

The Influence of Grit and Resilience on Virtues and Character Strengths in Military Leadership

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Abstract:

Virtues and character strengths are highly revered in military leadership. However, there is no scientific work investigating the influence of grit and resilience, two integral psychological constructs essential in fostering mentally healthy individuals, in relation to these virtues and character strengths and successful military leadership and officer development.

Using a cross-sectional design, this study recruited 107 participants (ages 18 to 22) from a private U.S. Military university. Both Peterson and Seligman's (2004) and McGrath, Rashid, Park, and Peterson's (2010) taxonomy of virtues and character strengths were evaluated. Self-reported grit and resilience were also measured. Findings revealed Peterson and Seligman's (2004) virtues of wisdom and knowledge, humanity, and temperance and McGrath et al.'s (2010) virtue of self-control as the highest ranked virtue for an effective Army leader. Character strengths of judgment followed by perspective and fairness associated to successful military leadership. Findings further revealed a significant model indicating that grit and resilience explained 50.9% of variance suggesting that both grit and resilience significantly predicted leadership. Regression models including humility and fairness also provided significant predictive outcomes on leadership. Findings are discussed in regard to self, unit, and organizational performance in the military.

Keywords: grit; resilience; leadership; virtues; character strengths

The Influence of Grit and Resilience on Virtues and Character Strengths in Military Leadership

In a military environment, a successful military leader is able to acclimate rapidly to changing conditions, persevere and continue with effort regardless of failure, and recover quickly from difficult situations and environments. Executing these tasks and missions, a successful military leader must have sound character (Matthews, Eid, Kelly, Bailey, & Peterson, 2006). Specifically, individuals must be courageous with convictions, show dependable actions, and demonstrate honest behaviors and thoughts. A sound character comprises of numerous appropriate and comprehensive virtues and character strengths (Matthews et al., 2006; Peterson & Seligman, 2004). Virtues are fundamental features deemed by scholars as "predispositions toward moral excellence as means of solving the important tasks necessary for survival and advancement of the species" (Park & Peterson, 2009, p. 6). Character strengths are psychological mechanisms that describe virtues, and thus, are not isolated systems of performance and conduct (Park, Peterson, & Seligman, 2004). Better understanding virtues and character strengths is integral in building a successful leader, especially in a military and paramilitary environment.

Virtues and character strengths are revered as essential characteristics in effective military leadership (Matthews et al., 2006). Military doctrines from various national armed forces have expressed importance in virtues and character strengths for successful leadership (Boe, Bang, & Nilsen, 2015; Gayton & Kehoe, 2015). For example, Canada's and Norway's Armed Forces have highlighted significance of virtues and character strengths in leadership (Boe et al., 2015). Research has also shown importance of virtues and character strengths in military leadership. Boe et al. (2015) reported Norwegian Military Academy (NMA)'s Corp of Cadets found bravery, citizenship, creativity, fairness, leadership, love of learning, integrity, open-mindedness, perspective, persistence, self-regulation, and social intelligence to be the most important character strengths. Matthews et al. (2006) showed the highest rated



character strengths among United States Military Academy (USMA)'s Corp of Cadets were bravery, hope, industry, teamwork, and honesty. While the aforementioned are examples of the importance of virtues and character strengths, potential influences of grit and resilience on virtues and character strengths for successful military leadership have yet to be emphasized.

While virtues and character strengths have been appreciated in numerous Army doctrines, previous research has revealed virtues and character strengths vary in degree of importance across groups which can influence effective leadership in Armed Forces operations (Boe et al., 2015; Matthews et al., 2006). Particularly, a sound character is imperative in how individuals behave and act, which consequently impacts human performance (Gayton & Kehoe, 2015). For example, a successful military leader must solve problems, reason and make decisions, and manage and direct individuals. Influences of virtues and character strengths on leadership allows for shaping and predicting of human performance which is essential in successful military leadership and officer development (Boe et al. 2015; Matthews et al., 2006). Additionally, outside of virtues and character strengths, grit and resilience also show to be integral in developing successful military leaders as well as influencing and predicting human performance (Maddi, Matthews, Kelly, Villarreal, & White, 2012). Grit, defined as the combination of persistence and passion, has been identified as a trait that allows an individual to perform vigorously toward challenges without losing energy over an extended period of time regardless of failure (Duckworth, Peterson, Matthews, & Kelly, 2007). Resilience is operationalized as an individual's ability to appropriately adapt to significant adversity, trauma, or other stressors (Bartone, 2006; Bonanno, Galea, Bucciarelli, & Vlahov, 2007). As grit and resilience are both essential in shaping and predicting human performance and promoting and facilitating successful military leadership development, their influence on virtues and character strengths can impact military leadership and officer development (Duckworth et al., 2007). By understanding influences of grit and resilience on virtues and character strengths, successful military leadership development can be better conceptualized (Gayton & Kehoe, 2015).

Virtues and Character Strengths

Virtues and character strengths are assumed to be the "capacities of cognition, conation, affect, and behavior—the psychological ingredients for displaying virtues or human goodness" (Park & Peterson, 2009, p. 1). Virtues are considered wide-range and socially and culturally desirable constructs; character strengths are dimensional, observable traits that vary, contingent on context and situation (McGrath et al., 2010). Particularly, virtues and character strengths have been categorized as pivotal in conceptualizing "the psychological good life." Through the use of Values in Action (VIA) Inventory of Strengths, Peterson and Seligman (2004) classify 24 different strengths of character into the empirically supported six-virtue model. The six virtues include: (1) humanity, (2) justice, (3) courage, (4) temperance, (5) wisdom and knowledge, and (6) transcendence. Most recently, though a hierarchical regression approach, McGrath et al. (2010) suggested a three-virtue model: (1) self-control, (2) caring, and (3) inquisitiveness with 18 character strengths. Peterson and Seligman's (2004) and McGrath et al.'s (2010) taxonomy of virtues and character strengths were evaluated in the present study.

