Grit: Sustained Self-Regulation in the Service of Superordinate Goals

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In 2013, an unknown mathematician named Yitang Zhang proved a conjecture in analytic number theory that had befuddled experts for over a century (Wilkinson, 2015). His proof, published in the *Annals of Mathematics*, earned him world renown and a MacArthur Fellowship. Asked what could explain this out-of-the-blue landmark achievement, a colleague commented: "[With Zhang] nothing is rushed. If it takes him … ten years, that's fine with him" (p. 28). Working on proofs in pure mathematics, it turns out, mostly involves being stuck. Zhang's genius was his "willingness to be stuck much longer" (p. 28).

What inclines individuals like Zhang to sustain focus on a single pursuit over months, years, and even decades? One self-regulatory construct relevant to this question is grit, defined as passion and perseverance for long-term goals despite setbacks, failures, and competing pursuits. In the present chapter, we compare grit to another prominent self-regulatory construct, self-control. We identify conceptual distinctions between these constructs that account for their differential predictive validity, and use a hierarchical goal framework to throw both their similarities and differences into sharper relief. After identifying the defining features of grit, we consider how psychological interventions might target these features to cultivate grit and, finally, suggest especially promising avenues for future research.

A Précis on Grit

Grit has a short history but a long past. Even the earliest scientific inquiries into the determinants of success recognized the importance of sustained goal pursuit. Galton, in 1869, reviewed the biographies of eminent individuals and concluded that success resulted from intellect combined with "zeal" and the "capacity for hard labour" (p. 38). Half a century later, Cox (1926) surveyed the life histories of 301 geniuses and observed, "youths who achieve eminence are characterized not only by high intellectual traits, but also by persistence of motive and effort" (p. 218). If anything, Cox proposed, persistence was more important: "High but not the highest intelligence combined with the greatest degree of persistence will achieve greater eminence than the highest degree of intelligence with somewhat less persistence" (p. 187).

The years following Galton and Cox were dominated by attempts to study persistence in more typical populations, using performance tasks in controlled settings (Hartshorne, May & Maller, 1929; Ryans, 1938; Ryans, 1938a; for review see Feather, 1962). These tasks afforded psychologists the opportunity to examine individual differences in behavior in identically challenging circumstances. However, it is not at all clear that struggling with a difficult puzzle in a single sitting or holding one's leg aloft for minutes on end gets at the same psychological phenomena as documented by Galton and Cox. The modern study of grit continues in the initial tradition of examining single-minded perseverance over the very long-haul. In this section, we review how grit is measured, outcomes it predicts, as well as motivational, cognitive, and behavioral correlates of grit.

Measurement

Grit has typically been assessed using self-report questionnaires. The Grit Scale (Duckworth et al., 2007) has 12 items, and its short-form, the Grit-S, contains a subset of 8 of them (Duckworth & Quinn, 2009). The Grit-S, which is often preferred due to time constraints, demonstrates internal consistency ($\alpha > .73$ across six studies), test-retest stability ($r = .68$ over one year), and convergent and discriminant validity (Duckworth & Quinn, 2009; see Duckworth et al., 2007 for comparable statistics on the Grit Scale). An informant-report version of the Grit-S has similar psychometric properties ($\alpha > .83$ for family and friend ratings) and converges with the self-report version ($r > .45$; Duckworth & Quinn, Study 3).

Passion and perseverance for long-term goals map directly onto the two-factor structure of the Grit Scale. "Passion" aligns with the first factor, *consistency of interests*, the tendency to invest effort in the same goal over time (e.g., "New ideas and projects sometimes distract me from previous ones," reverse scored). Notably, questionnaire items that load on this factor do not measure intensity of commitment to a goal. Rather, these items assess the tendency to pursue a single objective, rather than varying ones, over long stretches of time. "Perseverance" aligns with the second factor, *consistency of effort*, the tendency to sustain effort towards goals (e.g., "Setbacks don't discourage me"). The two factors of the grit scale point to related but separable characteristics of the gritty individual: the inclination to focus on the same goal over time and to persist in the face of adversity. Combined, these factors are typically more predictive of performance in challenging settings (e.g., in the Scripps National Spelling Bee, at West Point) than is either factor alone (Duckworth & Quinn, 2009).

