



Connectedness and Perseverance: Examining Grit's Relation to Age, Academic Performance and Interest, and Adult Attachment

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Abstract

The individual with grit is one who engages in deliberate practice in effortful perseverance toward long-term goals, despite experiencing difficulty or struggle. We investigated how age, grade point average (GPA), college discipline, and adult attachment dimensions (close, depend, and anxiety) relate to grit. Grit, a trait-level characteristic defined as perseverance and passion for long-term goals, has been found to predict successful outcomes, including achievement and high performance, above and beyond talent. We recruited 797 participants through a university listserv to complete an anonymous online survey. Although studies have found gender and age variably relate to grit, we found gender had no significant relationship and age had a small but significant positive relationship with grit. Age, GPA, college discipline, and adult attachment were significant predictors of grit, with close and anxiety attachment dimensions having the largest effect. Although grit may not be inherent to a college discipline, this study joins others in finding that some college disciplines have individuals with higher levels of grit than other disciplines.

Keywords Age · Attachment · Grit · Interest

1 Introduction

Institutions such as the U.S. Department of Education and the U.K. Department for Education have recognized grit, a trait-level characteristic defined as perseverance and passion for long-term goals (Duckworth et al., 2007), as a critical factor for success in the 21st century (Shechtman et al., 2013). With grit receiving greater attention in the

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literature and as the benefits of grit become better understood, it grows increasingly important to understand predictors of grit so interventions can be created to encourage its development. Unlike more static predictors of success (e.g., IQ and SES), grit is malleable and can be learned (Duckworth, 2016). Grit significantly impacts psychological outcomes, including commitment in school, marriage, and work (Eskreis-Winkler et al., 2014), teaching effectiveness (Duckworth et al., 2009), intensity of physical exercise (Reed et al., 2013), and meaning in life (Kleiman et al., 2013). Individuals with grit view achievement as a long-term process; they can sustain effort over many years, despite disappointments, failures, or boredom (Duckworth et al., 2007).

Investigations into grit deepened when Duckworth et al. (2007) questioned “why some individuals accomplish more than others of equal intelligence” (p. 1087). Their attempt to answer this question led to interview studies wherein professionals of various industries expressed that employees who displayed a persistence in their endeavors, as well as enthusiasm for their work, were the most effective. Researchers who investigated grit have focused largely on its relation to age, educational attainment, the Big Five personality model (e.g., Duckworth et al., 2007, Duckworth & Quinn, 2009, Rimfeld et al., 2016), and have begun to include attachment style (e.g., Levy & Steele, 2011) as potential explanations for why some individuals have more grit than others. Therefore, the purpose of this study was to further our understanding of how attachment style, measures of achievement, academic interest, and age contribute to the description of a gritty individual.

2 Grit

Scholars investigating performance and achievement have attempted to understand the types of challenges people face and their ability to persevere through those challenges. A person with grit is one who “approaches achievement as a marathon” and persists through adversity (Duckworth et al., 2007, p. 1088). For example, in a study of 1,218 cadets who attended West Point, the elite U.S. Military Academy, grit was a better predictor of program completion rates than measures such as self-control and the candidate’s “whole score” (i.e., high school rank, SAT score, physical aptitude), which was used as the criterion for admittance (Duckworth et al., 2007). Among engineering students at Northeastern University, grit score differences were found between students in different majors, with chemical engineering students scoring the highest, followed by mechanical and computer engineering students (Jaeger et al., 2010). Researchers also found students on campus regarded chemical engineering to be the most difficult major.

Duckworth et al. (2011) surveyed 190 of 274 finalists from a 2006 elite National Spelling Bee to learn how they gained their spelling expertise. Researchers found that grittier spellers often engaged in deliberate practice, using activities they may not have enjoyed but were effective, more so than individuals who did not score as high on grit (Duckworth et al., 2011).

Grit is comprised of two structures, *perseverance of effort* and *consistency of interest*. Perseverance of effort refers to the extent to which people exert durable effort in the face of challenges. Consistency of interest refers to the tendency of individuals to maintain similar interests for a long period of time (Duckworth & Quinn, 2009). Grit

studies have produced mixed results concerning how grit and its two structures manifest across demographics like sex/gender and race/ethnicity. For example, Jaeger et al. (2010) found females to have more overall grit than males, with little difference in the perseverance of effort but significant difference in consistency of interest. Studies have investigated whether grit increases success outcomes such as academic achievement, substance use, and other risk behaviors across race/ethnicity (Guerrero et al., 2016; Strayhorn, 2014; Winiker et al., 2019), with some studies finding a weak but significant relationship between grit and ethnic minority status (e.g. Credé et al., 2017).

