated the relationship between grit and final round of the spelling bee” (Duckworth et al., 2007, p. 1097). Grit grows with age, and one learns from experiences that quitting, changing plans, or starting over repeatedly are not suitable for success (Duckworth et al., 2007).

While not much evidence exists about the formation of grit, an examination of self-efficacy can inform how grit is formed in individuals. Self-efficacy beliefs are developed when individuals experience success through mastery experiences. In addition, self-efficacy is also influenced by vicarious learning or otherwise known as modeling (Stajkovic & Luthans, 1998). Having a role model can influence one’s self-beliefs. Verbal persuasion serves as another means of strengthening self-efficacy by enhancing the beliefs that the individual already possesses (Stajkovic & Luthans, 1998).

In review, a significant limitation in the current literature is the lack of research focused on the antecedents of grit especially in K-12 academic settings. Evidence on grit is mostly limited to its performance and goal-related outcomes. In general, grit appears to be a trait found in individuals who overcome challenges and hardships to excel in specific long-term goals. It is unclear how grit may be formed in individuals for the purpose of academic responsibilities. We do not know if academic grit is a student characteristic that is shaped by conditions in the school environment. This study will now turn to an examination of Self-Determination Theory (SDT) as the theoretical framework to determine if specific psychological needs or school supports may be foster the formation and development of grit.

Theoretical Framework

Grit is a personality trait and belief that can trigger specific behaviors such as perseverance, persistence, self-control, and resilience to achieve long-term goals (Farrington et al., 2012; Shechtman et al., 2013). Grit also requires personal motivation and personal interest to achieve long-term goals (Roberts et al., 2006; Von Culin et al., 2014). For this reason, theories of motivation have value for advancing claims about plausible sources of grit. Self-determination, in particular, offers an explanation that accounts for the interaction of social factors and student psychological needs (Ryan & Deci, 2011). The intent in this section is to derive from self-determination theory a set of social factors conjectured to be related to student grit.

From birth, humans are active, inquisitive, curious, and playful creatures, displaying an ever-present readiness to learn and explore while not requiring irrelevant incentives (Ryan & Deci, 2000; Niemiec & Ryan, 2009). Ryan and Deci (2000) state this tendency from birth to be inquisitive, active human beings is “a critical element in cognitive, social, and physical development because it is through acting on one’s inherent interests that one grows in knowledge and skills” (p. 56). Self-Determination Theory (SDT) provides a theoretical framework for understanding this internal motivation to seek mastery and growth. A macro-theory of human motivation, Self-Determination Theory takes an interest in factors that facilitate the growth processes in people (Ryan & Deci, 2000; Niemiec & Ryan, 2009). In particular, Self-Determination Theory examines intrinsic and extrinsic sources of motivation and focuses on how social and cultural factors affect motivation and initiative.

Self-Determination Theory can inform our understanding of human success. The success behind high performers is tied to having an environment that enables those individuals to function optimally (Duckworth, 2016; Ryan & Deci, 2000). Self-Determination Theory is useful for studying human functioning. Self-Determination Theory connects the need for personal growth with intrinsic motivation suggesting that autonomy, relatedness, and competence are required to experience optimal human functioning (Deci & Ryan, 1985; Ryan & Deci, 2000). Within the research connected to motivation, one specific mini-theory of particular importance to grit is Basic Psychological Needs Theory. Within Basic Psychological Need Theory, three distinct categories of motivation exist: autonomy, competence, and relatedness.

Basic Psychological Needs Theory

Basic Psychological Needs Theory (BPNT) provides the explanatory bridge that connects extrinsic motivation with more autonomous motivation. Reeve et al. (2008) claim that BPNT was developed to “Identify students’ innate, universal psychological needs as sources of autonomous self-regulation and to investigate the degree to which their satisfaction facilitates learning, development, and well-being” (p. 227). Basic psychological needs are defined as universal requirements for ongoing psychological growth, integrity, and well-being (Ryan & Deci, 2000). Ryan et al. (1996) define needs as universal necessities, the nutriments that are essential for optimal human development and integrity. Research in positive psychology (Duckworth et al., 2007; Crede et al., 2017; Duckworth et al., 2011) has shown grit to be a powerful predictor of success across a variety of populations (Crede et al., 2017).

Three specific psychological needs influence healthy functioning (Ryan & Deci, 2000). In experiencing psychological progress, SDT emphasizes the satisfaction of these basic needs: autonomy, competence, and relatedness (Deci & Ryan, 1985). These three psychological needs are considered as necessary for psychological health, adaptive behavior, personality development, and peak functioning (Ryan & Deci, 2000). Satisfying the basic psychological needs of autonomy support, competence support and relatedness support is considered as one of the variables that might influence grit tendencies (Akbag & Ummet, 2017).

Motivation is dependent on the fulfillment of three basic psychological needs described by SDT (Deci & Ryan, 1985; Ryan & Deci, 2000). To better understand motivation, this study will describe and define autonomy, competence, and relatedness. Autonomy is defined as the feeling of freedom and the sense that one's behavior is self-initiated and personally endorsed rather than pressured by an external force. Autonomy is supported by the internalized experiences of interest and value without being externally controlled by rewards or punishment (Ryan & Deci, 2000).

Competence is defined as the feelings of accomplishment and increasing mastery in chosen activities which is best satisfied when environments such as classrooms provide opportunities for challenges, positive feedback and opportunities for growth (Ryan & Deci, 2000). Relatedness is defined as the feelings of being accepted and sharing a meaningful experience with others. It is facilitated by mutual respect and caring (Ryan & Deci, 2000). Researchers have found competence, relatedness, and autonomy are related to positive outcomes, more fulfilling relationships, and better overall psychological health (Chirkov et al., 2011).

The framework within the BPNT addresses issues that are pertinent to personal growth and well-being (Gunnell et al., 2013). In a study, Jin and Kim (2017) found grit to be positively and strongly related to autonomy ($\beta=.60$, $p<.001$) and competence ($\beta=.60$, $p<.001$). The basic needs of autonomy and competence mediated the effect of grit on life satisfaction (Jin & Kim, 2017). A gritty person takes goals and places intrinsic value on them because the basic psychological needs have been satisfied (Akbag & Umme, 2017; Duckworth et al., 2007). Satisfaction of the basic psychological needs might influence one's grit tendencies (Akbag & Umme, 2017).

