

## RESEARCH ARTICLE

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# Grit's Incremental Validity over Non-Cognitive Predictors of Job-Relevant Outcomes

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### Abstract

This study analyzes grit's validity in predicting several work-relevant outcomes (in-role performance, counter-productive work behaviors, job satisfaction) over the Five-Factor Model, and core self-evaluations. Hierarchical regression analyses were used in order to estimate grit's incremental validity over the canonical five-factor dimensions and core-self-evaluation. Findings indicate that grit does not explain significant amounts of variance in job-related outcomes.

### Keywords

grit, personality, core self-evaluations, job satisfaction, counter-productive work behaviors, performance

Research on personality and its implications for various health, work-related or educational outcomes remained popular throughout the decades. In the realm of I/O psychology the general consensus regarding personality's importance in respect to work relevant outcomes shifted radically over the decades, from considering that personality traits are of little relevance in respect to workplace outcomes (e.g., Guion & Gottier, 1965) to asserting their centrality to I/O psychology (Judge et al., 2008).

Meta-analytical reviews expanded our understating regarding personality's contribution to the workplace. The emergence

and popularization of the Five Factor Model of Personality (FFM) enabled a unitary approach to measuring and validating the use of personality in work settings. FFM personality traits were identified as robust predictors in respect to various outcomes (e.g.: Barrick and Mount, 1991, Berry et al., 2007, Chiaburu et al., 2011). Personality traits generally outperform other non-cognitive predictors of job performance, most of their explanatory power in respect to job performance being linked to conscientiousness (e.g., Schmidt & Hunter, 1998). Relying on personality measures for selection purposes, not only increases the predictive validity of the selection system, but

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it also reduces the adverse impact against certain protected groups (e.g., Hough et al., 2001). To date, most of the criticism surrounding the validity and utility of personality dimensions in the workplace has been dispelled (e.g., Sackett & Lievens, 2008).

However, some issues concerning personality's role in the workplace are still unresolved, remaining dormant throughout the past decades. First, one of the most severe criticisms regarding personality in the workplace has to do with its relatively low validity in predicting various work-relevant outcomes, personality traits typically accounting for less than ten percent unique variance in job performance (Woods et al., 2013). This issue remains one of critical unresolved challenges understanding the actual importance of individual differences in the workplace (e.g., Morgeson et al., 2007; Ones et al., 2007). Various "lenses" have been used in order to accurately understand this relationship. One of them consists in exploring dimensions lying beyond the FFM dimensions (e.g., Lee et al., 2005). Second, an early but still relevant criticism consists in the limitation of the FFM in describing personality, more specifically, there are various personality traits not adequately captured within the FFM that might account for supplementary performance-relevant variance (Schneider, et al., 1996).

Drawing from these two limitations, we estimate the incremental validity of a relatively new personality construct, grit, in predicting work-relevant outcomes (job performance and job satisfaction) over the established and widely acclaimed non-cognitive predictors of job performance, more precisely FFM personality traits and core-self evaluations (CSEs).

### **Grit, a predictor of long-term success**

Grit is one of the non-cognitive predictor that received an increased attention over the past couple of decades. As a trait sitting outside of the FFM, grit was defined as "perseverance and passion for long term goals" (Duckworth et al., 2007, p. 1087). Grit has been associated with various life outcomes, accounting for an unique, although relatively small-sized

proportion of variance in respect to academic success and job performance over the typical FFM personality traits (Duckworth et al., 2007, Eskreis-Winkler et al., 2014, Ion et al. 2019). However, one issue eliciting vivid debates had to do with grit's insufficient differentiation from conscientiousness. The two constructs seem to have "phenotypic correlations of approximately .70" (Rimfeld et al., 2016). Even so, the passion scale shares less variance with conscientiousness comparing to perseverance (Schmidt et al., 2018), making grit and conscientiousness difficult to differentiate, but not identical (Werner et al., 2019). This lack of differentiation from conscientiousness was also retrieved in a comprehensive meta-analytical review (Credé et al., 2017). Consequently, any further explorations regarding grit's potential role in predicting various outcomes, must adequately control potential overlaps with conscientiousness.

