GRIT IN LATINO MIDDLE SCHOOL STUDENTS: CONSTRUCT VALIDITY AND

PSYCHOMETRIC PROPERTIES OF THE SHORT GRIT SCALE

By

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A thesis submitted to the

Graduate School-New Brunswick

Rutgers, The State University of New Jersey

In partial fulfillment of the requirements

For the degree of

Master of Science

Graduate Program in Psychology

Written under the direction of

Maurice J. Elias

And approved by

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New Brunswick, New Jersey

January 2016

ABSTRACT OF THE THESIS

Grit in Latino middle school students: Construct validity and

psychometric properties of the *Short Grit Scale*

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Grit, defined as perseverance and passion for long-term goals (Duckworth,
Peterson, Matthews, & Kelly, 2007), is a character strength that may be a promising
target for improving academic achievement. Despite grit's popularity and its increasing
application to underserved students, there is no published literature examining the
psychometric properties of the *Short Grit Scale* (Grit-S) or validating the construct in
underserved student populations. The current study sought to determine whether
previous research on the psychometric properties and construct validity of grit replicated
in a low-income, majority Latino middle school. To better understand the grit construct,
the study also investigated how grit interacts with experience of an academic setback to
predict academic achievement. In addition, the study sought to clarify the role social-
emotional learning (SEL) skills play in explaining the impact of grit on academic
achievement.

Students from a large urban middle school completed the self-report *Grit-S* and
teachers completed observational measures of observed student SEL skills. Student
demographics and grades data were obtained from the school's online database. Results

indicated that although a two-factor structure ("Interest" and "Effort") replicated in this

sample, the two factors behaved in a manner inconsistent with previous research. The

reliability coefficients of the full *Grit-S* and of each subscale were also very low.

Hierarchical regressions showed that the "Interest" factor was a consistent predictor of

academic achievement, whereas the "Effort" factor was not. Experiencing an academic

setback was found to be a consistent predictor of grades; however, the interaction of grit

and setbacks was only significant for models predicting grades in Math and students'

Best subject. Notably, the significant interactions were inconsistent with hypothesized

relationships in that higher grit in students who had experienced a setback predicted

lower grades. Finally, mediation analyses supported a partial mediation of grit's impact

on academic achievement by SEL skills, which is the first empirical support for how grit

operates to impact academic achievement. Results from this study show that more

research is needed to clarify the construct validity of grit in disadvantaged, Latino middle

school students.

Acknowledgements

I would like to thank my committee chair and mentor, Maurice Elias, for his guidance and support throughout this project. I would also like to thank my committee members Jami Young and Edward Selby for their careful consideration of my work and insightful comments that improved my research and learning. I would also like to acknowledge the students, teachers, and staff at the New Brunswick Middle School for their time and willingness to participate in the survey process. Finally, I would like to thank my friends and family for their ongoing support, without which this project would have never been possible.

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Introduction

To an increasing degree in recent months, evidence has been accumulating about the crucial role of so-called "noncognitive factors" in academic achievement (Farrington et al., 2012). While there are clearly cognitive dimensions to these "noncognitive" factors, this unfortunate misnomer refers to elements of education that lie outside the realm of traditional academic learning. Several broad categories of these noncognitive factors have been linked to academic achievement, including social emotional learning (SEL) skills (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011), character strengths (Benninga, Berkowitz, Kuehn, & Smith, 2003), mindsets (Blackwell, Trzesniewski, & Dweck, 2007), and school climate (MacNeil, Prater, & Busch, 2009). Particularly for youth in impoverished, urban settings, noncognitive factors have been touted as key targets for intervention to decrease the achievement gap (Elias & Haynes, 2008).

Over the past several years, one particular noncognitive construct—grit—has received noteworthy attention from researchers and the general public. Grit, defined as "perseverance and passion for long-term goals," may account for why some individuals are more successful than their peers of equal talent or intelligence (p.1087, Duckworth, Peterson, Matthews, & Kelly, 2007; Duckworth & Quinn, 2009). Since introducing grit to the psychology field in 2007, Angela Duckworth has garnered significant media attention—her TED talk about grit, filmed in 2013, has over 7 million views as of this writing (Duckworth, 2013). Grit is featured as a centrally important character strength in Paul Tough's bestselling book, *How Children Succeed* (Tough, 2012). A Google search

for "grit" returns a host of articles and blogs that summarize and comment on Duckworth's work (Perlis, 2013; Smith, 2014).

Not only is grit a popular concept, but it is also a new target for intervention in disadvantaged school settings. For example, the KIPP schools, a growing network of charter schools serving students in underserved communities, highlight grit as one of seven key character strengths on their character report card ("Character Growth Card," n.d.; Tough, 2012). As an intervention for increasing grit, the KIPP schools ask teachers, students, and parents to reflect on whether they try hard after experiencing failure ("Character & Academics," n.d.). In addition, Duckworth's research lab at University of Pennsylvania has piloted grit-building programs in several schools to determine whether youth can be taught to think and act like "gritty" individuals (Duckworth, personal communication, 2014).

Despite the popularity of grit and its application to underserved youth, there is no published literature validating the construct in urban, disadvantaged settings. Further, while a differential capacity to persevere has been suggested as an explanation for racial/ethnic differences in academic achievement, little research has examined this directly (Farrington et al., 2012). Recent reviews by the United States Office of Education Technology (2013) and the Consortium on Chicago School Research (2012) highlight the need to explore grit in additional populations and settings and develop an understanding of grit in relation to other noncognitive factors that promote student learning (Farrington et al., 2012; Shechtman, DeBarger, Dornsife, Rosier, & Yarnall, 2013).

If interventions promoting grit in disadvantaged youth are going to be successful, it is important to develop clarity around the definition, measurement, and predictive utility of the construct. Efforts to enhance grit in underserved students may be premature if the construct is not found to have the same structure, measurability, or validity for these students. Therefore, this study examines the psychometric properties of the *Short Grit Scale* (Duckworth & Quinn, 2009) in largely impoverished, urban Latino middle school students and investigates the construct validity of grit in this population.

<div align="center">**Overview of Grit**</div>

Defining Grit

Duckworth and colleagues consider grit to be a trait-level indicator of an individual's tendency to work consistently toward a long-term goal and a neglected facet of the "Conscientiousness" factor of the Big Five personality traits (Duckworth et al., 2007). Duckworth et al. (2007) distinguish grit from the related constructs of need for achievement, self-control, and conscientiousness by emphasizing grit's compound structure. They suggest that gritty behavior necessarily involves both consistent interest in one goal and the long-term stamina required to work toward that goal. The only previously measured construct that the authors suggest overlaps directly with grit comes from work in the 1980s on "follow-through" (Willingham, 1985). Duckworth et al. (2007) contend that follow-through captures the "essence of grit" in its focus on long-term commitment (p. 1099, Duckworth et al., 2007). As the authors do not attempt to distinguish between grit and similarly defined terms, such as diligence, perseverance, or tenacity, more research is needed to clarify whether distinctions exist.

When Duckworth et al. (2007) developed the *Original Grit Scale (Grit-O),* they sought to discriminate between highly intelligent individuals to determine whether grit would predict success among individuals of equal talent or intelligence. According to Duckworth et al. (2007), success can be understood as a result of talent and effort across three dimensions: intensity, direction, and duration. Whereas many concepts of goal attainment highlight work intensity (working hard), grit captures both the direction (working toward the same goal without swerving) and duration (marathon-like mentality of working toward the goal over an extended amount of time) of an individual's effort (Duckworth et al., 2007).

According to the Duckworth et al. (2007) framework, grit is considered a disposition, suggesting that an individual's tendency to behave in a "gritty" manner would be similar across settings, independent of other factors. Grit also fits within the broader classification of character strengths. Park and Peterson (2006) define character strengths as the psychological processes that allow an individual to demonstrate any of the six broad categories of character virtues: wisdom, courage, humanity, justice, temperance, and transcendence (Dahlsgaard, Peterson, & Seligman, 2005). In the Park and Peterson (2006) framework, grit would be considered one of the character strengths allowing a person to demonstrate courage. In line with previous applications of grit (e.g., Tough, 2012), in the current study, grit is conceptualized as a character strength that represents an individual's tendency to pursue long-term goals diligently in the face of setbacks.

Previous Research on Grit

Duckworth and colleagues (2007) found that grit predicts achievement and ability to persevere across a variety of domains. Grittier adults achieve higher levels of education and make fewer career changes than their less gritty counterparts (Duckworth et al., 2007). Grit also predicts whether West Point cadets in a rigorous summer program remain in the program and whether novice teachers remain in challenging, low-income school districts (Duckworth et al., 2007; Robertson-Kraft & Duckworth, 2014). Gritty contestants reach higher rounds in the Scripps National Spelling Bee because they spend more time engaged in deliberate practice (Duckworth, Kirby, Tsukayama, Berstein, & Ericsson, 2010; Duckworth et al., 2007; Duckworth & Quinn, 2009).

Most pertinent to the current study, grit has also been related to academic achievement. Controlling for SAT scores (as a proxy for innate intelligence), grit in Ivy League undergraduates was associated with higher GPAs (Duckworth et al., 2007). As would be expected, SAT scores were positively correlated with GPAs; however, higher levels of grit were actually associated with *lower* SAT scores, suggesting that some individuals may make up for lower levels of innate intelligence or education by working harder than their more gifted peers. In a population of high-achieving, middle and high school students in a magnet public school, Duckworth and Quinn (2009) found evidence of grit's stability over one year ($r = .68$, $p < .001$). The sample for this study was reported to be 59% female, 58% White, 20% Black, 16% Asian, 4% Hispanic, and 18% low-income. When controlling for age in these students, grit predicted GPA one year later and was inversely related to hours spent watching television per day. The authors reported that students' grit scores did not differ by gender, but no further analyses were reported concerning differences by age, grade, racial background, or SES. See Table 1 for

a summary of previous studies examining grit's prediction of achievement and perseverance.