Grit has been found to account for significant differences in educational attainment, teacher effectiveness, and grade point average (GPA) above and beyond that explained by IQ (Duckworth et al., 2007; Robertson-Kraft & Duckworth, 2014). The gritty individual attains difficult achievements not merely through talents but through resilience in the face of adversity and sustaining impassioned goals that may require a long time to accomplish. In the development of the grit construct, Duckworth et al. (2007) found more educated adults scored higher in grit than those who were less educated but of equal age, and that although older age is variably related to grit, it does not always predict grit. They also found grittier students outperformed less gritty students in GPA and SAT scores, and that grit was positively correlated with self-control ($r = .63, p < .001$).

3 Differentiating Grit from Similar Constructs

As grit receives greater attention in the literature, it is important to differentiate grit from constructs similar to it, such as self-control and resilience. Self-control enables conflict resolution of two immediate decisions where one can choose the option that provides the most valuable outcome (Mischel, 2014). Grit and self-control, defined as the capacity to regulate attention, emotion, and behavior despite temptation, are at times used interchangeably when in fact they differ in their pursuit of superordinate (higher-order) goals that produce long-lasting importance (Duckworth & Gross, 2014). Grit enables consistent focus on a superordinate goal and can even motivate the individual to create new, lower-level goals to maintain the integrity of interest that fosters perseverance towards the superordinate goal (Duckworth & Gross 2014).

Self-control is the ability to achieve everyday goals, whereas grit is the ability to achieve goals that require long periods of time to accomplish. Higher-order abstract goals, or superordinate goals, are the target of gritty individuals, whereas lower-order, context-specific goals, or everyday goals, are more related to self-control (Duckworth & Gross, 2014). Furthermore, grit was found to predict performance in the National Spelling Bee when controlling for self-control, but self-control was not able to predict the same performance outcome when controlling for grit (Duckworth et al., 2007).

Grit and resilience can also seem to be indistinguishable. However, Robertson-Kraft and Duckworth (2014) provide a notable distinction that gives guidance to understanding the uniqueness of the grit construct: “Grit entails consistency of interests and goals over time, whereas the construct of resilience is agnostic on the stability of an individual’s interest” (p. 5). As a construct, grit is said to predict perseverance and achievement beyond talent (Duckworth & Quinn, 2009). Among those with similar talents, grit predicts the likelihood of engaging in deliberate practice and achieving

success (e.g., GPA, SAT, military performance) above and beyond the predictability of self-control and resiliency (Arouty, 2015; Duckworth & Gross, 2014; Duckworth & Seligman, 2017; Larkin et al., 2016).

Unlike other predictors of academic achievement, including socioeconomic status and intelligence, that are difficult to change (Moffitt et al., 2011), grit is said to be a more malleable construct in an individual's life (Duckworth & Gross, 2014; Flanagan & Einarson, 2017; Strayhorn, 2014). This makes grit a useful construct to study because it is an impactful trait to long-term achievement that may be amenable to intervention. To aid in instilling and developing grit, we must further understand natural motivators of gritty individuals. Studies are now adding to the grit foundation and proposing that it originates from attachment styles and conditioned values obtained from family and peers (Duckworth & Gross, 2014; Levy & Steele, 2011; Rimfeld et al., 2016, Waring et al., 2019).

4 Adult Attachment Theory

Early interactions with caregivers are thought to serve as a template for how one interacts with others in adulthood (Ainsworth, 1969). Attachment style has been regarded as an attribute that explains an individual's enduring patterns of relating from birth to death (Collins & Reed 1990). Attachment in adulthood stems from mental models of others and oneself, which were developed in infancy or childhood. Collins (1996) found adults with maladaptive attachment styles were more likely to negatively view their behavior in their relationships as being “caused by something that was unchanging and widespread” (p. 817). Adults with a more secure attachment style tended to interpret events in ways that minimized the negative impact of the event and were more likely to depend on and trust others.