While its role in accounting for academic outcomes seems to be supported by empirical findings, grit's importance in respect to occupational or workplace outcomes was not thoroughly identified. For example, grit proved to significantly predict important life outcomes, explaining a unique, although minor variance in academic success or job retention (e.g., Duckworth, 2013; Duckworth & Eskreis-Winkler, 2013; Duckworth et al., 2007; Eskreis-Winkler et al., 2014; Von Culin et al., 2014). This dimension has been negatively related with the number of career changes, suggesting its potential relevance in predicting career stability (Duckworth & Quinn, 2009). Furthermore, grit displayed incremental validity over the Five-Factor dimensions in predicting educational attainment (e.g., Duckworth & Quinn, 2009). Grit scores were predictive of associated college and graduate school grade point averages (e.g., Duckworth & Quinn, 2009). Grit seems to predict job success in teaching positions (e.g., Duckworth et al., 2009). Studies conducted across other domains indicated that grit was a better predictor than self-control in respect to completion of training program (Duckworth et al., 2007). Another recent empirical investigation revealed that grit is positively related with task persistence, especially when persons were on

losing streak (e.g., Lucas et al., 2015). However, the few replications conducted in this domain showed that grit did not always predict academic outcomes. For instance, grit did not predict student academic achievement and course success in a sample of first-year Canadian college students (e.g., Bazalais et al., 2016). Similar results were found in an American study where grit had no predictive validity in relation to school success beyond Conscientiousness (e.g., Ivcevic & Brackett, 2014). Previous empirical research suggested that grit predicted in-role performance and job satisfaction over and beyond FFM personality traits (Ion et al., 2019). However, the findings from this investigation were hampered by some important limitations. First, it was relatively underpowered, having an overall sample of only 170 employees. Second, considering the conceptual criticism surrounding this construct (e.g.: Crede et al., 2017) its overlap with other personality variables might explain its association with job performance and other job-relevant outcomes (Ion, et al., 2019). Hence, it is crucial to establish whether grit can be considered a valid predictor of occupational outcomes while controlling not only for FFM personality traits, but also for other personality constructs relevant in predicting such outcomes, such as core-self evaluations.

To understand whether this new variable could prove to have any relevance in I/O psychology, its relevance for work-related outcomes must be established. In so far, research provided only circumstantial evidence regarding grit's relevance for various occupational outcomes. For instance, Zissman and Ganzach (2020) showed that grit predicted performance only when there was "context-specific passion for work", motivating employees to exert more effort at work even though they are drawn to it naturally in a work environment (Kim et al., 2019). Although, empirical studies tapping into this domain argued that "dedication to achieve long term goals and objectives" explains why people having moderate standings on the strongest predictors of job performance (e.g. cognitive ability), systematically obtain high degrees of job performance. Therefore, gritty people pursue long-term goals and are less

discouraged by failure (Credé et al., 2017) due to their ability to "bounce back from stressful or negative emotional experiences" (Stoffel & Cain, 2018). For example, controlling for experience, education and age, grit score predicted entrepreneurs' performance one year later and positively impacted managerial performance (Southwick et al., 2019).

### **Beyond FFM traits, core-self evaluations**

Two decades have passed since Judge et al. (1998) formulated the first description of a broad meta-trait which captures inter-individual differences in evaluations people make about their own person, their environment and the world as a whole. Known as "Core Self Evaluation" (CSE), this concept encompasses four different lower order traits – namely, self-efficacy, self-esteem, locus of control and emotional stability (Judge et al., 1998). Although these traits are not new and have been extensively studied separately, along with CSE came the possibility to explain the complex relations that have been previously found to exist between those lower order traits through a higher order factor (e.g., Erez & Judge, 2001; Judge et al., 2002).

Ever since the outset of the concept, concerns have been raised regarding the redundancy of the CSE when compared to other personality models. Those concerns have meanwhile been addressed by studies which have shown CSE's relevance in terms of the incremental validity it brings - in addition to FFM - in predicting outcomes such as job satisfaction or job performance (e.g., Judge & Bono, 2001; Judge et al., 2003; Judge et al., 1998). Other consequence variables which have been studied along with CSE as antecedent include motivation, job attitudes, job satisfaction, job performance, citizenship behavior, counterproductive work behavior (e.g., Judge et al., 2011).