Recent efforts have focused on developing alternative measures of grit. One method entails using biographical evidence of long-term commitment as a proxy for grit (Matteucci et al., manuscript in preparation; Robertson-Kraft & Duckworth, 2012). This approach builds upon foundational research by Willingham (1985), who found that *follow-through*—multi-year participation in extra-curricular activities and evidence of advancement therein—during high school out-predicted both SAT scores and high school GPA for a range of non-academic college success outcomes. In a more recent study of high school seniors, resumes scored using an adaptation of Willingham's procedure—which quantified follow-through in sports, paid work, and other serious pursuits outside the classroom—correlated with both self-report and teacher-report questionnaire measures of grit (Matteucci et al., manuscript in preparation).

Outcomes[1]

In cross-sectional research, grit is associated with achievement and well-being. For example, gritty adults tend to make fewer career changes (*OR* = .65) (Duckworth et al., 2007), grittier individuals progress farther in their formal education (*r* = .22), and at one elite college, grittier undergraduates earn higher GPAs (*r* = .34) (Duckworth et al., 2007). Grit is also associated with happiness: grittier adults report higher life satisfaction (*r* = .40), higher positive affect (*r* = .47), and lower negative affect (*r* = -.34) (Young, Lin, & Duckworth, 2015). Interestingly, older individuals generally report higher levels of grit, suggesting that grit may develop with life experience (*r* = .17) (Duckworth et al., 2007). However, because available data are cross-sectional, this finding may also indicate a cohort effect: cultural influences may have more strongly encouraged grit in the past.

Stronger evidence that grit contributes to achievement comes from prospective longitudinal research. For example, among cadets at West Point military academy, grit predicts which cadets persist through their first summer training, colloquially termed "Beast Barracks" due to the mental and physical demands it makes of new recruits (*OR* = 1.62) (Duckworth et al., 2007). The consistency of effort subscale continues to predict retention at West Point four years later (*OR* = 1.20) (Kelly, Matthew & Bartone, 2014). In contrast, the Whole Candidate Score—a weighted average of SAT score, high school rank, ratings of leadership potential, and performance on physical aptitude tests—fails to predict retention, either through Beast Barracks

[1] Unless otherwise noted, the studies reported in this section used the Grit Scale or the Grit-S. For all dichotomous outcomes (e.g., retention) we report odds ratios. Because measures of grit were standardized prior to analyses, odds ratios represent the change in odds associated with a one standard deviation increase in grit.

or at graduation four years later (for replication studies, see Duckworth et al., 2007; Duckworth & Quinn, 2009).

Grit is prospectively associated with performance in a range of other challenging settings as well. For example, grit predicts graduation from the Chicago Public Schools (*OR* = 1.48) (Eskreis-Winkler et al., 2014), and, among exceptionally high-achieving students, rank in the Scripps National Spelling Bee (*OR* = 1.86) (Duckworth et al., 2007). In professional settings, grittier soldiers are more likely to complete Green Beret training (*OR* = 1.28), and grittier sales representatives are less likely to quit their jobs over a six-month period (*OR* = 1.38) (Eskreis-Winkler et al., 2014). Grittier teachers are more likely to produce superior academic learning gains in their students over the course of the following academic year (*OR* = 1.31) (Duckworth, Quinn, & Seligman, 2009). Likewise, teachers who during their college years demonstrated follow-through in a small number of extracurricular pursuits are more likely to stay in teaching through the end of the school year (*OR* = 2.34) and to help their student achieve at least a full year of academic learning during that time (*OR* = 1.60) (Robertson-Kraft & Duckworth, 2012).

Motivational, Cognitive, and Behavioral Correlates

A nascent literature is beginning to explore the motivational, cognitive, and behavioral correlates of grit. For example, grit is differentially related to three distinct motivational approaches to pursuing happiness: pleasure, engagement, and meaning. Individuals who are motivated by pleasure seek positive hedonic experiences, individuals who are motivated by engagement seek attention-absorbing activities, and individuals motivated by meaning seek activities that serve a greater altruistic purpose (Peterson, Park, and Seligman, 2005). In two large samples, grittier adults reported being motivated by engagement (βs = .34 and .32) and meaning (βs = .15 and .19), but not pleasure (βs = -.10 and -.24) (Von Culin, Tsukayama, & Duckworth, 2012). Relatedly, Hill, Burrow and Bronk (2014) found that gritty undergraduates reported higher levels of meaning in life (r = .44), and that grit predicted prospective increases in meaning over a three-month period (β = .21). Similarly, in a longitudinal study of undergraduates, grit combined with gratitude conferred resilience against suicidal ideations (r = -.28), an effect that was mediated by higher levels of self-reported meaning (r = .38) (Kleiman, Adams, Kashdan, & Riskind, 2013).

