Abstract

There is conflicting evidence for the value of the personality trait *grit* in determining success (e.g., Credé, Tynan, & Harms, 2016). We help to clarify grit's role in enhancing task performance by separately analyzing its underlying facets: perseverance of effort (perseverance) and consistency of interest (consistency). We theorize that perseverance leads to engagement in tasks, regardless of whether performance on those tasks facilitates achievement of a higher-order goal. In contrast, we theorize that consistency is sensitive to situational cues and will only lead to engagement when cues indicate that task performance is helpful for goal achievement. As predicted, perseverance was associated with greater task engagement and performance, regardless of whether participants' task performance enabled goal achievement. However, consistency was only associated with greater task engagement and performance when participants' task performance enabled goal achievement. Our work highlights the importance of understanding the boundary conditions and nuances of grit.

Keywords: personality, achievement, psychophysiology

Uncovering the Light and Dark Sides of Grit by Separately Considering its Underlying Facets

Consider Albert Einstein's development of the revolutionary General Theory of Relativity. One explanation for Einstein's success in this endeavor is his high level of grit (i.e., passion and perseverance for long-term goals; Duckworth, Peterson, Matthews, & Kelly, 2007). However, some scholars suggest that Einstein's grit may have led him to pursue a faulty mathematical problem, which nearly allowed competitors to scoop his theory (Credé, Tynan, & Harms, 2016). Indeed, empirical evidence supporting grit's role in determining success is mixed (Credé et al., 2016). Proponents of grit argue that it predicts steadfast engagement in a goal and ultimately superior performance despite challenges and low chances of success (Duckworth, 2016). However, critics of grit suggest that gritty people engage in endeavors when quitting is objectively the better option (Lucas, Gratch, Cheng, & Marsella, 2015; Ris, 2015).

Thus, the question arises: Is grit a risk factor for indiscriminately engaging in tasks, even those that do not enable goal achievement? To answer this question, we examine grit's two underlying facets separately: perseverance of effort (*perseverance*) and consistency of interest (*consistency*). This approach is consistent with work suggesting that grit's facets are empirically distinct and that creating a single composite across them reduces predictive validity (Credé et al., 2016). We propose that the answer is both yes and no. That is, perseverance is a risk factor for engaging in tasks that do not enable goal achievement, but consistency is not.

Perseverance

The perseverance facet of grit is defined as the ability to consistently put forth effort despite boredom or failure (Duckworth, 2016). Perhaps unsurprisingly, perseverance predicts positive performance outcomes, including higher high school and college grade point averages (Bowman, Hill, Denson, & Bronkema, 2015; Credé et al., 2016). Grit theory suggests that people

high in perseverance perform well because they possess the determination to work diligently on tasks despite negative feedback (Duckworth, 2016). Thus, although being high in perseverance can lead to a greater likelihood of success, it may also lead to working too long or hard on tasks that will not benefit one's higher-order goal(s) (i.e., general and important goal(s); Lucas et al., 2015). Therefore, we theorize that perseverance is a tendency to work hard regardless of the context and propose that people high in perseverance put effort into tasks even when their performance will not help them achieve a higher-order goal. For example, if Albert Einstein were high in perseverance, he may have fully engaged in the task of mastering a violin sonata, even though this would not help him achieve his higher-order goal of creating a parsimonious theory explaining gravity. Research on conscientiousness, a personality trait that conceptually and empirically overlaps with perseverance supports our theorizing (Credé et al., 2016). People higher in conscientiousness put effort into tasks even if there is no incentive to do so (Fong & Tosi, 2007).

Consistency

Consistency, the other facet of grit, is defined as the ability to sustain interest in a goal over a long period of time (Duckworth, 2016). Consistency predicts outcomes related to commitment at least as well as, if not better than, perseverance, including lesser intent to change careers and lower expectation of changing college majors (Bowman et al., 2015; Duckworth & Quinn, 2009). Grit theory suggests that people high in consistency perform well because they maintain passion in and prioritize tasks that help them achieve higher-order goals (Duckworth, 2016). Extending this reasoning, we theorize that consistency is a context-dependent tendency to maintain engagement that emerges only when performance on a task can facilitate the achievement of a higher-order goal. Therefore, we predict that people who score high on

consistency will show greater engagement in and better performance on a task *only* when task performance enables achievement of a higher order goal. For example, if Albert Einstein were high in consistency, he would not engage so fully in practicing his violin, because mastering a sonata does not enable his higher-order goal of creating a parsimonious theory explaining gravity. Consistent with our theorizing, several theories of motivation suggest that people disengage from tasks when their performance is unrelated to goal achievement (e.g., self-efficacy, Bandura, 1977; expectancy theory, Vroom, 1964; expectancy-value theory, Wigfield & Eccles, 2000).