Across studies with individuals of college age and older, exploratory and confirmatory factor analyses supported a two-factor model for both the original 12-item scale and the *Short Grit Scale* (8 items; Duckworth et al., 2007; Duckworth & Quinn, 2009). The two factors, labeled "Perseverance of Effort" and "Consistency of Interest," are theoretically consistent with grit as a compound trait of interest and stamina. Duckworth and Quinn (2009) found that particular outcomes (e.g., GPA, career changes) could be better accounted for by one of the factors, whereas other outcomes (e.g., final round of Spelling Bee, remaining enrolled in the West Point summer program) were better predicted by the overall scale. For example, in the high-achieving adolescent population, Perseverance of Effort was more predictive of GPA and television watching (inversely related) than was Consistency of Interest. However, Consistency of Interest was more predictive of career changes among adults than was Perseverance of Effort. But for some outcomes, effort and interest appear to be equally important, as the total *Grit–S* score was a better predictor of reaching the final round in the National Spelling Bee and remaining enrolled in the West Point summer program than was either factor alone (Duckworth & Quinn, 2009). See Table 2 for a summary of the samples used for scale development.

Despite the promising findings about grit's role in explaining achievement and related outcomes, more research is needed to support generalizability to students in disadvantaged school settings. The most apparent concern is that both the *Grit Scale (Grit- O)* and the *Short Grit Scale (Grit-S)* were developed and validated on populations

of high achieving individuals with above average intelligence. In addition, of the samples used for scale development and validation, participants' racial background was only reported for the West Point and public magnet school samples—both samples were majority White. The only samples of school-age children were high-achieving students who were either taking part in the Scripps National Spelling Bee or attending a magnet school for high-achieving students. An estimate of socioeconomic status was only reported for the magnet school population, of which 18% of the students were reported as participants in the federal free or reduced lunch program (Duckworth et al., 2007; Duckworth & Quinn, 2009). There is a clear need to investigate the properties of grit in students from diverse achievement histories and from low SES and racially diverse backgrounds.

Grit, Context, and Skills

More research is also needed to clarify grit's relationship to other individual and contextual factors in predicting academic achievement. The previous research outlined above focused on grit's ability to predict success beyond intelligence and the related personality dimensions of self-control and conscientiousness (Duckworth et al., 2007; Duckworth & Quinn, 2009). But, particularly in a school setting, questions remain about the relationship of grit to academic context, as well as students' social-emotional learning (SEL) skills.

Mindset

Beyond innate personality, perseverance in the academic setting is impacted by students' academic skills, learning strategies, and mindset (Farrington et al., 2012). Research on academic mindset and self-efficacy suggests that a student's grittiness in a

specific domain may be impacted by his or her belief in how well he or she can pursue a goal and cope with setbacks (Bandura, 1997; Dweck, Walton, & Cohen, 2011; Dweck, 2006; Valentine, DuBois, & Cooper, 2004; Yeager & Dweck, 2012). According to social learning theory (Rotter, 1954), students' past experiences in a particular domain shape their expectancies and behavior in that specific domain. Further, Rotter's (1954) distinction between specific and generalized expectancies suggests that students' situationally specific expectancies would serve as stronger predictors of behavior over a generalized expectancy. This theory implies that students' past experiences with a specific academic subject influences their academic performance more than their general sense of their own grittiness, though clearly the latter would be informed by the former.

Experience of Academic Setbacks

Previous research on grit centers on predicting success in highly intelligent individuals. However, while, perseverance "in the absence of positive feedback" is a central feature of grit, little attention has been paid to this behavior in related empirical research (p.1089, Duckworth et al., 2007). Grit's relationship to perseverance is clearest in the studies investigating retention in teachers and West Point cadets; however, these studies assume ongoing challenge but do not explicitly explore behavior after a setback (Duckworth et al., 2007; Duckworth & Quinn, 2009; Robertson-Kraft & Duckworth, 2014). Without exploring the link between grit and perseverance after a setback, it is possible that perseverance after failure is not a central feature of the grit construct. Instead, it is possible that so-called gritty students experience fewer setbacks than less gritty students because they repeatedly engage in efforts that lead to success.

Literature on academic resilience and academic buoyancy has investigated students' ability to bounce back from academic setbacks; however, similar to research on grit, this research typically focuses on students' self-reported ability to bounce back (e.g., Martin & Marsh, 2008). Few studies have investigated student outcomes in response to "real-world" academic setbacks. One exception is a study by Peterson and colleagues that employed an Academic Diary report, in which college students tracked personally relevant academic setbacks (Peterson, Colvin, & Lin, 1992). The authors found that students who explained negative events in a more circumscribed (as opposed to global or pervasive) manner reacted to academic setbacks with an active attempt to improve classroom performance. In another investigation of real-world setbacks, Grant and Dweck (2003) examined whether college students who experienced prolonged setbacks would be impacted by "ability goals." The authors explain that individuals who are motivated by ability goals view academic success as a validation of their own intelligence. They found that after successive academic setbacks, indicated by an average low performance across three pre-final exams, students motivated by ability goals fared worse on the final exam than students less motivated by these types of goals (Grant & Dweck, 2003). Taken together, Rotter's theory of specific expectancies and these studies of academic setbacks suggest that experiencing an academic setback in a particular academic subject would predict academic performance in that area more robustly than the global construct of grit.

Social-Emotional Learning Skills

As of this writing, there is no research that investigates mediators of grit's impact on academic achievement. The one study that explores how grit impacts achievement

found that deliberate practice was a partial mediator of grit's ability to predict the round reached by Spelling Bee contestants (Duckworth et al., 2010). In an academic context, it is difficult to imagine that a dispositionally gritty student would be able to behave in a gritty manner without also employing core social-emotional learning (SEL) competencies of recognizing and managing emotions, setting and achieving positive goals, making responsible decisions, and handling interpersonal situations constructively (Elias et al., 1997). Thus, a student's ability to act on his or her gritty character is likely related to the social-emotional skills the student employs. Although it has been theorized that SEL and character development represent two compatible mechanisms that work together to achieve positive youth development, there is no literature empirically testing this relationship (Elias, 2009). More research is needed to understand how character strengths, like grit, and SEL skills work together to predict academic achievement.

Latino Students

Latinos, particularly Latino children, make up an increasing proportion of the United States population. The 2010 U.S. Census data showed that the Latino population grew from 35.3 million to 50.5 million in one decade, accounting for more than half of the nation's population growth in that time (U.S. Census Bureau, 2011). In 2010, Latinos made up 16% of the total U.S. population and 23% of the population under age 18 (National Council of La Raza, 2011). Despite recent gains in high school graduation rates for Latino students, in many states the graduation rates for these students remain shockingly low (Balfanz, Bridgeland, Bruce, & Fox, 2013). Furthermore, Latino students' achievement scores in reading and math range from 16–26 points behind those of their non-Latino white counterparts, a finding that was consistent from 2004 to 2008

(National Center for Education Statistics, 2013; Zychinski & Polo, 2011). In addition to stressful experiences related to immigration and acculturation, Latino youth face well-established risk factors like being a minority student attending an inner-city school and coming from a low-income home where English is not the primary language (Perez et al., 2009).

As a growing segment of the US population facing ongoing high-risk environments, Latino students are of particular interest to researchers of academic achievement. Previous research suggests that belief in cognitive skills, individual persistence, and family support are among the most important factors in high academic achievement for Latino students (Gandara, 1995; Gonzalez & Padilla, 1997; Gordon, 1996). Understanding grit's role in optimizing Latino students' academic success may offer a unique opportunity for intervention.

The Current Study

The primary purpose of this study was to examine whether previous research on grit replicated in a low-income, majority Latino middle school sample. The study first examined whether the psychometric properties of the *Grit-S* replicated previous findings. Specifically, it was hypothesized that the previously identified two-factor structure of the *Grit-S* would replicate in this study, with the subscales labeled "Consistency of Interest" and "Perseverance of Effort." In addition, this study investigated the content validity of the *Grit-S* and examined whether evidence of construct validity of grit replicated in this population. It was expected that grit would predict end-of-year grades (2012-2013) in Core academic subjects (Language Arts, Math, Science, and Social Studies) above and beyond the previous year's grades (2011-2012). In addition, based on prior research, it

was hypothesized that the "Perseverance of Effort" factor would be a better predictor of grades than the "Consistency of Interest" factor. As a way to understand the role of specific expectancies based on academic context, these relationships were also explored in students' Best and Worst subjects.

This study also aimed to answer exploratory research questions regarding grit's relationship to academic setbacks and SEL skills. First, for students who experienced an academic setback, how did self-reported grit relate to future academic achievement? Although there is no previous research in this arena, the theory behind grit suggests that after an academic setback, the grittier student would perform better than the less gritty student. The theory of specific versus general expectancies also predicted that the subject-specific experience of an academic setback would be a stronger predictor of achievement than the global construct of grit. Finally, if grit were found to be a predictor of academic performance, would SEL skills be at least partially responsible for grit's impact on academic performance? As established above, it is likely that an individual's gritty behavior relies on social-emotional competencies. Thus, it was expected that at least part of the impact of grit on academic achievement would be a result of the mediating role of SEL skills.

Method

Participants

Participants were middle school students (grades seven and eight) in the New Brunswick Middle School. According to the New Jersey Department of Education, enrollment for the 2012-2013 school year was 1245. Publicly available enrollment reports indicated that the middle school's students in 2012-2013 were: 88.1% Latino, 10.6% Black, with 94.7% qualifying for free or reduced lunch. The process of defining the sample for this study is described below in the Results section. The Full School Sample, from which the Final Analysis Sample was derived, is described in Table 3.

Measures

Short Grit Scale (Grit-S; Duckworth & Quinn, 2009). The *Grit-S* is an eight-item measure of trait-level perseverance and passion for long-term goals. It demonstrates improved psychometric properties in comparison to the *Original Grit Scale (Grit-O)* and is more efficient (Duckworth et al., 2007). The items in the *Grit-O* were developed to capture attitudes and behaviors of highly successful individuals across a variety of domains. Items are intended to tap into an individual's ability to sustain effort in the face of difficulty and his or her consistency of interests over time. Items are rated on a 5-point Likert-type scale ranging from 1 = "Not at all like me" to 5 = "Very much like me." Most relevant to the current population, in a sample of magnet school students from 7th, 8th, 10th, and 11th grade (*n* = 279), the *Grit-S* had a test-retest reliability of *r* = .68 (p < .001) and internal consistency of α = .82 and .84 for the Fall and Spring assessments, respectively. See Appendix A for the full scale.