Research has shown virtues and character strengths are positively correlated with subjective well-being (Gillham et al., 2011), altruistic behaviors, actions, and thoughts (Peterson & Seligman, 2004), and accepting and respecting diversity and life and work satisfaction among a number of occupations (Park et al., 2004). Furthermore, research has shown that specific character strengths (e.g., hope, kindness, perspective, self-control, and social intelligence) safeguard against the negative impact of adversity and trauma (Park et al., 2004). As positive psychology emerges, the role of virtues and character strengths have been examined in adverse environments as these constructs have shown to be integral mechanisms towards ideal human development, and consequently, human performance (Park & Peterson, 2009).

Grit and Resilience

Grit has been identified as a trait that allows an individual to perform vigorously and persistently toward challenges without losing energy or effort over a long period of time regardless of disappointment or failure (Duckworth et al., 2007; Maddi et al., 2012). A person that is gritty is able to overcome obstacles to complete any tasks. Gritty individuals are more likely to self-maintain and self-regulate feelings of commitment and willpower over a long time, regardless of challenges or failures one might face (Duckworth et al., 2007). The definition of resilience though, has been problematic and complex due to numerous attempts to operationalize. Resilience is the capacity to acclimate to strenuous and distressful situations and events and a resilient individual has the ability to survive intense levels of stress from emotionally provoking experiences and can protect mental stability and psychological health (Bonanno et al., 2007).

Grit and resilience have been linked to factors central for successful military performance including but not limited to the ability to balance and reduce military operational stress (Bartone, 2006), be a successful and productive leader (Litz, 2014), support mental health of war survivors and flourish after significant aversive events (Bonanno et al., 2007). As a successful military leader, it is important a leader is able to face hardship or difficulty without failing and is able to bounce back from adversity. Therefore, it can be assumed that if grit and resilience are integral for successful military leadership and officer development, then these constructs could also influence virtues and character strengths that are revealed in successful military leadership.

Current Study

While virtues and character strengths have shown to be highly revered for successful leadership (Boe et al., 2015; Gayton & Kehoe, 2015; Matthews et al., 2006), there is limited scientific work investigating virtues and character strengths that best make a successful leader. Even more so, there is no research, to the authors' knowledge, of the influence of grit and resilience in relation to virtues and character strengths. Particularly, this study aims to determine influences of grit and resilience on virtues and character strengths for successful military leadership. The three goals for this study are as followed:

Goal 1: As virtues and characters have been deified as essential elements in successful leadership, the first goal intends to investigate which virtues and character strengths best make a successful leader utilizing both Peterson and Seligman's (2004) and McGrath et al.'s (2010) taxonomy of virtues and character



strengths.

Goal 2: As both grit and resilience have shown to be integral in shaping and predicting human performance and promoting and facilitating successful military leadership development, the second goal is to examine influences of grit and resilience on virtues and character strengths for successful military leadership.

Goal 3: As virtues, character strengths, resilience, and grit show to be essential mechanisms for human development, and have been perceived as significant predictors in effective leadership and for facilitating mental health and well-being, the third goal will assess impacts of resilience, grit, virtues, and character strengths on military leadership.

Methods

Participants

Participants from a private US Military university that houses all military branches were recruited for this study. The sample of 107 participants for this study, who identified as either male (66%) or female (34%), ranging from 18 to 22. Over a third of participants were either 19 years old (38%) or 18 years old (34%); this was consistent to participants' grade level with 40% being freshmen and 34% being sophomores. As members of the Corps of Cadets, half of participants (54.2%) reported that they were a leader within their cadet group.

Materials

The first (self-report) scale administered was the 12-item Grit Scale. The five-point Likert-type scale measures grit. The scale has revealed high internal consistency ($\alpha = .85$) including for factors of Consistency of Interests ($\alpha = .84$) and Perseverance of Effort ($\alpha = .78$) (Duckworth et al., 2007). The second (self-report) scale administered was the 32-item RSA. This scale measures resilience through evaluating interpersonal and intrapersonal protective factors associate with this construct. The

RSA has revealed high internal consistency reliability ($\alpha = .72$ to $.94$) (Wagnild & Young, 1993). Virtues and character strengths were assessed using Peterson and Seligman's (2004) six-virtue model and McGrath et al.'s (2010) three-virtue model.

Procedure

The study was approved by Teacher's College, Columbia University's Institutional Review Board (IRB). Recruitment occurred via word-of-mouth (i.e., professors provided extra credit for study participation). Using a cross-sectional design, participants received a Qualtrics link to complete two scales, the Grit Scale and the RSA. Additional to these two online measures, participants were asked to rank (in degree of importance) the virtues and character strengths necessary to be an effective Army leader.

Results

To evaluate influences of grit and resilience on virtues and character strengths for successful military leadership, a cross-sectional experimental design was used. Evaluating power analysis, G*Power 3.1.9.2 was employed to provide a sample size of 108 participants for medium-sized effects (Cohen's $f = .32$) with acceptable statistical power (Faul, Erdfelder, Buchner, & Lang, 2009). Participants self-reported moderately resilient ($M = 5.54$, $SD = .93$) and moderately gritty ($M = 3.78$, $SD = .47$). Furthermore, a Pearson product-moment correlation coefficient employed to measure the relationship between the two constructs ($r = .18$, $p = .053$), suggested constructs of resilience and grit were marginally correlated to one another. Bivariate correlations were utilized to assess the direction and magnitude of statistical relationship between grit, resilience, virtues and character strengths on cadet leadership (e.g., binary variable defined whether participant was a leader within their cadet group) (see Table 1).

