

The effect of combat sports experience, competition engagement, sex, and age on grit

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ABSTRACT

Grit is expressed as hard work aiming to conquer life challenges while sustaining interest and effort throughout long periods and despite failures, adversities, and plateaus. Several benefits have been established in the literature related to higher levels of grit, including lower depression, higher life satisfaction, higher academic and financial outcomes, and lower criminality. As vigorous activities, combat sports have been shown to influence grit. The present study aimed to explore the potential correlations between grit and age, combat sports experience, and competitive engagement and compare group differences in grit based on sex, age, competition engagement, and combat sports experience. In this cross-sectional quantitative study, 329 combat sports practitioners ranging from 18 to 57 years of age responded to the grit scale and additional demographic information. Findings demonstrate positive correlations between grit and age, combats sports experience and competition engagement. Group comparison showed higher grit in the 38-47 and 48-57 groups than the 18-27 group, higher grit in the >5 years of experience group compared to the <2 and 2-5 groups. Moreover, the >4 competitions per year group showed higher grit than the 1-4 group but not than the non-competitors group. In conclusion, this study suggests that age, combat sports experience, and competitive engagement contribute to the development of grit in combat sports practitioners.

Keywords: Performance analysis of sport, Perseverance, Resilience, Martial arts, Jiu-Jitsu, Judo wrestling, Muay Thai, Taekwondo, Karate.

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INTRODUCTION

Grit is defined as passion and perseverance for long-term goals (Duckworth et al., 2007). Applied grit is expressed as hard work aiming to conquer life challenges while sustaining interest and effort throughout long periods and despite failures, adversities, and plateaus (Duckworth et al., 2007). As a measuring tool, the Grit Scale addresses perseverance of effort and consistency of interest (Duckworth et al., 2007).

Grit provides greater incremental predictive validity of success than IQ and conscientiousness (Duckworth et al., 2007). Several studies have found positive correlations between grit and life satisfaction (Datu et al., 2022; Li et al., 2018; Liu et al., 2022), well-being (Datu et al., 2022), and GPA (Lee et al., 2021). Grit was found to predict GPA and be positively associated with walking, moderate physical activity, vigorous physical activity, and total physical activity (Daniels et al., 2021). Individuals who engaged in >300 minutes/week of vigorous physical activity present higher grit than participants not meeting this level (Dunston et al., 2022). Combat sports, such as Brazilian Jiu-Jitsu and Judo, have been characterized as vigorous activities improving various physical fitness factors (Franchini et al., 2017; Lorenco-Lima et al., 2020). Therefore, making combat sports a viable instrument to increase grit.

Lee et al. (2021) found that one year of Taekwondo classes accelerated the rate of grit improvement in college students. In children, parent and instructor-rated grit positively correlated with Taekwondo testing scores (Sawyer et al., 2018). The instructor-rated grit for children participating in at least one tournament was significantly higher than for non-competitors (Sawyer et al., 2018). Shamshirian et al. (2021) found that wrestlers demonstrate higher grit than non-wrestlers. However, there was no significant difference between national and international-level wrestlers (Shamshirian et al., 2021).

Several benefits have been established in the literature related to higher levels of grit, including lower depression, higher life satisfaction, higher academic and financial outcomes, and lower criminality (Duckworth et al., 2007; Duckworth & Gross, 2014; Duckworth & Seligman, 2017; Li et al., 2018; Montas et al., 2021; Lee et al., 2021; Datu et al., 2022; Liu et al., 2022). The amount of time spent engaged in physical activity has been shown to influence grit scores (Daniels et al., 2021; Dunston et al., 2022). As vigorous activities (Franchini et al., 2017; Lorenco-Lima et al., 2020), combat sports have also been shown to impact grit (Sawyer et al., 2018; Lee et al., 2021; Shamshirian et al., 2021). However, the number of studies investigating the effect of combat sports on grit is minimal.

The present study aimed to 1) explore potential correlations between grit and age, combat sports experience, and competitive engagement and 2) investigate potential group differences in grit based on sex, age, competition engagement, and combat sports experience. It was hypothesized that grit would: H1) positively correlate with age, H2) positively correlate with combat sports experience, H3) positively correlate with competitive engagement, H4) be higher in males than females, H5) be higher in older participants, H6) be higher in more experienced participants, and H7) be higher in participants with higher competition engagement.

METHODS

Participants

A total sample of 329 combat sports practitioners ranging from 18 to 57 years of age ($M = 38.21$; $SD = 10.35$), including 283 males and 46 females (14 % females), participated in the present study. Participants were practitioners of grappling (i.e., Brazilian Jiu-Jitsu, Judo, and Wrestling) and/or striking (i.e., Muay Thai,

Boxing, Karate, and Taekwondo) combat sports with an average experience of 13.63 ± 12.70 years in their combat sport.