***Devereux Student Strengths Assessment-Mini* (*DESSA-Mini*; LeBuffe,**

Shapiro, & Naglieri, 2009). The *DESSA-Mini* is an 8-item teacher-report measure that

assesses student social-emotional strengths. It was developed as a tool for universal

screening and ongoing monitoring of student positive social-emotional behaviors.

Teachers are asked to rate the extent to which they observed a student exhibit specific

positive behaviors over the past four weeks. Items include measures of emotional

maturity, such as: "During the past four weeks how often did the student accept

responsibility for what he/she did?" Other items are more closely related to school

settings: "How often did the student perform the steps of a task in order?" Each behavior

is rated on a 5-point scale from 0 = "Never" to 4 = "Very Frequently." In the sample used

in this study, the *DESSA-Mini* had excellent internal reliability ($\alpha = .94$). For the

purposes of this study, the total score of this measure will serve as an indicator of

students' overall SEL skills. See Appendix B for the full scale. The *DESSA-Mini* can

also be used to compare students to a national, diverse sample of students using *T* Scores

provided by the scale developers. *T* Scores for the current sample are reported in

Appendix C.

      Demographic Information. Demographic information about students' racial

background, gender, age, and grade level was obtained from the school's electronic

database.

      Academic Report Card Grades for Core Subjects. The New Brunswick

Middle School provides student report card grades in each academic subject area for four

marking periods and an additional final year grade. Grades are on a scale from 1-100.

Grades were obtained from the school's electronic database. Overall grades were

calculated by averaging four Core subjects. See Appendix D for numbers of students falling within a specific grade range for Overall grades.

Best and Worst Academic Subjects. A student's Worst subject was determined to be his or her lowest final grade (of the four Core academic subjects) received in 2011-2012. A student's Best subject was determined to be his or her highest final grade (of four Core academic subjects) the student received in 2011-2012. In the event that a student had the same score for the highest or lowest subjects, the overall school performance on these subjects was used to make a selection. Ties for a student's Worst subject preferenced the subject on which the school average was the highest and ties for a student's Best subject preferenced the subject on which the school average was the lowest. See Appendix D for numbers of students falling within a specific grade range for Best and Worst Subjects.

Academic Setbacks. Because there is scant literature on academic setbacks, and none (to my knowledge) that quantify a change in academic status, this study employed two preliminary definitions of an academic setback. Using both a stringent definition (defined as a drop of 1 standard deviation between Marking Periods 1 and 2) and a less stringent definition (a .5 standard deviation drop between Marking Periods 1 and 2) ensured that enough students met the "setback" criteria to allow for a moderation analysis.

Procedure

Data collection occurred in the wider context of an evaluation of a school-wide "turnaround" process designed to improve academic performance, discipline, and overall school climate. Middle school student participants were consented to study participation

through a passive consent process approved by the school district and the research

institution's Institutional Review Board. Students were also provided an opportunity to

decline participation through a passive assent process (school-wide student participation

rate approximately 76%). In an extended homeroom period, students completed self-

report surveys that included the *Grit-S* in the fall of the 2012-2013 school year. Teachers

completed measures of student social-emotional competencies in the winter of the same

academic school year as a part of a school-wide commitment to better monitor and

improve those skills on the part of students. Demographic information and grades for

participating students were collected from the school's electronic database.

Data Analysis

Data were examined for missing data points and outliers. Subsequently,

descriptive statistics and correlation analyses were used to explore the collected data and

uncover any potential error in data collection or problems with the data's error

distribution.

An exploratory factor analysis was used to determine whether the psychometric

properties of the *Grit-S* replicated previous findings, using the same methods as those

prior studies. To investigate potential structural differences, the factor structure of the

Grit-S was investigated in the total sample as well as grade level and gender groups. In

this case, confirmatory factor analysis was not indicated because the structure of the scale

was unknown in the current population.

Hierarchical linear regression was used to test the ability of grit to predict final

grades (2012-2013) above and beyond the previous year's final grades (2011-2012). This

hypothesis was tested for all four Core subject areas (Math, Language Arts, Science, and

Social Studies), Best and Worst subjects, and Overall academic achievement (average of four Core subjects). The interaction between grit and previous year final grades was examined to determine if the impact of grit on academic achievement is a function of previous academic performance.

Hierarchical linear regression was also used to test the hypothesis that grit allows students to more readily bounce back from an academic setback. Students who experienced a setback, defined by a drop of either 1 standard deviation or 0.5 standard deviations between Marking Periods 1 and 2, was coded. This resulted in a dichotomous, categorical variable indicating whether a student had experienced a setback. The interaction between grit and academic setback was tested using the previous year's final grade as a covariate measure with the subsequent Marking Period (Marking Period 3) as the outcome measure. This analysis was done for all four Core subjects and Best and Worst subjects. Marking Period 3 was chosen as the outcome measure because it has been observed that Marking Period 4—because it includes a lengthy period of time after high-stakes tests have been taken—may not be the best reflection of student effort. The transition between Marking Periods 1 and 2 was chosen as the point for a potential setback because there are many opportunities for students to experience difficulties as they transition from reviewing previously learned material into learning new material. The previous year's final grade in each subject served as an indicator of a student's typical performance in that subject.

Finally, mediation analyses tested the theorized relationship of SEL skills as a mediating factor of grit's impact on grades. PROCESS, a statistical program add-on to the software package SPSS (Hayes, 2014), was used to test the mediation models.

PROCESS provides bootstrapped confidence intervals for the relationships between each variable in the model. Covariates for the model were gender and grade level. Grit was the independent variable, with final grades in 2012-2013 as the dependent variable. The *DESSA-Mini* total score (as indicator of SEL skills) was the hypothesized mediator. Mediation by SEL skills was indicated if the indirect effect of grit on academic achievement was significant. The indirect effect was considered significant if the bootstrapped confidence interval for the indirect effect did not include 0. Mediation analyses were carried out for all four Core academic subjects.

Results

Sample Creation

The analysis sample was taken from the Full School Sample of students in NBMS in Fall 2012. The Full School Sample was defined by students who had at least one Core grade (Math, Language Arts, Science, or Social Studies) in Marking Period 1 of the Fall 2012 school year and whose demographic data were available from the school database ($n = 1221$). Students who had opted out of the evaluation (by parent or by student) were not included ($n = 27$; 2% of the full sample). See Table 3 for demographic characteristics of the sample during the sample creation process. To create the analysis sample, students were deleted from the dataset because they had either not completed the *Grit-S* ($n = 215$) or because they had completed fewer than 6 of the 8 items on the *Grit-S* ($n = 17$). Students in the Full School Sample versus the *Grit-S* Sample did not differ significantly by grade, gender, or whether they were Latino or non-Latino. However, students did differ by meal status ($\chi^2 (1) = 4.74$, $p < .03$) such that students in the *Grit-S* Sample were more likely than students in the Full School Sample to receive free or reduced lunch. Across these two samples, 94.3% of the students received free or reduced lunch; in the Full School Sample this rate was 91.4% versus 95% in the *Grit-S* Sample. Independent sample *t*-tests showed that students in the Full School Sample versus the *Grit-S* Sample differed significantly on several Marking Period grades and final grades for both 2011-2012 and 2012-2013. In all cases, students in the *Grit-S* Sample had higher grades than students who were removed from the sample. Significant differences in grades ranged from 2.15 to 4.14 points, which suggests that students who did not complete the survey

(students with higher rates of mobility or absenteeism) experienced slightly lower grades. Results found in this study may not generalize to these students.

Students with a substantial amount of missing data on academic grades were also deleted from the sample. Because baseline grades are a critical variable in this study, 6th grade students were excluded from the sample as their fifth grade academic report card data (from a prior, sending elementary school) were not available ($n = 362$). In addition, students were excluded for having insufficient baseline grade data, defined as having only 1 Marking Period of data in any Core academic subject ($n = 45$). Students who did not have 3 or more Marking Period grades for the four Core subjects in 2012-2013 were also deleted ($n = 22$). As would be expected after removing all 6th graders, the resulting *Grit-S* Plus Grades Sample differed significantly from the Full School Sample in how students were distributed across grade levels ($\chi^2 (2) = 611.22$, p < .001). Independent *t*-tests revealed that the *Grit-S* Plus Grades Sample had higher baseline grades than the Full School Sample for all marking periods (2011-2012), with differences ranging from 3.47 to 5.71 points. These samples also differed on several marking period and final grades for the current school year (2012-2013); however, most of the significant differences indicated that students who had been removed (primarily sixth graders) had higher 2012-2013 grades than the students who were included in the sample. Here, the differences in the 2012-2013 mean grades ranged from to 2.24 to 4.28 points.

Finally, students were excluded from the analysis sample if they did not have a Core subject area rating for the *DESSA-Mini*. Before including these ratings in the final dataset, all *DESSA-Mini* total scores were compared by subject area to see if the teachers rated students differently according to subject area. One-way analysis of variance

revealed that teachers from different subject areas differed significantly in their student ratings (F (5) = 12.32, $p < .001$). Bonferroni *post hoc* comparisons showed that Core subject area teachers (Math, Social Studies, Language Arts, and Science) rated students similarly, but Encores (Specials or non-Core teachers) rated students significantly higher than the Core teacher ratings. Thus, the Encores teacher ratings were not used in the analysis dataset. Some students received multiple ratings from Core teachers, so these ratings were averaged across raters at the item level. Students who were included in the sample had 1 rating *(n = 399)*, 2 ratings (*n* = 31), or 3 ratings (*n* = 1). Ultimately, of the students who were excluded from the final sample for lack of *DESSA-Mini* ratings (*n* = 130), *n* = 114 had not been rated at all. Thus, removing the Encores teacher ratings resulted in a loss of only 16 participants.