Table 1. Correlational Matrix of Study Constructs

	1	2	3	4
1. Wisdom and Knowledge	1			
2. Humanity	-0.32***	1		
3. Temperance	-0.27***	-0.14	1	
4. Courage	-0.12	-0.20*	-0.33***	1
5. Justice	-0.15	0.06	-0.05	-0.32***
6. Transcendence	-0.26***	-	-0.22*	-0.02
7. Inquisitiveness	0.11	-0.12	-0.11	0.11
8. Self-Control	0.22*	0.03	-0.05	-0.13
9. Carine	-0.27***	0.05	0.12	0.04
10. Creativity	-0.02	-0.04	-0.06	0.03
11. Bravery	0.04	-0.01	0.01	-0.03
12. Love	-0.04	0.07	-0.13	0.07
13. Teamwork	-0.12	0.05	0.01	-0.06
14. Forgivevness	0.084	-0.012	-0.101	-0.050
15. Appreciation of Beauty	0.04	0.09	-0.01	-0.09
16. Curiosity	0.09	0.01	0.12	-0.16
17. Perseverance	-0.14	0.00	0.09	0.08
18. Kindness	-0.03	-0.03	0.07	0.18
19. Fairness	-0.11	0.00	0.17	0.03
20. Humility	-0.06	-0.01	0.11	0.01
21. Social Intelligence	0.09	-0.20*	0.048	0.03
22. Judgment	0.07	-0.21*	-0.10	-0.03
23. Honesty	-0.04	0.09	-0.04	0.02
24. Gratitude	0.20*	0.03	0.01	-0.12
25. Leadership	-0.02	0.13	-0.04	0.07
26. Prudence	-0.08	0.04	-0.01	-0.02
27. Hope	-0.02	0.13	0.17	-0.07
28. Love of Learning	-0.01	0.10	0.00	0.04
29. Zest	-0.02	-0.03	-0.01	-0.06
30. Self-Regulation	-0.01	0.12	0.05	-0.08
31. Humor	0.07	-0.07	-0.16	0.04
32. Spirituality	0.12	0.00	-0.25***	0.13
33. Perspective	0.05	0.02	-0.18	-0.02
34. Grit	0.08	0.05	-0.11	0.00
35. Resilience	-0.15	-0.09	-0.12	0.17
36. Leader Role	0.06	0.03	-0.01	0.06
37. Age	0.06	0.04	-0.05	-0.04
38. Gender	-0.15	-0.03	0.02	0.01

1																				
-0.42***	1																			
-0.08	0.07	1																		
-0.12	0.02	-0.20*	1																	
0.16	-0.06	-0.46***	-0.78***	1																
0.19	-0.08	0.01	-0.06	0.05	1															
0.02	-0.05	0.05	0.00	-0.03	0.04	1														
0.12	-0.06	0.07	-0.08	0.03	0.53***	0.01	1													
0.09	0.05	0.01	-0.14	0.12	0.44***	0.32***	0.24**	1												
0.09	-0.02	0.26***	-0.05	-0.12	0.23**	0.30**	0.32***	0.09	1											
0.13	-0.14	-0.04	0.05	-0.01	0.34***	0.06	0.69***	0.03	0.29**	1										
0.20*	-0.24***	-0.03	-0.12	0.13	0.16	0.02	0.17	0.01	0.04	0.04	1									
0.04	-0.04	-0.04	-0.03	0.05	0.19*	-0.08	0.08	0.30***	-0.20*	0.11	0.10	1								
0.10	-0.25***	0.06	-0.08	0.04	0.16	0.16	0.17	-0.06	0.03	0.17	0.19*	0.58***	1							
-0.01	-0.07	-0.13	-0.17	0.24**	-0.07	-0.08	-0.191*	0.07	-0.39***	-0.14	0.15	0.31***	0.16	1						
-0.06	0.02	-0.12	-0.17	0.23**	-0.18*	0.09	-0.03	0.02	-0.11	0.05	0.14	0.18	0.16	0.16	1					
-0.05	0.03	0.04	0.02	-0.04	0.09	-0.14	0.25**	-0.10	0.20*	0.25**	-0.03	-0.19*	-0.02	-0.27**	0.47***	1				
0.01	0.20*	-0.09	0.13	-0.06	-0.13	-0.25**	-0.115	-0.26**	-0.24*	-0.02	-0.02	-0.01	-0.24**	0.10	0.14	0.14	1			
-0.08	0.07	-0.09	0.05	0.01	-0.06	-0.42***	-0.18**	-0.015	-0.43***	-0.21**	-0.03	0.15	-0.24**	0.05	-0.06	-0.40***	-0.25**	1		
-0.07	-0.08	-0.17	0.21*	-0.08	-0.26**	0.30**	-0.22*	-0.30**	-0.31***	-0.12	-0.22*	-0.18	-0.18	-0.19*	0.07	-0.13	-0.25**	-0.25**	1	
-0.07	-0.05	-0.03	0.17	-0.13	-0.150	-0.01	-0.16	-0.33***	-0.12	-0.15	-0.31***	-0.17	-0.17	0.04	-0.39***	-0.46***	-0.27***	-0.46***	-0.17	1
0.03	0.05	0.12	-0.12	0.03	0.030	-0.48***	-0.02	0.01	-0.03	-0.14	0.08	-0.47***	-0.25**	0.04	-0.10	-0.27***	-0.27***	-0.27***	0.11	0.11
0.04	-0.21*	0.06	-0.04	0.00	-0.02	-0.14	-0.18*	-0.21*	0.04	-0.05	-0.10	-0.22*	0.04	-0.01	-0.01	-0.28**	-0.28**	-0.28**	-0.30***	0.05
0.05	-0.15	-0.04	-0.26**	0.26**	0.16	-0.15	-0.01	-0.22*	-0.23*	-0.18	-0.02	-0.17	-0.17	0.13	-0.30***	-0.12	-0.30***	-0.30***	-0.30***	0.05
-0.05	0.17	0.13	-0.05	-0.04	-0.44***	-0.13	-0.50***	-0.04	-0.12	-0.37***	-0.02	-0.35***	-0.35***	0.05	-0.06	0.15	-0.06	-0.06	-0.15	-0.15
-0.01	-0.07	-0.10	0.06	0.01	-0.09	-0.12	-0.07	0.13	-0.01	0.03	-0.32***	-0.32***	-0.32***	0.03	0.03	0.18	0.03	0.03	-0.02	-0.02
0.07	0.03	-0.02	-0.05	0.06	0.08	-0.06	0.01	-0.25**	-0.13	-0.22*	0.17	0.17	0.17	0.03	0.03	0.01	0.01	0.01	-0.28***	-0.28***
0.17	-0.14	0.01	-0.04	-0.09	-0.11	-0.13	0.14	-0.16	-0.31***	-0.17	0.02	-0.16**	0.21**	0.24*	0.24*	0.18	0.18	0.18	0.05	0.05
0.01	0.10	0.11	0.04	-0.11	-0.16	-0.42***	-0.08	-0.47***	0.17	0.00	-0.01	-0.50***	-0.29**	-0.49***	-0.12	-0.12	-0.12	-0.12	0.08	0.08
-0.08	0.06	0.04	0.11	-0.13	0.03	-0.06	-0.04	-0.12	-0.14	-0.01	0.11	0.13	0.13	0.01	0.01	0.16	0.16	0.16	-0.09	-0.09
0.00	0.17	0.04	0.06	-0.09	0.12	0.04	0.14	-0.10	-0.02	-0.03	-0.07	0.03	0.03	-0.13	-0.13	0.04	0.04	0.04	0.13	0.13
0.05	-0.18	-0.11	-0.05	0.12	-0.11	0.03	-0.03	-0.03	0.10	0.01	-0.02	-0.01	-0.01	0.08	0.04	0.03	0.03	0.03	0.03	0.03
0.02	-0.04	0.07	0.03	-0.07	-0.08	0.00	-0.04	-0.10	0.00	-0.09	-0.09	0.01	0.01	0.01	-0.08	-0.02	-0.02	-0.02	0.01	0.01
0.22**	-0.02	-0.19*	-0.05	0.16	0.01	0.14	-0.03	0.01	0.04	0.03	-0.01	0.10	0.02	0.21*	-0.04	0.18	0.18	0.18	0.18	0.18