Gritty individuals also tend to be optimistic (Duckworth, Quinn, & Seligman, 2009). Optimistic explanatory style—interpreting the causes of adverse events to be specific and changeable, rather than global and permanent—leads to resilience in the face of adversity (Peterson & Park, 1998; Peterson, 2000). It is therefore unsurprising that among novice teachers, optimistic explanatory style has been associated with grit (r = .32), and that grit statistically mediates the association between optimistic explanatory style and teaching performance. Relatedly, across two samples of high school seniors, gritty individuals were more likely to hold a growth mindset, the implicit belief that intelligence can improve with effort, and to have an internal locus of control, the belief that life consequences primarily result from intentional actions (Galla et al., 2014).

Gritty individuals may also avoid grass-is-greener thinking. In one study, new cadets were asked to imagine what they might be doing if they hadn't come to West Point (Kwok et al., 2013). Cadets who imagined something worse or could not imagine an alternative at all had higher grit scores than those who could imagine an alternative that was the same or better. Should this finding replicate in other samples, it may suggest that grittier individuals generate lower estimates of the opportunity cost of their current pursuits. That is, grittier individuals may

focus on what they are doing for longer simply because they do not place a high value on the best forgone alternative.

One reason gritty individuals outperform their peers is because they invest more high-quality effort in their work. Grit, for example, leads individuals to engage in more deliberate practice—a difficult yet effective form of practice that is performed repetitively with feedback and designed to improve specific aspects of performance (Ericsson et al., 1993). In one study of National Spelling Bee finalists (Duckworth et al., 2011), deliberate practice was operationalized as studying vocabulary words and word origins in solitude and distinguished from other common practice activities such as being quizzed by another person, reading, or playing word games. Though deliberate practice was generally experienced as the hardest, least enjoyable form of practice, gritty contestants consistently did more of it (r = .30). Hours invested in deliberate practice fully mediated the prospective association between grit and rank in final competition. Relatedly, gritty undergraduates engage in self-regulated learning: they proactively adapt their cognitions and behaviors to facilitate learning and achievement (Wolters & Hussain, 2014). In one study, self-regulated learning mediated the effect of grit on improvements in self-reported GPA. Notably, these findings were only supported for the perseverance of effort factor of the grit scale.

Taken together, these findings suggest that gritty individuals are motivated more by meaning and engagement than by pleasure, disposed to think about what they can change in their lives as opposed to what they cannot change, focused on current pursuits as opposed to being preoccupied with alternatives, and inclined to put in more hours of arduous effort toward their goals. What grit has *not* been reliably associated with is talent. In most studies, grit has been shown to be either orthogonal to talent or, in one case, weakly inversely correlated (Duckworth et al., 2007).

Relating Grit to Self-Control

Much of human behavior is goal-directed (Locke & Latham, 2013). A number of self-regulatory constructs refer to the ability to regulate thoughts, feelings, and behaviors in the service of valued goals. In this section, we compare and contrast grit with self-control, another prominent self-regulatory construct. We situate grit and self-control within a hierarchical goal framework to sharpen similarities and differences between these constructs.

Grit and Self-Control

Self-control can be defined as the self-initiated regulation of conflicting impulses in the service of valued goals (Baumeister, Heatheron, & Tice, 1994). Freud (1930) believed that self-control—the ability to inhibit undesirable impulses—was the bedrock of civilized life. Like grit, self-control predicts achievement-related outcomes including school performance, income, and employment (de Ridder, Lensvelt-Mulders, Finkenauer, Stok & Baumeister, 2012; Duckworth & Carlson, 2013; Moffitt et al., 2011). Empirically, self-control and grit are highly correlated (rs > .63 in Duckworth et al., 2007).