Table 3 displays characteristics of the Final Analysis Sample. Ultimately, after removing students without *DESSA-Mini* ratings, the Final Analysis Sample (*n* = 431) did not differ from the students who were removed from the sample (*n* = 790) on gender, Latino status, or meal status. The samples did differ significantly by grade level, which is to be expected because 6th graders were excluded from the final sample (χ^2 (2) = 404.21, $p < .001$). Independent sample *t*-tests revealed no differences on either the *DESSA-Mini* total scores or the *Grit-S* total scores. The Final Analysis Sample did have higher baseline grades for all subjects when compared to the sample of students who were excluded. These differences ranged from 2.24 to 4.81 points. These samples also differed significantly on several of the Core subject marking period grades for 2012-2013 (7 of 16 marking period grades). For five of these seven significant differences, the analysis sample had lower grades than the Full School Sample (differences ranged from 2.36 to

3.73 points) whereas for two marking period grades, the Final Analysis Sample had higher grades (differences ranged from 1.34 to 2.33 points). There was no clear pattern to these academic grade differences, meaning that no particular subject appeared to be consistently higher or lower.

Missing Data

As described in the sample creation procedures above, cases were included in the analysis sample if they were missing fewer than 25% of data on the *Grit-S*, the *DESSA-Mini*, and 2012-2013 marking period grades. However, sample creation revealed a significant amount of missing data for the baseline grades. Only 35% of students in the final sample (n = 152) had received all four Core final grades from the school in the 2011-2012 school year. In the Final Analysis Sample, n = 172 students were missing one final grade and n = 105 were missing 2 final grades for the 2011-2012 year. Follow-up conversations with the school revealed that marking period grades were never reported for several classrooms in the 2011-2012 school year, resulting in final grades that were never calculated. Table 4 depicts the percentage of missing data on all study variables, including the marking period grades for 2011-2012. Given the strong correlations of grades over time and to preserve adequate sample size, cases were permitted to have 50% of marking period grades for 2011-2012 grades.

Multiple imputation is commonly accepted as one of the best methods for addressing missing data because of its ability to preserve cases and account for random error in data (Rubin, 1987). Multiple imputation was used to impute values of marking period grades for 2011-2012 and 2012-2013 as well as items on the *DESSA-Mini* and *Grit-S*. Demographic factors included as predictors in the imputation equation were

grade level, age, Latino status, and gender. Missing data were imputed with SPSS

Version 22 resulting in 20 imputed datasets; the average of the imputed data were used in

data analyses.

Factor Analysis of the *Grit-S*

Descriptive statistics and Pearson correlations of the individual *Grit-S* items are

reported in Table 5. Gender, age, and Latino ethnicity were unrelated to the *Grit-S*

individual items, with the exception of Item 8, "I am diligent," which was associated with

being non-Latino ($r = -.12$, $p = .01$). Table 5 reveals that many items were unrelated to

the other items on the scale, suggesting that the total *Grit-S* may not be capturing a single

construct in this population. Exploratory Factor Analysis (EFA) was performed to

investigate the factor structure of the *Grit-S* in this population. EFA was chosen because

of the lack of previous research on grit in low-SES, majority Latino student populations.

A principal component analysis with promax rotation was performed in accordance with

the Duckworth et al. (2007) research on the *Original Grit Scale*. The number of factors

was not constrained. Examining the eigenvalues and the scree plot supported a two-

factor solution (Table 6). However, the oblique rotation was found to be unsatisfactory

because in this sample, using an oblique rotation resulted in two factors that were not

highly correlated ($r = -.07$). In contrast, Duckworth and colleagues had used oblique

rotation and reported a correlation of $r = .45$ between two factors. When the oblique

rotation was repeated and constrained to extracting two factors, the same two-factor

solution appeared. An orthogonal rotation (varimax) was then performed to determine if

this rotation would provide an improved fit. The results aligned with those of the promax

rotation (Table 6). Ultimately, both the varimax and the promax rotation resulted in the

same two-factor structure: Factor 1: Items 4, 7, 8 and Factor 2: 1, 2, 3, 5, 6. This two-factor solution was similar to the structure reported by Duckworth et al. (2007) and Duckworth and Quinn (2009), with the exception of Item 2. The Duckworth research identified two factors representing Consistency of Interest (Items 1, 3, 5, 6) and Perseverance of Effort (2, 4, 7, 8). The factors identified here were Effort (4, 7, 8) and Interest (1, 2, 3, 5, 6). Reliability analyses were run on the full scale and subscales that emerged from the factor analysis. Results indicated poor internal consistency in this sample: Full Scale α = .45; Factor 1 (Effort) α = .64; Factor 2 (Interest) α: = .52. There was no item that improved the scale's reliability if it were to be deleted. These results are in contrast to the reliability coefficients reported in a high-achieving adolescent student sample (α = .82; Duckworth & Quinn, 2009).

Grit Predicting Final Grades

Preliminary Analysis and Descriptive Statistics. Descriptive statistics and Pearson correlations of dependent variables can be found in Table 7. The grades variables were all highly correlated, but in order to test the predictive value of grit in different settings, hypotheses were tested using grades for the four Core subjects, Best and Worst subjects, and Overall academic performance (average of four Core subjects). Descriptive statistics and Pearson correlations for all study variables, including the subscales determined from the *Grit-S* factor analysis, can be found in Tables 8 (Grades by Subject) and 9 (Best, Worst, and Overall grades). Demographic factors (gender, Latino ethnicity, age, and grade level) were not related to the *Grit-S* total score or either grit factor; however, age was significantly negatively associated with all final grades and with the *DESSA-Mini* total score. In addition, being female was associated with higher

DESSA-Mini scores and higher final grades. Independent sample *t*-tests for final grades in 2011-2012 and 2012-2013 found that current 8th graders had higher baseline grades in Math (2.68 points), lower grades in Language Arts (2.97 points) and Math (3.52 points) for the current year, and higher grades in Science for the current year (2.61 points). Latino ethnicity was not related to any study variables. Further, as the majority of the sample was Latino, Latino ethnicity was not included as a covariate. Gender and grade level were included as covariates in all analyses.

Of note, Factor 1 (Effort) showed stronger correlations to the other study variables than Factor 2 (Interest). Diagnostic statistics were also examined for all regressions. In each regression predicting 2012-2013 grades, a handful of cases showed standardized residuals that were greater than the absolute value of 3; however, no cases were found to be influencing either the model as a whole (Cook's distances were all less than 1) or the regression parameters (no standardized DFBeta value was greater than absolute value of 2). Therefore, there was no indication for removing cases.

Hypothesis Testing. The impact of grit on the current year final grades 2012-2013 was tested in a series of hierarchical regressions. This analysis aimed to determine whether grit offers additional explanatory power above the previous year's grades and whether the previous year's grades would moderate the impact of grit on the current year. To capture how these relationships were expressed in different academic settings, grit's impact on academic achievement was tested in four Core subjects: Language Arts, Math, Science, and Social Studies. Grit's impact on Overall academic achievement (average of four Core subject final grades) and on students' Best and Worst subjects (calculations described in Method section) was also tested. For each of these seven models, the *Grit-S*

total score and previous year grades were mean-centered; these variables were then multiplied to create the interaction term. Grade level and gender were entered as covariates (first step), followed by previous year final grade (second step), *Grit-S* total score (third step), and the interaction of previous year final grade and *Grit-S* total score (fourth step). Also tested was each of these seven regression models using Factor 1 (Effort) and Factor 2 (Interest) to represent grit.

Results indicated that Factor 1 (Effort) and the full *Grit-S* were consistent predictors of current year grades above and beyond the previous year's final grade, when controlling for grade and gender. For regressions using the full *Grit-S* scale, the interaction of grit and previous year grades was only significant when predicting Language Arts and Science grades (Table 10). For the regression equations using Factor 1 (Effort), the interaction term was only significant for the regression predicting Best subject grades.

For the regressions using Factor 2 (Interest), Factor 2 did not offer any additional predictive power for most of the regression models. Controlling for grade and gender, Factor 2 (Interest) accounted for significant variance in only two models: predicting Language Arts grades and Overall grades. The interaction terms were not significant for either of these models. In the models predicting Language Arts and Overall grades, the variance accounted for by Factor 2 (Interest) was statistically significant but was a small effect (R^2 change = .007 and .005, respectively). These results suggest that while grit appeared to have two subscales, only the Factor 1 (Effort) subscale was related to academic performance in this sample. Based on these results and to simplify interpretation, only Factor 1 (Effort) was used in subsequent analyses. Tables 10

(predicting Core academic subject grades) and 11 (predicting Best, Worst, and Overall grades) display the results of the models testing the ability of Factor 1 (Effort) to predict final grades.

Academic Setback as Moderator of Grit Impact on Grades

The next series of analyses explored whether the association of grit and grades depended on whether a student had experienced an academic setback in that subject. As described above, a dichotomous "setback" variable was created to indicate whether a student's grades had dropped between Marking Periods 1 and 2 of the current academic year (Table 12). Hierarchical linear regression was then used to test a model predicting Marking Period 3 grades for each of the four Core subjects as well as Best and Worst subjects, as potential indicators of salience to individual students. Covariates for each analysis were gender, grade, and previous year final grade in the subject being tested (step 1). Next, grit Factor 1 (step 2) was entered, followed by setback (step 3), and the interaction of grit and setback (step 4). This model was tested using setbacks of 1 standard deviation and setbacks of a .5 standard deviation (using standard deviation from Marking Period 1 of 2012-2013). In each of the models tested, having a setback did predict final grades above and beyond Factor 1 (Effort), when controlling for previous year grades, grade level, and gender. In each model, grit was a positive predictor of Marking Period 3 grades, whereas having a setback was a negative predictor of Marking Period 3 grades. With the exception of the model using a .5 standard deviation setback to predict Language Arts grades, the R-squared change was consistently greater for the setback variable than for grit. Thus, across the models tested, having a setback was a

stronger predictor of grades than self-reported grit. See Table 13 for the model predicting Math grades using setback of 1 standard deviation.

The hypothesized interaction between academic setbacks, grit, and grades was not supported. Although two significant interactions emerged from the series of academic setbacks analyses, these interactions did not support the hypothesis that higher grit would positively predict grades for students who had experienced a setback. Instead, for students who experienced an academic setback of at least one standard deviation in Math, *higher* scores on Grit Factor 1 (Effort) predicted *lower* grades in Marking Period 3 (Table 13; Figure 1). For students who had not experienced a setback, *higher* scores on Factor 1 predicted *higher* math grades in Marking Period 3. This same pattern was found for students' Best subject grades.

