



Mental Toughness, Resilience, and Grit in a College Student Sample of Athletes and Nonathletes

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Introduction

“The greatest glory in living lies not in never falling, but in rising every time we fall” –Confucius

Revolutionary and politician, Nelson Mandela, was one of many historical figures to emphasize the value of ‘getting back up again,’ and to challenge the meaning of ‘success.’ Success in our society, is the goal, an achievement made by avoiding of failure. However, failure is an inevitable life experience. The avoidance of failure is not an effective or practical way of obtaining success, nor is overvaluing the achievement of an end goal. This research focuses on the constructs of resiliency, grit, and mental toughness, all of which have been studies as factors which improve ones’ ability to conquer failure and foster personal growth. In times of hardship and doubt, physical and/or mental fatigue, those who demonstrate resiliency, grit, or mental toughness continue to move forward, transforming setbacks into opportunities for self-improvement. These resilient people do not necessarily meet their end goal, but they do persevere in the face of adversity, and their ability to produce the necessary self-discipline, intestinal fortitude, and commitment to go further draws them closer to success. While there is some evidence that mental toughness, resiliency and grit are trait-based (Horsburgh, et al., 2009), most literature finds that these constructs can also be cultivated, potentially through habit and cognitive restructuring (Gucciardi, 2017; Pulley & Wakefield, 2014; Duckworth, Peterson, Mathews & Kelly, 2007).

Purpose

The purpose of the study is to clarify the qualities and habits that contribute to one’s ability to recover from disappointment, criticism, and/or failure. Previous research has suggested that those with formal athletic training possess the ability to process failure into valuable learning opportunities. Coaching and mental toughness are exemplified in losing and experiencing defeat which are an essential part of learning.

Empirical Question

What are the characteristic and habits that makes someone more mentally tough, resilient, and/or gritty?

Method

Participants

This study consisted of 17 students from Pacific University between the ages of 18-22 (*M*=20.35, *SD*=2.10).

Materials

This quasi-experimental design involved three levels to the independent variable of discomfort. The levels for discomfort were: 1.) Physical, 2.) Cognitive, and 3.) Emotional. Physical discomfort condition involved a 12-liter, shallow polycarbonate container, an Aqua Medic digital thermometer, and a timer. Cognitive discomfort was manipulated using the Paced Auditory Serial Addition Test (PASAT; Gronwell, 1977) and required the PASAT cassette audio recording, a tape player, and a timer. For the physical discomfort condition, we use a modified Bruce protocol in a jump-rope cardiac stress test, with StabilityPro™, tangle-free, adjustable length cable jump ropes.

Self-report measures of the dependent variable,

- 20 demographic and health related questions
- 12-item Grit Scale (Duckworth, Peterson, Mathews & Kelly; 2007)
- 18-item Mental Toughness Scale (McGeown, Claire-Thompson & Putwain; 2018)
- NEO-Five Factory Inventory-Revised (Costa & McCrae; 1992)
- 25-item Connor-Davidson Resilience Scale (Connor & Davidson; 2003)

Design and Procedure

This within-between-subject, quasi-experimental design involved three levels to the independent variable of *discomfort*: 1.) Physical, 2.) Cognitive, and 3.) Emotional. Participants were recruited using snowball convenience sampling from listserves, emails, and social media. At the onset of the appointment, participants were randomly assigned to the order of conditions. “Giving up time” was used for all three physical protocols of perseverance.

Results

It was predicted that measures of grit, resiliency, and mental toughness, would vary between athletes (i.e., athletes and nonathletes) and genders (i.e., males, females). To assess this, we conducted six separate a 2 (Gender) x 2 (Athlete and Nonathlete) x 2 univariate analyses of variance for each measure (given the very small sample sizes, we would violate assumptions for a MANOVA), including the “giving up time” on the Cold Pressor Stress Test and the Paced Auditory Serial Addition Test. There were no statistically significant main effects for any of the measures between genders, athleticism, or religiosity.