While related both conceptually and empirically, these constructs demonstrate distinct patterns of association with achievement outcomes: grit tends to be relevant in challenging situations where dropout is common, whereas self-control is more relevant in everyday situations in which temptations or distractions abound. For example, grit predicts rank in the National Spelling Bee and retention at West Point over and above self-control (Duckworth et al., 2007; Duckworth & Quinn). In contrast, self-control predicts course grades, even at West Point, and healthy weight better than grit (Duckworth, 2014; Duckworth et al., 2007). These discrepancies were anticipated by Galton (1869) over a century ago when he distinguished the inclination to

pursue especially long-term aims in the face of obstacles, a hallmark of high-achievers, from self-denial in the face of "hourly temptations" (p. 40).

A Hierarchical Goal Framework

Considering how goals are hierarchically organized clarifies key similarities and distinctions between grit and self-control (Duckworth & Gross, 2014). It is now widely accepted that goals exist at higher and lower levels (Carver & Scheier, 1998; Kruglanski et al., 2002; Shah & Kruglanski, 2000) (see **Figure 1**). Higher-order goals are fewer, more abstract, and more valued, whereas lower-order goals are more numerous, less abstract, and more interchangeable. The uppermost goals in an individual's hierarchy reflect deeply-held ideals and values (Carver & Scheier, 1998). These higher-order goals generate lower-order goals to reduce the discrepancy between the higher-order goal's uncompleted state and completion. Higher-order goals also influence lower-level goals via *transfer*—which occurs when "a means … associated with a goal …[evokes] feelings and attitudes associated with that goal" (Kruglanski et al., 2002, p. 345). In other words, commitment to higher-order goals can transfer to their means by association.

We propose that grit entails working assiduously towards one superordinate, challenging goal over extremely long stretches of time. Consider Hall of Fame baseball pitcher Tom Seaver, whose superordinate goal was to "[pitch] the best I possibly can day after day, year after year…" (Dorfman & Kuehl, 1989, p. 46). Seaver coordinated nearly all his lower-level goals and actions in the service of this superordinate objective:

> Pitching … determines what I eat, when I go to bed, what I do when I'm awake. It determines how I spend my life when I'm not pitching. If it means I have to come to Florida and can't get tanned because I might get a burn that would keep me from throwing for a few days, then I never go shirtless in the sun … if it means I have to remind myself to pet dogs with my left hand, then I do that, too. If it means in the winter I eat cottage cheese instead of chocolate chip cookies in order to keep my weight down, then I eat cottage cheese. (Dorfman & Kuehl, 2002, p. 46)

Seaver is a good example of the principle of transfer. Here, the passion for excellence in pitching (a superordinate goal) increased motivation for specific goals and actions at lower levels.

The characteristic way gritty individuals respond to setbacks also has direct ramifications on their hierarchical goal structures. Individuals who persist over obstacles generate larger *equifinality sets*—substitutable sets of lower-level means for each higher-order goal in the pyramid (Kruglanski et al., 2002). Larger equifinality sets enhance goal commitment (Kruglanski et al., 2002) by increasing expectancy (the more ways one has to achieve a goal, the greater the perceived likelihood of goal attainment), increasing value (via the availability heuristic, more paths leading to a given goal enhance perceived value), and dulling the sting of failure (a larger set of means renders the individual less dependent on any given pathway, which makes failure on any one path less discouraging) (Kruglanski, Pierro, & Sheveland, 2011).

Grit and self-control describe similar responses to a similar dilemma: When movement towards a higher-level goal is impeded, what does one do? Gritty individuals and self-controlled individuals both successfully self-regulate in favor of the higher-level goal of greater enduring value. Grit and self-control have both been studied in the achievement context. As summarized above, both reliably predict success.