CSEs consistently predicts job satisfaction (Judge & Bono, 2001). In this meta-analytic paper it was shown that the four components have a relationship with job satisfaction between  $\rho = .24$  and  $\rho = .45$  (Judge & Bono, 2001) and at an aggregate level of  $r = .41$  (Erez & Judge, 2001). Other studies have also

supported these findings (e.g., Judge et al.; Judge et al., 2008). Furthermore, studies conducted in other cultures are also reaching similar results (e.g., Judge et al., 2004). More recently, another meta-analysis conducted by Chang et al. (2012) has shown a similar relationship between CSE and job satisfaction ( $\rho = .36$  and  $\rho_s = .44$  corrected for randomness).

Apart from predicting job satisfaction, CSEs consistently predict job performance. Its operational validity ranging from  $\rho = .19$ , which was the weakest and was found for emotional stability, and  $\rho = .26$ , which was the strongest and was found for self-esteem (Judge & Bono, 2001). The average correlation for all four components is  $\rho = .23$ . Other studies have identified robust relationships between CSE and objective or subjective job performance (Erez & Judge, 2001). The relationship is generally mediated by motivation (Bono & Judge, 2003). Further evidence comes from Chang et al. (2012), who obtained a relationship of  $\rho = .19$  with task performance and  $\rho = -.17$  with counter-productive work behaviors (CWB) the last outcome included. A more recent study shows a more complex relationship between within person fluctuation in CSE and within person fluctuation in task performance and CWB (Debusscher et al., 2016).

### Grit and self-efficacy

There is a paucity of investigations regarding the interplay between grit and self-efficacy in predicting various outcomes, ranging from educational attainment to psychological health or to work related outcomes. For example, Usher et al., (2019) explored how the two traits predict educational attainment and broader academic success. Self-efficacy outperformed grit in accounting for variance in teacher ratings of math and reading, and also in academic achievement (Usher et al., 2019). The same investigation reported that self-efficacy fully or partly mediated grit's impact on the various academic outcomes (Usher, et al., 2019). Another empirical investigation reported that both grit and self-efficacy predicted the adoption and maintenance of healthy behaviors (Ciaccio, 2019). A relatively recent meta-analytical

review concluded that grit consistently predicted academic achievement across multiple cultures (Lam & Zhou, 2022).

To conclude, we posit that some similarities could be identified between grit and CSE. Namely, just like CSE, grit 1) is also a higher order personality domain, 2) exhibiting similarities with the Five-Factor Model, and 3) is accompanied by bold claims regarding its predictive power for relevant industrial organizational psychology outcomes. At this moment, it could be said that the CSE is a well-established construct in the realm of organizational-relevant individual differences. Therefore, we test whether the increment added by grit in predicting organizational relevant outcomes goes above and beyond that of CSEs.

The overarching objective of the current investigation is bifold: first, we aim to replicate the findings reported by Ion et al., (2019) describing grit as a solid predictor of job performance and job satisfaction over and beyond FFM traits; second, we aim to identify the degree to which grit accounts for job-relevant outcomes over core-self-evaluations, a robust predictor of occupational outcomes.

## Methods

### Participants

For the purposes of this study, we collected data from 461 Romanian participants, in two samples.

The first sample consisted of 188 adult employees, among them 137 women (73%) and 51 men, with ages between 22 and 60 ( $M = 35.74$ ,  $SD = 6.97$ ). Most participants (107) had a Bachelor degree, 75 participants had a post-university degree, while only 3.2% had a high school degree. About 69% of participants were employed in non-managerial positions, while the rest had managerial roles.

The second sample included 273 participants, 180 women (66%) and 93 men, with ages between 18 and 55 ( $M = 27.78$ ,  $SD = 7.81$ ). About 60% of the participants (166) had a Bachelor degree, 31.9% had a post-university degree, and 7.3% had a high school degree. The majority of participants had non-managerial roles, while almost 30% were in managerial positions.

