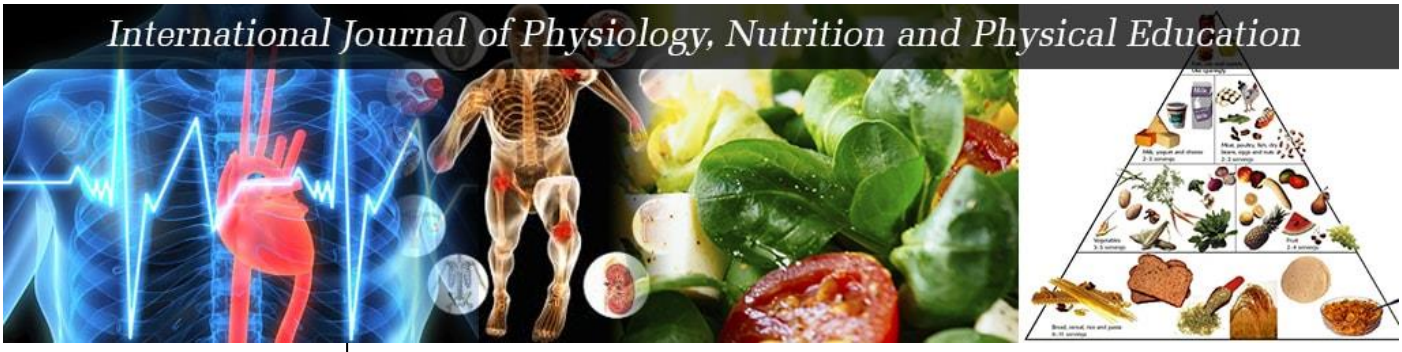

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Grit, self-regulation and resilience among college football players: A pilot study

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Abstract
The ability to manage stress and return successfully from defeat is a pre-requisite in achieving sporting excellence. Grit is the 'perseverance and passion for long-term goals.' (Duckworth, Peterson, Matthews & Kelly 2007) [1], Self-Regulation is the ability to control behaviors as well as develop and implement plans to achieve goals and Resilience is the ability of an individual to recover from defeat. To this end, especially among athletes in the normative stages of their career, Grit, Resilience and their Self-Regulation ability attains great importance, and often defines whether an amateur career evolves into a professional one or not. The present study investigated the operation of Grit, Self-Regulation on the Resilience of college football players. This Pilot study utilised the quantitative method (n= 32). The tools used for this study are the BU Resilience Scale (Anna Lakshmi, 2009) [2], the Grit Scale (Duckworth *et al*., 2007) [1] and the Self-Regulation Questionnaire (Brown, Miller & Lawendowski 1999) [3]. Correlation analysis indicated that Grit and Self-Regulation both share a positive relationship with Resilience. Self-Regulation is a predictor of Resilience among college football players. The findings and their implications are further discussed herewith.

Keywords: Grit, self-regulation, resilience, football players, quantitative, sports psychology

1. Introduction
In the arena of sports, from the time of ancient Greek wisdom to the advent of modern technology, men and women have been expected to hone their bodies to peak physicality and sharpen their minds to meet and excel at the demands of power, coordination and physical endurance. However, despite this expectation from the athlete to perform, it is the responsibility of sports scientists and coaches to unearth that which makes the average sportsperson great and the great into legends. The impact of psychological dispositions is covert and implicit in the field of sports. Athletes frequently state that the mental aspect is an important part of sports performance (Bali, 2015) [4]. Performance and perfection is mostly attributed to the physiological excellence and skill of the athlete, a viewpoint that is fast undergoing change in the modern discourses of sports science. As a result, the psychological aspects of athletes and their correlating effect on sports performance is gaining relevance in the present context.