22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.28**	0.04	0.31****	-0.08	0.53****	0.23**	0.39****	-0.13	-0.09	-0.07	-0.05	-0.07	-0.10	-0.19*	0.18	-0.01	1
0.19	0.12	-0.50****	0.24**	0.55****	0.32****	0.39****	-0.09	-0.02	0.08	-0.05	-0.07	-0.10	-0.04	0.02	1	1
-0.34****	0.16	0.24**	-0.24**	0.55****	0.32****	0.39****	-0.06	-0.02	0.08	-0.04	-0.04	-0.08	-0.04	0.04	1	1
-0.19*	0.18	0.34****	-0.24**	0.55****	0.32****	0.39****	-0.06	-0.02	0.08	-0.04	-0.04	-0.08	-0.04	0.04	1	1
-0.16	0.09	-0.39****	0.24**	0.55****	0.32****	0.39****	-0.06	-0.02	0.08	-0.04	-0.04	-0.08	-0.04	0.04	1	1
-0.08	0.05	0.34****	-0.24**	0.55****	0.32****	0.39****	-0.06	-0.02	0.08	-0.04	-0.04	-0.08	-0.04	0.04	1	1
0.04	0.13	-0.02	0.01	0.01	0.17	-0.06	-0.06	0.01	0.08	-0.04	-0.04	-0.08	-0.04	0.04	1	1
0.15	0.05	0.34****	-0.24**	0.55****	0.32****	0.39****	-0.06	-0.02	0.08	-0.04	-0.04	-0.08	-0.04	0.04	1	1
-0.25**	0.02	-0.16	-0.23*	0.05	0.08	0.35****	-0.18	-0.27**	0.33**	0.09	0.05	0.27**	0.05	1	1	1
-0.08	0.02	-0.02	-0.17	-0.10	-0.04	0.35****	-0.14	-0.19*	0.33**	0.09	0.05	0.27**	0.05	1	1	1
0.02	0.02	-0.28**	0.20*	0.55****	-0.06	0.35****	-0.14	-0.19*	0.33**	0.09	0.05	0.27**	0.05	1	1	1
0.10	0.04	0.03	0.05	-0.09	-0.07	0.35****	-0.14	-0.19*	0.33**	0.09	0.05	0.27**	0.05	1	1	1
-0.06	-0.12	-0.13	0.13	-0.02	0.00	0.35****	-0.14	-0.19*	0.33**	0.09	0.05	0.27**	0.05	1	1	1
-0.05	-0.04	0.07	-0.10	-0.03	-0.12	0.35****	-0.14	-0.19*	0.33**	0.09	0.05	0.27**	0.05	1	1	1
0.10	-0.01	0.15	0.05	-0.13	-0.13	0.35****	-0.14	-0.19*	0.33**	0.09	0.05	0.27**	0.05	1	1	1
-0.12	-0.02	0.07	-0.12	0.07	-0.01	0.35****	-0.14	-0.19*	0.33**	0.09	0.05	0.27**	0.05	1	1	1

* = p > .05, ** = p > .01, *** = p > .001



Goal 1

To investigate virtues and character strengths of a successful leader, both Peterson and Seligman’s (2004) and McGrath et al.’s (2010) taxonomy of virtues and character strengths were utilized. Table 2 provides an overview of participants’ virtues and character strengths rankings. Findings revealed participants found the most important Peterson and Seligman (2004)’s virtues as an

effective military leader to be wisdom and knowledge (37.4%), humanity (37.2%) and temperance (14.0%). For McGrath et al.’s (2010) virtues, participants ranked self-control as the most important virtue for military success (45.8%), then caring (42.1%) and inquisitiveness (12.1%). Findings revealed participants found the top three Peterson and Seligman (2004)’s character strengths were judgement (18.7%), perspective (15.9%), and fairness (13.1%).