## Measures

All measures were Romanian versions translated according to recommended testing guidelines (Hambleton, 2005). The versions that did not already have a Romanian equivalent were translated by 4 doctoral level psychologists into Romanian from their original English versions and then back-translated in order ensure semantic equivalence.

Personality was measured based on the Five-Factor Model using the 60-item Romanian version of the NEO-FFI (Costa & McCrae, 1992). The five domains were measured with items rated on a 4-point scale from 1 (strongly disagree) to 4 (strongly agree). Internal consistencies for the five dimensions ranged between .70 (Neuroticism) and .76 (Extraversion). The inventory employs typical self-report items (e.g. "I rarely feel fearful or anxious").

Core self-evaluations were measured with a 12-item questionnaire comprised of items measuring self-esteem, generalized self-efficacy, locus of control and neuroticism (Judge et al., 2003). One example item of the scale is 'I am filled with doubts about my competence'. The items were rated on a scale from 1 (strongly disagree) to 5 (strongly agree). Internal consistency as measured with Cronbach's Alpha was .81 for Sample 1 and .87 for the second sample.

We used a two-dimensional 12-item inventory to measure grit (Duckworth et al., 2007) which has shown very good psychometric characteristics (Duckworth & Quinn, 2009). Some example items are 'Setbacks don't discourage me' or 'I often set a goal but later choose to pursue a different one', measured on a scale from 1 (not like me at all) to 5 (very much like me). Internal consistency reliability as measured with Cronbach's Alpha was .75 and .77, respectively.

*In-role performance.* In-role performance was measured with 7 items from an inventory proposed by Williams and Anderson (1991), rated on a five-point scale. An example item of this inventory is 'I adequately fulfil responsibilities specified in the job description'. Reliabilities for the performance measures were .69 and .73, respectively.

*Counter-productive work behaviors (CWB).* CWB was measured with a 10-item questionnaire developed by Spector et al. (2010). The items, such as 'I came to work late without permission' or 'I insulted someone about their job performance' were measured on a scale from 1 (never) to 5 (every day). Alpha Cronbach for our samples was .68 and .75.

*Job satisfaction.* Overall job satisfaction was measured with a 5-item scale (Judge et al., 1998), rated on a scale from 0 (strongly disagree) to 10 (strongly agree). Some sample items are 'I feel fairly well satisfied with my job' or 'Each day of work seems like it will never end'. Alpha Cronbach for our samples was .87 and .89.

## Procedure

We administered the measures online. The survey was disseminated via email and social networks to adult Romanian employees in two consecutive years (2016 and 2017). The candidates were explained their rights as volunteers and were provided with contact information for further details or questions. Those who agreed to participate in the study were then provided with the link to the set of questionnaires. Only those participants who were over 18 and employed at the time were selected to take part in the study.

## Results

All the analyses were conducted with MPlus, version 8 (Muthen & Muthen, 1998-2017). Following the recommendations of Ployhart et al. (2003), we conducted confirmatory factor analyses (CFA) for our variables. Personality was the only exception, due to concerns regarding the use of CFA for personality (Borkenau & Ostendorf, 1990; Church & Burke, 1994), which is why we conducted exploratory structural equation modeling (ESEM) for this measure. The results are reported in Table 1.

While some measures showed a good fit, such as the NEO-FF-I in sample 1 ( $CFI = .953$ ,  $RMSEA = .039$ ), others showed less than ideal fit (e.g., grit in both sample 1 –  $CFI = .914$ ,  $RMSEA = .058$  and sample 2 –  $CFI = .904$ ,  $RMSEA = .095$ ) or even a poor of fit (e.g.,

CWB in either sample 1 –  $CFI = .880$ ,  $RMSEA = .057$  or sample 2 –  $CFI = .867$ ,  $RMSEA = .080$ ). Because of its poor goodness of fit, the

CWB measure was eliminated from further analyses.