SEL Skills Mediate the Relationship between Grit and Grades

The next series of analyses explored whether the relationship between grit and grades was mediated by teacher ratings of student social and emotional learning (SEL) skills. The mediational hypotheses were tested using PROCESS version 2.13 (Hayes, 2014). As in the setback regressions above, Factor 1 (Effort) was used to represent grit in each analysis. Controlling for gender, grade, and previous year final grades, there was a significant indirect effect of grit on final grades through SEL skills. The bootstrapped confidence intervals did not include 0 for this indirect effect for any of the four Core academic subjects. These results supported a partial mediation of grit—as represented by Factor 1 (Effort)— by SEL skills. The mediation model for predicting Language Arts grades is depicted in Figure 2. Although grit had a direct impact on final Core grades, part of the impact of grit on grades was explained by teacher ratings of SEL skills.

Discussion

The primary purpose of this study was to examine whether previous research on grit replicated in a low-income, majority Latino middle school sample. To my knowledge there has been no published research on grit's relationship to academic achievement in a disadvantaged student population. The current sample was comprised of predominantly low-income Latino students, a growing segment of the US population that faces ongoing high-risk environments (U.S. Census Bureau, 2011). The current study extends previous research on grit to a new population and provides a fuller understanding of how grit impacts academic achievement by examining the moderating role of academic setbacks and mediating role of SEL skills.

Results suggest several differences in the psychometric properties of the *Grit-S* in the current sample when compared to previous research. Current results only partially supported the theory that grit is universally made up of two distinct factors, "Consistency of Interest" and "Perseverance of Effort" (Duckworth et al., 2007; Duckworth & Quinn, 2009). Although results of the factor analysis did support a two-factor structure, the two factors did not operate as expected. First, the structure of the *Grit-S* differed slightly in the current sample in that Item 2 ("Setbacks don't discourage me") loaded on the "Interest" factor rather than the "Effort" factor. In addition, the internal consistency of the full scale was lower than the reliabilities of each subscale (Full Scale, $\alpha = .45$; Factor 1 (Effort), $\alpha = .64$; Factor 2 (Interest), $\alpha: = .52$), suggesting that grit as assessed by the *Grit-S* may not operate as a coherent construct in low-income, Latino students.

The poor internal consistency of the *Grit-S* was unexpected, given the Cronbach's alphas reported in a high-achieving adolescent student sample ($\alpha = .82$; Duckworth &

Quinn, 2009). There are several possible explanations for the low reliability found in this study. One explanation is that for this population, a Consistency of Interest is not an appropriate indicator of grittiness. The current sample differed from previous research in three distinct ways: socioeconomic status, racial/ethnic make-up, and achievement history. The current sample was made up of 95% low-income, majority Latino, 7th and 8th grade students in a low-performing school, whereas the Duckworth and Quinn (2009) adolescent sample consisted of 18% low-income, majority white, high-achieving 7th, 8th, 10th, and 11th grade students. The results found in this study could be a result of any one of these demographic factors or a combination of these factors. It is important that future research is designed to disentangle the relationship of socioeconomic status, achievement history, and racial/ethnic background on the construct validity of grit.

Alternatively, it is possible that the psychometric properties found in this study were unrelated to issues of validity in the current sample. The results could be an artifact of the wording of the scale items. A close look at the scale items reveals that simple and short sentences make up the Effort factor (4, 7, 8). In contrast, the Interest items are lengthier and use more difficult vocabulary. Unlike the Effort items, the Interest items are mostly reverse-scored (Items 1, 3, 5, 6 are reverse-scored). Because the Duckworth and Quinn (2009) sample included older students who were high achieving, the wording of scale items may not have impacted results in that study. The psychometric properties of the *Grit-S* should be examined in additional disadvantaged adolescent samples to determine whether the results found in this study are an anomaly. Future research might also examine the predictive value of individual items on the scale, rather than examining entire subscales.

As hypothesized, grit (as operationalized by Factor 1, Effort) was found to predict end-of-year grades (2012-2013) in Core academic subjects (Language Arts, Math, Science, and Social Studies) and Best and Worst subjects, beyond the previous year's grades (2011-2012). However, for most subjects, the hypothesis that grit would interact with previous grades to predict current grades was not supported. This finding suggests that grit impacts future academic achievement regardless of previous academic performance. Perhaps students' perceptions of their degree of grit are not based on their views of academic performance; or, perhaps students view their own degree of grit as stable enough that one prior year's academic performance does not affect their sense of grittiness. These results are similar to Duckworth and Quinn's (2009) finding that Perseverance of Effort was more predictive of GPA than was Consistency of Interest in students in the adolescent magnet school sample.

Overall, it is clear that the compound empirical structure of grit previously reported in the literature did not hold in the context of the present study. Interestingly, Duckworth et al. (2007) suggested that there are three dimensions to effort that are captured by the grit construct: intensity, direction, and duration. These dimensions do appear to be included in the three retained items on the "Effort" factor. Item 4, "I am a hard worker" appears to capture *intensity* of effort, or working hard. Item 7, "I finish whatever I begin," captures the *direction* of effort, meaning that a student continues to work toward one goal. Finally, Item 8, "I am diligent," appears to capture both working hard (intensity) and stamina of effort (duration). Thus, the Effort factor primarily used in this study may well capture the three key conceptual elements of the grit construct.

The exploratory research questions about academic setbacks provided further information about the relationships between grit and the academic context. As hypothesized, experiencing an academic setback was found to be an important predictor of grades in the subsequent marking period. In fact, in most cases, having a setback accounted for a greater R-squared change than grit, indicating that the negative impact of a setback could not be undone by the positive impact of grit. Interestingly, having a setback was a negative predictor of grades in all subjects tested, but the interaction between setbacks and grit was only significant for Math and Best subject grades. It had been hypothesized that after an academic setback, the grittier student would perform better than the less gritty student. However, results found that for students who experienced an academic setback in math, *higher* levels of grit were associated with *lower* grades in the subsequent marking period. In contrast, for students who had not experienced an academic setback, *higher* levels of grit were associated with *higher* math grades. These results relate to a finding by Duckworth et al. (2007) that *higher* levels of grit were associated with *lower* SAT scores in a population of Ivy League undergraduates. Duckworth et al. (2007) interpreted this finding to mean that some students may make up for lower levels of innate intelligence or education by working harder than their more gifted peers. A similar process may occur in schools whereby students who are finding school increasingly challenging may try to compensate with effort and, finding that this does not yield success, enter what could potentially be a downward academic cycle.

Finally, the hypothesized role of SEL skills as a partial mediator of grit's impact on academic achievement was supported. The only previous work on mediators of grit

was research on Scripps National Spelling Bee contestants that found time engaged in deliberate practice to be a mediator of grit's impact on the round achieved in the Spelling Bee (Duckworth et al., 2010). While some researchers have suggested that character strengths and SEL skills work together to impact academic achievement (Elias, 2009), to this point there has been no empirical support for this theory. Thus, the results supporting the mediating role of SEL skills represent the first empirical evidence for *how* grit impacts academic achievement.

Limitations and Directions for Future Research

This study had several limitations. The most critical limitation was the low reliability of the *Grit-S,* which makes interpretation of results difficult. The poor reliability of the scale, particularly the "Interest" factor, likely impacted the relationship between the "Interest" and "Effort" factors, which may explain the low correlation found between the subscales. Further, the poor reliability makes it difficult to interpret the inability of the "Interest" subscale to predict grades. It is not clear whether the unexpected results found in this study are due to issues of construct validity or measurement error. While it is possible that "Consistency of Interest" is not a relevant construct for this population or context, it is also possible that the scale was not able to accurately capture the construct. In addition, the reading difficulty of the *Grit-S* items may have impacted the reliability and predictive ability of the scale. Future research should address this concern by providing scales in simpler language or by supplementing the student self-report format with coding of effort- and interest-related behaviors in the educational environment. It is important to note that in spite of a low alpha for the "Effort" factor, this subscale was able to predict final grades in all the academic subject

areas examined.

An additional limitation for this study was that it was primarily cross-sectional and correlational, which means that causal conclusions cannot be drawn about the relationships between grit, SEL skills, and academic grades. A further limitation was the sample's small age range (7th and 8th grade students); results may not extend to younger or older students. Finally, the study used a different reporting method for each construct in the study—student report measures of grit, school-report grades, and teacher-report SEL skills. Using behavioral observations or other forms of data in conjunction with teacher and student-report could boost the reliability of the constructs being measured.

The current study used a newly defined construct, "academic setback," to explore the relationship between grit and academic achievement. Because an academic setback has not been clearly defined or tested previously, the current finding that an academic setback was a predictor of academic achievement must be studied further. Future research should refine the construct of a "setback" and investigate the validity of defining an "academic setback" as a decrease in grades between marking periods. To determine whether an academic setback has relevance to the current population, it is particularly important to determine how students and teachers in disadvantaged middle schools perceive changes in grades between marking periods.

The poor psychometrics of the Interest subscale and the failure of the Interest subscale to predict final grades raise questions about the coherence and relevance of that construct to academic performance in this population. But, as described above, there are several characteristics of the current sample that could explain the lack of association between "Interest" and academic achievement. For one, the socioeconomic context of

the school could play a role. It is possible in a disadvantaged school environment with few resources, students have few choices available to them, making sustained interest irrelevant to the academic school day. However, for these disadvantaged school contexts, interest may be an appropriate component of grit in settings in which students have more choices available to them, such as in after-school activities. For the academic setting, a more relevant construct than interest might be academic motivation or education engagement.

The developmental tasks of middle school age youth must also been considered when interpreting the results of the current study. While "Consistency of Interest" has been found to be an important component of grit for older students and adults, it was not found to be relevant to grit in the current study. Sustained interest in a specific subject or activity may not be developmentally appropriate for middle school students. In fact, typically developing young adolescents are known to demonstrate a wide array of interests, few of which persist into adulthood (Caskey & Anfara, 2007). Further research is clearly needed to determine the meaning of the Interest subscale and items to diverse student populations, the developmental pathway of sustaining interest for middle school students, and how socioeconomic factors and school resources might play a role in the relationship between interest and academic achievement.