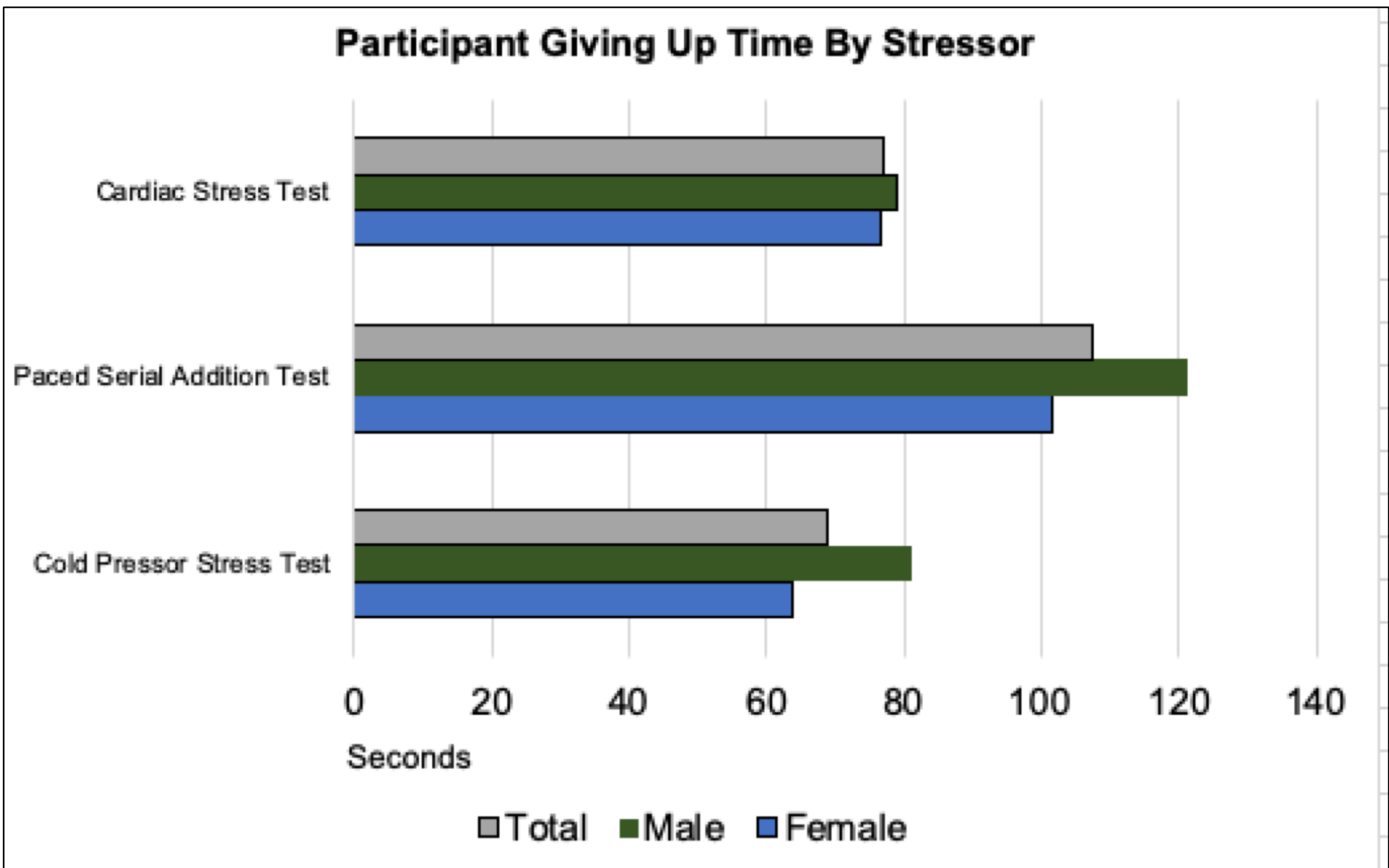
However, there was one interaction between Gender and Religiosity for scores on the Cardiac Stress Test (i.e., jump rope), *F*(,)=9.25, *p*=.001. Though without significant main effects for the categorical variables, it is difficult to reconcile the meaningfulness of this outcome.

Table 1.