A priori power analysis was conducted using a medium effect size (.25), $\alpha = .05$, and power criterion of .80. The analysis revealed the need for 180 participants as the minimum sample size for age group comparison (4 groups) and 159 participants for combats sports experience and competition engagement comparison (3 groups).

Procedures

This cross-sectional quantitative research collected data from May to August of 2023 via a Google Form and distributed electronically through email and social media campaigns in the United States. Participation was voluntary, with no compensation.

The questionnaire included the Grit Scale and additional demographic information about the participant's age, sex, years of combat sports experience, and competitive engagement (numbers of competitions engaged over the past 12 months).

For age group comparison, participants were divided into 18-27, 28-37, 38-47, and 48-57 years old. For combat sports experience group comparison, participants were divided into <2 years of experience, 2-5 years of experience, and >5 years of experience. Participants were divided into three groups for competition engagement group comparison: non-competitor, 1-4 competitions, and >4 competitions. Correlations were performed using the participants' raw data (age, experience, and competition engagement).

Measurement

The 12-item Grit Scale (GS) was used to measure grit in combat sports practitioners due to its high internal consistency and alpha of 0.85 (Duckworth et al., 2007). The GS comprises 12 items answered on a 5-point Likert scale, where participants were asked to select the one answer that best described them compared to most people (Duckworth et al., 2007). Answers for statements 1, 4, 6, 9, 10, and 12 ranged from 1 for "*not like me at all*" to 5 for "*very much like me*" (Duckworth et al., 2007). Statements 2, 3, 5, 7, 8, and 11 were reversely coded. Total scores were determined by the average of the 12 items (Duckworth et al., 2007). Five is the maximum possible score representing extremely gritty individuals, and one is the lowest possible score representing individuals not at all gritty (Duckworth et al., 2007).

Additional information was collected about the participants' age, sex, experience in combat sports (number of years), and competitive engagement (number of competitions over the past 12 months).

Statistical analyses

Correlations between age and grit, combat sports experience and grit, and competitive engagement and grit were determined via Pearson's *r*. An independent *t*-test was performed for group comparison between males and females. Analyses of variance (ANOVA) with Tukey's post hoc were performed to compare age, combat sport experience, and competition engagement groups. Data was analysed using IBM SPSS Statistics (Version 29) with alpha level of .05.

RESULTS

Correlations

A significant correlation between age and grit was found, $r(327) = 0.201$, $p < .001$ (one-tailed). The null hypothesis is rejected; 4.04% of the variation in grit is accounted for by age (small effect).

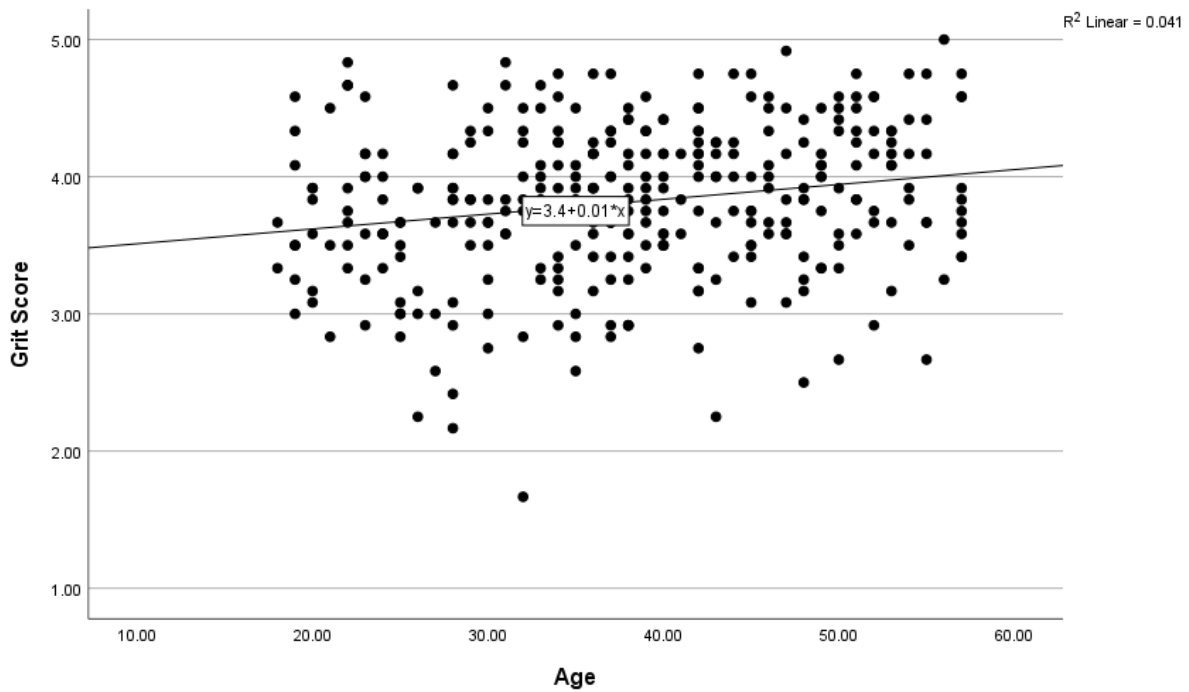


Figure 1. Scatterplot depicting the correlation between age and grit.