The role that Latino culture plays in the validity of the grit construct must also be further examined. Grit emphasizes the importance of individual effort to reach individual goals. In contrast to this individualistic perspective, a core value in Latino culture is *familismo*, which refers to the family having greater importance than individual needs (Calzada, Tamis-LeMonda, & Yoshikawa, 2013). Thus, it is possible that the results

found in this study indicate a mismatch between the individualistic worldview of Eurocentric educators and the more relational and collectivist Latino culture. The positive psychology movement, of which grit research is a part, has been criticized for a Eurocentric emphasis on individualism (see Christopher & Hickinbottom, 2008). Although the results found in the current study cannot be specifically linked to Latino culture, it is clear that more research is needed to uncover the role Latino culture plays in the construct validity of grit.The current results serve as a warning to reconsider how the construct of grit is operationalized in populations that differ from those found in the original grit research. The current study also supports modifications in interventions seeking to build grit in students. First, particularly in the academic context, interventionists are advised to focus on the sustained effort dimension of grit, rather than sustained interest. This is particularly important considering the developmental needs of middle school students. Second, interventions that attempt to bolster students' grittiness should take into account students' experiences of setbacks. It is possible that students who have experienced setbacks have found that sustaining effort in the face of setbacks did not lead to success. For these students, prompting them to continue working hard may be invalidating. Third, interventions may not need to focus solely on building grit because the experience of academic setbacks might be seen as a warning sign for future performance. Student achievement might benefit more from schools and teachers who use an academic setback as an opportunity to intervene and build study habits or academic skills. Finally, because broad SEL skills explain at least part of the association of grit and grades, interventionists are advised to foster global skill-building instead of focusing solely on the specific trait of grit.

Conclusion

Grit has received significant media attention as a key character attribute that needs to be strengthened in youth and has been declared distinct from conscientiousness in its compound reliance on both interest and stamina (Duckworth et al., 2007). However, the current study calls into question whether grit operates as a compound trait of interest and stamina in all populations. The current results were inconsistent with past research on grit, but it is not clear whether these differences were a result of construct validity in the current population, sample-specific characteristics, or measurement errors. More research is needed to disentangle the roles of achievement history, race/ethnicity, socioeconomic status, and adolescent development on the make-up of the grit construct. Additional efforts to measure grit through behavioral observations may also clarify the current results.

While it is clear that grit, particularly sustained effort, is a critical component of academic achievement, it is only a small part of a greater academic context. What positive impact grit offers may not be enough to overcome the negative impact of experiencing academic setbacks. Because SEL skills were also found to be a critical factor in explaining academic achievement, interventionists are advised to incorporate SEL skill-building into programs that focus on building grit. Particularly for students facing many challenges beyond school and homework, a hyper-focus on the singular character strength of grit may be short sighted.

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Table 1

Predictive Utility of Grit: Summary of Significant Findings

Grit was found to be a significant predictor of the outcome measure when controlling for the listed variables.

Authors	Sample Description	N	M (SD)	Controlling For	Outcome Measure	Grit Measure Used
Duckworth et al., 2007 Study 1	Adults age 25 and older	1545	3.65 (0.73)	Age	Educational Attainment	Grit-O
Duckworth et al., 2007 Study 2	Adults age 25 and older	690	3.41 (0.67)	Big Five traits Age	Lifetime Career Changes	Grit-O
Duckworth et al., 2007 Study 3	Ivy League undergraduates	138	3.46 (0.61)	IQ (SAT scores)	GPA	Grit-O
Duckworth et al., 2007 Study 4	West Point cadets (Class of 2008)	1218	3.78 (0.53)	Whole Candidate Score Self-control	Completion of rigorous summer training program	Grit-O
Duckworth et al., 2007 Study 5	West Point cadets (Class of 2010)	1308	3.75 (0.54)	Whole Candidate Score Conscientiousness	Completion of rigorous summer training program	Grit-O
Duckworth et al., 2007 Study 6	2005 Finalists of Scripps National Spelling Bee	175	3.50 (0.67)	Age Self-Control	Reaching final round of Spelling Bee	Grit-O
Duckworth & Quinn (2009) Study 2	Adults age 25 and older	1554	3.40 (0.70)	Age Big Five traits	Educational Attainment	Grit-S
Duckworth & Quinn (2009) Study 2	Adults age 25 and older	1554	3.40 (0.70)	Big Five traits Age	Lifetime Career Changes	Grit-S

Study	Sample	N		Controls	Outcome	Measure
Duckworth & Quinn (2009) Study 4	7th-, 8th-, 10th-, and 11th-grade magnet public school students	279	3.40 (0.80)	Age	GPA (1 year later)	Grit-S
Duckworth & Quinn (2009) Study 4	7th-, 8th-, 10th-, and 11th-grade students in magnet public school	279	3.40 (0.80)	Age	Hours spent watching television (1 year later)	Grit-S
Duckworth & Quinn (2009) Study 5	West Point cadets (Class of 2009)	1248	*	Whole Candidate Score	Completion of rigorous summer training program	Grit-S
Duckworth & Quinn (2009) Study 6	2006 Scripps National Spelling Bee finalists	190	3.40 (0.80)	Age Big Five Traits	Final round reached of Spelling Bee	Grit-S

Not reported.

Table 2

Summary of Sample Characteristics for Grit-O and Grit-S Development

Authors	Sample Description	N	Grit Measure	Total α	Consistency of Interest α	Perseverance of Effort α	Analyses Done*
Duckworth et al. (2007) Study 1	Adults over age 25 (Mean = 45)*	1545	Grit-O	.85	.84	.78	EFA, CFA
Duckworth & Quinn (2009) Study 1	West Point cadets (Class of 2008) *77% Caucasian, 6% Hispanic*	1218	Grit-S	.73	.60	.73	Removed Items, CFA
Duckworth & Quinn (2009) Study 1	West Point cadets (Class of 2010) *Demographics similar to class of 2008*	1308	Grit-S	.76	.65	.74	Removed Items, CFA
Duckworth & Quinn (2009) Study 1	2005 Spelling Bee finalists*	175	Grit-S	.80	.65	.76	Removed Items, CFA
Duckworth & Quinn (2009) Study 1	Ivy League undergraduates*	139	Grit-S	.83	.78	.79	Removed Items, CFA
Duckworth & Quinn (2009) Study 2	Adults age 25 and older*	1554	Grit-S	.82	.77	.70	CFA
Duckworth & Quinn (2009) Study 4	7th-, 8th-, 10th-, and 11th-grade students in magnet public school *58% White, 4% Hispanic*	279	Grit-S	.82 (Fall) .84 (Spring)			Test-retest: *r* = .68

Note. EFA = Exploratory Factor Analysis; CFA = Confirmatory Factor Analysis; "Removed Items" refers to analyses done to remove items from the Original Grit Scale to create the Short Grit Scale. To enhance predictive utility of the Grit Scale, Duckworth & Quinn (2009) eliminated the two items from each of the two subscales that were most frequently below the median in predicting outcomes.

* *Racial breakdown not reported.*

Table 3

Characteristics of Each Sample During Sample Creation

	Full School Sample	Grit-S Sample	Grit-S Plus Grades Sample	Final Analysis Sample
	n	*n*	*n*	*n*
Grade Level[a]				
6th	452	362	-	-
7th	406	338	308	204
8th	363	289	252	227
Gender				
Male	631	503	294	226
Female	590	486	266	205
Race/Ethnicity				
Latino	1072	872	495	377
Non-Latino	149	117	65	54
Black	135	109	60	50
Other	14	8	5	4
Meal Status[b]				
Free or Reduced Lunch	1152	940	528	408
No Free or Reduced Lunch	69	49	32	23
Total	1221	989	560	431

Note. Samples defined as follows: Full School Sample = All students with one Marking Period 1 grade in 2012-2013 (excluding opt-outs); *Grit-S* Sample = Additionally excluded students without Grit-S or with fewer than 75% of Grit-S items; *Grit-S* Plus Grades Sample = Additionally excluded students without baseline grades or enough current year grades; Final Analysis Sample= Additionally excluded students without teacher ratings of social-emotional skills (*DESSA-Mini*).

[a] Significant differences in grade level comparing Full School Sample to Grit Plus Grades Sample and Full School Sample to Final Analysis Sample

[b] Significant differences between number of students receiving free or reduced lunch when comparing Full School Sample versus *Grit-S* Survey Sample.

Table 4
Percentage of Cases with Missing Data in Final Analysis Sample

All Study Variables	%	Baseline Grades by Marking Period (2011-2012)	%
		2011-2012 Language Arts Grades	
Grit-S Full Scale			
Missing 1 or 2 out of 8 items	4.4%	Marking Period 1	12.76%
DESSA-Mini Full Scale			
Missing 1 or 2 out of 8 items	12.3%	Marking Period 2	0.70%
		Marking Period 3	7.42%
2011-2012 Grades (Baseline)			
Language Arts			
Missing 1 or 2 out of 4 Marking Periods	21.4%	Marking Period 4	20.42%
Math			
Missing 1 or 2 out of 4 Marking Periods	2.1%	2011-2012 Math Grades	
Social Studies			
Missing 1 or 2 out of 4 Marking Periods	24.1%	Marking Period 1	1.39%
Science			
Missing 1 or 2 out of 4 Marking Periods	43.6%	Marking Period 2	0.23%
		Marking Period 3	0.23%
2012-2013 Grades (Current Year)		Marking Period 4	0.23%
Language Arts			
Missing 1 out of 4 Marking Periods	3.2%	2011-2012 Science Grades	
Math			
Missing 1 out of 4 Marking Periods	3.0%	Marking Period 1	1.86%
Social Studies			
Missing 1 out of 4 Marking Periods	1.4%	Marking Period 2	2.32%
Science			
Missing 1 out of 4 Marking Periods	1.4%	Marking Period 3	2.55%
		Marking Period 4	39.21%
		2011-2012 Social Studies Grades	
		Marking Period 1	0.00%
		Marking Period 2	0.00%
		Marking Period 3	23.20%
		Marking Period 4	23.67%

Table 5
Correlations for Grit-S Items

	M	SD	1	2	3	4	5	6	7	8
1 Item 1: New ideas and projects sometimes distract me from previous ones.	3.20	1.21	-	.19**	.26**	-.09	.22**	.19**	-.08	.03
2 Item 2: Setbacks don't discourage me.	3.07	1.19		-	.15**	.03	.07	.23**	.07	.09
3 Item 3: I have been obsessed with a certain idea or project for a short time but later lost interest.	3.04	1.25			-	-.05	.17**	.15**	-.04	.06
4 Item 4: I am a hard worker.	3.68	1.16				-	.00	-.14**	.43**	.34**
5 Item 5: I often set a goal but later choose to pursue a different one.	3.31	1.19					-	.15**	-.07	.12*
6 Item 6: I have difficulty maintaining my focus on projects that take more than a few months to complete.	2.97	1.30						-	-.15**	-.09
7 Item 7: I finish whatever I begin.	3.55	1.13							-	.35**
8 Item 8: I am diligent.	3.56	1.13								-

Note: Items 1, 3, 5, 6 are negatively worded; these items were reverse coded for total calculations but were not reverse scored here.