Present Studies

We conducted two experimental studies in which we measured participants' perseverance and consistency, manipulated whether their performance on an anagram task enabled achievement of a higher-order goal (i.e., a more general and important goal than simply performing well), and, subsequently, measured participants' engagement in and performance on the task. To allow us to manipulate whether performance enabled goal achievement, we gave all participants the goal of gaining entry into a drawing for a $50 gift card. We chose this goal because research shows that monetary rewards provide a more motivating goal than other relevant goals, such as performing well or impression management (for similar methodology: Major et al., 2002; Townsend, Major, Sawyer, & Mendes, 2010). We then manipulated whether performance enabled goal achievement by telling participants that drawing entry required high task performance (*goal-enabling* condition) or was unrelated to task performance (*control* condition). We used physiological (Study 1) and self-report (Studies 1 and 2) measures of task engagement and a behavioral measure of task performance (i.e., number of anagrams correctly solved; Studies 1 and 2). We predicted that perseverance would be positively associated with

engagement and performance in both conditions. In contrast, we predicted that consistency would be positively associated with engagement and performance in the goal-enabling condition, but not in the control condition. We report all measures, manipulations, and exclusions in these studies along with our methods for determining sample size.

Study 1

To provide an initial test of our hypotheses, we conducted Study 1 as the second half of a larger, unrelated research project. For more information on this project, see the Supplemental Material and Townsend, Truong, and Smallets (in preparation).

Method

Participants. 161 undergraduate students (40% women, M_{age} = 20.80) at a private university participated for course credit. Given the absence of previous research on moderators of grit, we chose an anticipated effect size between small and medium (f^2 = .10), consistent with most social psychological effects (Richard, Bond, & Stokes-Zoota, 2003). Aiming for 80% power and allowing for six predictors (three covariates, two main effects, and one interaction, see *Analysis plan* below), our target sample size was 143. Due to the possibility of unscorable physiological data, we aimed to recruit between 160 and 170 participants. Eleven people did not complete the grit scale and two people did not complete the task, yielding a final sample of 148 participants (39% women, M_{age} = 20.80). The degrees of freedom vary between dependent variables because one person did not complete the self-reported engagement measure, some participants' physiological data were too noisy to interpret, and two people did not report their height and weight so we were unable to compute their body-mass index (BMI; a covariate for our physiological data analysis).

Procedure.

Pretest. Before coming to the laboratory, participants completed a grit measure online.

***Physiological set-up*.** Upon arrival to the laboratory for a study on internship skills and physiological responses during evaluative tasks, the experimenter attached cardiovascular sensors to participants. Then the experimenter left the room and recorded participants' resting baseline physiological responses for 5 minutes.

***Experimental manipulation*.** Next, the experimenter told participants that they would have a one-in-six chance to earn entry into a drawing for a $50 Amazon gift card. To manipulate whether performance mattered for goal achievement, we randomly assigned participants to one of two conditions. In the *goal-enabling* condition (n = 72), participants learned that they needed to score in the top 6th of participants on at least one of two tasks (i.e., performance matters). In the *control* condition (n = 76), participants learned that their entry was based on a chance die roll (i.e., performance does not matter).

***Initial task and feedback*.** Prior to the key task (i.e., the anagram task), participants completed an idea generation task, which was part of the larger, unrelated research project (see the Supplemental Material). Participants believed that this task represented their first opportunity to gain drawing entry, either as a function of their performance or the die roll. Given that theory suggests grit is particularly beneficial when success is unlikely (Duckworth et al., 2007), we used this task to indicate that participants were unlikely to gain drawing entry. Specifically, all participants were told that they had not gained entry, either due to their performance or the die roll, and had only one remaining opportunity to do so. Thus, not gaining entry also constituted negative performance feedback in the goal-enabling condition. To control for this experience across conditions, we provided negative feedback to all participants that they "didn't do that well" and "only scored better than 50% of other students."

Anagram task. Next, the experimenter told participants they would complete a cognitive ability task (i.e., solving anagrams, a common task of verbal reasoning). Engagement in and performance on this task were our primary dependent variables. To reinforce the manipulation, participants were reminded that their drawing entry was either based on their performance (goal-enabling condition) or chance (control condition). Participants had 5 minutes to complete the task while their physiological responses were recorded.

Self-report questionnaire. Finally, participants completed a measure of self-reported engagement, a manipulation check, and demographic questions.[1]

Measures. We briefly describe the measures below and provide a complete list of items from both studies in the Supplemental Material.

Perseverance. Participants reported their perseverance using six items from the Grit Scale (Duckworth et al., 2007) on a scale from 1 (*not at all true*) to 7 (*extremely true*), $M = 5.43$, $SD = .98$, $\alpha = .81$.

Consistency. Participants reported their consistency using six items from the Grit Scale (Duckworth et al., 2007) on a scale from 1 (*not at all true*) to 7 (*extremely true*), $M = 3.61$, $SD = 1.04$, $\alpha = .77$.

Physiological engagement (RSA reactivity). Our physiological measure of task engagement was respiratory sinus arrhythmia (RSA), a measure of heart rate variability, or the variation in time between heart beats during a respiratory cycle (Porges, 1995). We specifically examined RSA reactivity, or the change in RSA from baseline during a task. *Decreased* RSA

[1] We also included exploratory measures to investigate (a) differences in participants' experience of the study based on condition and (b) associations between participants' self-esteem and personal mastery and control with their perseverance and consistency (see the Supplemental Material).

reactivity is an indicator of increased attention, mental effort, and approach orientation (Heponiemi, Keltikangas-Jävinen, Kettunen, Puttonen, & Ravaja, 2004; Porges & Raskin, 1969; Tattersall & Hockey, 1995) and is correlated with better performance on cognitive tasks (Duscheck, Muckenthaler, Werner, & Reyes del Paso, 2009).