Attachment experiences indicate the degree to which individuals become prone to intense fear, develop confidence, and cultivate expectations that are said to “persist relatively unchanged throughout the rest of life” (Bowlby, 1973, p. 157). Attachment style in adulthood can be described by three related concepts: close, depend, and anxious attachment. Secure attachment style in adulthood results in an individual who finds it easy to get *close* to and *depend* on others (Collins, 1996). Adults with an avoidant attachment style feel uncomfortable being close to others, have difficulty depending on and trusting others, and have romantic partners who want them to display a level of intimacy that makes them feel uncomfortable. Anxious-ambivalent attachment style in adulthood results in those who are often *anxious* that their partner does not love them or will not want to stay with them. To describe further adult attachment styles, Collins (1996) explained how developed attachment styles from childhood manifest in adult intimate relationships. The identified attachment style dimensions that are displayed in adult intimate relationships were *close attachment* or “the extent to which a person is comfortable with closeness and intimacy,” *depend attachment* or “the extent to which a person is comfortable depending on others and believes that people can be relied on when needed,” and *anxiety attachment* or “the extent to which a person is worried about being rejected and abandoned by others” (p. 814).

In a study of attachment and romantic relationships among 2,214 participants, Caron et al. (2012) found that distress in romantic relationships was predicted by avoidant

attachment style. Those secure in their attachment to friends reported fewer difficulties with communication, whereas anxiety in relationships was related to having greater difficulties with communication. Adults with high anxious-ambivalent attachment style scores have concerns of abandonment and seek emotional support, making these individuals hypervigilant to signs of distance or coldness from partners (Baldwin et al., 1996; Collins & Feeney, 2000; Simpson et al., 1999). A secure attachment style has been found to benefit an individual's relationship with family, peers, and romantic partners.

Grit is surfacing as another beneficial outcome of a secure attachment style. Grit has been found to have a significant association with parental care, such that having higher grit has been related to a likelihood of "past bonding and relationships to parents" (Levy & Steele, 2011, p. 19). It has been proposed that having high quality, early age care by a parent or guardian can encourage the ability to cope, therefore contributing to the development of grit. Those who received high parental care were found to experience secure attachments with caregivers and close partners as adults (Coppola et al., 2006).

5 The Present Study

The purpose of the current study is to reinforce the inclusion of attachment into the study of grit and contribute to the description of a gritty individual. This study measures the degree to which grit has a relationship with demographics (age, gender, race/ethnicity), academic performance (GPA), academic interest (college discipline), and adult attachment style dimensions (close, depend, anxiety). Furthering our understanding of grit can help us better grasp the concept and develop intervention strategies to increase grit within individuals. In other words, improving our ability to predict individuals who have high levels of grit allows us to better understand the psychosocial factors that will enhance achievement. Given current research findings, we proposed the following hypotheses:

Hypothesis 1: Grit will be positively related to age, be higher in those identified as women than as men, and have no significant relationship with race/ethnicity.

Hypothesis 2: Grit will be positively related to academic performance (GPA).

Hypothesis 3: Grit will be significantly higher in some academic interest areas (college disciplines) over others.

Hypothesis 4: Adult Attachment Style will be significantly related to grit above and beyond age, academic performance (GPA), and academic interest (college discipline).

6 Method

6.1 Participants and Procedure

We recruited participants using a university mass email sent to all students, faculty, and staff at a large, public Midwestern university in the United States. The study included

797 participants whose average age was 34.03 ($SD = 14.73$ years). Participants anonymously completed a voluntary, 20-minute online questionnaire approved by the institutional review board at the authors' university.

The recruitment email took participants to a Qualtrics page with the survey and presented the consent form prior to participation. We collected data regarding participants' age, gender, race/ethnicity, GPA, college discipline, adult attachment style, and scores on a measure of grit. GPA was a self-report of college GPA on a 4.0 scale and participants reported the college of their major (e.g., college of education). We categorized race/ethnicity as follows: Asian (Chinese, Filipino, Indian, Japanese, Korean, Vietnamese, Other Asian), Black (African, Black), Latinx (Mexican, Puerto Rican, Other Hispanic/Latinx/Spanish Origin), Native American (American Indian, Native Hawaiian/Other Pacific Islander), White, and Biracial.