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 6

Grit- S Factor Loadings for Exploratory Principal Component Analysis

	Promax Rotation Pattern Matrix[a]		Varimax Rotation Factor Matrix[b]	
	1	2	1	2
Item 7	0.77		0.66	
Item 4	0.77		0.64	
Item 8	0.74		0.56	
Item 1		0.66		0.53
Item 3		0.61		0.45
Item 2		0.55		0.40
Item 6		0.54		0.37
Item 5		0.54		0.37

	Variance Explained after Extraction [c]		Rotated Sums of Squared Loadings	
Factor	Eigenvalue	% of Variance Explained	Eigenvalue	% of Variance Explained
1	1.88	23.50	1.82	22.69
2	1.68	20.95	1.74	21.76

[a] Principal Component Analysis. Rotation Method: Promax with Kaiser Normalization. Rotation converged in 3 iterations. Factor loadings < .30 are suppressed.

[b] Principal Component Analysis. . Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 3 iterations. Factor loadings < .30 are suppressed.

[c] Variance after rotation not reported.

Table 7
Descriptive Statistics and Pearson Correlations Between Dependent Variables

	M	(SD)	1	2	3	4	5	6	7	8	9	10
1 LA 12-13 Final Grade	73.12	10.36	-	.63**	.67**	.71**	.74**	.75**	.85**	-.01	.30**	-.35**
2 Math 12-13 Final Grade	73.55	12.40		-	.64**	.68**	.69**	.81**	.85**	.04	.14**	-.31**
3 Science 12-13 Final Grade	77.38	11.14			-	.76**	.78**	.71**	.88**	.005	.25**	-.18
4 Social Studies 12-13 Final Grade	75.14	12.27				-	.85**	.75**	.90**	-.00	.24**	-.29**
5 Best Final Grade 2012-2013	75.78	11.62					-	.68**	.88**	-.01	.25**	-.28**
6 Worst Final Grade 2012-2013	73.00	12.76						-	.87**	-.02	.25**	-.33**
7 Overall Final Grade 2012-2013	74.80	10.07							-	.01	.27**	-.32**
8 Ethnicity	87.47% Latino									-	-.06	.01
9 Gender	47.56% Female										-	-.10*
10 Age	11.80	0.89										-

Note: Final grades represent averages of available marking periods for students; Ethnicity coded 1 = Latino 0 = non-Latino; Gender coded male = 0; female = 1; Age calculated as of beginning of school year 2012-2013. LA = Language Arts.

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 8

Descriptive Statistics and Pearson Correlations Between Predictors, Covariates, and Final Grades by Subject

		M	(SD)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	*Grit-S* Full Scale	25.33	4.25	-	.71**	.79**	.19**	.12*	.17**	.18**	.21**	.22**	.23**	.25**	.24**	-.08	.05	-.05
2	Grit Factor 1	10.78	2.62		-	.13**	.20**	.14**	.19**	.24**	.24**	.22**	.25**	.29**	.25**	-.06	.02	-.03
3	Grit Factor 2	14.55	3.02			-	.10*	.05	.07	.05	.08	.12*	.11*	.10*	.12*	-.05	.05	-.05
4	*DESSA-Mini*	20.20	6.72				-	.40**	.37**	.40**	.38**	.52**	.45**	.47**	.48**	-.01	.22**	-.18**
5	LA 11-12 Final Grade	75.10	9.91					-	.68**	.71**	.70**	.59**	.50**	.63**	.58**	-.01	.31**	-.29**
6	Math 11-12 Final Grade	73.04	12.64						-	.74**	.62**	.48**	.59**	.64**	.51**	-.03	.14**	-.14**
7	Science 11-12 Final Grade	76.46	9.81							-	.74**	.56**	.56**	.66**	.57**	-.03	.21**	-.21**
8	Social Studies 11-12 Final Grade	79.40	9.73								-	.46**	.51**	.58**	.54**	-.02	.21**	-.18**
9	LA 12-13 Final Grade	73.12	10.36									-	.63**	.67**	.71**	-.01	.30**	-.35**
10	Math 12-13 Final Grade	73.55	12.40										-	.64**	.68**	.04	.14**	-.31**
11	Science 12-13 Final Grade	77.38	11.14											-	.76**	.01	.25**	-.18**
12	Social Studies 12-13 Final Grade	75.14	12.27												-	.00	.24**	-.29**
13	Ethnicity	87.47% Latino														-	.06	.01
14	Gender	47.56% Female															-	-.10*
15	Age	11.80	.89															-

Note: Grit-S = Total of Grit Short Scale; Factor 1 = Effort Subscale (4, 7, 8); Factor 2 = Interest Subscale (1, 2, 3, 5, 6); LA = Language Arts; DESSA = Total of Devereux Student Strengths Assessment-Mini; Final grades represent averages of available marking periods for students; Ethnicity coded 1 = Latino 0 = non-Latino; Gender coded male = 0; female = 1; Age calculated as of beginning of school year 2012-2013.

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 9
Descriptive Statistics and Pearson Correlations Between Predictors, Covariates and Best, Worst, and Overall Grades

		M	(SD)	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Grit-S Full Scale	25.33	4.25	-	.71**	.79**	.19**	.19**	.18**	.23**	.23**	.19**	.27**	-.08	.052	-0.05
2	Grit Factor 1	10.78	2.62		-	.13**	.20**	.22**	.21**	.23**	.24**	.23**	.29**	-.06	.02	-.03
3	Grit Factor 2	14.55	3.02			-	.10*	.08	.07	.12*	.12*	.07	.13**	-.05	.05	-.05
4	DESSA-Mini	20.20	6.72				-	.41**	.41**	.48**	.52**	.44**	.55**	-.01	.22**	-.18**
5	Year 11-12 Best Subject	82.31	8.17					-	.82**	.60**	.58**	.93**	.70**	-.04	.20**	-.25**
6	Year 11-12 Worst Subject	69.42	11.59						-	.59**	.57**	.95**	.68**	-.02	.23**	-.18**
7	Year 12-13 Best Subject	75.78	11.62							-	.68**	.64**	.88**	-.01	.25**	-.28**
8	Year 12-13 Worst Subject	73.00	12.76								-	.60**	.87**	-.02	.26**	-.33**
9	Year 11-12 Overall Grade	76.15	9.26									-	.73**	-.03	.24**	-.23**
10	Year 12-13 Overall Grade	74.80	10.07										-	.01	.27**	-.32**
11	Ethnicity	87.47% Latino												-	-.06	.01
12	Gender	47.56% Female													-	-.10
13	Age	11.80	.89													-

Note: *Grit-S* = Total of *Grit Short Scale*; Factor 1 = Effort Subscale (4, 7, 8); Factor 2 : Interest Subscale (1, 2, 3, 5, 6); *DESSA-Mini* = Total of Devereux Student Strengths Assessment-Mini; Best Subject for 11-12 and 12-13 is the student's highest grade in 2011-2012; Worst Subject for 11-12 and 12-13 is student's lowest grade in 2011-2012; Overall grades represent average of four core academic subjects; Ethnicity coded 1 = Latino 0 = non-Latino; Gender coded male = 0; female = 1; Age calculated as of beginning of school year 2012-2013.

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 10

Grit (Factor 1) Predicting Final Grades (Year 2012-2013)

Predictor	Language Arts			Math			Science			Social Studies		
	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2	β
Step 1	.11	.11***		.04	.04***		.08	.08***		.06	.06***	
Grade			-.14**			-.14**			.12*			-.05
Gender			.30***			.14**			.25***			.24***
Step 2	.62	.27***		.40	.36***		.46	.38***		.32	.26***	
Grade			-.11**			-.21***			.10**			-.09*
Gender			.14**			.06			.12**			.14**
Previous Year Final Grade			.54***			.61***			.63***			.52***
Step 3	.40	.02***		.42	.02***		.47	.02***		.34	.02**	
Grade			-.12**			-.21***			.10*			-.10*
Gender			.14***			.06			.12**			.14**
Previous Year Final Grade			.52***			.58***			.60***			.49***
Grit (Factor 1)			.15***			.16***			.14***			.13**
Step 4	.40	.00		.42	.00		.47	.00		.34	.00	
Grade			-.12**			-.21***			.09*			-.10*
Gender			.14***			.06			.12**			.14**
Previous Year Final Grade			.52***			.58***			.60***			.50***
Grit (Factor 1)			.15***			.16***			.14***			.13**
Grit x Previous Year Grade			.03			.03			.00			.02

Note: Grade was coded as dichotomous variable 8th grade = 1; 7th grade = 0. Gender was coded as dichotomous variable: Female = 1; Male = 0.

* p<.05 ** p<.01 *** p < .001

Table 11

Grit (Factor 1) Predicting Best Subject, Worst Subject, and Overall Final Grades (Year 2012-2013)

Predictor	Best Subject			Worst Subject			Overall Grades		
	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2	β
Step 1	.06	.06***		.08	.08***		.07	.07***	
Grade			-.01			-.13**			-.07
Gender			.25***			.26***			.27***
Step 2	.38	.32***		.38	.30***		.55	.48***	
Grade			-.01			-.18***			-.10**
Gender			.14**			.12**			.09**
Previous Year Final Grade			.57***			.56***			.71***
Step 3	.39	.01**		.40	.02***		.57	.02***	
Grade			-.01			-.19***			-.11**
Gender			.14***			.13**			.10**
Previous Year Final Grade			.55***			.53***			.68***
Grit (Factor 1)			.11**			.14***			.14***
Step 4	.40	.01**		.40	.00		.57	.00	
Grade			-.01			-.19***			-.10**
Gender			.13**			.13**			.10**
Previous Year Final Grade			.56***			.53***			.68***
Grit (Factor 1)			.11**			.14***			.14***
Grit x Previous Year Grade			.10**			.01			.05

Note: Grade was coded as dichotomous variable 8th grade = 1; 7th grade = 0. Gender was coded as dichotomous variable: Female = 1; Male = 0. Best subject was highest final grade in 2011-2012; Worst subject was lowest final grade in 2011-2012.