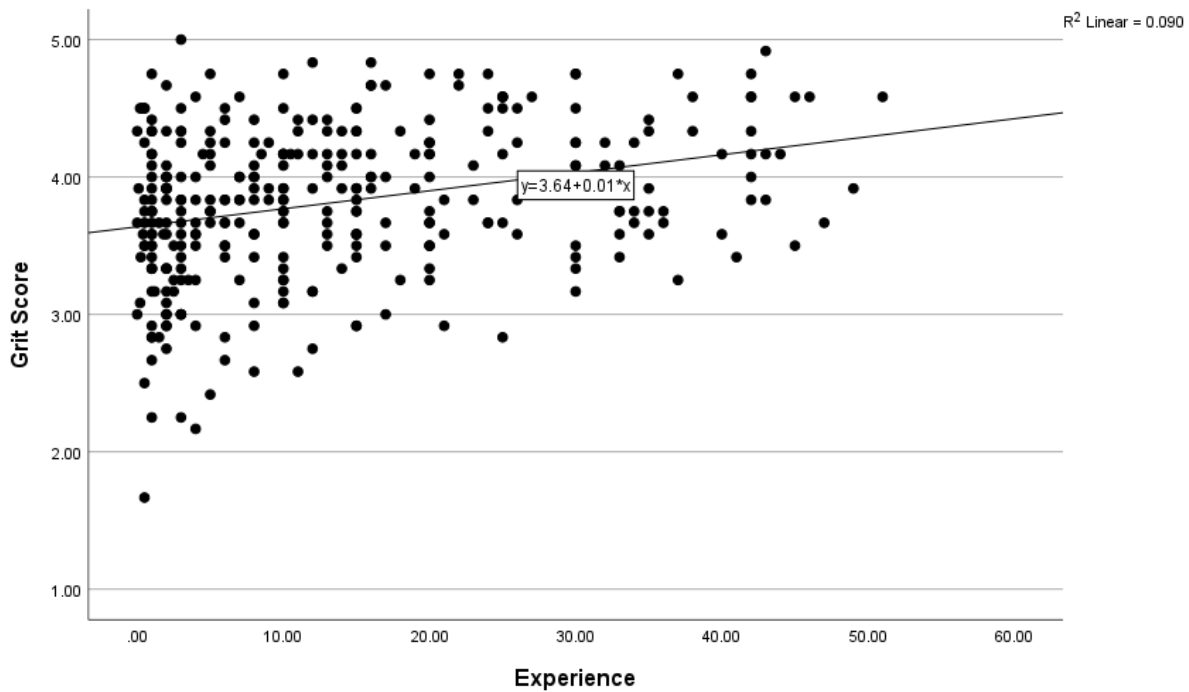


Figure 2. Scatterplot depicting the correlation between combat sports experience and grit.

A significant correlation between combat sports experience and grit was found, $r(327) = .300, p < .001$ (one-tailed). The null hypothesis is rejected; 9% of the variation in grit is accounted for by combat sports experience (small effect).

A significant correlation between competitive experience and grit was found, $r(327) = .102, p = .033$ (one-tailed). The null hypothesis is rejected; 1.04% of the variation in grit is accounted for by competitive experience (small effect).