6.2 Measures

6.2.1 Adult Attachment Scale

The Revised Adult Attachment Scale (RAAS; Collins, 1996) is an 18-item instrument that contains three subscales (close, depend, anxiety), each with six items. The instrument is rated on a 5-point scale ranging from 1 = *not at all characteristic of me* to 5 = *very characteristic of me*, wherein seven items required reverse scoring, and higher scores reflected more of that attachment subscale. The RAAS measures an adult's attachment style dimensions using self-report of one's belief in the nature and quality of their romantic relationship capabilities. It measures one's comfort with closeness and intimacy (close attachment), the extent of one's ability to depend on and trust others (depend attachment), and one's worry about being rejected or being unloved (anxiety attachment; Collins, 1996). In the current study, the close, depend, and anxiety attachment subscales had Cronbach's alpha coefficients of .81, .82, and .90, respectively. These coefficients were similar to the close, depend, and anxiety coefficient ranges of .77–.82, .78–.80, and .83–.85, respectively, achieved by Collins (1996) across the studies in which the RAAS was developed.

6.2.2 Grit-S Scale

The Short-Grit Scale (Grit-S; Duckworth & Quinn, 2009) is an 8-item instrument that measures grit (perseverance and passion for long-term goals) on a 5-point scale ranging from 1 = *very much like me* to 5 = *not like me at all*. Four items require reverse scoring, and higher scores reflect higher levels of grit. The instrument is a revised version of the 12-item Original Grit Scale (Grit-O; Duckworth et al., 2007). In the present study, the Grit-S Scale had a Cronbach's alpha coefficient of .80, similar to the coefficients within the .73 to .83 range Duckworth and Quinn (2009) achieved across the studies in which Grit-S was developed.

6.3 Data Analysis

We excluded participants who were missing data on more than 10% of the attachment and grit instruments ($n = 54$), which left 797 participants (Bennett, 2001; Dong & Peng, 2013). We performed mean substitution imputation with the variable series mean to

replace the remaining missing data, which prevents disrupting the mean estimate of the variable (Baarda & Dijkum, 2019; Bennett, 2001; Saunders et al., 2006). We conducted preliminary analyses to ensure that the data did not violate assumptions of normality, linearity, homoscedasticity, and multicollinearity. We then ran correlations to compare relationships between grit, age, GPA, and attachment dimensions, including partial correlations to understand the relationship between attachment dimensions (close, depend, anxiety) and grit while controlling for age. We conducted analysis of covariance (ANCOVA) to measure whether there was a significant difference in grit between college disciplines while controlling for age. We dummy coded college disciplines, gender, and race/ethnicity. A four-stage hierarchical multiple regression was conducted to investigate the predictor variables of age, GPA, college discipline, and adult attachment and their relation to grit (outcome variable).

7 Results

7.1 Descriptive Statistics

The study sample was predominantly White (84.8%) and consisted of 574 (72%) women and 194 (24.3%) men with an average age of 34.03 ($SD = 14.73$ years). On average, participants scored 28.43 ($SD = 5.06$) out of a possible 40 on grit, 20.65 ($SD = 5.25$) out of 30 on close attachment, 17.51 ($SD = 5.22$) out of 30 on depend attachment, 16.19 ($SD = 6.55$) out of 30 on anxiety attachment, and 3.58 ($SD = .35$) out of 4.0 on GPA. See Table 1 for frequency data and Table 2 for descriptive data.

To test hypothesis one, we explored the relationship between grit and the demographic variables of age, gender, and race/ethnicity. We found no significant relationship between grit and gender, nor was there a significant relationship between grit and race/ethnicity. However, age had a weak but significant correlation with grit ($r = .19, p < .001$), with age having a stronger correlation with consistency of interest ($r = .22, p < .001$) than perseverance of effort ($r = .09, p = .012$). To test hypothesis two, predicting that grit would be positively correlated with GPA, we correlated the two variables and found a weak but significant correlation between grit and GPA ($r = .18, p < .001$). We found GPA had a stronger relationship with perseverance of effort ($r = .22, p < .001$) than consistency of interest ($r = .10, p < .01$). To test hypothesis three, we conducted a one-way ANCOVA to explore academic interest and we found a significant difference in grit between college discipline while controlling for age $F(11,755) = 2.72, p < .01$. Table 3 summarizes grit and GPA means based on academic interest (college discipline).