We measured RSA using noninvasive cardiac measures following established guidelines (Sherwood et al., 1990; see the Supplemental Material). To calculate RSA reactivity, we subtracted participants' RSA during the last minute of baseline from their RSA during each of the 5 minutes of the anagram task. To index engagement during the entire task, we created a composite by averaging these 5 reactivity values. Lower values reflect *greater* engagement.

Performance. Participants attempted to unscramble 20 moderate-difficulty anagrams (e.g., "charm" would be unscrambled to "march"). We measured performance as the number of correctly solved anagrams, $M = 6.67$, $SD = 2.68$, range: 0–14.

Self-reported engagement. Participants reported their task engagement using one author-generated item, "I tried my hardest on the second task," on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*), $M = 5.45$, $SD = 1.29$.

Manipulation check. Participants completed two items to ensure the manipulation was successful: "My performance on the tasks influenced my chances of being entered in the drawing for the $50 gift card," and "My chances of being entered in the drawing for $50 is based on chance" (0 = *no*, 1 = *yes*).

Demographics. Participants reported their gender and whether they were U.S. born along with other demographic items.

Results and Discussion

Manipulation check. Chi-square analyses indicated that the manipulation was successful: 89% of participants in the goal-enabling condition reported that their entry into the drawing was based on their performance, compared to 20% in the control condition, $\chi^2(1, N = 147) = 70.12$, $r = .69$, $p < .001$. Similarly, 83% of participants in the control condition reported that their entry into the drawing was based on chance, compared to 17% in the goal-enabling condition, $\chi^2(1, N = 147) = 64.01$, $r = .66$, $p < .001$. Importantly, our results hold when we exclude people who failed the manipulation check (see the Supplemental Material). We report results using the full sample to maintain greater power.

Analysis plan. We conducted moderated regression analyses, in which we entered covariates on Step 1, condition (0 = control, 1 = goal-enabling) and mean-centered grit facet (i.e., perseverance or consistency) on Step 2, and the grit facet by condition interaction on Step 3.[2] For all regressions, we controlled for whether participants were born in the U.S. (0 = not U.S. born, 1 = U.S. born) given potential cultural differences in the experience of our manipulation. Specifically, people from the U.S. desire and enjoy personal control over their outcomes more than those from more interdependent contexts (Markus & Conner, 2013). Our goal-enabling condition may create a sense of control over one's outcomes because better performance leads to higher likelihood of goal attainment, which may make this condition less engaging for non-U.S. born (vs. U.S. born) participants. For the RSA regressions, we also controlled for participants' BMI (mean-centered) and gender (0 = female, 1 = male), because both significantly influence heart rate variability (e.g., Molfino et al., 2009; Umetani, Singer, McCraty, & Atkinson, 1998). Across studies, we report key statistical results in the text and full statistical results in Tables 1-5.

[2] Controlling for the alternative facet does not significantly change our results (see the Supplemental Material).

For effect sizes, we report ΔR^2 for the interaction effects and *b* for main effects and simple slopes.

Table 1

Moderated Regression Results for Study 1 RSA Reactivity

	b	95% CI (*b*)	*t*	*F*	*p*	R^2	ΔR^2
Step 1[a]				2.06	.109	.045	.045
Gender	-.28	[-.56, -.003]	-2.00		.048		
BMI	-.02	[-.06, .02]	-0.87		.386		
U.S. Born	-.09	[-.37, .20]	-0.59		.556		
Perseverance							
Step 2				1.50	.195	.055	.010
Perseverance	.01	[-.13, .16]	0.18		.860		
Condition	-.15	[-.23, .12]	-1.21		.265		
Step 3				1.33	.249	.059	.004
Perseverance x Condition	-.10	[-.39, .18]	-0.71		.478		
Consistency							
Step 2				1.96	.089	.071	.026
Consistency	-.10	[-.22, .03]	-1.49		.139		
Condition	-.16	[-.42, .11]	-1.17		.245		
Step 3				2.71	.016	.113	.042
Consistency x Condition	-.31	[-.57, -.06]	-2.46		.015		

Note. Results of moderated regressions in Study 1 for RSA reactivity with gender (0 = female, 1 = male), BMI (mean-centered), and being U.S. born (0 = not U.S. born, 1 = U.S. born) entered on Step 1, perseverance (mean-centered) or consistency (mean-centered) and condition (0 = control, 1 = goal-enabling) on Step 2, and their interactions on Step 3. [a] Step 1 results were the same for perseverance and consistency.