Table 2.
Mean Values, Standard Deviations, and Ranks for Virtues and Character Strengths

	M	SD	Rank (#)
Peterson and Seligman’s (2004) virtues			
Wisdom and Knowledge	2.64	1.64	1
Humanity	2.39	1.34	2
Temperance	3.22	1.47	3
Courage	3.76	1.36	4
Justice	4.06	1.37	6
Transcendence	4.91	1.69	5
McGrath et al.’s (2010) virtues			
Inquisitiveness	2.13	0.60	3
Self-Control	1.83	0.85	1
Caring	2.04	0.94	2
Character Strengths			
Creativity	21.23	2.78	20
Bravery	7.27	4.65	5
Love	22.12	1.90	23
Teamwork	7.6	4.47	11
Forgiveness	8.27	4.87	10
Appreciation of Beauty	22.11	1.64	24
Curiosity	20.65	2.07	22
Perseverance	7.51	4.03	7
Kindness	7.05	3.76	4
Fairness	7.66	4.67	3
Humility	8.61	3.19	6
Social Intelligence	7.80	3.67	8
Judgment	7.82	4.54	1
Honesty	8.33	3.26	13
Gratitude	9.70	4.44	14
Leadership	7.26	4.24	9
Prudence	8.21	4.32	12
Hope	19.89	2.28	18
Love of Learning	18.32	2.19	16
Zest	18.79	1.76	21
Self-Regulation	9.99	3.70	15
Humor	18.21	2.03	19
Spirituality	18.97	2.44	17
Perspective	7.36	5.39	2

Goal 2

To examine the influence of grit and resilience on virtues and character strengths for successful military leadership, ordinal logistic regression (ORL) analyses were completed due to the nature of virtues and character strengths (i.e., dependent variables) and continuous nature of grit and resilience (i.e., independent variables). Assessing influences of grit on virtues, findings revealed grit predicted Peterson and Seligman (2004)’s virtue of justice (OR = 11.61, $\beta = 2.452$) ($\chi(25) = 44.39$, $p = .010$) and McGrath et al.’s (2010) virtue of self-control (OR = 9.26, $\beta = 3.147$) ($\chi(35) = 67.54$, $p < .001$) and McGrath et al.’s (2010) virtue of self-control (OR = 9.26, $\beta = 3.147$) ($\chi(35) = 67.54$, $p < .001$) (see Table 3). Nagelkerke

2.226) ($\chi(25) = 43.89$, $p = .011$) (see Table 3). Nagelkerke modifications showed grit’s moderate proportion of variation amongst Peterson and Seligman (2004)’s virtue of justice ($R^2 = 35.5\%$) and McGrath et al.’s (2010) virtue of self-control ($R^2 = 38.2\%$). Examining the influence of resilience on virtues, findings revealed resilience predicted Peterson and Seligman (2004)’s virtue of justice (OR = 11.61, $\beta = 2.452$) ($\chi(25) = 44.39$, $p = .010$) and McGrath et al.’s (2010) virtue of self-control (OR = 9.26, $\beta = 3.147$) ($\chi(35) = 67.54$, $p < .001$) (see Table 3). Nagelkerke



modifications showed resilience’s moderate proportion of influence of resilience on character strengths, results revealed variation amongst Peterson and Seligman (2004)’s virtues of resilience predicted character strengths of appreciation of beauty (R² = 41.9%) and courage (R² = 39.8%), and McGrath (OR = 23.69, β = 3.17) (χ(35) = 51.23, p = .038), curiosity (OR = et al.’s (2010) virtues of self-control (R² = 56.3%) and caring (R² = 54.5%).

Assessing the influence of grit on character strengths, findings revealed grit predicted character strengths of bravery (OR = 15.09, β = 2.714) (χ(25) = 52.35, p < .001), teamwork (OR = 13.90, β = 2.632) (χ(25) = 44.01, p = .011), perseverance (OR = 12.65, β = 2.538) (χ(25) = 46.19, p = .006), humility (OR = 15.47, β = 2.739) (χ(25) = 41.13, p = .022), social intelligence (OR = 11.38, β = 2.432) (χ(25) = 46.38, p = .006), and hope (OR = 10.14, β = 2.316) (χ(25) = 46.45, p = .006). Nagelkerke modifications showed grit’s moderate proportion of variation in character strengths of bravery (R² = 39.0%), teamwork (R² = 34.1%), curiosity (R² = 41.2%), fairness (R² = 43.1%), humility (R² = 32.2%), social intelligence (R² = 35.6%), and hope (R² = 36.0%). Nagelkerke modifications show grit’s moderate proportion of variation in character strengths of appreciation of beauty (R² = 40.6%), perseverance (R² = 35.4%), teamwork (R² = 34.1%), curiosity (R² = 41.2%), fairness (R² = 43.1%), humility (R² = 32.2%), social intelligence (R² = 38.4%), and hope (R² = 46.5%). Examining the