To test hypothesis four, we correlated adult attachment dimensions with grit and ran a four-stage hierarchical multiple regression. Table 4 contains the correlations between age, grit, GPA, and adult attachment dimensions. When controlling for age, we found the following partial correlations between grit and close attachment $r = .23, p < .001$, between grit and depend attachment $r = .16, p < .001$, and between grit and anxiety attachment $r = -.27, p < .001$. All three attachment dimensions showed a stronger relationship with consistency of interest than perseverance of effort. Conversely, the relationship between grit and anxiety attachment was negative, such that anxiety attachment decreased as grit increased (see Figure 1). Figure 1 shows adult attachment dimensions across grit standard deviations. As levels of grit increase, so did levels of close attachment and depend attachment.

Table 1 Frequency Statistics ($N = 797$)

	Variables	N
Gender	Woman	574 (72%)
	Man	194 (24.3%)
	Fluid	7 (.9%)
	Trans	8 (1%)
	Other	5 (.6%)
	Prefer not to answer	9 (1.1%)
Race/Ethnicity	African	5 (.6%)
	American Indian	1 (.1%)
	Biracial: Predominantly Asian and White	14 (1.8%)
	Biracial: Predominantly Black and (Hispanic, Latinx, or Spanish Origin)	2 (.3%)
	Biracial: Predominantly Black and White	4 (.5%)
	Biracial: Predominantly (Hispanic, Latinx, or Spanish Origin) and Native American	1 (.1%)
	Biracial: Predominantly (Hispanic, Latinx, or Spanish Origin) and White	16 (.2%)
	Biracial: Predominantly Native American and White	2 (.3%)
	Black	7 (.9%)
	Chinese	11 (1.4%)
	Filipino	1 (.1%)
	Indian	8 (1%)
	Japanese	3 (.4%)
	Korean	3 (.4%)
	Mexican	14 (1.8%)
	Native Hawaiian/Other Pacific Islander	1 (.1%)
	Other Asian	4 (.5%)
	Other Biracial	2 (.3%)
	Other Hispanic, Latinx, or Spanish Origin	5 (.6%)
	Other	11 (1.4%)
Puerto Rican	2 (.3%)	
Vietnamese	4 (.5%)	
White	676 (84.8%)	

We next ran a four-stage hierarchical multiple regression with grit as the dependent variable. We entered demographics (age) at stage one, academic performance (GPA) at stage two, academic interest (college disciplines, excluding undecided as reference) at stage three, and adult attachment style dimensions (close, depend, anxiety) at stage four. The regression statistics are available in Table 5.

The hierarchical multiple regression revealed that at stage one, age contributed significantly to the regression model, $F(1, 795) = 29.03$, $p < .001$, $R^2 = .04$. Introducing GPA into the model explained an additional 4% of the variance in grit and this change was significant, $F(2, 794) = 33.16$, $p < .001$, $R^2 = .08$. Introducing

Table 2 Descriptive Statistics (N = 797)

Variables	n	M Grit (SD)	M Age (SD)	M GPA (SD)	M Close Attachment (SD)	M Depend Attachment (SD)	M Anxiety Attachment (SD)
Gender							
Men	194	28.02 (5.23)	33.44 (14.89)	3.48 (.17)	19.96 (5.29)	17.59 (5.13)	15.81 (6.23)
Women	574	28.62 (4.97)	34.30 (14.96)	3.61 (.10)	20.93 (5.16)	17.52 (5.25)	16.27 (6.67)
Race/Ethnicity							
Non-White	121	27.61 (5.17)	28.01 (11.47)	3.53 (.13)	19.67 (5.36)	16.36 (5.13)	17.51 (6.85)
White	676	28.58 (5.03)	35.10 (15.20)	3.59 (.18)	20.82 (5.20)	17.71 (5.20)	15.96 (6.45)
Asian	34	26.91 (5.09)	26.07 (8.94)	3.58 (.09)	19.49 (4.96)	17.29 (5.30)	16.12 (5.90)
Biracial	41	27.83 (4.78)	26.78 (11.06)	3.54 (.15)	20.02 (5.46)	16.07 (5.03)	18.93 (6.82)
Black	12	25.58 (6.33)	28.25 (14.93)	3.43 (.18)	18.58 (4.72)	14.58 (4.50)	19.42 (6.69)
Latinx	21	28.14 (5.64)	31.00 (13.27)	3.42 (.18)	19.33 (6.04)	16.00 (4.80)	17.76 (7.23)
Native American	2	33.00 (7.07)	28.50 (13.44)	3.70 (.00)	20.50 (13.43)	18.00 (7.07)	14.00 (11.31)
Other	11	29.18 (3.95)	28.50 (13.44)	3.60 (.06)	20.64 (5.07)	16.91 (6.30)	14.64 (8.05)