Table 2

Moderated Regression Results for Study 1 Performance

	b	95% CI (*b*)	*t*	*F*	*p*	R^2	ΔR^2
Step 1[a]				6.65	.011	.044	.044
U.S. Born	1.18	[.28, 2.09]	2.58		.011		
Perseverance							
Step 2				3.49	.017	.068	.024
Perseverance	.41	[-.04, .85]	1.82		.072		
Condition	.39	[-.47, 1.25]	0.90		.370		
Step 3				2.69	.034	.070	.002
Perseverance x Condition	.26	[-.64, 1.15]	0.56		.573		
Consistency							
Step 2				2.43	.068	.048	.005
Consistency	-.10	[-.52, .31]	-0.50		.617		
Condition	.30	[-.56, 1.15]	0.68		.498		
Step 3				1.82	.128	.049	< .001
Consistency x Condition	.10	[-.73, .92]	0.23		.819		

Note. Results of moderated regressions in Study 1 for performance with being U.S. born (0 = not U.S. born, 1 = U.S. born) entered on Step 1, perseverance (mean-centered) or consistency (mean-centered) and condition (0 = control, 1 = goal-enabling) on Step 2, and their interactions on Step 3. [a] Step 1 results were the same for perseverance and consistency.

Table 3

Moderated Regression Results for Study 1 Self-reported Engagement

	b	95% CI (*b*)	*t*	*F*	*p*	R^2	ΔR^2
Step 1[a]				0.02	.893	< .001	< .001
U.S. Born	.03	[-.42, .48]	0.14		.893		
Perseverance							
Step 2				1.49	.220	.030	.030
Perseverance	.20	[-.02, .42]	1.81		.072		
Condition	-.18	[-.60, .24]	-0.84		.405		
Step 3				1.18	.324	.032	.002
Perseverance x Condition	-.11	[-.55, .33]	-0.50		.614		
Consistency							
Step 2				0.60	.618	.012	.012
Consistency	.08	[-.12, .29]	0.80		.427		
Condition	-.23	[-.66, .19]	-1.08		.282		
Step 3				0.56	.696	.015	.003
Consistency x Condition	.14	[-.27, .54]	0.66		.510		

Note. Results of moderated regressions in Study 1 for self-reported engagement with being U.S. born (0 = not U.S. born, 1 = U.S. born) entered on Step 1, perseverance (mean-centered) or consistency (mean-centered) and condition (0 = control, 1 = goal-enabling) on Step 2, and their interactions on Step 3. [a] Step 1 results were the same for perseverance and consistency.

Physiological engagement (RSA reactivity). See Table 1 for full results.

***Perseverance*.** The main effect of condition and the perseverance by condition interaction on RSA reactivity were nonsignificant, *p*s > .264. Inconsistent with our prediction that higher perseverance would be associated with lower RSA reactivity across conditions, the main effect of perseverance was also nonsignificant, t (134) = 0.18, b = 0.01, p = .859.

***Consistency*.** The main effects of condition and consistency on RSA reactivity were nonsignificant, *p*s > .139. Consistent with our prediction, there was a significant consistency by condition interaction on RSA reactivity, F (6, 128) = 2.71, b = -0.31, ΔR^2 = 0.04, p = .015 (See Figure 1). Specifically, higher consistency was associated with lower RSA reactivity, indicating greater engagement, in the goal-enabling condition, b = -0.26, p = .006, but not in the control condition, b = 0.06, p = .507.

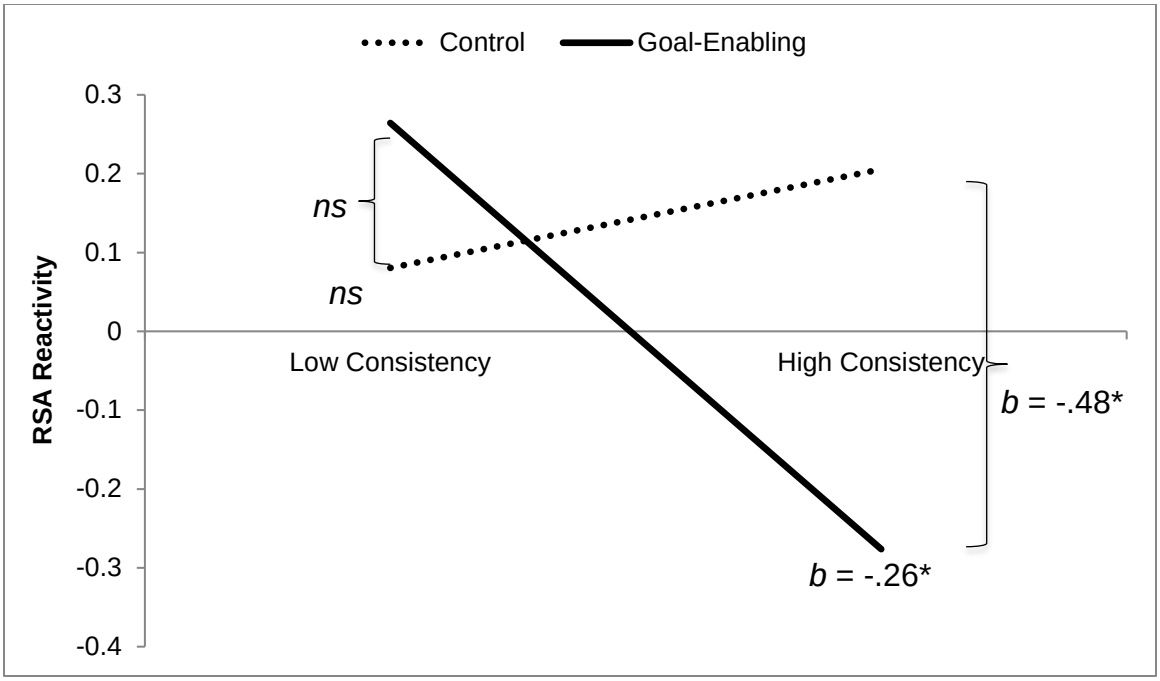

Figure 1. RSA reactivity as a function of consistency and condition in Study 1. Lower RSA reactivity values reflect greater engagement in the anagram task. "High" and "low" consistency represented as ± 1 *SD* from the mean.

