



Development of the grit scale for children and adults and its relation to student efficacy, test anxiety, and academic performance



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ABSTRACT

We sought to develop a new measure of grit, which would be suitable (i.e. readable) for both schoolchildren and adults. An initial pool of 14 items was administered to a student/community sample in Study 1 and 12 items were selected for the Grit Scale for Children and Adults (GSCA) based on factor loadings. In Study 2, the GSCA was administered to 249 students in grades 3–12. Participants also completed measures of self-efficacy, test anxiety, the Grit-O scale, and standardized tests in ELA, Math and Science. The GSCA demonstrated high internal consistency and test-retest reliability. Construct validity was supported by significant correlations with efficacy, anxiety, and other measures of grit. Scores on the GSCA predicted achievement on the ELA and Science standardized tests, over and above an existing grit scale (the Grit-O). The study found initial evidence for the psychometric properties of the GSCA and its use in school-children.

1. Introduction

Grit has become a key concept in the educational arena thanks in large part to the work of Angela Duckworth and colleagues. Although Duckworth reignited interest in the personality construct, grit has been invoked for many years to champion traits such as perseverance and the determination to overcome setbacks. *Stokas (2015)* has argued that the dominant class from Teddy Roosevelt's era embraced grit as a way for the privileged class to justify their position, relative to the majority of individuals who lacked the same supports and lived a tough life by today's standards. Others have argued that the current, renewed focus on grit neglects more important socioeconomic variables that undermine minority performance (see articles on the subject by *Cohen, 2015; Kohn, 2014; and Thomas, 2014*). While we do not disagree with *Stokas (2015)* and others that the concept is imbued with many political and social meanings, or that collective support systems play a major role in academic success, we see great value in grit as a personality trait that can predict academic performance across various backgrounds, much in the same way that self-efficacy has been shown to.

In 2007, Duckworth et al. introduced grit as a personality trait which could partially account for William *James' (1907)* observations that some individuals were able to accomplish more than others of similar intelligence. *Duckworth, Peterson, Matthews, and Kelly (2007)* defined grit as “perseverance and passion for long-term goals.” Specifically, grit was defined as incorporating two factors: 1) Consistency of

interest, and 2) Perseverance of effort. Duckworth and colleagues have found grit to predict wide ranging variables from adult educational attainment and career stability to spelling bee performance (*Duckworth & Quinn, 2009*). These findings sparked renewed attention to the construct from those in the educational arena as a non-cognitive variable that could predict retention and achievement.

In the present paper we offer an alternative definition and operationalization of the construct for the following reasons:

1. The *Duckworth et al. (2007)* Grit-O Scale was thought to require a relatively high reading level and could be problematic or developmentally inappropriate for a younger population. For example, the following items may contain content that is not age appropriate for younger students: “I am diligent,” and “I have overcome setbacks to conquer an important challenge.” Our Grit Scale for Children and Adults (GSCA) would (ideally) be suitable for grades 3 to college.
2. Disagreement over the definition of grit, specifically the consistency of interest dimension. On the Grit-O scale, responding positively to items such as “My interests change from year to year” or “I become interested in new pursuits every few months” is thought to reflect a lack of grit. We see no reason why multivariate interests should reflect a lack of grit. Instead, we propose that it is fine to have wide-ranging, changing interests and grit is reflected in the ability to maintain focus on any one of them and see projects through to completion. Indeed, in a large sample with a wide age range,

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Abuhassan and Bates (2015) showed that consistency of interests was just a facet of conscientiousness, with the authors going on to say “what is unique to Grit, then, is a single (rather than bi-factor) construct tapping effortful persistence or ‘elbow grease.’” Moreover, perseverance, but not consistency of interest, was significantly related to achievement.

Therefore, we defined grit as follows: *To sustain a focused effort to achieve success in a task, regardless of the challenges that present themselves, and the ability to overcome setbacks.* The goal of the present study was to develop a measure that would adequately capture this definition and would be readable by young adults and children alike.

1.1. Grit and academic performance

Grit has been shown to predict grade point average (GPA) in Ivy League and state college students (Duckworth et al., 2007); adolescents at a public school (Duckworth & Quinn, 2009); Black male college students at a predominantly White college (Strayhorn, 2014); and doctoral students (Cross, 2014). Most of the associations that have been found between grit and GPA have been in the modest to moderate range. It is notable that grit predicted performance over and above traditional predictors such as SAT scores (Duckworth et al., 2007) or ACT scores and high school GPA (Strayhorn, 2014). Grit has been shown not only to predict GPA but also retention in a variety of roles as would be expected if existing grit scales are really measuring perseverance and a “stick-to-it-ness.” For instance, Robertson-Kraft and Duckworth (2014) found that grit was able to predict both teacher effectiveness and retention. Eskreis-Winkler, Shulman, Beal, and Duckworth (2014) found grit predicted high school graduation rates, completion of an Army Special Forces course, retention in salespeople, and even the propensity of married males to stay in their marriage. Most of the effect sizes were relatively modest, yet grit accounted for unique variance in the outcomes, even after controlling for other known predictors.