Literature suggests that psychological attitudes and skills differentiate between the levels of sport performance and achievement (Baker & Cote, 2003; Ward & Yates, 2008) [5, 6]. Grit is one such psychological skill, defined as perseverance and passion for long-term goals (Duckworth *et al*., 2007) [1]. Elumaro (2016) [7], states that Grit acts as a determining factor of sporting achievement and scaffolds findings of Duckworth *et al*. (2007) [1] that concluded that grittiness could possibly distinguish levels of achievement in the realm of sports. Concurrently, in the arena of sports, even more so than in daily life, the importance of Resilience is paramount for productivity and peak performance, since the ability to react positively to setbacks, obstacles and failures is fundamental for a successful athlete (Galli & Gonzalez, 2016) [8]. Masten, Best and Garmezy (1990) [9], state that Resilience to be the capacity for adaptation in challenging and/or threatening circumstances. This adaptive capacity is not a static quality but rather results from the interaction of dynamic processes employed in adapting to a variety of adverse situations (Masten, 2014; Rutter, 2013) [10, 11], which frequently arise in various sports. Resilience thus, is the ability of an individual to

"bounce-back", after experiencing stress (Wald *et al*., 2006) [12]. Athletes often undergo injuries (Podlog & Eklund, 2006) [13], mental health issues (Papathomas & Lavallee, 2012) [14], relationship strains (Mellalieu, Shearer & Shearer, 2013) [15] and often abuse (Stirling & Kerr, 2008) [16], hence the way they respond to it, or how resilient they are gains supreme importance. This ability to bounce back from defeat and/or disappointment in order to overcome future challenges contributes immensely to the psychological wellbeing and performance of athletes and sportspersons. In recent years, sports psychologists have employed Grounded Theory to investigate levels of athletic expertise and high performance (Hold & Dunn, 2004) [17]. Fletcher and Sarkar (2012) [18] studied Olympic champions to formulate the Grounded Theory of Psychological Resilience which outlines the existence of certain psychological factors which contributes to a process of Challenge-Appraisal and Meta-Cognition, which leads to facilitative responses. According to this model, in athletes, psychological resilience is a resultant interaction of these internal psychological factors in response to sporting stressors that the athletes encounter. Therefore, with regard to Resilience in athletes, Grit could be a potentially important component of sporting resilience, in terms of "bouncing-back" from defeats and disappointments over a span of time, through effort perseverance which is crucial for successful long term careers in sports (Peterson & Seligman 2004; Duckworth *et al*., 2007; Crede *et al*., 2017) [19, 1, 20].

Self-Regulation is appraised to be the self's capacity to be able to alter its behaviours. According to Rothbart and Posner (2005) [21] it involves task persistence, goal setting, planning, environmental management, as well as modulation of emotional, behavioural and attentional reactivity. It develops over time via transactional processes such as maturity of attention and socialization (Wills & Dishion, 2004; Rothbart & Posner, 2005; Dishion & Patterson, 2006) [22, 21, 23]. For instance, inadequate Self-Regulation has been linked to impulse control problems and maladaptive behaviour such as smoking, lack of persistence, underachievement and failures in task performance (Baumeister, Heatherton, & Tice, 1994; Vohs & Faber, 2007) [24, 25]. Findings denote a person's ability to self-regulate is determined by his/her response to adjustment to changing requirements of environmental conditions (Kitsantas *et al*., 2008; Zimmerman, 2002) [26, 27], and that in order to successfully attain goals, one must change behaviour by regulation of urges (Baumeister, Heatherton & Tice, 1994) [24]. All of which could be simply translated as 'discipline'; a requisite attribute for a sportsperson. Therefore, an athlete with superior ability to regulate his training, emotions, mindset, attitudes and so on, could be conceived as an athlete who would also respond better to setbacks and "bounce-back" more adaptively. As stated in the quote by Michael Jordan above, Resilience would make the athlete find a way around it, Grit would keep them at this task over a period of time, and Self-Regulation would prevent them from turning around and giving up.