Performance. See Table 2 for full results.

Perseverance. The main effect of condition and the perseverance by condition interaction on performance were nonsignificant, *p*s > .369. However, consistent with our prediction, we found a marginal main effect of perseverance indicating that greater perseverance was somewhat associated with better performance on the anagram task across conditions, t (147) = 1.82, b = 0.41, p = .072.

Consistency. The main effects of condition and consistency on performance were nonsignificant, *p*s > .497. Although we predicted that higher consistency would be

associated with better performance in the goal-enabling condition, but not the control condition, the consistency by condition interaction was nonsignificant, F (4, 143) = 1.82, b = 0.10, ΔR^2 = 0.00, p = .819.

Self-reported engagement. See Table 3 for full results.

Perseverance. The main effect of condition and the perseverance by condition interaction on self-reported engagement were nonsignificant, ps > .404. Consistent with our prediction and the performance result, we found a marginal main effect of perseverance, such that participants higher in perseverance reported being somewhat more engaged in the task across conditions, t (146) = 1.81, b = 0.20, p = .072.

***Consistency*.** The main effects of condition and consistency on self-reported engagement were nonsignificant, ps > .281. As with the performance results, although we predicted that higher consistency would be associated with greater self-reported engagement in the goal-enabling condition, but not in the control condition, the consistency by condition interaction on self-reported engagement was nonsignificant, F (4, 142) = 0.56, b = 0.14, ΔR^2 = 0.00, p = .510.

Summary and limitations. In our initial study, we found only partial support for our hypotheses. Consistent with our predictions for perseverance, participants higher (vs. lower) in perseverance performed better and reported greater task engagement, regardless of whether performance enabled goal achievement; however, we did not find this effect for physiological engagement (i.e., RSA reactivity). Further, consistent with our predictions for consistency, participants higher (vs. lower) in consistency showed greater physiological engagement in the goal-enabling condition and not in the control condition;

however, we did not find this moderated effect for performance or self-reported engagement.

We speculate that the lack of supportive evidence on engagement may be due to our measures. We suggest that RSA may primarily assess interest in a task (Heponiemi et al., 2004; Porges & Raskin, 1969; Tattersall & Hockey, 1995), which conceptually overlaps with consistency more than perseverance. Similarly, we suggest that our single-item measure of self-reported engagement (i.e., "I tried my hardest") may primarily assess effort, which conceptually overlaps with perseverance more than consistency. However, we are interested in overall engagement, which we conceptualize to be a combination of interest and effort (Macey & Schneider, 2008). Therefore, in Study 2, we create a more reliable self-report measure of engagement including items assessing both effort on and interest in the task.

We also speculate that the lack of supportive evidence for our predicted consistency by condition interaction on performance may be due to task duration. Specifically, consistency may primarily influence performance when the task duration is long enough to allow people to substantially lose focus, which may have been unlikely in 5 minutes. Therefore, in Study 2, we give participants 10 minutes, instead of 5 minutes, to complete the task.

Study 2

Method

Participants. 168 U.S. born undergraduate students (49% women, M_{age} = 20.43) at a private university participated for course credit.[3] Given the effect size of our overall model predicting engagement in Study 1 (f^2 = .106), we aimed to recruit a similar number of participants in Study 2 (i.e., between 160 and 170). Six people did not complete the grit scale, yielding a final sample of 162 (49% women, M_{age} = 20.42). We have only three predictors (two main effects and one interaction, see *Analysis plan* below), therefore, power analysis indicates our final sample size provides adequate power (i.e., 94% power). Degrees of freedom vary between dependent variables because two people did not complete the self-reported engagement measure.

Procedure.

Pretest. Before coming to the laboratory, participants completed a grit measure online.

Experimental manipulation. Upon arrival to the laboratory, participants learned that they would complete a study on internship skills and have a one-in-six chance to be entered into a drawing for a $50 Amazon gift card. The manipulation was nearly identical to Study 1. Experimenters told participants that their entry into the drawing was determined by their performance in the goal-enabling condition (n = 82) or by a die roll in the control condition (n = 80).

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[3] Given that being U.S. born was associated with performance in Study 1 and because personal control is especially important in middle-class U.S. contexts, we initially ran enough participants to investigate whether being U.S. born influenced the results (N = 198). We found sufficient evidence that being U.S. born affected the consistency by condition interactions on engagement and performance. Because we are not interested in cross-cultural variation in our effects, we subsequently recruited only U.S. born participants and report results excluding non-U.S. born participants. See the Supplemental Material for more information.