Yet these constructs also differ in important ways. Self-control, as understood in a hierarchical goal framework, constitutes acting in ways that concord with *relatively* higher-order goals, but not necessarily a single, highest-level goal. The difference is subtle but important. For example, a self-controlled individual may decide to put money into a retirement fund

because she finds it relatively more valuable to be financially secure later in life than to enjoy dinner out tonight. This is adaptive and admirable, but it is not an example of grit unless the goal of financial security is, or leads to, a challenging, superordinate goal of unparalleled significance. In a hierarchical framework, self-controlled individuals will have truncated goal structures: small triangles, half triangles, maybe sometimes trapezoids, but no peaked pyramids of the sort exemplified by Seaver's dedication to pitching. Thus in contrast to the gritty individual, for whom nearly all daily actions and lower-order objectives converge towards an ultimate concern, the lower-level actions and goals of self-controlled individuals are not unified towards a single peak. Individuals without superordinate objectives can also be expected to approach their goals with less passion, because no highly valued overarching objective transfers motivation to them.

At lower-levels of the goal hierarchy, grit and self-control are also distinguished by the modal "enemies" they address. Whereas for the self-controlled individual, the modal enemy is temptation—a lower-level competing goal in the face of a more valued alternative—the modal enemies for the gritty individual are obstacles and rival pursuits. Whereas a failure of self-control entails choosing to satisfy a relatively lower-level temptation over a relatively higher-order goal, a failure of grit more commonly entails giving up on a superordinate goal in the face of obstacles or pursuing a series of superordinate goals in quick succession. As documented in the empirical findings reviewed above, self-control is more robustly associated with everyday success, while grit is more strongly correlated with exceptional achievements that can take years—or even decades—to accomplish.

Building Grit

It is the presence of a dominant superordinate goal that distinguishes grit from other self-regulatory constructs. In this section, we highlight two qualitatively different intervention approaches that aim to build grit by highlighting this superordinate goal—one is based in the logic of consequence and the other in the logic of appropriateness. According to March (1994), these logics represent two distinct approaches to understanding and motivating human behavior. Action based on the logic of consequence is determined by expectancies, anticipated costs, and anticipated benefits. When applying the logic of consequence, the individual asks himself the following operational questions: What is the likelihood that I will achieve the desired outcome? What benefits will I accrue? What costs—including opportunity costs—will I incur?

In contrast, actions determined by the logic of appropriateness are informed by considerations of identity. Identity comprises the individual's core life roles and values (Neisser, 2006). When an individual acts based on the logic of appropriateness, he asks what set of behaviors would be appropriate, given his identity, in his present situation: Who am I? What is this situation? What does someone like me do in this situation? Key to understanding the distinction between these two logics is recognizing that action based in the logic of identity is not informed by anticipated benefits or costs. Identity-congruent thoughts and behaviors are heuristically enacted, irrespective of associated costs or benefits. Whereas interventions informed by the logic of consequence motivate action towards a superordinate goal by highlighting benefits and downplaying costs, interventions informed by the logic of appropriateness motivate action by cueing an identity associated with the superordinate goal that, in turn, motivates goal-relevant behavior.

The Logic of Consequence

Expectancy-Value Theory (EVT), a dominant psychological theory of achievement, encapsulates the logic of consequence. EVT posits that people are motivated by expectancies and values. Expectancy is the extent to which people believe they can achieve their desired

goals. Value, which indexes the subjective value the individual attaches to his goal, varies positively with perceived benefits (e.g., attainment value, intrinsic value, utility value) and inversely with perceived costs (e.g., the opportunity cost, emotional cost, and/or required effort). Higher levels of expectancy and value promote goal commitment, and, in turn, effort expenditure and achievement (Eccles, 1987; Eccles, 1983; Eccles et al., 1984).

Expectancy-value interventions typically aim to increase either expectancies or values (Hulleman et al., in press). For example, growth mindset and attributional retraining interventions, which focus on altering expectancies, encourage students to replace uncontrollable attributions for success (e.g., "I'm not smart enough to get A's") with controllable ones (e.g., "If I try harder I will get good grades"). These interventions can have positive, lasting effects on achievement in grade school (for review, see Yeager & Dweck, 2012) and college (for reviews, see Haynes et al., 2009; Perry et al., 1993; Wilson, Damiani & Shelton, 2002). Interventions that increase the value of academic achievement demonstrate similar benefits (Hulleman et al., in press; Yeager et al., 2014). One of the most commonly used value-focused interventions, also designed for the school context, asks students to articulate connections between their desired futures (which they intrinsically value) and the material they are learning in class, thus increasing their valuation of school (Harackiewicz et al., 2012; Hulleman & Harackiewicz, 2009).