Table 3 Grit Means Based on College Discipline

College Discipline	N	M Grit (SD)	M GPA (SD)
College of Business	54	27.69 (5.78)	3.50 (.18)
College of Dentistry	4	28.00 (2.00)	3.57 (.17)
College of Education	41	28.32 (5.29)	3.60 (.10)
College of Engineering	43	28.21 (4.99)	3.53 (.12)
College of Law	9	29.67 (4.34)	3.52 (.06)
College of Nursing	69	30.96 (4.01)	3.60 (.08)
College of Pharmacy	8	32.25 (3.01)	3.66 (.05)
College of Liberal Arts and Sciences	417	27.81 (5.13)	3.59 (.12)
College of Medicine	47	30.13 (4.63)	3.71 (.06)
College of Public Health	19	28.44 (5.06)	3.76 (.04)
Other College	48	29.73 (4.48)	3.47 (.13)
Undecided	9	26.44 (4.72)	3.51 (.18)

college disciplines into the model explained an additional 3% of the variance in grit and this change was significant, $F(13, 783) = 7.45, p < .001, R^2 = .11$. Introducing adult attachment dimensions into the model explained an additional 7% of the variance in grit and this change was significant, $F(16, 780) = 10.90, p < .001, R^2 = .18$. The analysis shows that depend attachment was not a significant predictor of grit when all variables were included in stage four of the regression model, $B = -.07, t = -1.74, p = .08$. However, age, $B = .14, t = 2.81, p = .005$, GPA, $B = .77, t = 5.36, p < .001$, being in the College of Nursing, $B = 2.53, t = 2.68, p = .008$, being in the College of Pharmacy, $B = 3.60, t = 1.99, p = .047$, close attachment, $B = .16, t = 3.99, p < .001$, and anxiety attachment, $B = -.18, t = -5.85, p < .001$, did significantly predict grit with all variables included in the model.

Table 4 Correlations between Grit, Age, GPA, & Adult Attachment Dimensions

Variables	Grit	Age	GPA	Close Attachment	Depend Attachment	Anxiety Attachment
Grit	–					
Age	.19***	–				
GPA	.18***	-.14***	–			
Close Attachment	.25***	.12***	.07	–		
Depend Attachment	.18***	.14***	.07*	.59***	–	
Anxiety Attachment	-.31***	-.34***	-.02	-.38***	-.48***	–

* = $p < .05$. ** = $p < .01$. *** = $p < .001$

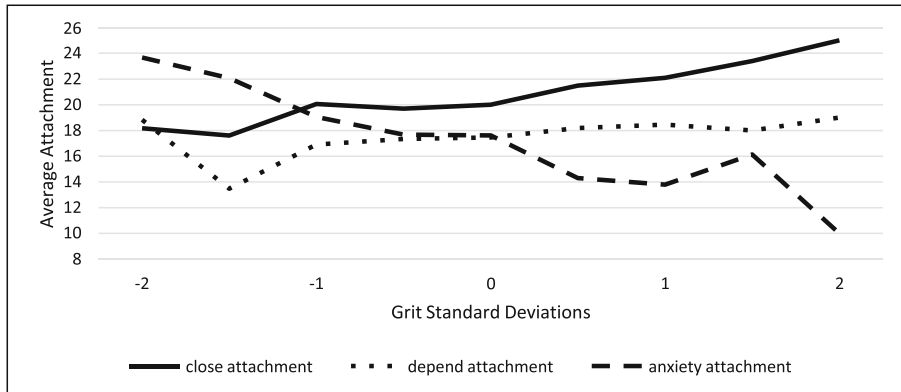
Adult Attachment Dimensions across Grit Standard Deviations