We should note that more recent studies have somewhat tempered the expectations for grit as a key predictor of academic performance. Notably, a meta-analysis by Credé, Tynan, and Harms (2016), showed that grit was correlated at about 0.16 and 0.17 with GPA at the high-school and college levels respectively. The perseverance factor was related to academic performance at a higher level (0.26) than the consistency factor (0.10). Overall grit scores did not show incremental validity over conscientiousness (which was found to be highly correlated with grit; also see Rimfeld, Kovas, Dale, & Plomin, 2016 for similar conclusions). Yet, the perseverance factor yielded substantial incremental validity, over and above conscientiousness. We see this as further support for omitting the consistency facet from our definition of grit, and instead focusing on perseverance.

Of course, there are other personality and mood constructs which are known to predict academic performance, and which are theoretically associated with grit. We included two of these constructs, efficacy and anxiety, in the present study. Their relationship to academic performance is briefly reviewed below.

1.2. Self-efficacy and academic performance

Self-efficacy has been defined by Bandura (1977) as the belief that individuals will be able to produce desired outcomes and has been equated with mastery or competence. Self-efficacy is considered a personality variable that is relatively stable and has important implications for coping and persistence in challenging situations (Bandura, 1977; Blatt, D’Afflitti, & Quinlan, 1976).

Following Bandura’s landmark paper, many researchers sought to examine self-efficacy as it related to various domains within the academic sphere. For example, Bandura (1990); Bandura, Barbaranelli, Caprara, and Pastorelli (1996) himself differentiated the construct to

include efficacy as it related to self-regulatory learning (incorporating motivation, planning, and enlisting resources to learn) and meeting others’ expectations (ability to live up to expectations of parents, teachers, and peers), among other domains. Subsequent research demonstrated that efficacy in self-regulated learning directly predicted academic achievement and was indirectly related to performance by promoting a prosocial orientation and decreased despondency (Bandura et al., 1996). Diseth (2011) showed that previous academic success, as measured by high-school GPA, predicted higher efficacy, which in turn led to future academic achievement. Other research has demonstrated that self-efficacy predicts GPA partly through persistence of effort and overcoming of difficulties (Komarraju & Nadler, 2013). The impact of self-efficacy on academic performance and persistence is now well-established (see Multon, Brown, & Lent, 1991 and Richardson, Abraham, & Bond, 2012 for meta-analyses).

1.3. Test anxiety and academic performance

The relationship between anxiety and academic performance dates back many years with the pioneering work of Mandler and Sarason (1952) and Sarason’s (1960) attempts to define test anxiety and examine its role in academic performance. While it is acknowledged that some anxiety is adaptive in preparing students for upcoming challenges, such as exams or assignments, too much anxiety is clearly detrimental to performance. Seipp (1991) identified 126 studies that tested this association and her meta-analyses showed a clear, albeit modest, relationship across the studies. Of particular note was that specific forms of anxiety, namely test anxiety, showed stronger correlations with performance compared to generalized anxiety.

Liebert and Morris (1967) differentiated test anxiety into an emotional and cognitive component (labelled worry) and found initial evidence that the cognitive aspect may be more involved with performance. Indeed, Hembree (1988) conducted an early meta-analysis and showed that the worry component seemed to interfere with performance to a greater extent than emotionality. Further, he found that test anxiety was linked to personality variables such as low self-esteem (inversely) and an external locus of control. Cassidy and Johnson (2002) developed a specific measure for cognitive test anxiety and found it to be related to academic performance on self-reported SAT scores and examination grades. A high degree of stability has been found for both the cognitive and bodily system components of test anxiety, which would indicate that the construct is more a trait than a state (Cassidy, 2001).

Studies showing the effects of test anxiety on high stakes tests are less common. Hancock (2001) found that individuals with high test anxiety are more likely to show performance deficits in highly evaluative contexts. Segool, Carlson, Goforth, Von Der Embse, and Barterian (2013) showed that high stakes tests were related to significantly higher levels of test anxiety compared to classroom tests. To our knowledge, the current study represents a unique opportunity to examine cognitive test anxiety in relation to high stakes testing of the Common Core Learning Standards as well as grit. Insofar as grit represents confidence in the ability to overcome challenges (such as tests), we would expect it to be inversely related to test anxiety, which is associated with lower self-confidence and an external locus of control (Hembree, 1988). Studies on this association are rare but Sheridan, Boman, Mergler, and Furlong (2015) found a moderate negative correlation between grit and general anxiety, while Celik and Sarıçam (2016) specifically found higher grit to be related to lower levels of test anxiety in a sample of Turkish school-children and adolescents.

1.4. Study overview

The goal of the present study was to validate a new grit scale that would be comprehensible by young children and adults alike. Items for the new scale were created with this goal in mind and the resulting item

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