In our own work (Eskreis-Winkler et al., 2015a), we have developed brief interventions that teach students the tenets of deliberate practice (e.g., focus on your weaknesses, set specific goals) and target associated expectancies and values in an attempt to motivate it. For example, in addressing expectancy, students learn: "Many people think talent is all that matters … Actually scientific evidence suggests that deliberate practice is incredibly important to improvement and success." The intervention goes on to explain that it is common to misattribute achievement to talent because the hours of hard practice individuals invest are often "hidden" (e.g., carried out in private). Students are also encouraged to reappraise phenomenological costs related to practice as typical, and even essential, to learning: "If you are frustrated or confused while practicing ... it can mean you are working on your weaknesses ... when you practice and everything goes perfectly, it may feel good, but it's probably a sign that you're not challenging yourself."

We tested this intervention in four random-assignment, longitudinal field studies (combined $N = 988$). In our first study, we randomly assigned middle school students to receive this intervention or a control activity. One week later, students were given a series of challenging math problems. Among lower-achievers, students randomized to the treatment condition demonstrated higher mastery than those assigned to the control condition. In a second study, we delivered the intervention to undergraduates several weeks before final exams. The intervention improved end-of-semester grades, especially for lower-performing students. In two final studies, we delivered the intervention to middle school students and assessed its effect on subjective appraisals of expectancies, benefits and costs, in addition to its effects on objectively-measured behavior and achievement. Compared to students in the control condition, students in the treatment condition were more likely to endorse the expectancy that deliberate practice promotes success, and to reappraise one salient cost associated with deliberate practice—frustration during learning—as a positive sign of growth. The intervention improved deliberate practice behavior for up to one month and raised end-of-quarter grades, particularly for lower-achievers; however, effects were no longer detectable at four months, suggesting that the benefits of the intervention were transient rather than permanent.

The Logic of Appropriateness

The logic of consequence remains the dominant approach to achievement motivation (March, 1994; Hulleman et al., in press). But social scientists are slowly coming to realize its limitations. For example, the discipline of economics has recently recognized that beyond traditionally recognized monetary incentives, individuals pursue actions that feel identity-congruent (Akerlof & Kranton, 2010). In contrast to actions motivated by incentives, identity-congruent actions are undertaken irrespective of anticipated costs and benefits. In this section, we review identity-based interventions informed by the logic of appropriateness and speculate how this approach might be used to build grit.

Because people prefer to think and act in identity-congruent ways, cueing an identity can set in motion a cascade of associated cognitive and behavioral tendencies (Oyserman, 2007). These cognitions and behaviors are not enacted in a deliberative way; rather, when an identity is cued, they ensue, script-like. For example, priming Asians to think about the fact that they are Asian improves their math performance, presumably because they have associated their ethnic identity with the stereotype of working hard and exceling in math (Shih et al., 1999). Role-playing leads to similar effects. For example, participants prompted to step into the identity of a nurse by donning a nurse uniform administer fewer shocks to innocent victims than participants who wear no uniform at all (Johnson & Downing, 1979). College students told to pretend to be lawyers interviewing at a prestigious firm perform better on follow-up reading comprehension tasks than controls who are not given this cover story (Strain & D'Mello, 2011). Although we are unaware of published studies that have asked individuals to step into an identity associated with grit, role playing has been shown to encourage self-control. In one experiment, children given a red cape and told to "pretend to be superman" performed better on the delay of gratification task than their peers (Karniol et al., 2011).

In our own work, we are developing novel role-playing interventions that motivate effort, at least in the short-term (Eskreis-Winkler et al., 2015b). Across three separate samples, middle school students prompted to step into the identity of a hard-working person (treatment) as opposed to someone whose name begins with the letter A (control) expended more effort on a challenging series of math problems—both immediately following the intervention and at 2-week follow-up. In a sample of adults on MTurk, this same manipulation improved performance on 10 logic problems taken from an official LSAT exam. Finally, in a related manipulation (adapted from Adam & Galinsky, 2012), middle school students were given white coats to wear and were told either that these were the coats of industrious doctors (treatment) or the smocks of creative painters (control). "Industrious doctors" demonstrated heightened focus on a challenging series of math problems compared to "creative painters."