Fig. 1 Adult Attachment Dimensions across Grit Standard Deviations

8 Discussion

The purpose of this study was to reinforce the field’s inclusion of attachment into the understanding of grit and contribute to the description of an individual with grit. In this investigation, we attempted to understand grit’s relationship with demographics (age, gender, and race/ethnicity), to what degree academic performance (GPA) and interest (college discipline) were related to grit, and to what degree adult attachment style dimensions (close, depend, and anxiety) were predictive of grit. We found variable support for our first hypothesis, which was that grit would be positively related to age, higher in those identified as women, and have no significant relationship with race/ethnicity. Unlike studies that have shown significant differences in grit between sexes (i.e., Jaeger et al., 2010), there was no significant difference in grit between genders. This finding is similar to that of Levy and Steele (2011) who found no significant difference in grit between those who identified as male and those who identified as female. Additionally, grit was not related to a specific race/ethnicity among our sample. This is consistent with studies (e.g., Waring et al., 2019) that have found no significant difference in grit across race/ethnicity, and others (Guerrero et al., 2016; Strayhorn, 2014; Winiker et al., 2019) who have found that having higher levels of grit is helpful across race/ethnicity.

Our results were consistent with a significant positive relationship between grit and age, wherein older participants reported more grit than younger participants. Similarly, older participants reported higher levels of closeness and intimacy (close attachment). Anxiety had an inverse relationship; younger participants were more likely than older participants to worry about being rejected or being unloved (anxiety attachment). This may have been due to the birth cohort effect. That is, meta-analyses have found that generational differences in social and cultural context lead to people growing up with different levels of psychosocial factors like locus of control, conformity, and social etiquette (Curran & Hill, 2019; Twenge et al., 2004). Alternatively, Duckworth et al. (2007) suggested “grit grows with age and that one learns from experience that quitting plans, shifting goals, and starting over repeatedly are not good strategies for success” (p. 1091).

When investigating hypothesis two, that grit would be positively related to academic performance (GPA), we found that, congruent with previous grit studies (e.g., Duckworth et al., 2007), the relationship was significant; more gritty participants received significantly higher GPAs than less gritty participants. Our results also supported hypothesis three, or that grit would be significantly higher in some academic interest areas (college disciplines) over others. Like Jaeger et al. (2010) who found differences in grit between various subdisciplines in engineering, our participants from the College of Pharmacy, College of Nursing, and College of Medicine scored the highest on grit. Additionally, students who reported college majors scored higher on grit than students with undecided majors. Precise reasons for differences in grit between college disciplines are unclear. However, in accordance with Jaeger et al.'s (2010) finding that the major considered to be the most difficult by students also had those with the highest levels of grit, we propose that degrees in pharmacy, nursing, and medicine are all rigorous and competitive and thus may attract students with higher levels of grit.

We also found support for hypothesis four, that adult attachment style would be significantly related to grit above and beyond age, academic performance (GPA), and academic interest (college discipline). Anxiety attachment had a negative relationship with grit, in that individuals showing a more anxious attachment pattern also showed less grit. Those who were more comfortable with closeness and intimacy (close attachment) had significantly more grit than those who worried about being rejected or unloved (anxiety attachment). This is consistent with Levy and Steele's (2012) and Waring et al.' (2019) findings that a gritty individual is not only one who perseveres through difficulty while maintaining passion for long term goals, but they are also more comfortable with closeness and intimacy and worry less about being rejected or unloved.

9 Limitations

Limitations with this study include that the sample was predominantly White; therefore, findings for non-White participants may not be fully reflective of the population of persons of color. Second, the age measure had a 61+ ceiling. In future studies, the measure of age may be more precisely analyzed by extending the available age responses to understand grit variability in older ages. Third, GPA was collected through a self-report of college GPA rather than a collection of academic records, which may not reflect a precise measure of achievement. Fourth, all participants were asked about GPA and college discipline regardless of age and, therefore, participants out of college responded based on memory.