Gritty individuals can regulate their own behaviors, emotions and goal setting. These individuals regulate their behaviors through hard work and zeal to complete the long-term goal with perseverance and persistence (Duckworth et al., 2007; Duckworth & Gross, 2014; Duckworth et al., 2009). Gritty people show resilience in response to difficulties, exhibit flexible behavior, have the ability to cope with stress, and demonstrate an unwillingness to give up easily (Bailey et al., 2012; Duckworth et al., 2007). These individuals are more capable of satisfying their autonomy, competence, and relatedness needs (Akbag & Umme, 2017). Autonomy, competence, and relatedness have been found to predict students' engagement in academic work (Skinner, et al., 2012). In fact, Shogren et al. (2013) argue that students that have self-determination skills such as goal setting, problem-solving, and self-regulation behaviors are more likely to be successful in the general education curriculum. Intrinsic motivation is dependent on the fulfillment of the three basic psychological needs (Deci & Ryan, 1985; Kursurkar et al., 2012).

Research Questions and Rationale

The evidence behind SDT provides the theoretical foundation for the research questions that can be tested in the empirical part of the study. Support for student psychological needs and the effects of need-support on motivation and adaptive behavior is the specific dimension of SDT that has implications for variability in student grit. As a personality trait, grit is likely to remain relatively stable, but such proclaimed stability should not indicate that grit is a fixed characteristic. Evidence has shown the human mindsets and traits are influenced by conditions in the social environment (Dweck et al., 2014). Autonomy support, competence support, and relatedness support represent general experiences that can alter personality characteristics (Ryan & Deci, 2000).

The motivational and performance effects of need-supporting instructional strategies are well established. Students who experience classrooms as reinforcing their psychological needs have higher interest in academic tasks (Niemic & Ryan, 2009), greater persistence (Kursurkar et al., 2012), more engagement in uninteresting activities (Reeve, 2006), and higher achievement (Fortier et al., 1995; Niemic & Ryan, 2009; Vallerand et al., 1997). Classrooms experienced as controlling erode interest and motivation (Reeve, 2002; Tsai et al., 2008), reduce creativity and expression (Koestner et al., 1984), enhance anxiety, and reduce learning (Ryan & Weinstein, 2009).

Associated with the above effects of need-support is an underlying connection to inner student resources behind high functioning individuals. Grit is an internal resource that underlies peak student performance. Most current evidence indicates that character traits, cognitive functioning, and motivational states are malleable characteristics that are partly affected by one's task context and social surroundings (Dweck et al., 2014; Ryan

& Deci, 2000). As explained by self-determination theory, support for psychological needs makes the difference between an enriching and activating environment and a suppressing and constraining one (Gagne' & Deci, 2005). Principals and teachers control the degree to which students experience schooling and learning as supportive or constraining. Building upon the theoretical framework that serves as the basis of this study, three research questions were advanced for examination:

R1: Is student perceived autonomy supportive instruction significantly associated with the development of grit in a school setting?

R2: Is student perceived competence supportive instruction significantly associated with the development of grit in a school setting?

R3: Is student perceived relational supportive instruction significantly associated with the development of grit in a school setting?

Chapter 3: Research Methods

The purpose of this study was to investigate the relationship between student grit and three psychological needs identified by the Basic Psychological Needs Theory of autonomy support, competence support and relational support to determine if they are predictors in the formation of student grit. For the empirical component of this study, a non-experimental, correlational research design utilizing a cross-sectional approach was used. The purpose was to measure student attitudes and perceptions of the teaching and learning environment and assess the connections with self-reported levels of grit. As a cross-sectional study, the purpose was not intended to make strong causal claims about the determinants of grit. Rather, this research aimed to explore plausible relationships between grit and social conditions in the school environment and individual student characteristics.

Data Source

Data for the study came from the Oklahoma Center for Education Policy (OCEP). The research site for this study is a large suburban school district in the Central Midwest, referred to hereafter by the pseudonym Central Public Schools. OCEP through its capacity project with Central Public Schools have de-identified data from elementary, middle, and high school students. The respective school districts collected student data and shared with OCEP as part of a data sharing agreement. OCEP administered this project in partnership with Central Public Schools for four consecutive years spanning from the 2013-2014 school year through the 2016-2017 school year. The data utilized in this study were drawn from the latest collection cycle conducted in 2017.

Data were collected from students, parents, school principals, and faculty in Central Public Schools. All 4th grade students and their parents were surveyed. In addition, 100 students were randomly surveyed from each of the 6th, 7th, 8th, 9th, 10th, 11th and 12th grades. Faculty members and principals were also surveyed via electronic survey received through their school email account. All student surveys were administered by the school district during the school day. Parent surveys were taken home by each sampled student to be filled out by the parents and returned to school in a sealed envelope or mailed directly to OCEP. For the purpose of this study, only student surveys were analyzed. The response rates were calculated based on the number of usable responses received. Responses were considered unusable if fewer than half of the items were completed. The response rates for student surveys were at 68%. This study utilized several scales to measure grit, autonomy support, competence support and relational support. In the case of relational support, the student trust in teachers scale was utilized.

Measures

The school district used in this study is located in a city in the Central Midwest with a population of approximately 600,000 residents. The district serves approximately 15,000 students across 19 campuses. Demographically, approximately 40 percent of the students are Hispanic, 15 percent are African American, 24 percent are Caucasian, 4 percent are Native American, 7 percent are Asian, 10 percent are multi-racial. 80 percent of the students qualified for the federal lunch subsidy. The school district employs nearly 1,020 teachers, 910 support personnel and 80 administrators. Approximately 41 percent of the teachers hold advanced degrees.