Directions for Future Research

Grit is the tendency to pursue a singular, challenging goal over extremely long stretches of time, doing so despite inevitable obstacles, setbacks, and long plateaus during which progress may not be obvious. The timescale over which grit is expressed and the nature of the goal pursued distinguish grit from other forms of self-regulation. Accordingly, grit is especially predictive of achievement in contexts where progress is difficult and dropout is common. The motivational, cognitive, and behavioral correlates of grit include: a stronger desire for engagement and meaning than for pleasure, an inclination to see what can be improved with effort rather than what cannot be changed, a focus on the task at hand rather than potentially more attractive alternatives, and a propensity to log hours and hours of highly effortful deliberate practice. Similarities and differences between grit and related but distinct constructs, such as self-control, are illuminated by a hierarchical goal framework: Grit entails adhering to a singular

superordinate goal and its corresponding lower-level goals and actions, whereas self-control refers to adhering to any goal over any relatively less valued alternative. We speculate that interventions aimed at building grit may succeed if they target the expected value of goal-congruent actions (i.e., highlighting the benefits or minimizing the costs of effort) or, alternatively, activate goal-congruent identities (i.e., prompting individuals to appraise persistence as "the sort of thing that someone like me does in a situation like this").

We see several especially profitable directions for future research on grit. For example, little is known about how individuals develop superordinate goals of the sort that guide mathematicians like Yitang Zhang or athletes like Tom Seaver. It has been suggested that individuals are more likely to develop superordinate goals if they are more mindful (Sheldon, 2004) or proactive (Bateman & Crant, 1993), and when they are in environments that support autonomy (Sheldon & Watson, 2011; Damon, 2009). For some individuals, surviving a traumatic life experience may play a pivotal role. Specifically, individuals who overcome extreme hardship can develop a survivor mission—a long-term, higher-order goal to redress the hardship that was personally experienced (e.g., an individual who has been victimized by violence who becomes a homicide detective) (Eskreis-Winkler & Duckworth, 2014; Herman, 1992). Prospective longitudinal research is needed to fully understand how individuals develop superordinate goals that inspire allegiance across a lifetime.

Future research might also examine the darker side of grit. Too much grit might be a bad thing. Although we have found that grit is linearly related to objective measures of achievement and subjective measures of well-being, it is possible that larger samples would reveal a nonmonotonic relationship. Indeed, many positive traits sour beyond an inflection point (Grant & Schwartz, 2011). Still, in our experience, individuals who are *too* dedicated to valued goals or *too* willing to persist in the face of failure are rare. We suspect that the dark side of grit more commonly surfaces when grit exists in the absence of other balancing virtues (Diener & Kesebir, in press). Grit without judgment or empathy, for example, leads the overworked executive to stay at a job he hates, even though the job is destroying his life and family. Grit without temperance can lead to burnout. Relatedly, Vallerand and colleagues (2003, 2008) distinguish obsessive passion—an overpowering urge to engage in an activity of interest—from harmonious passion—engaging in activities of interest due to the intrinsic pleasure one derives—and find that obsessively passionate people experience more domain-related injuries (Akehurst & Oliver, 2014). Finally, grit can be applied to maladaptive, destructive goals. In one sample of undergraduates, gritty individuals with a tendency towards non-suicidal self-injury were more likely than their peers to actually attempt suicide (Anestis & Selby, 2015).

In contrast to the substantive work that has been conducted on mechanisms that link grit to achievement, relatively little is known about what moderates the effect of grit on outcomes. For instance, the association between grit and achievement may vary with talent. Maybe grit matters most for the most talented, who have the most to gain by sticking with things over time. Or maybe it holds the greatest benefits for the least talented, who can compensate for lack of alacrity with steadfast effort. Grit may also differentially relate to success over time. Not only may grit be more important (and more easily cultivated) during certain developmental periods, it may also differentially relate to success at different stages of goal pursuit. One could imagine grit mattering most at the beginning of an endeavor, before reinforcing habits and commitments have formed. Alternatively, grit may matter most as the honeymoon phase ends, or when a goal is nearly complete and the individual needs to muster a final effort to cross the finish line.