Table 1. *Confirmatory and exploratory structural equations modeling*

Measure	Framework	Model	$\chi^2$ (df)	CFI	RMSEA (90% CI)	SRMR	$\chi^2$ (df)	CFI	RMSEA (90% CI)	SRMR
NEO-FF-I	ESEM	5 factors (4 correlated errors for sample 2)	114.78 (100)	.953	.039 (.011 - .052)	.053	363.91 (96)	.903	.099 (.090 - .111)	.037
Grit	CFA	1 factor (4/8 correlated errors)*	82.02 (50)	.914	.058 (.034 - .080)	.064	117.35 (46)	.904	.095 (.076 - .114)	.083
In-Role Performance	CFA	1 factor (2 correlated errors for sample 2)	31.20 (14)	.920	.081 (.042-.119)	.052	36.41 (12)	.943	.086 (.055 - .119)	.048
CWB	CFA	1 factor	56.69 (35)	.880	.057 (.027 - .084)	.065	84.75 (35)	.867	.080 (.060 - .100)	.059
JS	CFA	1 factor	26.62 (5)	.931	.152 (.098 - .111)	.045	29.96 (5)	.906	.135 (.091 - .184)	.051

Note: \* = 4 and 8, respectively, correlated errors for sample 1 and sample 2.

The analyses examining grit's incremental validity over non-cognitive variables in predicting the job-relevant outcomes measured for the first sample are summarized in Table 2 and Table 3, and for the second sample in Table 4 and Table 5.

Table 2. Incremental validity of grit over demographics and personality traits sample 1

Step	Independent variable	In-role Performance			Job Satisfaction		
		$\beta$	Adjusted $R^2$	$\Delta R^2$	$\beta$	Adjusted $R^2$	$\Delta R^2$
1	Gender	.32	.030		-.06	.044	
	Age	.01			.03		
2	Gender	.31	.252	.222***	-.08	.244	.117***
	Age	.00			.02		
	Neuroticism	-.23**			-.12		
	Extraversion	.00			.26*		
	Openness	.00			.05		
	Agreeableness	.16			-.06		
	Conscientiousness	.28***			.08		
3	Gender	.31	.252	.000	-.08	.244	.002
	Age	.00			.02		
	Neuroticism	-.24**			-.13		
	Extraversion	.00			.26*		
	Openness	.00			.04		
	Agreeableness	.16			-.06		
	Conscientiousness	.29**			.10		
	Grit	-.02			-.06		

Note:  $B$  = Unstandardized  $B$ , \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

Table 3. Incremental validity over demographics and core-self evaluations sample 1

Step	Independent variable	In-role Performance			Job Satisfaction		
		$\beta$	Adjusted $R^2$	$\Delta R^2$	$\beta$	Adjusted $R^2$	$\Delta R^2$
1	Gender	.32	.030		-.06	.044	
	Age	.02			.03		
2	Gender	.32*	.181	.151***	.05	.244	.200***
	Age	.00			.02		
	Core-self Evaluations	.40***			.46***		
3	Gender	.32*	.202	.021*	.05	.244	.000
	Age	.00			.02		
	Core-self Evaluations	.35***			.46***		
	Grit	.15**			-.02		

Note:  $B$  = Unstandardized  $B$ , \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

By accounting for gender and age, personality traits and grit, the results for both samples showed that Gender and Age were not statistically significant in predicting In-Role Performance, CWB or Job Satisfaction. Next, for both samples, personality traits exhibited medium sized relationships with all the work-relevant outcomes. More specifically, personality traits accounted for approximately 22% of the variance of In-Role Performance ( $R^2=.222$ ,  $p<.001$ ) in sample 1 and for roughly

37% in sample 2 ( $R^2=.367$ ,  $p<.001$ ). In addition, grit's inclusion in the prediction model resulted in a null increase to the model's explanatory power. About 12% ( $R^2=.117$ ,  $p<.001$ ) of Job Satisfaction variance was explained by personality traits in sample 1 and 13% ( $R^2=.132$ ,  $p<.001$ ) in sample 2. Including grit resulted in negligible gains in predictive validity in sample 2 ( $R^2=.032$ ,  $p<.01$ ). Its incremental validity over the other predictor in sample 1 was not significant.