This study identifies several scales to measure grit, autonomy support, competence support, and relatedness support which were analyzed to empirically test the relationships between grit and the dimensions of motivational support from Basic Psychological Needs Theory (BPNT). Grit was measured using the academic grit scale (Duckworth et al., 2007; Duckworth et al., 2009; Duckworth, 2016; Duckworth & Quinn, 2009). Most research on grit reports the findings as an overall grit score (Crede et al., 2017; Duckworth & Quinn, 2009). The Grit Scale measured consistency of interest and perseverance of effort. Consistency of interest is defined as the tendency to not frequently change goals and interests (Eskreis-Winkler et al., 2016). Perseverance of effort is defined as the tendency to work hard even in the presence of setbacks (Eskreis-Winkler et al., 2016). Both consistency of interest and perseverance of effort are considered to contribute to success (Ericcson et al., 1993; Crede et al., 2017). Student grit was measured using the 10-item Grit Scale (Duckworth & Quinn, 2009). Students responded to each item using a four-point Likert scale with responses ranging from strongly disagree (score 1), disagree, agree, or strongly agree (score 4). Students responded to statements in Figure 1.

Figure 1.

Academic Grit Survey

Academic Grit

Please completely shade in the bubble that is closest to how you feel or what you think.

	Strongly Agree	Agree	Disagree	Strongly Disagree
1. If a task is hard, I try even harder.	☐	☐	☐	☐
2. Whenever I do something, I put all my effort into it.	☐	☐	☐	☐
3. When I have responsibilities for school, I do them.	☐	☐	☐	☐
4. I keep at my homework until I am done with it.	☐	☐	☐	☐
5. Once I make a plan, I stick to it.	☐	☐	☐	☐
6. Once I make a commitment, I keep it.	☐	☐	☐	☐
7. I am a hard worker.	☐	☐	☐	☐
8. I keep trying even after I fail.	☐	☐	☐	☐
9. I keep working at something new even when it's hard.	☐	☐	☐	☐
10. I get things done that need to be done, even when I don't feel like doing them.	☐	☐	☐	☐

Figure 1. Grit survey from Oklahoma Center for Education Policy, 2017

The Grit Scale reported evidence of validity and reliability in determining grit in adults and students (Duckworth & Quinn, 2009). The consistency of interest and perseverance of effort showed sufficient internal consistency and were strongly correlated, $r=0.59$, $p<.001$ (Duckworth & Quinn, 2009). Test-retest reliability on the Grit

Scale was $r=0.68$, $p<.001$, self-reported versions correlated $r=0.45$, $p<.001$ (Duckworth & Quinn, 2009).

Autonomy support measured the degree to which students perceived teachers in the classroom allowed criticism, encouraged independent thinking, fostered relevance and provided choice (Deci & Ryan, 1985; Gagne, 2003). Students responded to seven items using a Likert scale ranging from strongly disagree (score 1), disagree, agree, or strongly agree (score 4). Students responded to statements displayed in Figure 2.

Figure 2.

Autonomy Support Survey

Autonomy Support

Please completely shade in the bubble that is closest to how you feel or what you think.

	Strongly Agree	Agree	Disagree	Strongly Disagree
1. Teachers allow students to decide things for themselves.	☐	☐	☐	☐
2. Teacher listen to the opinions and ideas of students.	☐	☐	☐	☐
3. Teachers encourage students to work in their own way.	☐	☐	☐	☐
4. Teachers respect students when they share what they really think.	☐	☐	☐	☐
5. Teachers explain why it is important to study certain subjects in school.	☐	☐	☐	☐
6. Teachers show students how to solve problems themselves.	☐	☐	☐	☐
7. Teachers talk about the connection between what is studied in school and what happens in real life.	☐	☐	☐	☐

Figure 2: Autonomy Support survey from Oklahoma Center for Education Policy, 2017

Reliability as measured using Cronbach's alpha was .77 with factor loadings ranging from .55 to .83 (Forsyth & Adams, 2017). Items were taken from the Autonomy-Enhancement Scale (Assor et al., 2002.) This measure is consistent with the literature defining autonomy support as a sense of initiative and ownership in one's own actions. Autonomy is supported by the internalized experiences of interest and value without being externally controlled by rewards or punishment (Ryan & Deci, 2000).

Competence support measured student views of teachers' efforts to encourage higher levels of academic performance (Ryan & Deci, 2000; Gagne, 2003). Students also reported on teacher expectations of student effort and participation. High levels indicate most teachers challenge all students toward academic achievement. The survey instrument administered in this study was adapted by the Consortium on Chicago School Research. Students responded to seven items using a Likert scale ranging from strongly disagree (score 1), disagree, agree, or strongly agree (score 4). Students responded to statements displayed in Figure 3.

Figure 3.

Competence Support Survey

Competence Support

Please completely shade in the bubble that is closest to how you feel or what you think.

	Strongly Agree	Agree	Disagree	Strongly Disagree
1. Teachers in this school really make students think.	☐	☐	☐	☐
2. Teachers in this school expect students to work hard.	☐	☐	☐	☐
3. Teachers in this school help students with difficult assignments.	☐	☐	☐	☐
4. Teachers in this school celebrate the achievement of students.	☐	☐	☐	☐
5. Teachers in this school make learning interesting.	☐	☐	☐	☐
6. Teachers in this school challenge students to achieve academic goals.	☐	☐	☐	☐
7. Teachers in this school expect students to do their best all of the time.	☐	☐	☐	☐

Figure 3. Competence Support survey from Oklahoma Center for Education Policy, 2017

Reliability, as measured by the Cronbach alpha ranged from .79 - .93 for the Academic Press Scale suggesting strong internal consistency among items (Forsyth & Adams, 2017). This measure is consistent with the literature defining competence support as the feelings of accomplishment and increasing mastery in chosen activities which is best satisfied when environments such as classrooms provide opportunities for challenges, receiving positive feedback and have opportunities for growth (Ryan & Deci, 2000).

Relational support was measured through student trust in teachers. Student trust in teachers measured the quality of relationships between teachers and students. Trust in schools have been linked to academic optimism (Bevel & Mitchell, 2012; Hoy et al., 2006; Tarter & Hoy, 2004), academic performance (Goddard et al., 2001; Hoy & Tschannen-Moran, 1999), and student identification with school (Mitchell et al., 2008). Student trust in teachers referred to the relational support that students perceived teachers provided. Students responded to questions about the reliability of teacher actions, teacher concern for students, teacher competence in their teaching, teacher willingness to help students, teacher honesty, and teacher dependability. Students responded to ten items using a Likert scale from strongly disagree (score 1), disagree, agree, to strongly agree (score 4). Students responded to statements in Figure 4.