The formulation of the current study arises from the reality that in sport, aptitude and talent do not always lead to high performance or successful careers. Rather, other factors such as psychological attributes of Resilience, Self-Regulation and Grit in addition to training, coaching, dedication and a capacity for teamwork act as indicative factors. The relationship of Grit, Self-Regulation and Resilience has been illustrated in literature. However, all such studies are in diverse but non-sport related samples. Holt & Dunn (2004) [17], explicitly state that Resilience as a psychological skill is yet to be thoroughly studied in the sporting context, despite upcoming evidence of the link between Resilience and high levels of sporting achievement. The raison d'être of this study is to effectively address this gap. To this end, this pilot study seeks to empirically detect if Grit and Self-Regulation have a relationship with Resilience as well their plausible predictive capacities, in the field of sports and performance psychology, more specifically among college football players. Results of this study, can be utilised as the foundational basis of further research in sports psychology with regard to these variables and their consequent influence on athletic performance and growth.

1.1 Objectives

The following are the objectives of the current study,

1. To find out if there exist any relationship between Grit, Self-Regulation and Resilience among college football players
2. To find out effects of Grit and Self-Regulation on Resilience among college football players
3. To find out if there exist any gender differences in Grit, Self-Regulation and Resilience among college football players

1.2 Hypotheses

H_0. There is no relationship between Grit, Self-Regulation and Resilience among college football players.

H_0. There is no effect of Grit and Self-Regulation on Resilience among college football players.

H_0. There is no gender difference in Grit, Self-Regulation and Resilience among college football players.

2. Method

The present research is a pilot study examining the association of Grit and Self-Regulation of college football players with their Resilience.

2.1 Participants

The sample consisted of 16 male and female football players (n= 32), who are part of college football teams, and represent their institutions in a competitive capacity. Purposive sampling technique was used to identify potential participants of the age group of 18-24 years of age. Players who were injured, or otherwise indisposed were excluded from the study. The current study employed a quantitative research design. The primary aim of the study was to assess the impact of the independent variables Grit and Self-Regulation on the dependent variable Resilience.

2.2 Tools used for the study

BU Resilience scale (Annalakshmi, 2009) [2]. BU Resilience scale is a self-report questionnaire that assesses psychological resilience. The scale has a total of 30 items and has been standardised in the Indian population. Items have a five-point scale ranging from "Not at all appropriate in describing you" to "Most appropriate in describing you". The total score of the subject represents their Resilience. The maximum total score of the subject is 150 and the minimum score possible is 30. The Cronbach's Alpha score of the scale is 0.876.

Grit Scale (Duckworth, Peterson, Matthews & Kelly, 2007) [1]. The Grit scale was designed for assessment of levels of Grit through self-report. The items are developed to measure levels of Grit across varied situations. Respondents are instructed to rate each item on a five-point scale ranging from "Very much like me" to "Not like me at all". Some items are

structured to be reverse scored. The Grit Scale shows a consistent validity and has a Cronbach Alpha reliability score of 0.85.

Self-Regulation Questionnaire (SRQ) (Brown, Miller & Lawendowski, 1999) [3]. The SRQ assesses an individual's ability to regulate the self, based on the seven sub-processes of the Miller and Brown (1991) model, which includes receiving, evaluating, triggering, searching, planning, implementing and assessing sub-dimensions. The 63 items of the scale are structured in the form of a 5-point Likert scale which ranges from 1=Strongly Disagree to 5=Strongly Agree. Some items are structured to be reverse scored. The SRQ has high content validity and the Cronbach Alpha reliability of this scale is 0.91 (Carey, Neal & Collins, 2004) [28].

2.3 Procedure

Following approval from Institutional Review Board (IRB), CHRIST (Deemed to be University), data was collected from the participants through purposive sampling technique. Prior to the collection of the data, in line with the American Psychological Association (2010) [29] code of ethics, the participants were briefed on the rationale and objectives of the study. The protocol also included an informed consent briefing as well as their right to withdraw participation. Post briefing, the psychometric tests were administered. The administration of the questionnaires was personally supervised by the researchers. Average time of the administration protocol was 15-20 minutes, and the data was collected in the period of December 2018-January 2019.

2.4 Statistical Analysis

Collected data was organized and analysed using IBM Statistical Package for Social Sciences (SPSS) 21. Descriptive statistics along with Shapiro-Wilk normality test was used. Following this analysis, parametric statistical analysis was employed. Independent sample *t*-test was used to check gender differences. Pearson's correlation and Stepwise regression analysis was employed to test the relationship of Grit and Self-Regulation with Resilience among college football players.