Table 4. Incremental validity over demographics and personality traits sample 2

Step	Independent variable	In-role Performance			Job Satisfaction		
		$\beta$	Adjusted $R^2$	$\Delta R^2$	$\beta$	Adjusted $R^2$	$\Delta R^2$
1	Gender	.26	.025		.41	.046	
	Age	.02			.02		
2	Gender	.21	.391	.367***	.26	.178	.132***
	Age	.04			.01		
	Neuroticism	.03			-.11		
	Extraversion	-.01			.23**		
	Openness	.19***			-.00		
	Agreeableness	.06			.13*		
	Conscientiousness	.59***			.01		
3	Gender	.04	.392	.001	.25	.211	.032**
	Age	.01			.01		
	Neuroticism	.03			-.05		
	Extraversion	-.01			.23**		
	Openness	.19***			-.02		
	Agreeableness	.06			.13*		
	Conscientiousness	.58***			-.12		
	Grit	.03			.25		

Note:  $B$  = Unstandardized  $B$ , \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

Table 5. Incremental validity over demographics and core-self evaluations sample 2

Step	Independent variable	In-role Performance			Job Satisfaction		
		$\beta$	Adjusted $R^2$	$\Delta R^2$	$\beta$	Adjusted $R^2$	$\Delta R^2$
1	Gender	.26	.025		.42	.046	
	Age	.02			.02		
2	Gender	.16	.220	.195***	.34	.142	.096***
	Age	.00			.01		
	Core-self Evaluations	.45***			.32***		
3	Gender	.16	.226	.006	.34	.155	.013*
	Age	.00			.01		
	Core-self Evaluations	.39***			.22**		
	Grit	.11			.16*		

Note:  $B$  = Unstandardized  $B$ , \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

Adding grit over the other established non-cognitive predictors was significant only in respect to in-role performance in sample 1 ( $R^2=.021$ ,  $p<.05$ ) and Job Satisfaction in sample 2 ( $R^2=.013$ ,  $p<.05$ ). However, these increments were very small rendering grit's predictive power negligible.

## Discussion

As previously shown (e.g. Ion et al., 2017), understanding the way in which new personality constructs, such as grit, can contribute to explaining the variance of work-relevant outcomes is an important stepping

stone in establishing the practical values of that respective construct. This is especially relevant in the context of debates regarding the validity of personality in predicting outcomes, seen by some as low (Morgeson et al., 2007; Murphy, 2005) and by others as acceptable (Ones et al., 2007).

From a theoretical standpoint, despite its popularity, grit does not appear to be a solution for capturing more personality-related variance in job performance or job satisfaction, thus not offering potential solution to the narrow vs. broad personality traits in predicting work-related outcomes (Judge et al., 2014, Schneider et al., 1996).

From a practical angle, when it comes to explaining the outcomes considered in this study, it seems that grit is not bringing an explanatory contribution of sufficient magnitude compared to that of well-established personality measures such as FFM or CSEs. Grit was unable to predict any of the test's outcomes above other well-established personality dimensions. When it comes to In-Role performance and job satisfaction, the results are not consistent among samples. Grit's incremental value in predicting in-role performance over the five-factor personality dimensions is limited for both samples. The only significant relationship, but low in magnitude - was found in sample 1, indicating a small predictive increment that grit brings above that of CSEs.

Taken together, our findings suggest that grit's relevance and impact in the workplace is limited, rendering the construct redundant in explaining work-relevant outcomes beyond well-established personality dimensions.

## Limitations

There are several issues that would warrant further discussion. First of all, since this study is cross-sectional, causality from grit to organizational outcomes cannot be implied. In this sense, further areas of research would include longitudinal designs and the inclusion of other outcomes (e.g., organizational citizenship behaviors, organizational commitment, turnover), especially since the author of the scale has claimed that this personality construct can change over the course of a person's lifetime, as a result of effort, environment and others (Duckworth, 2016). Second, the results could be plagued by common method bias, both criterion and predictor data being collected at the same time. Third, the study did not include any measures accounting for potential mechanisms linking predictors with criteria. Fourth, we did not account for a range of potential moderating effects stemming from job complexity or type of organization.

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