There were three important procedural differences between Studies 1 and 2. First, we did not measure participants' RSA in Study 2 and, therefore, did not attach physiological sensors to participants. Second, participants only completed one task in Study 2 and, therefore, did not receive negative feedback. However, because we still wanted participants to believe their success was unlikely, the experimenter told participants, "the odds of gaining entry into the drawing are *extremely* low." Third, we gave participants 10 minutes, instead of 5 minutes, to complete the anagram task.

***Anagram task*.** Experimenters instructed participants to work on the anagram task for up to 10 minutes. Nine participants (6%) stopped working before time expired. We include these participants in the analyses to maintain greater power, but excluding them does not change our results.

Self-report questionnaire. Finally, participants completed measures of self-reported engagement, a manipulation check, and demographic questions.[4]

Measures.

***Perseverance*.** Participants reported their perseverance using four items from the Short Grit Scale (Duckworth & Quinn, 2009) on a scale from 1 (*not at all true*) to 5 (*very true*), $M = 3.94$, $SD = .60$, $\alpha = .69$.

Consistency. Participants reported their consistency using four items from the Short Grit Scale (Duckworth & Quinn, 2009) on a scale from 1 (*not at all true*) to 5 (*very true*), $M = 2.82$, $SD = .64$, $\alpha = .62$.

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[4] We also measured investment as another dependent variable and whether it was participants' first time completing an anagram task as a potential covariate (see the Supplemental Material).

Performance. Participants completed the same anagram task as Study 1, M = 9.02, SD = 3.42, range: 2-18.

Self-reported engagement. Participants reported their engagement using six author-generated items on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*), M = 5.97, SD = .93, α = .78. We included three items assessing effort (e.g., "I tried my hardest on the task") and three items assessing interest (e.g., "I was interested in the task").

Manipulation check. Participants completed the same manipulation check as Study 1.

Demographics. See the Supplemental Material.

Results and Discussion

Manipulation check. Chi-square analyses indicated that the manipulation was successful: 88% of participants in the goal-enabling condition reported that their drawing entry was based on their performance, compared to 2% in the control condition, $\chi^2(1, N = 159) = 115.86$, $r = .85$, $p < .001$. Similarly, 99% of participants in the control condition reported that their drawing entry was based on chance, compared to 23% in the goal-enabling condition, $\chi^2(1, N = 159) = 94.08$, $r = .77$, $p < .001$. As in Study 1, our results hold when we exclude people who failed the manipulation check (see the Supplemental Material), but we report results using the full sample to maintain greater power.

Analysis plan. We conducted moderated regression analyses, in which we entered perseverance (mean-centered) or consistency (mean-centered) and condition (0 = control, 1 = goal-enabling) on Step 1, and the grit facet by condition interaction on Step 2.

Table 4

Moderated Regression Results for Study 2 Performance

	b	95% CI (*b*)	*t*	*F*	*p*	R^2	ΔR^2
Perseverance							
Step 1				4.39	.014	.052	.052
Perseverance	1.27	[.54, 2.00]	2.87		.005		
Condition	.51	[-.37, 1.38]	0.96		.338		
Step 2				3.14	.027	.056	.004
Perseverance x Condition	.71	[-.76, 2.18]	0.80		.423		
Consistency							
Step 1				0.78	.462	.010	.010
Consistency	.42	[-.27, 1.11]	1.01		.316		
Condition	.41	[-.48, 1.30]	0.76		.450		
Step 2				2.12	.100	.039	.029
Consistency x Condition	1.84	[.44, 3.23]	2.18		.031		

Note. Results of moderated regressions in Study 2 for performance with perseverance (mean-centered) or consistency (mean-centered) and condition (0 = control, 1 = goal-enabling) on Step 1 and their interactions on Step 2.

Table 5

Moderated Regression Results for Study 2 Self-reported Engagement

	b	95% CI (*b*)	*t*	*F*	*p*	R^2	ΔR^2
Perseverance							
Step 1				2.05	.132	.025	.025
Perseverance	.25	[.05, .46]	2.02		.045		
Condition	.03	[-.22, .27]	0.19		.850		
Step 2				1.60	.193	.030	.004
Perseverance x Condition	.21	[-.20, .62]	0.84		.405		
Consistency							
Step 1				< .001	1.00	< .001	<.001
Consistency	.001	[-.19, .19]	.01		.990		
Condition	.001	[-.24, .25]	.01		.996		
Step 2				2.45	.065	.045	.045
Consistency x Condition	.62	[.24, 1.00]	2.71		.007		

Note. Results of moderated regressions in Study 2 for self-reported engagement with perseverance (mean-centered) or consistency (mean-centered) and condition (0 = control, 1 = goal-enabling) on Step 1 and their interactions on Step 2.

Performance. See Table 4 for full results.

Perseverance. The main effect of condition and the perseverance by condition interaction on performance were nonsignificant, *p*s > .337. Consistent with our prediction, across conditions, participants higher (vs. lower) in perseverance performed better on the task, t (161) = 2.87, b = 1.27, p = .005.

Consistency. The main effects of condition and consistency on performance were nonsignificant, *p*s > .315. Consistent with our moderation prediction, there was a significant consistency by condition interaction on performance, F (3, 158) = 2.12, b = 1.84, ΔR^2 = 0.03, p = .031 (See Figure 2). Specifically, consistency was positively associated with performance in the goal-enabling condition, b = 1.52, p = .021, but not in the control condition, b = -0.32, p = .555.