3. Results

The sample was evenly distributed with 16 male and female college football players each. The mean age of the sample was 19.55 years (*SD*= 1.22), and all of them were players in college football teams. Descriptive statistics (see Table 1 below) indicate the average and standard deviation of the variables of Grit (*M*= 40.52, *SD*=7.31), Self-Regulation (*M*=248, *SD*= 16.63) and Resilience (*M*= 109.45, *SD*= 13.20). Shapiro-Wilk analysis revealed that all variables were normally distributed.

Table 1: Descriptive statistics with Shapiro-Wilk test of Normality

Variable	Mean (SD)	Min	Max	W
Grit	40.52 (7.31)	30	50	.956*
Self-Regulation	248 (16.63)	179	248	.958*
Resilience	109.45 (13.20)	74	130	.982*

*p>.05

Table 2: Relationship of Grit, Self-Regulation and Resilience among college football players.

Variables	1	2
Resilience (1)		
Grit (2)	.262	
Self-Regulation (3)	.385*	.253

*p < .05

Pearson's correlation was carried out, the results of which are illustrated in Table 2. Results indicate that there exists a significant positive correlation between Resilience and Self-Regulation (r =.385, p<.05). There is a moderate positive correlation between Self-Regulation and Grit, as well as between Resilience and Grit, which is not significant.

Table 3: Regression analysis predicting Resilience from Self-Regulation.

Model	Predictor	β	T	R^2	ΔR^2	F	D-W
1	Self-Regulation	.385	2.287*	0.148	0.120	5.231*	2.189

*p < .05, DV = Resilience

Stepwise regression analysis was employed to test if variables of Grit and Self-Regulation predicted Resilience levels. Stepwise regression model excluded Grit as a possible predictor variable of Resilience. Results indicate that Self-Regulation is a significant positive predictor of Resilience (β= 0.385, p < .05). It explains 14.8% change in Resilience (R^2 = 0.148, F= 5.231, p<.05).

Table 4: Differences in Resilience, Grit and Self-Regulation among males and females

Variables	Sex	Mean (SD)	*t*
Resilience	Female Male	108.81 (11.77) 112.31 (11.84)	0.838
Grit	Female Male	39.94 (5.57) 42.88 (4.73)	1.60
Self-Regulation	Female Male	218.13 (17.18) 215.44 (15.03)	0.471

As displayed above in Table 4, independent sample *t*-test was conducted to check gender differences in Resilience, Grit and Self-Regulation. Results indicate that there is no significant difference based on gender among the sample.

4. Discussion

Prior research has established Resilience to be an important aspect in sporting performance, especially for the development of achievement in football (Weissensteiner, Abernethy, & Farrow, 2009) [30]. Grit and Self-Regulation, albeit overlapping in some domains, each have a link with Resilience.

The findings of the current study are in line with prior studies, which indicate a relationship between Self-Regulation and Resilience (see Nota, Soresi & Zimmerman, 2004; Luthar, 2006) [31, 32]. Additionally, Martin, Byrd, Watts and Dent (2015) [33], state that Grit and Resilience display correlation among wheelchair basketball players. The results of this study state that this relationship exists among college football players as well. Lastly, Self-Regulation and Grit also show a moderate correlation among college football players, a finding in line with prior research conducted in other conditions (Rojas *et al*., 2012; Christensen & Knezek, 2014; Wolters & Hussain, 2015; Muenks, Wigfield, Yang & O'Neal, 2017) [34] [35, 36, 37]. Therefore, the hypothesis, stating that "there is no relationship between Grit, Self-Regulation and Resilience among college football players", is rejected.