Figure 4.

Student Trust in Teachers survey

Student Trust in Teachers

Please completely shade in the bubble that is closest to how you feel or what you think.

	Strongly Agree	Agree	Disagree	Strongly Disagree
1. Teachers are always ready to help at this school.	☐	☐	☐	☐
2. Teachers at this school are easy to talk to.	☐	☐	☐	☐
3. Students are well cared for at this school.	☐	☐	☐	☐
4. Teachers at this school always do what they are supposed to.	☐	☐	☐	☐
5. Teachers at this school really listen to students.	☐	☐	☐	☐
6. Teachers at this school are always honest with me.	☐	☐	☐	☐
7. Teachers at this school are good at teaching.	☐	☐	☐	☐
8. Students at this school can believe what teachers tell them.	☐	☐	☐	☐
9. Students learn a lot from teachers at this school.	☐	☐	☐	☐
10. Students at this school can depend on teachers for help.	☐	☐	☐	☐

Figure 4. Student Trust in Teachers survey from Oklahoma Center for Education Policy, 2017

Higher student trust suggests that students perceive teachers as being open, honest, reliable, competent, and benevolent in their social interactions with students. Reliability, as measured by the Cronbach alpha was .90, suggesting strong internal consistency among the items (Forsyth & Adams, 2017). This measure is consistent with

the literature in defining relational support as a sense of belonging and connection. It is facilitated by mutual respect and caring (Ryan & Deci, 2000).

Analytical Approach

Descriptive analysis was first used to describe the sample and the level of grit among students within the sample of schools within Central Public Schools. To address the study's research objectives, the research questions were examined using correlational analyses to determine the extent to which student perceived autonomy, competence and relational supports are statistically associated with levels of reported grit. Specifically, correlational analyses were employed to investigate the relationships between grit, and the three psychological behavior constructs of autonomy support, competence support, and relatedness support. In addition, multiple regression analyses were conducted to explore the relationship among other school conditions such as student socioeconomical status and grit. Regression techniques were used to investigate the relationship between grit and autonomy support, competence support, and relational support. The specific regression depended on a couple of factors: First, if evidence indicated that student grit varied significantly across schools, a multi-level analysis would be needed. Multi-level analyses are appropriate when data were nested; in this case, students were nested in schools. Evidence indicated that grit did not vary across schools. Since grit did not vary significantly across schools, regular multiple regression analysis was used. In this case, a hierarchal multiple regression technique was then used to test the relationship between grit and autonomy support, competency support, and relational support. This approach examined the relationship between predictor variables and grit after controlling for

confounding factors. The study utilized a multiple linear regression model to examine predictors of grit as shown in the following equation:

$$Y_{Grit} = \beta_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4FRL + B_5White + \epsilon$$

Where Y represents the dependent variable of Grit. X_1 = autonomy support, X_2 = competence support, and X_3 represent student trust in teachers (relatedness support). ϵ is the error term which accounts for unexplained variance in the model.

A multiple linear regression analysis was conducted to determine which of the predictor variables of autonomy support, competence support and relational support significantly predicted student grit. This technique is appropriate for evaluating the contribution of each independent variable that contributes to the development of grit. IBM SPSS Statistics was utilized in the analysis of data.

Chapter 4: Results

As stated in the previous chapter, the research study used a non-experimental, cross-sectional research to examine the perceptions of the teaching and learning environment to examine the relationships between self-reported grit and the three psychological needs identified by the Basic Psychological Needs Theory (BPNT) of autonomy support, competence support, and relational support. The purpose of this study was to measure student attitudes and perceptions to the teaching and learning environment and assess the connections with self-reported levels of grit. The purpose was not intended to make strong causal claims about the determinants of grit. Rather, this research aimed to explore plausible relationships between grit and social conditions in the school environment and individual student characteristics.

The data collected for this study were analyzed to empirically test the relationships between grit and the dimensions of motivational support from Basic Psychological Needs Theory (BPNT): autonomy support, competence support and relational support. Guided by Self-Determination Theory and research on grit, this study sought to evaluate if the student perceptions of autonomy supportive instruction, competence supportive instruction, and relational supportive instruction would be positively related with student grit. The results section begins with descriptive statistics, moves to bivariate correlations among the constructs, and culminates with regression analysis results.

Research Questions

Building upon the theoretical framework that serves as the basis for this study, three research questions were proposed for examination.

R1: Is student perceived autonomy supportive instruction significantly associated with the development of grit in a school setting?

R2: Is student perceived competence supportive instruction significantly associated with the development of grit in a school setting?

R3: Is student perceived relational supportive instruction significantly associated with the development of grit in a school setting?

Each of the research questions were analyzed controlling for student socioeconomical status and for race.

Descriptive Statistics

Descriptive statistics (Table 1) describe the characteristics of the students in Central Public Schools who participated in this study. Approximately 80 percent of the students in the school district qualified for the federal lunch program, indicating a sample that is predominately socioeconomically disadvantaged. For context, this is comparable to the two largest school districts in Oklahoma – Tulsa Public Schools and Oklahoma City Public Schools – with each reporting over 90% of their students qualifying for the federal lunch program.

Student trust in teachers, autonomy support, competence support, and grit was reported using a 4-point Likert scale. A score of one means the participant does not exhibit the characteristic while a score of 4 indicates a high level of the characteristic. As shown in Table 1, the mean score for all variables were relatively high and tightly clustered. The mean score for grit was the highest ($M=3.18$, $SD=0.53$), followed by perceived competence support ($M=3.14$, $SD=0.59$), student trust in teachers ($M=3.04$, $SD=0.59$), and autonomy support ($M=2.95$, $SD=0.56$).