Despite limitations, these findings contribute to our knowledge of grit and its associated characteristics. Strengths of this study include reinforcing the inclusion of attachment into the understanding of grit, specifically how adult attachment relates to grit above and beyond the predictability of demographics, academic performance, and academic interest. These findings paint a picture of the relational context of an individual's ability to maintain perseverance of effort through difficulty and maintain passion for long-term goals. Future research would contribute greatly to the understanding of grit by employing a qualitative investigation to understand the lived

Table 5 Multiple Hierarchical Regression Analysis Showing Age, GPA, College Discipline, and Adult Attachment as Predictors of Grit

Variables	B	SE B	β	t	r	r ²	sr ²	F-change	R	R ²	R ² change
Step 1											
(Constant)	27.12	.30		90.29***				29.03***	.19	.04	.04
Age	.25	.05	.19	5.39***	.19	.19	.19				
Step 2											
(Constant)	22.71	.79		28.67***				36.02***	.28	.08	.04
Age	.29	.05	.22	6.30***	.19	.22	.22				
GPA	.89	.15	.21	6.01***	.18	.21	.21				
Step 3											
(Constant)	21.96	1.09		20.12***				2.64**	.33	.11	.03
Age	.25	.05	.19	5.21***	.19	.18	.18				
GPA	.85	.15	.20	5.71***	.18	.20	.19				
College of Business	.55	1.02	.03	.54	-.04	.02	.02				
College of Dentistry	.72	2.53	.01	.29	-.01	.01	.01				
College of Education	.60	1.09	.03	.55	-.01	.02	.02				
College of Engineering	1.49	1.08	.07	1.38	-.01	.05	.05				
College of Law	2.72	1.79	.06	1.52	.03	.05	.05				
College of Nursing	3.27	.98	.18	3.35**	.15	.12	.11				
College of Pharmacy	4.31	1.88	.09	2.30*	.08	.08	.08				
College of Liberal Arts & Sciences	.68	.83	.06	.82	-.13	.03	.03				
College of Medicine	2.17	1.06	.10	2.05*	.08	.07	.07				
College of Public Health	.66	1.37	.02	.48	-.01	.02	.02				
Other College	2.12	1.05	.10	2.02*	.07	.07	.07	23.11***	.43	.18	.07
Step 4											

Table 5 (continued)

Variables	B	SE B	β	t	r	r ²	st ²	F-change	R	R ²	R ² change
(Constant)	24.24	1.50		16.21***							
Age	.14	.05	.10	2.81**	.19	.10	.09				
GPA	.77	.14	.18	5.36***	.18	.19	.17				
College of Business	-.02	.98	-.01	-.02	-.04	-.01	-.01				
College of Dentistry	-.89	2.45	-.01	-.36	-.01	-.01	-.01				
College of Education	.26	1.05	.01	.25	-.01	.01	.01				
College of Engineering	1.18	1.04	.05	1.14	-.01	.04	.04				
College of Law	2.61	1.72	.06	1.52	.03	.05	.05				
College of Nursing	2.53	.95	.14	2.68**	.15	.10	.09				
College of Pharmacy	3.60	1.81	.07	1.99*	.08	.07	.06				
College of Liberal Arts & Sciences	.40	.80	.04	.50	-.13	.02	.02				
College of Medicine	1.37	1.02	.06	1.34	.08	.05	.04				
College of Public Health	.44	1.31	.01	.34	-.01	.01	.01				
Other College	1.75	1.01	.08	1.73	.07	.06	.06				
Close Attachment	.16	.04	.16	3.99***	.25	.14	.13				
Depend Attachment	-.07	.04	-.07	-1.74	.18	-.06	-.06				
Anxiety Attachment	-.18	.03	-.23	-5.85***	-.31	-.21	-.19				

* = $p < .05$. ** = $p < .01$. *** = $p < .001$

experiences of gritty individuals and the guiding motivation behind their aspirations to further provide an understanding of how one comes to have high levels of grit.

10 Conclusion

Our findings have several implications for educators, parents, and counselors. To assess or motivate an individual's ability to persevere and maintain passion for long-term goals, it may be important to attend to their relational style. Additionally, when attempting to encourage a student's effort or interest, we recommend applying these findings by attending to the student's ability to feel close to or depend on others and their anxious relational tendencies as areas to intervene. Parents may find encouragement in these findings to apply attachment-oriented parenting interventions so they can better attend to a child's preoccupation with being rejected or unloved (anxious attachment) and minimize their relational barriers to having perseverance of effort and consistency of interest tendencies. Counselors may find it useful to assess and attend to a client's grit level to understand the motivational context of the client.

Declarations

Conflict of Interest We have no conflict of interest to disclose.

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