Self-Regulation has priorly been found to be a source of Resilience in the context of peer deviance and anti-social behavior (Gardner, Dishion & Connell, 2008) [38], and among youths living in poverty (Buckner, Mezzacappa & Beardslee, 2003) [39]. In the current study, Self-Regulation was seen to be a robust predictor of Resilience among college football players, resonating with existing findings. This significant predictive relationship between Self-Regulation and Resilience may exist due to Self-Regulation acting as a protective factor for Resilience (Masten & Coatsworth, 1998; Masten, 2007; Masten & Narayan, 2012) [40-42]. Resilience has been stated to be related to cognitive and behavioural resources, especially locus of control related to adaptation in the face of difficulty (Leontopoulou, 2006; Shehu & Mokgwathi, 2008) [43, 44], both of which form important aspects of an individual's self-regulation (Rothbart & Posner, 2005) [21]. Furthermore, cognitive regulation strategies such as positive reappraisal of situations as a predictor of perceived resilience (Mestre *et al*., 2017) [45]. Athletes who can therefore better regulate their cognitive-behavioral functions and have adaptive locus of control will be more resilient. Emotional control and impulse control is also a major component of self-regulation (Neal & Carey, 2005; Rothbart & Posner, 2005) [46] [21]. Therefore, if one aligns to the Broaden and Build theory and related research on positive emotional regulation promoting resilience (Tugade & Fredrickson, 2007; Fredrickson, 2011) [47, 48], it can be said that better emotional regulation leads to better resiliency tendencies, which may illuminate on the cause for the predictive capacity of self-regulation on resilience. The idea of ego resilience i.e the ability to constantly adapt to various situations and regulate emotions (Block & Kremen, 1996) [49], may also be the foundation for this predictive relationship since, ego-resilient individuals (or athletes in this case) will find positive meaning and are more optimistic when faced problems and stressful situations. Thus, the hypothesis, stating that "there is no effect of Grit and Self-Regulation on Resilience among college football players", stands rejected. Results of the stepwise regression analysis implies that Grit is not a predictor of resilience among college football players. This may have been so due to the fact that the dimensions of grit, i.e 'passion' and 'perseverance' operate primarily at the level of the individual and therefore grit would theoretically have greater predictive capacity for resilience among players involved in individual sports.

Literature states that there exists gender differences in Resilience across various populations (see Samplin, Ikuta, Malhotra, Szesko & DeRosse, 2014; Erdogan, Ozdogan & Erdogan, 2015;Waqas *et al*., 2016) [50-52], as well as gender differences in the heritability of Resilience (Boardman, Blalock & Button, 2008) [53]. However, results indicate that male and female college football players do not have any significant differences in Resilience. Furthermore, in contrast to previous findings which indicate that males and females have differences in Self-Regulation (Weinberg, Tronick, Cohn & Olson, 1999; Nolen-Hoeksema & Corte, 2004; Matthews, Ponitz & Morrison, 2009) [54-56], results indicate that college football players do not display significant gender differences in Self-Regulation. Moreover, Grit too does not have any significant gender differences among college football players. Thus, the hypothesis, stating that "there is no gender difference in Grit, Self-Regulation and Resilience among college football players", stands accepted. To this end, we proffer that this lack of gender differences in Resilience, Self-Regulation and Grit may be attributed a priori to the homogenous training regime that the players are subject to, as well as the similar kind of coaching strategies and competitive match experience shared by the players. Therefore, different intervention programmes tailored to males and females need not be designed.

5. Conclusion

As an emerging discipline, sports psychology has been focused on optimising sports performance via psychological intervention. To this end, the findings of this pilot study can be utilised to build upon future research with larger samples so as to prove beyond reasonable doubt the predictive capacity of Self-Regulation for Resilience. The current pilot study, albeit undertaken in a limited sample, provides evidence that Self-Regulation is a predictor of Resilience among college football players. The implication of this study supports prior findings (Bali, 2015; Ohuruogu, Jonathan & Ikechukwu, 2016) [4, 55], in reinforcing the importance of psychological intervention programmes in addition to general training. More specifically, Self-Regulation based intervention which would optimise sporting resilience among players. Owing to the fact that it is a pilot study, the findings of the study have limited external validity. Future research can also develop tailored Self-Regulation models which would aim at enhancing sporting resilience, which in turn would ensure higher levels of performance. This would enable sports psychologists to find a way to empower athletes to not give up, and find a way to climb, go through or work around obstacles as Michael Jordan so eloquently states.

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