On a scale of 1 to 4, with a midpoint of 2.0, these results indicate that students reported high levels of internal grit and their perceived instructional support at their school. These variables scored nearly a full point above the neutral midpoint, suggesting that students identify strongly with these constructs within their school environment. While grit had the highest mean score, the constructs of SDT were similar with mean scores for competence support, student trust in teachers and autonomy support differing by 0.19 units. The demographics of the participants in this study indicate a diverse population with a representation from lower socioeconomic backgrounds. Specifically, 31% of the participants identified as White ($M=0.31$) and 69% of the participants were eligible for the federal lunch subsidy program. This demographic confirms that the participants were from a high poverty school and the students face socioeconomic challenges.

Table 1:
Descriptive Statistics

	Minimum	Maximum	Mean	SD
Student Trust in Teachers	1.00	4.00	3.04	0.59
Autonomy Support	1.00	4.00	2.95	0.56
Competence Support	1.00	4.00	3.14	0.59
Grit	1.00	4.00	3.18	0.53
White	0.00	1.00	0.31	0.20
Free/Reduced Lunch	0.00	1.00	0.69	0.21

Note: $N=3,205$. Free/reduced lunch reports the percentage of students in the sample who qualified for the federal lunch subsidy.

Correlation Results

Correlations were first tested to analyze bivariate relationships between the variables in this study. The analysis focused on how the independent variables of student trust in teachers (STT), autonomy support (AS), and competence support (CS) relate to

the development of student grit. Results in Table 2 showed grit had a statistically significant relationship with each independent variable. The relationship between grit and competence support was positive and strong with an estimate coefficient of $\rho = .56$, $p = .001$. Likewise, grit was positive and strongly related to autonomy support ($\rho = .52$, $p = .001$) and student trust in teachers ($\rho = .52$, $p = .001$). Interestingly, students eligible for free and reduced-price lunch showed no meaningful association with grit ($\rho = .06$). White students demonstrated a small negative correlation ($\rho = -.10$) suggesting that grit levels were slightly higher among students of color.

Table 2:

Correlation Table of Grit and Independent Variables

	Grit	Student Trust in Teachers	Autonomy Support	Competence Support	FRL	White
Grit	1.00	0.518**	0.518**	0.564**	0.058	-0.097
STT		1.00	0.617**	0.635**	-0.138	0.281**
AS			1.00	0.722**	-0.013	0.219*
CS				1.00	0.058	0.367
FRL					1.00	-0.61**
White						1.00

Note: N= 3,205, ** $p < .001$, * $p < .005$

Table 2 illustrates interesting findings from the correlational relationships between demographic factors and the variables in the study. Socioeconomically disadvantaged had a weak relationship with student teacher trust ($\rho = -.14$) and a small positive relationship with competence support ($\rho = .06$). No meaningful relationship was found between socioeconomic status and autonomy support ($\rho = -.01$). Additionally, white students also had a negative correlation to grit ($\rho = -0.10$) but had small positive relationships with

student trust in teachers ($\rho = .28$), autonomy support ($\rho = .22$) and competence support ($\rho = .37$).

Multiple Regression Results

A multiple regression analysis was conducted to determine the extent to which psychological supports predict student grit, while controlling for socioeconomic status and race. In step 1, the demographic variables of Free and Reduced Lunch (FRL) status and race were entered into the model. Consistent with the results of bivariate correlations, these demographic characteristics were not statistically significant predictors of grit. This suggests that in the current sample, a student's socioeconomic background and racial identity were not determinants of grit. Since these external factors were non-significant, it indicates that school-based environmental factors may have a more direct influence in the development of student grit.

Relational support which was measured as student trust in teachers was added in step 2. The construct measured the degree in which students perceive their teachers as reliable, caring, and trustworthy. The results indicate a strong and positive relationship with grit ($\beta = .38$, $p < .001$). The results revealed that for every one standard deviation increase in student trust in teachers, there is a predicted a 0.38 standard deviation increase in student grit. These results emphasize that trust is the emotional safety net of the classroom.

In the third step of the model, autonomy support was entered. This construct measured the degree to which students perceive that their teachers allow for constructive criticism, encourage independent thinking, foster instructional relevance, and provide meaningful choices. The results indicate the strongest positive relationship to grit ($\beta = .49$,

$p < .001$). The addition of autonomy support significantly improved the model with the total variance explained by the three predictors reaching 23%. This indicates that the inclusion of autonomy which is defined as student voice, choice and independent thinking serves as a considerable driver of grit within the school environment. A one standard deviation increase in perceived autonomy support is associated with a 0.49 standard deviation increase in reported student grit. It may have a lower mean perception among students, but it has a high predictive power.

In the fourth step of the regression model, competence support was entered. This construct measured the degree to which students perceive that their teachers provided clear expectations, offer optimal challenges, and deliver constructive feedback. The results indicate a strong and positive relationship to grit ($\beta = .46$, $p < .001$) explaining 19 percent of the variance in grit. With the inclusion of competence support, the model accounted for 19% of the total variance in student grit. The predictive weight is slightly lower than that of autonomy support, it does remain as a strong driver of student grit. This finding indicates that for every one standard deviation increase in competence support, student grit is predicted to increase by 0.46 standard deviations.

In the final step of the regression model, all three variables of autonomy support, competence support, and student trust in teachers were entered simultaneously. When analyzed together, the individual power of each variable shifted with none of the three reached the level of statistical significance. Specifically, student trust in teachers showed a small negative relationship to grit ($\beta = -.04$), while autonomy support ($\beta = .38$) and competence support ($\beta = .20$) maintained a positive but non-significant relationship to grit. This combined model accounted for 20 percent of the variance in student grit. Table 3

presents results of the stepwise regression analysis, detailing the predictive relationship between instructional supports and student grit.