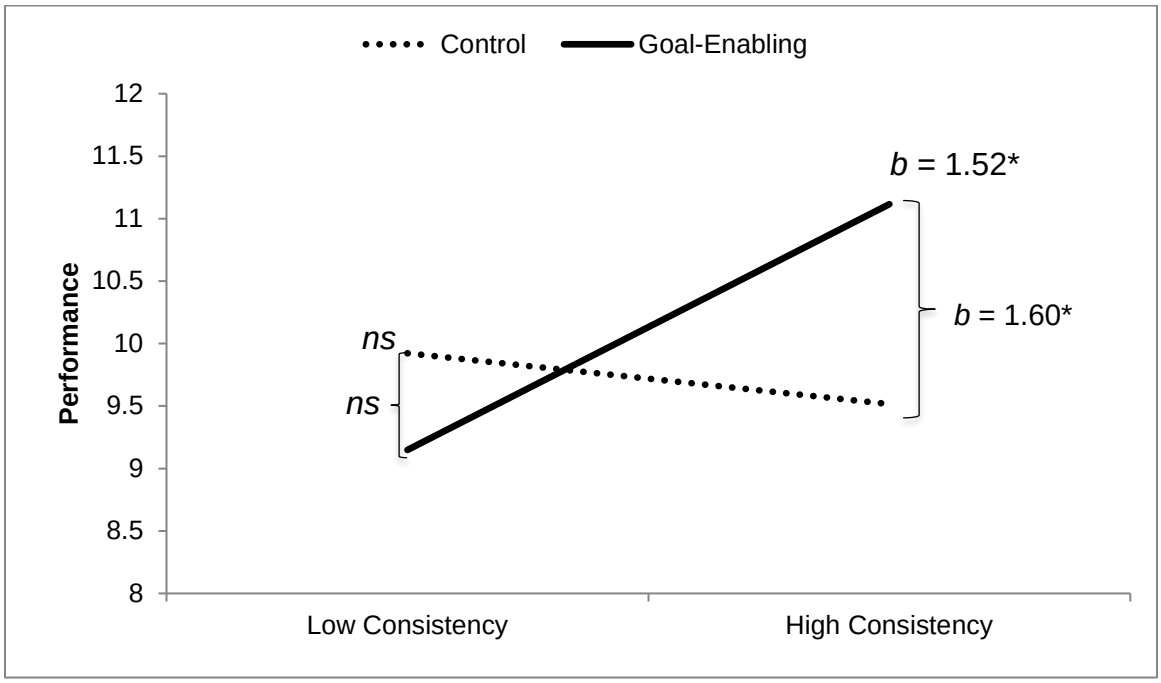

Figure 2. Performance as a function of consistency and condition in Study 2. Higher values reflect better performance on the anagram task. "High" and "low" consistency represented as ± 1 *SD* from the mean.

Self-reported engagement. See Table 5 for full results.

Perseverance. The main effect of condition and the perseverance by condition interaction on engagement were nonsignificant, *ps* > .404. Consistent with our prediction, across conditions, participants higher (vs. lower) in perseverance reported greater engagement, t (159) = 2.02, b = 0.25, p = .045.

***Consistency*.** The main effects of condition and consistency on engagement were nonsignificant, *p*s > .988. Consistent with our moderation prediction, the consistency by condition interaction on engagement was significant, F (3, 156) = 2.45, b = 0.62, ΔR^2 = 0.04, p = .007 (See Figure 3). Specifically, consistency was positively associated with engagement in the goal-enabling condition, b = 0.38, p = .036. However, this was not true in the control condition, in fact there was marginal negative association, b = -0.25, p = .091.