* p<.05 ** p<.01 *** p < .001

Table 12

Students with Setbacks Between Marking Periods (MP) 1 and 2 of 2012-2013

Subject	MP 1 Standard Deviation	Number of Students with Setback	
		1 Standard Deviation	.5 Standard Deviation
Language Arts	11.13	46	118
Math	12.19	63	137
Science	12.02	44	93
Social Studies	11.65	68	149
Best Subject	11.81	63	135
Worst Subject	12.48	47	118

Table 13
Setbacks as Moderator of Grit Predicting Marking Period 3
Math Grades (Year 2012-2013)

| Predictor	R^2	ΔR^2	β
Step 1	.36	.36***	
Grade			-.27***
Gender			.12**
Previous Year Final Grade			.54***
Step 2	.37	.01**	
Grade			-.28***
Gender			.12**
Previous Year Final Grade			.51***
Grit Factor 1 (Effort)			.11**
Step 3	.42	.05***	
Grade			-.24***
Gender			.12**
Previous Year Final Grade			.53***
Grit Factor 1 (Effort)			.10**
Setback of 1 Standard Dev.			-.22***
Step 4	.43	.01*	
Grade			-.23***
Gender			.11**
Previous Year Final Grade			.52***
Grit Factor 1 (Effort)			.14**
Setback of 1 Standard Dev.			-.23***
Interaction: Grit x Setback			-.09*

* $p<.05$, **$p<.01$, *** $p<.001$
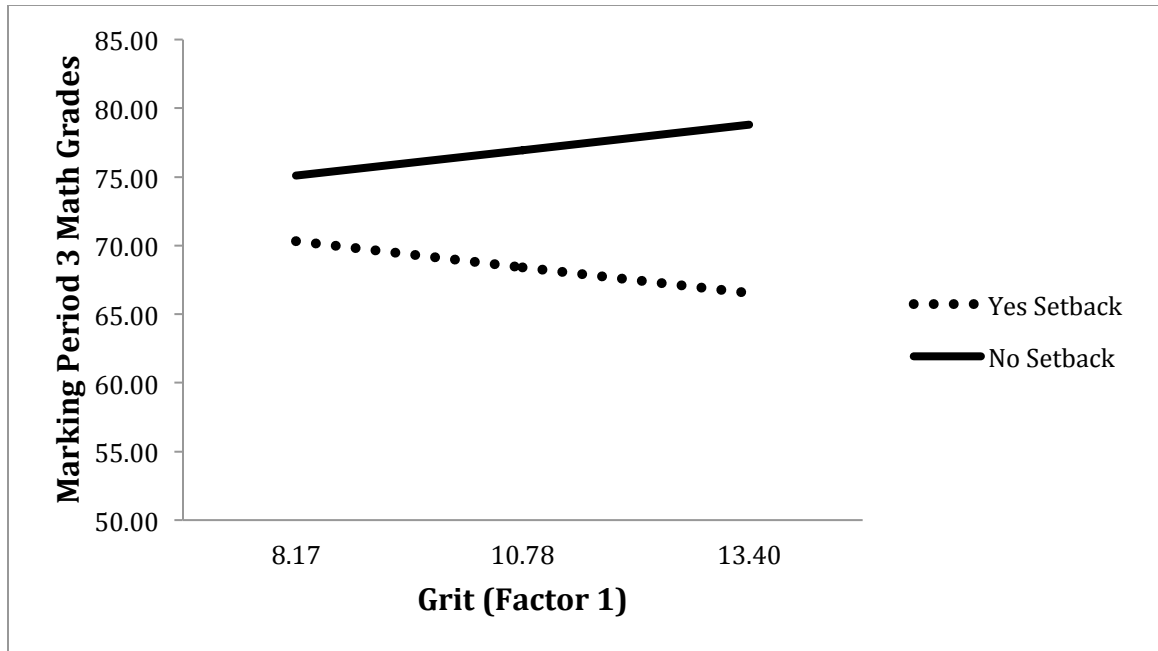
Figure 1. Interaction of grit (total score of Factor 1) and setback (1 standard deviation drop between Marking Periods 1 and 2) in predicting Marking Period 3 math grades.
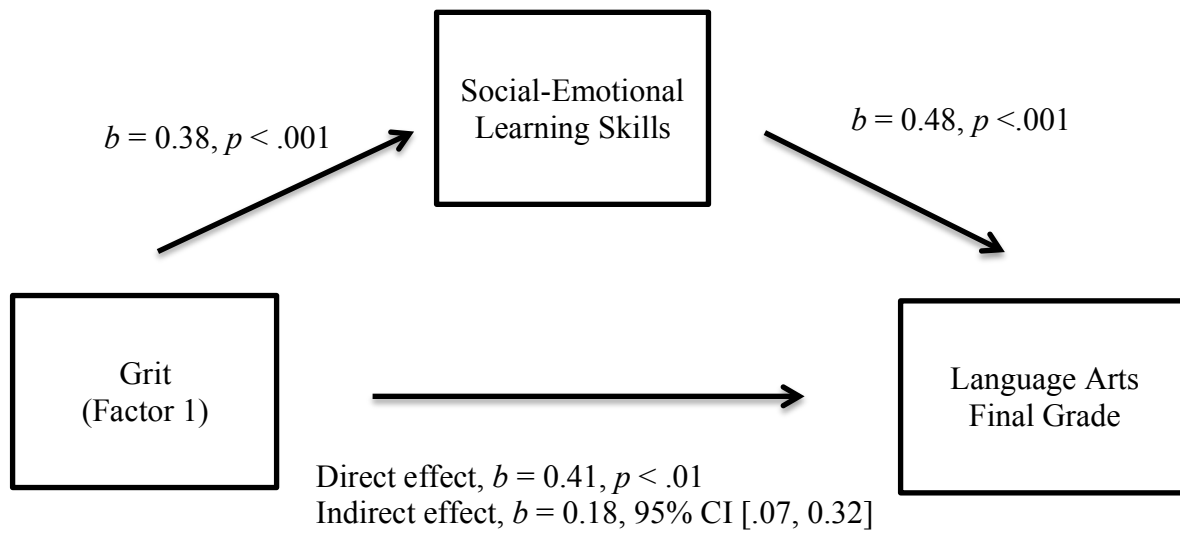
Figure 2. Model of grit (Factor 1, Effort) as a predictor of Language Arts Final Grade, mediated by social-emotional learning skills (*DESSA-Mini*). The confidence interval for the indirect effect is a BCa bootstrapped CI based on 1000 samples.

List of Appendices

Appendix A

Short Grit Scale (*Duckworth & Quinn, 2009)*

5 = Very much like me

4 = Mostly like me

3 = Somewhat like me

2 = Not much like me

1 = Not like me at all

1. New ideas and projects sometimes distract me from previous ones.

2. Setbacks don't discourage me.

3. I have been obsessed with a certain idea or project for a short time but later lost interest.

4. I am a hard worker.

5. I often set a goal but later choose to pursue a different one.

6. I have difficulty maintaining my focus on projects that take more than a few months to complete.

7. I finish whatever I begin.

8. I am diligent.

Appendix B

Devereux Student Strengths Assessment-Mini (LeBuffe, Shapiro, & Naglieri, 2009)

This form describes a number of behaviors seen in some students. Read the statements

that follow the phrase: **During the past four weeks, how often did the student…** and

circle the number in the box underneath the word that tells how often you saw the

behavior. Answer each question carefully. There are no right or wrong answers. Please

answer every item.

	During the past 4 weeks, how often did the student...	Never	Rarely	Occasionally	Frequently	Very Frequently
1.	Accept responsibility for what she/he did?	0	1	2	3	4
2.	Do something nice for somebody?	0	1	2	3	4
3.	Speak about positive things?	0	1	2	3	4
4.	Pay attention?	0	1	2	3	4
5.	Contribute to group efforts?	0	1	2	3	4
6.	Perform the steps of a task in order?	0	1	2	3	4
7.	Show care when doing a project or school- work?	0	1	2	3	4
8.	Follow the advice of a trusted adult?	0	1	2	3	4

Appendix C

Summary of T Scores for DESSA-Mini in Study Sample

Raw Score Range	T Score Range	Description	n	%
<6 to 14	28-40	Need	79	18.3
15-26	41-59	Typical	279	64.7
27-32	61-72	Strength	73	16.9

Appendix D

Students' Final Grades by Grade Range

Subject	Final Grade Range	n	%
Best Subject (2011-2012)	< 60	5	1.2
	60 to 69.99	26	6.0
	70 to 79.99	114	26.5
	80 to 89.99	215	49.9
	90 to 100	71	16.5
Worst Subject (2011-2012)	< 60	68	15.8
	60 to 69.99	121	28.1
	70 to 79.99	178	41.3
	80 to 89.99	60	13.9
	90 to 100	4	.9
Overall Final Grade (2011-2012)	< 60	24	5.6
	60 to 69.99	70	16.2
	70 to 79.99	170	39.4
	80 to 89.99	150	34.8
	90 to 100	17	3.9
Best Subject (2012-2013)	< 60	39	9.0
	60 to 69.99	68	15.8
	70 to 79.99	150	34.8
	80 to 89.99	136	31.6
	90 to 100	38	8.8
Worst Subject (2012-2013)	< 60	64	14.8
	60 to 69.99	92	21.3
	70 to 79.99	134	31.1
	80 to 89.99	116	26.9
	90 to 100	25	5.8
Overall Final Grade (2012-2013)	< 60	34	7.9
	60 to 69.99	89	20.6
	70 to 79.99	164	38.1
	80 to 89.99	130	30.2
	90 to 100	14	3.2