Table 3.
Ordinal Regression Analyses for Virtues and Character Strengths

	χ ²	df	Sig	R ² (%)
Peterson and Seligman’s (2004) Virtues x Grit				
Wisdom and Knowledge	28.59	25	0.28	24.5
Humanity	27.96	25	0.31	24.3
Temperance	30.45	25	0.21	25.6
Courage	19.85	25	0.76	17.6
Justice	44.39	25	0.010**	35.5
Transcendence	36.46	25	0.07	32.0
McGrath et al.’s (2010) Virtues x Grit				
Inquisitiveness	30.40	25	0.21	29.7
Self-Control	43.89	25	0.011*	38.2
Caring	30.03	25	0.22	28.5
Peterson and Seligman’s (2004) Virtues x Resilience				
Wisdom and Knowledge	39.46	35	0.28	32.2
Humanity	43.67	35	0.15	35.4
Temperance	55.68	35	0.015*	41.9
Courage	51.72	35	0.034*	39.8
Justice	29.24	35	0.74	25.0
Transcendence	41.83	35	0.20	35.9
McGrath et al.’s (2010) Virtues x Resilience				
Inquisitiveness	30.21	35	0.70	29.5
Self-Control	73.38	35	< .001***	56.3
Caring	67.54	35	< .001***	54.5
Character Strengths x Grit				
Creativity	17.94	25	0.85	15.8
Bravery	52.35	25	< .001***	39.0
Love	21.63	25	0.66	19.5
Teamwork	44.01	25	0.011*	34.1
Forgiveness	33.11	25	0.13	26.9
Appreciation of Beauty	35.31	25	0.08	30.0
Curiosity	31.37	25	0.18	26.2
Perseverance	46.19	25	0.006**	35.4
Kindness	33.93	25	0.11	27.5
Fairness	30.26	25	0.22	24.9
Humility	41.13	25	0.022*	32.2
Social Intelligence	46.38	25	0.006**	35.6
Judgement	29.46	25	0.25	24.3
Honesty	19.00	25	0.80	16.4
Gratitude	34.67	25	0.94	28.1
Leadership	22.94	25	0.58	19.5



Prudence	30.35	25	0.21	25.0
Hope	46.45	25	0.006**	36.0
Love of Learning	26.54	25	0.38	22.5
Zest	34.90	25	0.09	28.5
Self-Regulation	29.20	25	0.26	24.1
Humor	26.67	25	0.34	22.9
Spirituality	31.34	25	0.18	25.9
Perspective	31.49	25	0.17	25.8
Character Strengths x Resilience				
Creativity	46.84	35	0.08	36.3
Bravery	44.51	35	0.13	34.3
Love	45.94	35	0.10	37.2
Teamwork	46.10	35	0.10	35.4
Forgiveness	46.67	35	0.09	35.7
Appreciation of Beauty	51.23	35	0.038*	40.6
Curiosity	54.43	35	0.019*	41.2
Perseverance	46.48	35	0.09	35.5
Kindness	48.04	35	0.07	36.6
Fairness	59.66	35	0.006**	43.1
Humility	60.78	35	0.004**	43.8
Social Intelligence	51.02	35	0.039*	38.4
Judgement	40.20	35	0.25	31.6
Honesty	38.82	35	0.57	26.7
Gratitude	46.39	35	0.09	35.7
Leadership	47.37	35	0.08	36.1
Prudence	48.78	35	0.06	37.0
Hope	64.94	35	0.002**	46.5
Love of Learning	47.09	35	0.08	36.5
Zest	45.87	35	0.10	35.7
Self-Regulation	45.56	35	0.11	35.1
Humor	44.45	35	0.13	35.3
Spirituality	32.75	35	0.58	26.9
Perspective	47.07	35	0.08	36.0