Total and Gender Descriptives with Cronbach Alpha Score Reliabilities for Age and Measures

Variables and Score-Reliability, Cronbach alphas	<i>N</i> Total =17 <i>M</i> (<i>SD</i>)	Females, <i>n</i> =12 <i>M</i> (<i>SD</i>)	Males, <i>n</i> =5 <i>M</i> (<i>SD</i>)	Non-Athletes <i>n</i> =14, <i>M</i> (<i>SD</i>)	Athletes, <i>n</i> =3 <i>M</i> (<i>SD</i>)	Atheist or Agnostic <i>n</i> =7, <i>M</i> (<i>SD</i>)	Religious or Spiritual, <i>n</i> =10, <i>M</i> (<i>SD</i>)
Age (yrs)	20.35 (0.70)	20.33 (0.78)	21.69 (2.52)	20.10 (0.72)	20.22 (0.62)	20.71 (0.76)	20.10 (0.57)
Cold Pressor Stress Test Giving Up Time (seconds)	68.82 (45.12)	63.75 (48.42)	81.00 (38.30)	67.07 (44.23)	77.00 (59.30)	67.14 (39.24)	70.00 (51.03)
Cardiac Stress Test Giving Up Time (seconds)	77.12 (53.32)	76.42 (54.13)	78.80 (57.53)	81.14 (57.78)	58.33 (20.21)	82.14 (48.16)	73.60 (58.95)
PASAT Test Giving Up Time (seconds)	107.29 (47.17)	101.58 (55.44)	121.00 (10.70)	107.71 (49.53)	105.33 (42.92)	118.00 (43.56)	99.80 (50.39)
Grit Scale Score, α = 0.81	40.00 (6.144)	38.83 (6.51)	42.80 (4.55)	40.29 (6.40)	38.67 (5.69)	38.29 (7.04)	41.20 (5.49)
CD-Resiliency Scale Score, α = 0.94	65.24 (15.79)	62.58 (17.10)	71.60 (11.08)	63.86 (16.40)	71.67 (13.10)	62.86 (18.78)	66.90 (14.16)
Mental Toughness Scale Score, α = 0.87	49.41 (6.18)	48.50 (6.16)	51.60 (6.31)	49.64 (5.78)	48.33 (9.30)	49.43 (7.35)	49.40 (5.64)

The lack of significance among our variables is likely a Type II error (i.e., accepting the null when, if there were sufficient participants, it would be false) given the extraordinarily poor power and small sample sizes. However, the sample’s Cronbach alpha score reliabilities are within the range of robust internal consistency (See Table 1). A replication of this study with a larger sample size (*N*=100) would likely provide more meaningful comparators among our demographic variables (E.g., Sexual orientation, Gender, Athletes, demographic age cohorts, etc.).



Discussion

Athletes in our study only surpassed non-athletes in two categories (CD Resiliency Scale and Cold Presser Test), and the rest of the categories proved to yield similar results. This may be due to our insufficient sample size (*N*=17) resulting in extremely low power. Our small sample size was restricted to our Research Methods class due the COVID-19 pandemic. Stay at home order were in effect immediately following our first round of trials. With a sufficient sample size, these results would suggest that athletes do not necessarily outweigh their peers in grit, resiliency, and mental toughness, but instead they are to be considered “normal” with no edge on people without athletic experience(s). This might have also suggested that everyday experiences such as, but not limited to, work, religion, morals, and even education make a major impact on how well you handle the mishaps of life and other stress provoking circumstances.

In the last decade, grit has been well studied (See Duckworth); however the interplay between mental toughness, resiliency, and grit are still unintegrated. A widescale measure of these variables and the degree to which these constructs are independent is still necessary.

Other meaningful questions that emerged with our limited sample size included:

- What activities outside of Athletics are positively correlated with grit, resiliency, and mental toughness scores?
- What is the difference in pain tolerance as well as stress tolerance between genders?
- Does religion/spirituality have any correlation with the way we handle with stress?
- How do tease out competitiveness from grit using our protocols?
- What role does personality have in grit, resiliency, and mental toughness scores?

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A complete reference list is available upon request