The predictive power of grit may also vary depending on the nature of the pursuit itself. Pursuits that lead to observable—even tangible—progress (e.g., carpentry) may require less grit than pursuits in which progress is not observable (e.g., teaching). As one teacher put it: "a carpenter at the end of the day can actually see what he has built, a doctor can observe a patient responding to treatment, but a teacher oftentimes has to go along for months with relatively few noticeable results" (Thompson, 1991, p. 104). Yitang Zhang was an extreme outlier on this spectrum—laboring in obscurity on an abstract mathematical problem for years, without any obvious interim sign of praise or progress.

Concluding Comment

Research on self-regulation has illuminated the importance of aligning actions with intentions in order to achieve one's objectives. Research on grit adds an appreciation for the extreme stamina with which singular objectives are pursued over time. It likewise adds an appreciation for the steadfast effort that enables extraordinary accomplishment. To quote Fields Medal recipient Terrence Tao:

> The popular image of the lone (and possibly slightly mad) genius—who ignores the literature and other conventional wisdom and manages by some inexplicable inspiration … to come up with a breathtakingly original solution to a problem … is a charming and romantic image, but also a wildly inaccurate one … actually, I find the reality … in which progress is obtained naturally and cumulatively as a consequence of hard work…to be far more satisfying than the romantic image that I had as a student (Tao, 2007).

In addition to being more satisfying, we find the second image more awe-inspiring. We live in a talent-crazed culture—a culture that often assumes effortless genius when it finds remarkable accomplishment. But which is more admirable? The ability to solve mathematical problems through "inexplicable inspiration" or the ability to doggedly pursue a singular goal over years, overcoming obstacles, setbacks, failures, and all else that stands in the way? As more is learned about the Herculean efforts that precede accomplishment, we expect a demystification of high achievement that, rather than diminishing our opinion of human accomplishment, will magnify our respect thereof.

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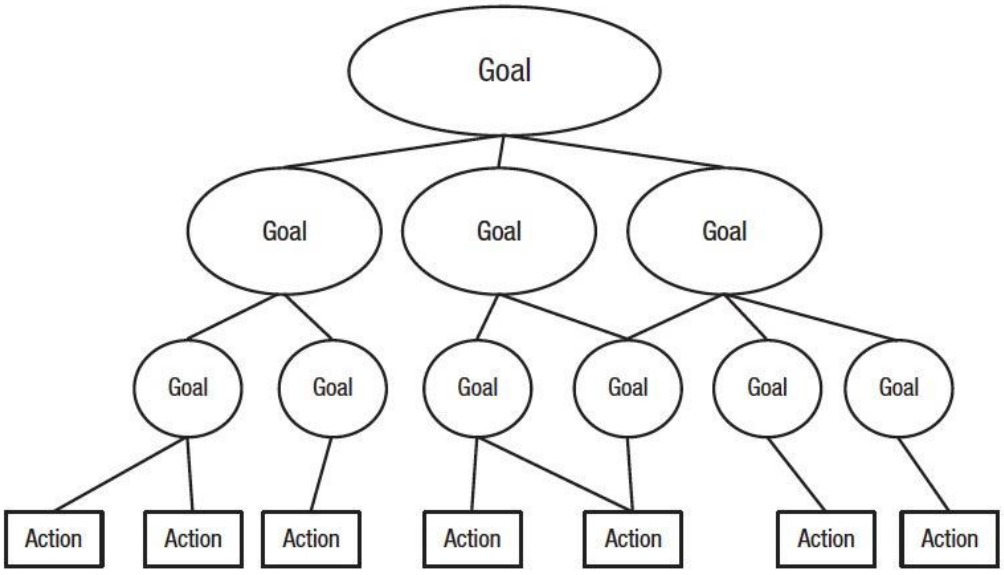

Figure 1. Hierarchical goal framework. According to this framework, goals are organized hierarchically with fewer, high-level goals, and more numerous low-level goals facilitating these higher-order objectives. Reprinted from Self-Control and Grit: Related but Separable Determinants of Success" by A. L. Duckworth and J. J. Gross, 2014, *Current Directions in Psychological Science*, 23, p. 321. Copyright 2014 by the Association for Psychological Science. Reprinted with permission.