Table 3:

Multiple Regression Results for Grit and School Variables

	Step 1	Step 2	Step 3	Step 4	Step 5
F/R Lunch	.06(.53)	-.03(.49)	-.04(.67)	-.05(.71)	-.04(.71)
White Students	-.10(.67)	-.15(.91)	-.07(.86)	-.05(.93)	-.04(.93)
Student Trust in Teachers	---	.38(.13) **	---	---	-.04(.23)
Autonomy Support	---	---	.49(.13) **	---	.38(.25)
Competence Support	---	---	---	.46(.12) **	.20(.20)
Adj. R ²	-.01	.13	.23	.19	.20

Note: N=3.205, **p<.001, * p<.005

Model selection was conducted through a series of linear regressions to assess the individual predictive power of each instructional support of autonomy, competence, and relational support after controlling for socioeconomic status and student race. Entering the variables individually allowed the analysis to evaluate the unique contribution of each construct. This process confirmed the explanatory power of each variable in relation to the overall development of grit. The full equation used for this assessment is

$$Y_{Grit} = \beta_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4FRL + B_5White + \epsilon$$

Where Y represents the dependent variable of Grit. X₁ = autonomy support, X₂ = competence support, and X₃ represent student trust in teachers (relatedness support) which were analyzed individually. ϵ is the error term which accounts for unexplained variance in the model.

The hierarchical regression analysis provided a comprehensive look at the predictors of student grit. In the initial stage of the model, the demographic variable that

included socioeconomic status (FRL) and race were found to be non-significant suggesting that grit is not a trait that is not determined by a student's background. When each independent variable was analyzed individually, grit exhibited a positive effect on each variable. Autonomy support emerged as the most predictor in developing grit ($\beta=.49$, $p<.001$). Competence support followed closely behind ($\beta=.46$, $p<.001$). Finally, student trust in teachers had a slightly weaker effect ($\beta=.38$, $p=.002$). The final regression model which included all three pillars of Basic Psychological Needs Theory accounted for 20% of the variance in student grit. This suggests that the collective instructional environment defined by autonomy, competence, and relational support plays an important role in shaping student grit. These findings suggest that all three constructs are important to the development of student grit with autonomy supportive practices may have the largest influence in the development of grit.

In summary, the results addressed the research questions by showing that student perceived autonomy supportive instruction, competence supportive instruction and relational supportive instruction showed a significant relationship with student grit when analyzed as separate factors. When all three variables of student trust in teachers, autonomy support, and competence support were assessed as a group, the strength of the individual relationships to grit decreased significantly. Controlling for key demographic factors such as students living in poverty or their race revealed neither variable was a statistically significant predictor of student grit as measured in this survey.

Robustness Checks

To ensure the reliability and stability of the findings regarding the factors influencing grit, a series of robustness checks were performed. In addition to the

previously discussed stepwise regression model, various alternative regression models were executed using SPSS to verify no negative effects on grit were present. The independent variables autonomy support, competence support, and student trust in teachers were entered into the SPSS regression models individually to assess the significance of each concept.

Limitations of the Study

There are fundamental limitations to the research methods used in this study. First, a limitation of this study is social desirability bias and the use of the self-reported surveys or questionnaires. The grit scale is a self-reported questionnaire. Social desirability bias takes place when individuals tend to inaccurately report their experiences but instead present themselves in a way that may be more socially acceptable (Cohen, 2015; Krumpal, 2014). The self-report questionnaire limits itself to the participants' viewpoint and their honesty to assess themselves. Self-report questionnaires subject itself to subjectivity. These questionnaires also lend itself to a chance of misinterpretation or lack of insight by the individual taking the survey. The Grit Scale is psychometrically valid and reliable but needs to continue to be researched using a variety of populations and circumstances (Duckworth & Quinn, 2009; Denby, 2016).

A primary limitation of the current study is the geographic specificity of the sample. Since the data were collected exclusively from one single school district in the central Midwest, the findings may be limited in the generalization to other school districts. To produce more robust and reliable findings, further research should expand to a broader sampling that includes participants from multiple school districts in varying geographic locations. Including participants from diverse urban and suburban school

districts in different regions would better ensure that the findings are representative of a wider sampling student population. It would also be worth investigating in future research to measure the participant's grit level as they age. Duckworth (2016) points out in her book that traits such as grit are influenced by experiences. In other words, as students age, their level of grit could also change as they discover passions worth their time and effort to invest.

Finally, the non-experimental nature of this investigation limits the findings to correlational connections rather than causal conclusions. Although the study identifies strong links between autonomy support, competence support, and relational support to student grit, it does not allow for strong claims regarding the factors that directly cause the formation or development of grit.

Chapter 5: Discussion

The primary objective of this study was to examine the relationship between student grit and the three pillars of Basic Psychological Needs Theory (BPNT) of autonomy support, competence support, and relational support. Utilizing a non-experimental, cross-sectional design, the research analyzed the student perceptions of the teaching and learning environment to identify significant associations with self-reported grit and the three pillars of Basic Psychological Needs Theory (BPNT). While this study does not seek to make strong causal claims about the determinants of grit, it offers an exploration of the plausible relationships between social conditions within the school environment and individual student characteristics. The research study, therefore, sought answers to the following research questions:

R1: Is student perceived autonomy supportive instruction significantly associated with the development of grit in a school setting?

R2: Is student perceived competence supportive instruction significantly associated with the development of grit in a school setting?

R3: Is student perceived relational supportive instruction significantly associated with the development of grit in a school setting?

Although grit and the Basic Psychological Needs Theory of autonomy support, competence support and relational support have been widely researched, few previous studies have investigated the direct link between these constructs particularly within the context of best instructional practices that formulate grit in students. Extensive evidence exists on the effects of grit for academic achievement, goal attainment, and effective performance, but evidence on the formation of grit is lacking (Shechtman et al., 2013;

Farrington et al., 2012; Tang et al., 2019). There is less evidence in the process of the development of grit among adolescents (Tang et al., 2019). This study defined grit as a personality trait characterized by the perseverance and passion to pursue long-term goals with sustained zeal and hard work (Von Culin et al., 2014; Duckworth et al., 2007; Robertson-Kraft & Duckworth, 2014; Duckworth et al., 2009; Duckworth & Quinn, 2009; Eskreis-Winkler et al., 2014). This study was unique in its comprehensive examination of the school environmental factors that serve as a driver in the development of grit in students.