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

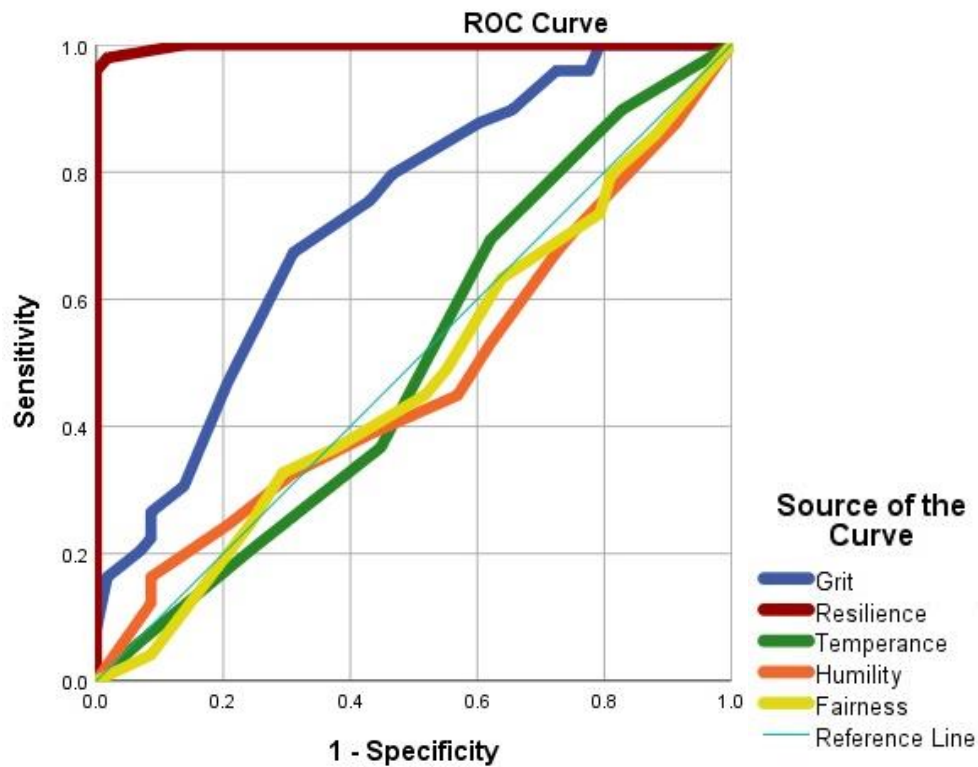
Goal 3

Virtues, character strengths, resilience, and grit have shown to be essential mechanisms for optimum human development and have been perceived as significant predictors in effective leadership behavior. To evaluate this goal, multiple regression analyses were calculated to assess if virtues, character strengths, resilience, and grit significantly predicted leadership. Additionally, area under the curve (AUC) from receiver operating characteristic (ROC) analyses (e.g., reviewing the probability a randomly selected cadet leader would have more resilience or grit (and/or more character strengths and virtues) than a randomly selected cadet who was not a leader) and odds ratios from logistic regression analyses were completed (e.g., determining the change in relative probability in association to unit changes) (Rice & Harris, 2005). The first model, Model 1, consisted of grit and resilience, with no virtues and character strengths. In regard to predictability of leadership, results from Model 1 showed resilience and grit was statistically significant in predicting leadership ($F(2, 104) = 53.99, p < .001$), suggesting resilience and grit accounted for 51.0% of total variability in leadership (see Table 4). Using Rice and Harris (2005)'s guidance to determine the size of AUC values, (i.e., AUC values = .56 as small, .64 as moderate, and .71 as large), grit and resilience revealed large AUC values of .728 and .998, respectively (see Figure 1). When Peterson and Seligman's (2004) virtues were added to the regression models, while all models were significant, no better model was presented

throughout. For example, Model 2, consisting of resilience, grit, and Peterson and Seligman's (2004) virtues of wisdom and knowledge, humanity, and temperance were statistically significant in predicting leadership ($F(5, 101) = 22.27, p < .001$), suggesting resilience, grit, and Peterson and Seligman's (2004) virtues of wisdom and knowledge, humanity, and temperance accounted for 52.4% of total variability in leadership. Significant main effects of resilience ($t(1) = -8.55, p < .001$) and grit ($t(1) = -3.29, p < .001$) were both statistically significant while wisdom and knowledge and humanity did not exhibit significance, ($t(1) = -0.79, p = 0.43, NS$) and ($t(1) = -0.64, p = .53, NS$), respectively. Temperance approached significance ($t(1) = -1.77, p = .080$) (see Table 4). Temperance exhibited small AUC values of .504 (see Figure 1).



Figure 1.
Area Under the Curve for Grit, Resilience, Temperance, Humility & Fairness



Similar to both Peterson and Seligman’s (2004) and McGrath et al.’s (2010) virtues, when Peterson and Seligman’s (2004) character strengths were added to the regression models, while all models were significant, no better model was presented throughout. For example, Model 3, which consisted of resilience, grit, and Peterson and Seligman’s (2004) character strengths of fairness, kindness, and humility were statistically significant in predicting leadership ($F(5, 101) = 23.31, p < .001$), suggesting resilience, grit, and Peterson and Seligman’s (2004) character strengths of fairness and humility accounted for 53.6% of total variability in leadership. Significant main effects of resilience ($t(1) = -8.78, p < .001$), grit ($t(1) = -3.69, p < .001$), and humility ($t(1) = -1.68, p = 0.10, NS$) and kindness did not exhibit significance, ($t(1) = 1.22, p = 0.23, NS$), respectively (see Table 4). However, when perspective is added and kindness is removed from Model 3, fairness begins reaching significance ($t(1) = -1.80, p = .074$), while that model (e.g., Model 4 - resilience, grit, and Peterson and Seligman’s (2004) character strengths of fairness, humility, and perspective) accounts for 53.5% of total variability in leadership (see Table 4). Humility and fairness exhibited small AUC values of .476 and .478 (see Figure 1).

(1) = -8.78, $p < .001$), grit ($t(1) = -3.69, p < .001$), and humility ($t(1) = -1.68, p = 0.10, NS$) and kindness did not exhibit significance, ($t(1) = 1.22, p = 0.23, NS$), respectively (see Table 4). However, when perspective is added and kindness is removed from Model 3, fairness begins reaching significance ($t(1) = -1.80, p = .074$), while that model (e.g., Model 4 - resilience, grit, and Peterson and Seligman’s (2004) character strengths of fairness, humility, and perspective) accounts for 53.5% of total variability in leadership (see Table 4). Humility and fairness exhibited small AUC values of .476 and .478 (see Figure 1).

Table 4.
Model Predictions for Leadership

Model	Predictor	Unstandardized coefficients		Standardized coefficients		R ²	F	p
		B	SE	β	p			
1	Grit	-0.021	0.006	-0.238	.001***	0.51	53.99	< .001***
	Resilience	-0.013	0.002	-0.612	< .001***			
2	Grit	-0.021	0.006	-0.238	.001***	0.52	22.27	< .001***
	Resilience	-0.014	0.002	-0.641	< .001***			
	Humility	-0.018	0.029	-0.049	0.53			
	Temperance	-0.045	0.026	-0.113	0.08			
	Wisdom & Knowledge	-0.019	0.025	-0.063	0.43			
3	Grit	-0.023	0.006	-0.263	<.001***	0.54	23.31	< .001***
	Resilience	-0.013	0.002	-0.626	<.001***			
	Fairness	-0.014	0.009	-0.135	0.10			
	Kindness	0.011	0.009	0.086	0.23			
	Humility	0.028	0.013	0.177	0.029*			
4					0.54	23.23	< .001***	



Grit	-0.023	0.006	-0.255	.001***
Resilience	-0.014	0.002	-0.631	< .001***
Fairness	-0.017	0.010	-0.162	0.074
Humility	0.026	0.012	0.167	0.036*
Perspective	-0.008	0.007	-0.090	0.257

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

Discussion

While military doctrine express importance of virtues and character strengths in successful leadership, there is scarce scientific work looking into what specific virtues and character strengths best make up an effective leader, let alone, research investigating influences of grit and resilience on virtues and character strengths (Boe et al., 2015; Matthews et al., 2006). This study not only aimed to investigate which of Peterson and Seligman's (2004) and McGrath et al.'s (2010) taxonomy of virtues and character strengths best define successful leaders, but also examined influences of grit and resilience on virtues and character strengths for successful military leadership while assessing impacts on military leadership. This study is a significant endeavor in systematically and scientifically analyzing influences of grit, resilience, virtues and character strengths on military performance and leadership.