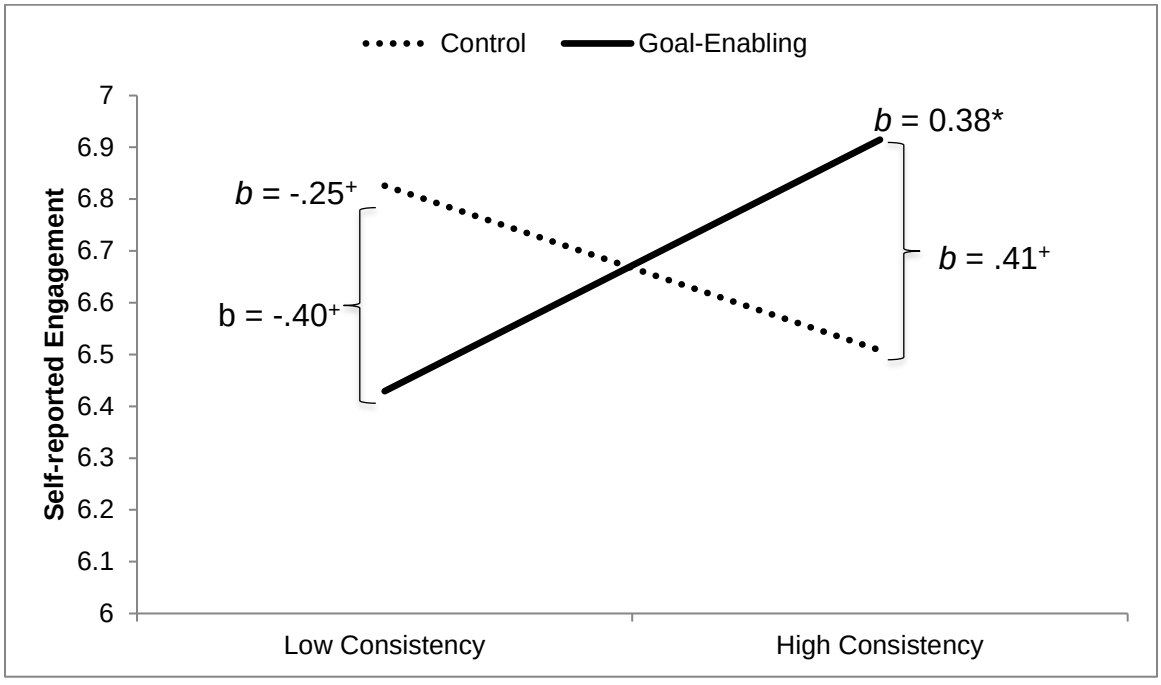

Figure 3. Self-reported engagement as a function of consistency and condition in Study 2. Higher values reflect greater engagement in the anagram task. "High" and "low" consistency represented as ± 1 *SD* from the mean.

Summary. We found full support for our hypotheses. Participants higher (vs. lower) in perseverance performed better and reported greater task engagement, regardless of whether performance enabled goal achievement. Further, participants higher (vs. lower) in consistency performed better and reported greater task engagement, but only when performance enabled goal achievement.

General Discussion

Although grit is an important resource for success, our work suggests that grit has nuanced implications due to how its separate facets interact with context. We found that perseverance was marginally (Study 1) or significantly (Study 2) associated with better task performance and greater self-reported engagement, regardless of whether performance enabled goal achievement. These results suggest that perseverance is *not* sensitive to contextual cues that indicate engaging in a task is not in one's best interest, which may explain why grit predicts costly persistence (Lucas et al., 2015). In contrast, our results suggest that consistency *is* sensitive to contextual cues that indicate whether performance enhances the likelihood of goal attainment. We found consistency to be significantly associated with physiological engagement (Study 1), self-reported engagement (Study 2), and task performance (Study 2), but *only* when performance enabled goal achievement. Although the results of Study 1 were only partially consistent with our predictions, we found strong support in Study 2 when we used a more

reliable measure of self-reported engagement and gave participants more time to complete the anagram task.

Our work contributes to a growing body of research aimed at understanding non-cognitive factors, like grit, and their consequences for success. Theoretically, our results support the idea that grit's facets should be considered separately because they have divergent effects (Credé et al., 2016). It is possible that perseverance and consistency also differentially predict outcomes based on other factors, such as task characteristics (e.g., creative vs. logical tasks) and individual differences (e.g., ability, self-regulation). Further, our studies suggest that seemingly beneficial non-cognitive factors are not without disadvantages. A trait that predicts universally enhanced performance and engagement, like perseverance, may sound like a panacea for underachievement, but it may have hidden downsides, such as the investment of valuable time and energy into relatively inconsequential tasks.

Limitations and Future Directions

We found preliminary evidence that perseverance and consistency are more strongly associated with effort and interest, respectively. Future research might examine how grit's facets relate to tasks that predominantly require effort or interest, but not both. For example, perseverance may be particularly helpful for repetitive tasks while consistency may be more helpful for creative pursuits. Thus, although the current paper focuses on perseverance leading to maladaptive engagement, perseverance may more beneficial than consistency in situations in which individuals need to engage in tasks in which they are not interested. Consider a chef who wants to own a restaurant. Achieving this goal includes menu planning, which the chef is passionate about, but also business accounting, which the chef finds tedious. Although high

consistency may enable the chef to spend hours planning the perfect menu, high perseverance may be essential in helping the chef to engage in crucial financial tasks.

One potential limitation is our use of entry into a drawing for a $50 gift card as participants' higher-order goal, given that it was not freely chosen by participants. Importantly, previous research supports our contention that the goal of drawing entry was salient and compelling (e.g., Major et al., 2002; Townsend et al., 2010), and that grit leads to meaningful differences in behavior on short-term tasks (Lucas et al., 2015). However, grit theorizing has generally focused on predicting outcomes for freely chosen, long-term goals (Duckworth, 2016). Future research can investigate if our effects hold when people pursue other types of goals.

Conclusion

How can grit be both a predictor of success (Duckworth, 2016) and a risk factor for maladaptive persistence (Lucas et al., 2015)? By considering grit's underlying facets, the current studies reconcile these seemingly contradictory findings and provide a more nuanced understanding of grit's light and dark sides. Theoretically, our work suggests the importance of considering grit's facets separately and that non-cognitive factors, like grit, have less straightforward outcomes than providing a cure-all for underachievement. Practically, our results also urge organizations to exercise caution before attempting to increase grit among employees and students. It will be essential for organizations to understand how each facet may affect engagement and performance within their context in comparison to others. Thus, as the movement to maximize individuals' potential by cultivating grit progresses, organizations must understand how grit's facets separately predict outcomes and how they may negatively affect behavior in order to properly support constituents' success.

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