In this study, autonomy support demonstrated the strongest positive effect on student grit among the three variables analyzed, as evidenced by the standard regression coefficient ($M=2.95$, $SD=.56$, $\beta=.49$; $p<.001$). This construct measured the degree to which students perceive that their teachers allow for constructive criticism, encourage independent thinking, foster instructional relevance, and provide meaningful choices. This finding suggests that the degree to which students perceive their teachers as supportive of their independent thinking is the most significant predictor of their ability to maintain long-term perseverance. In an educational environment, autonomy support allows students to move beyond mere compliance and toward a sense of internal ownership over their learning. When students feel their voices are heard and their choices are respected, they are more likely to view academic challenges not as a mandate, but as personal goals worth pursuing. Particularly, in high poverty contexts, providing a sense of student ownership may be the critical tool for fostering grit. It empowers students to navigate obstacles with a heightened sense of individualized purpose. A one standard deviation increase in perceived autonomy support is associated with a 0.49 standard

deviation increase in reported student grit. It may have a lower mean perception among students, but it has a high predictive power.

Competence support also demonstrated a strong positive effect on student grit within the model ($M=3.14$, $SD=.59$, $\beta=.46$; $p<.001$). This construct measured the degree to which students perceive that their teachers provided clear expectations, offered optimal challenges, and delivered constructive feedback. While it followed autonomy support in the standard regression coefficient, competence support generated the highest mean score and the highest correlation among the three constructs. This indicates that students' belief in their own productivity is strengthened by teacher feedback, clear expectations, and desirable challenges. When educators provide competence support, they are essentially providing the encouragement for students to keep going. Students are more likely to exhibit grit when they believe that success is a reachable goal. In this study, the high level of perceived competence support suggests that students felt capable in their school environment to persist through difficulty without the fear of failure. For every one standard deviation increases in competence support, student grit is predicted to increase by 0.46 standard deviations.

Finally, relational support which was defined in this study through the lens of student trust in teacher demonstrated a statistically significant positive relationship with student grit ($M=3.04$; $SD=.59$, $\beta=.38$, $p<.001$). This construct measured the degree to which students perceived their teachers as reliable, caring, and trustworthy. While it is the third predictor in the model, these results suggest that the student-teacher relationship is necessary to develop the classroom environment of belonging. It also suggests that when students feel valued and supported by their teachers, they are better prepared to sustain

effort and interest in long-term goals even when faced with hurdles along the way. The results revealed that for every one standard deviation increase in student trust in teachers, there is a predicted a 0.38 standard deviation increase in student grit.

Each of three pillars of autonomy, competence, and relational play a unique role in fostering student grit. The data reveals that while students perceive the highest levels of support in the area of competence support based on the mean ($M=3.14$; $SD=.59$, $\beta=.46$), followed closely by relational support ($M=.3.04$, $SD=.59$, $\beta=.38$), it is actually autonomy support that holds the most predictive power over student grit ($M=2.95$, $SD=.56$ $\beta=.49$) despite having the lowest mean score. This is important for school leadership to understand as it suggests that students feel a strong sense of trust with their teachers. However, the most effective way to increase student grit is through autonomy support. Autonomy support has the most predictive power of the three pillars. Even making slight adjustments to giving students voice and choice in the classroom can make some impressive gains in student grit. Given these results, it underscores the fundamental need for educators to implement practices in their classrooms that provide autonomy support, competence support and relatedness support. By addressing these three basic needs, educators can strengthen the principles of the Basic Psychological Needs Theory to increase student motivation and drive students to greater academic success.

The results from the current study indicated autonomy support demonstrated the strongest positive effect on student grit based on the standardized regression coefficient ($M=2.95$; $SD=.56$; $\beta=.49$). Competence support demonstrated the second-largest positive effect on student grit ($M=3.14$; $SD=.59$; $\beta=.46$). Finally, relational support demonstrated through student trust in teachers exhibited a statistically significant positive effect on grit,

even though it had the smallest effect size ($M=3.04$; $SD=.59$; $\beta=.38$). Even though competence support had the highest mean score ($M=3.14$) and the strongest correlation value ($r=.56$), autonomy support proved to be the strongest predictor of grit ($\beta=.49$).

Implications for School Leadership

Research supports the need for autonomy support, competence support, and relational support as identified by the Basic Psychological Needs Theory (Ryan & Deci, 2000). Given the existing research on grit and the findings of this study, school leaders should consider instructional practices designed to fulfill the basic psychological needs of students, especially in autonomy support, competence support, and relatedness support as a way to strengthen student motivation and student success. This study showed a strong relationship with autonomy support, competence support, and student trust in teachers when analyzed independently. Therefore, it is important to look at how to support the classroom with these three needs.

In this study, autonomy support demonstrated a strong, statistically significant relationship to grit ($\beta=.49$, $p<.001$). This construct measured the degree to which students perceived that teachers allowed for constructive criticism, encouraged independent thinking, fostered relevance and provided meaningful choice (Forsyth & Adams, 2017). It is essential to note that autonomy support does not make students happier, it shifts the responsibility from the teacher to the student. When students feel they are in control of their own learning, they are more likely to persevere through the setbacks to enhance their own development of grit (Niemiec & Ryan, 2009)

Teachers can implement strategies in their classrooms that support autonomy. First, teachers can allow students some decision-making role in terms of classroom

management issues (Stafanou et al., 2004; Koh & Frick, 2010). For example, teachers can give students choice in selecting the members of their groups, allow students to identify their seat in the classroom, and allow students to set their own norms to develop the rules of their groupwork. Teachers can improve their instructional design to create some time for student-centered investigation to allow students the opportunity to explore their personal interests related to the curriculum by facilitating student feedback.

Competence support also showed a strong statistically significant relationship to grit ($\beta=.46, p<.001$). The measure for competence support measured students' views of their teachers' efforts to push them to higher levels of academic performance (Forsyth & Adams, 2017). Teachers can implement strategies that push students to higher levels of academic performance. First and foremost, classrooms should embed the language of a growth mindset. Growth mindset is the belief that abilities and intelligence can be developed through hard work and commitment (Dweck, 2006). As part of the growth mindset, schools need to normalize that the struggle and failure is part of the learning process. Mistakes should be viewed as a learning opportunity. Another strategy that schools can implement is the use of goal setting and tracking of those goals. Students need to be taught to break down large and overwhelming tasks into smaller, more manageable tasks to ultimately achieve that larger goal. Having a process to track their goal progress and celebrating the small achievements will keep the momentum going towards achieving the overarching larger goal.