For effective military leadership, findings revealed the top three Peterson and Seligman (2004)'s virtues were wisdom and knowledge, followed by humanity and temperance. McGrath et al.'s (2010) virtues of self-control was ranked as the top virtue, with caring and inquisitiveness second and third. The top three character strengths were judgement, followed by perspective and fairness. While each virtue and character strength are essential in successful leadership, there appears to lesser virtues and character strengths. Previous research evaluating a similar population reported courage, humanity and justice as top three, with wisdom and knowledge as fourth and temperance as sixth, and honesty, industry, and hope as top three character strengths with judgment at 9, perspective at 14, and fairness at 10 (Matthews et al., 2006). While this study did not cohere to previous research, judgement, perspective, and fairness have shown to be integral in garrison and in battlefield.

Grit predicted Peterson and Seligman (2004)'s virtue of justice, McGrath et al.'s (2010) virtue of self-control, and character strengths of bravery, hope, teamwork, social intelligence, perseverance, and humility. Findings also revealed resilience predicted Peterson and Seligman (2004)'s virtues of temperance and courage, and McGrath et al.'s (2010) virtues of self-control and caring, and character strengths of appreciation of beauty, curiosity, fairness, humility, social intelligence, and hope. As grit encompasses consistency of interest and perseverance of effort, character strengths of bravery, hope, teamwork, perseverance, humility, and social intelligence are related to these two defining traits. For example, a gritty individual must be hopeful and brave to persevere over a long period of time to reach their goals. Also, as resilience comprises the ability to stabilize after stress, character strengths of appreciation of beauty, curiosity, fairness, humility, social intelligence, and hope are dependent on these distinctions. For example, a resilient person must be hopeful and humble to return to homeostasis.

Lastly, findings also exhibited, in regard to predictability of

leadership, Model 3 of grit, resilience, fairness, humility, and perspective and Model 4 of grit, resilience, fairness, humility, and kindness, both accounted for 54.0% of total variability in leadership. As perspective, fairness, kindness and humility were ranked as second, third, fourth, and sixth, respectively, it makes sense the two models accounted for over half of total variability in leadership, would encompass these character strengths. However, findings revealed no strong model with either Peterson and Seligman (2004)'s and McGrath et al.'s (2010) virtues.

Limitations

A number of limitations influenced results of this study. First, this study utilized a military college population, and results might not be generalizable or replicable beyond military samples. As a private US Military university, this sample did not have a broad range of resilience or grit levels as most US Military academies' curriculums demand levels of resilience and grit that are not expected in other institutions. Second, the recruiting process could be considered a possible limitation since participants volunteered to complete this study as a way to gain extra credit in their respective psychology courses and each scale participants completed was self-report. While this is common methodology in behavioral science disciplines, there are risks in interpreting studies conducted in this context. Particularly, participants might not have reported truthfully in response to their feelings of resilience or grit. Third, the operationalization of leadership was constructed through a self-report measure – participants were asked to report whether they were a leader within their cadet group. As most participants were in the younger demographic, many might not have had opportunities to acquire leadership experience, let alone, feel like a leader. Additionally, participants were asked to report what they believed were the most important virtues and character strengths to be an effective leader – there were no specific definitions of virtues and character strengths or why these were chosen by each participant.

Implications and General Conclusion

The need to better understand the impact of resilience and grit on virtues and character strengths are incalculable, as these two constructs are essential in influencing positive human performance, in promoting mentally healthy individuals, and in fostering protective mechanisms that shield individuals from adverse environments – essential skills in effective leadership (Bonanno et al., 2007). Most military leaders experience some sort of life-threatening or violent encounter during their time, therefore it is essential we further comprehend constructs that protects from adversity (Bartone, 2006). This study found significant relationships amongst these constructs and suggests possible relevance of expanding such research and further investigating impacts of grit and resilience on virtues and character strengths.

As virtues and character strengths are essential in effective and



successful leadership, understanding top virtues and character strengths contributing to successful military operations is important. Specifically, training future military leaders on those specific virtues and character strengths is essential. As this study supports the need to conduct more research to evaluate models of military leadership, additional focus on grit and resilience, especially in reference to shaping and predicting virtues and character strengths is integral. Particularly, along with training future military leaders on acquiring, honing, bolstering, and perfecting these virtues and character strengths, this research endeavor promotes the need to enhance grit and resilience training to include a focus on these virtues and character strengths; this study supports the need to advance work towards preparation of constructing efficient tools helping individuals become more resilient or grittier, which in turn can influence their virtues and character strengths.

This study provides evidence of how grit and resilience, two integral constructs in shaping and predicting human performance and promoting successful military leadership and development, influences virtues and character. This study investigated which Peterson and Seligman's (2004) and McGrath et al.'s (2010) virtues and character strengths best define an effective leader, and also assessed impacts of grit and resilience on virtues and character strengths for successful military leadership.

Authors Information

On behalf of all authors, the corresponding author states that there is no conflict of interest

On behalf of all authors, the corresponding author states that we acknowledge that the manuscript has not been published elsewhere and that it has not been submitted simultaneously for publication in another outlet.

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