Finally, student trust in teachers also showed a strong positive effect on grit ($\beta=.38, p=.002$). The measure for student trust in teachers measured the quality of relationships between students by asking questions about the reliability of their peers,

their peers concern for other students, their competence in their learning, their willingness to help other students, their honesty, and their openness (Forsyth & Adams, 2017). A strong collective trust in faculty indicates an environment at school where students feel connected with their teachers and are highly engaged in the curriculum and instruction (Adams, et al., 2015). Teachers and all staff need to work to develop authentic and caring relationships with their students. Students need that one trusted adult in school. When students perceive their teachers are committed to their achievement, they are more willing to accept and engage with constructive feedback. This trust between student and teacher enables students to accept and process that challenging information in a more accepting fashion.

Future Work in Research

This research study used a non-experimental, cross-sectional research to examine the perceptions of the teaching and learning environment to examine the relationships between self-reported grit and the three psychological needs identified by the Basic Psychological Needs Theory (BPNT) of autonomy support, competence support, and relational support. The purpose of this study was to measure student attitudes and perceptions to the teaching and learning environment and assess the connections with self-reported levels of grit. The purpose was not intended to make strong causal claims about the determinants of grit. Rather, this research aimed to explore plausible relationships between grit and social conditions in the school environment and individual student characteristics.

Further empirical research is still needed in the area of grit to fully understand the development and formation in adolescents. Future studies could investigate the role of the

school and classroom context in increasing the development of non-cognitive factors. It is still not clear how individuals develop grit outside of their own passion to pursue and achieve long-term goals. Investigation could also continue by looking at individuals who exhibit high levels of grit by exploring possible school-level factors that could have contributed to their grit.

Although this study utilized a cross-sectional analysis of one mid-sized urban public school district, future research could expand the data sample to include differing school demographics. Future studies could expand the data sample to include a variety of schools such as public, private, and charter schools across urban, suburban, and rural communities to be capture the full spectrum of student populations and academic environments.

An additional study that could take place is to conduct a longitudinal study to track students from childhood into adulthood to examine how individuals develop grit especially during times of difficulty, making mistakes, experiencing failure, and other obstacles. A longitudinal study could take place across several urban school districts in order to generate more reliable findings. The responses could have varied if students were surveyed in other school districts using a larger sample from multiple urban communities. It would be worth investigating in future research to measure the participant's grit level as they age. Duckworth (2016) points out in her book that traits such as grit are influenced by experiences.

Conclusion

The purpose of this study was to explore the relationship of grit with the three needs identified by the Basic Psychological Needs Theory of autonomy support,

competence support, and relational support. The study was a non-experimental, cross-section research with the sample from one suburban public school district in the Central Midwest.

This study utilized the evidence of Self-Determination Theory by Deci and Ryan to explore relationships between grit and social conditions in the school environment. SDT believed that people's actions were governed by their own motivation to fulfill basic needs. SDT argues that people are motivated more by finding enjoyment or meaning rather than some material reward or consequence. When the three key human needs of autonomy support, competence support, and relatedness support are sustained then an individual's intrinsic motivation will be posited.

School systems in the current state are tasked with successfully preparing students for a knowledge and information-driven society (Shechtman et al., 2013). Adequate preparation for college, careers, and citizenship also involves developing sets of behaviors, skills, attitudes, strategies, attitudes, intrapersonal resources and attributes that high achieving individuals rely on to succeed (Shechtman et al., 2013; Farrington et al., 2012). This study sought to address the gap in the literature by investigating factors to enhance the success of all students.

Educators play a substantial role in increasing the academic performance of all students. Administrators can facilitate meeting the academic needs and basic psychological needs of their students to develop their own grit. Students who display self-determination skills (e.g., goal setting, problem solving, and self-regulation skills) are more likely to be successful in the general education curriculum (Shogren et al., 2013). Furthermore, educators should design their instruction that fosters student engagement

within the classroom that is necessary to deepen student academic participation. Positive classroom experiences and relational support are the determinants for student engagement. Student engagement is a useful concept because it provides educators with information they can more readily observe (Reeve, 2002).

The findings of this study underscore a fundamental shift in how we must view student perseverance. Grit is not merely an internal trait students bring to school, but a response to the psychological environment that schools can create for them. When educators intentionally cultivate an environment that promotes autonomy, competence, and relatedness, they create conditions for students to engage in the hard work of learning. If we are able to empower students to maximize their future opportunities, we must address their motivation by fostering an environment where they feel a sense of belonging, independence, and growth, and productivity. By aligning instructional practices with these three basic psychological needs, schools can actively enhance student grit. Ultimately, this elevated level of grit serves as a catalyst to drive academic engagement for students to navigate their futures with purpose and success.

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Appendix A: IRB Approval Letter



Institutional Review Board for the Protection of Human Subjects
Approval of Initial Submission – Exempt from IRB Review – AP01

Date: January 15, 2026

IRB#: 19286

Principal Investigator: Glen M Abshere

Approval Date: 01/15/2026

Exempt Category: Category 4

Study Title: AN EXAMINATION OF SCHOOL SOCIAL FACTORS RELATED TO ACADEMIC GRIT

On behalf of the Institutional Review Board (IRB), I have reviewed the above-referenced research study and determined that it meets the criteria for exemption from IRB review. To view the documents approved for this submission, open this study from the *My Studies* option, go to *Submission History*, go to *Completed Submissions* tab and then click the *Details* icon.

As principal investigator of this research study, you are responsible to:

- Conduct the research study in a manner consistent with the requirements of the IRB and federal regulations 45 CFR 46.
- Request approval from the IRB prior to implementing any/all modifications as changes could affect the exempt status determination.
- Maintain accurate and complete study records for evaluation by the HRPP Quality Improvement Program and, if applicable, inspection by regulatory agencies and/or the study sponsor.
- Notify the IRB at the completion of the project.

If you have questions about this notification or using iRIS, contact the IRB @ 405-325-8110 or irb@ou.edu.

Cordially,

A handwritten signature in black ink that reads 'Lara Mayeux'.

Lara Mayeux, Ph.D.
Chair, Institutional Review Board