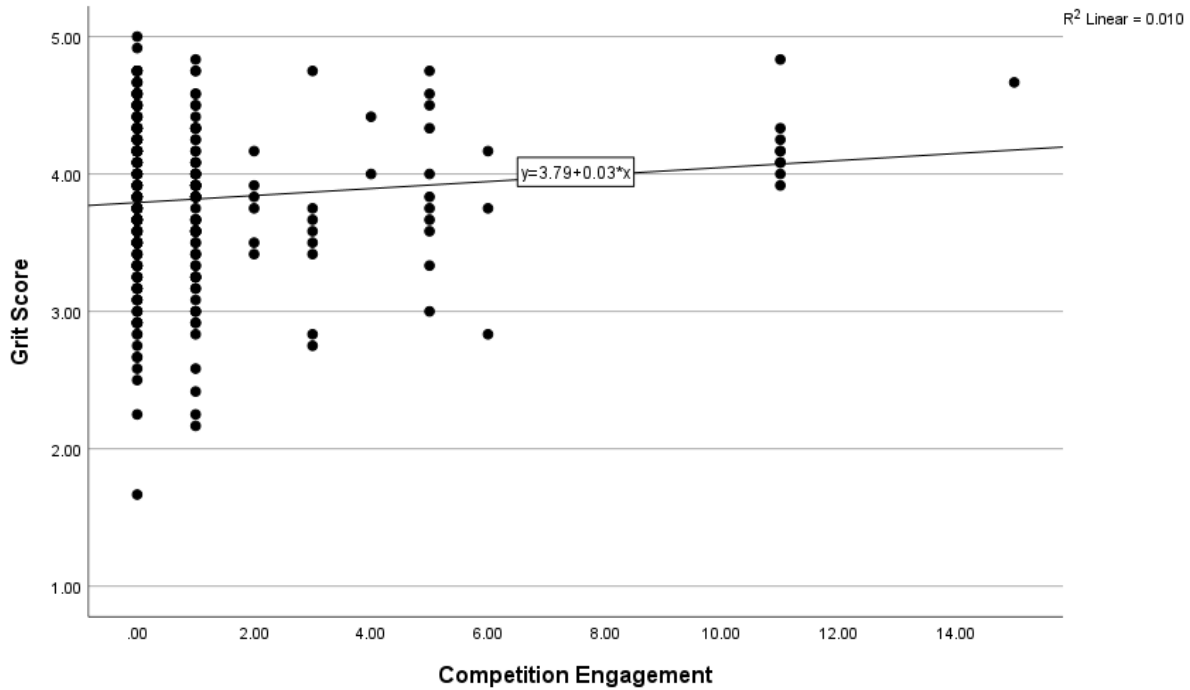


Figure 3. Scatterplot depicting the correlation between competition engagement and grit.

Group comparisons

An independent samples *t*-test found no statistically significant difference in grit between males and females $t(327) = -0.322, p = .374, r^2 = 0.1036, 95\% \text{ CI } [-0.20228, 0.14538]$, failing to reject the null hypothesis. An independent samples *t*-test found a statistically significant difference in training experience between males and females $t(327) = 2.175, p = .030, r^2 = 4.7306, 95\% \text{ CI } [4.41790, 8.31611]$ (Table 1).

Table 1. Descriptive statistics of the sample.

	Total	Males	Females
Sample size	329	283	46
Age	38.21 ± 10.35	38.35 ± 10.42	37.35 ± 9.91
Experience in years	13.63 ± 12.70	14.24 ± 12.91*	9.87 ± 10.67*
Competitions per year	0.95 ± 2.21	0.95 ± 2.11	0.98 ± 2.78
Grit Score	3.82 ± 0.55	3.81 ± 0.56	3.84 ± 0.55

Note. * $p < .05$.

A one-way ANOVA was conducted to examine whether there was a clear difference in grit between age groups (18-27, 28-37, 38-47, and 48-57). The null hypothesis was rejected; a significant difference was found

between age groups $F(2,325) = 4.501$, $p = .004$, $\eta^2 = .0398$ (Table 2). Tukey's post hoc analyses revealed that the 38-47 ($p = .29$) and the 48-57 ($p = .004$) presented higher grit than the 18-27 group.

Table 2. Analysis of variance (Tuckey's post hoc) between age groups.

	18-27	28-37	38-47	48-57
Sample size	57	99	98	75
Grit score	$3.62 \pm 0.55^{*a}$	3.77 ± 0.59	$3.87 \pm 0.49^{*}$	3.95 ± 0.54^a

Note. $^{*} p < .05$, $^a p < .05$.

A one-way ANOVA was conducted to examine whether there was a clear difference in grit between combat sports experience groups (<2, 2-5, and >5). The null hypothesis was rejected; there is a significant difference between experience groups $F(2,326) = 10.351$, $p < .001$, $\eta^2 = .0597$ (Table 3). Tukey's post hoc analyses revealed that the >5 group presented higher grit than the <2 group ($p < .002$, see Table 4) and the 2-5 group ($p < .001$).

Table 3. Analysis of variance (Tuckey's post hoc) between experience groups.

	<2	2-5	>5
Sample size	52	68	209
Grit score	$3.62 \pm 0.64^{*}$	3.64 ± 0.58^a	$3.92 \pm 0.50^{*a}$

Note. $^{*}, ^a p < .05$.

A one-way ANOVA was conducted to examine whether there was a clear difference in grit between the competition engagement groups (non-competitors, 1-4 competitions, and >4 competitions). The null hypothesis was rejected; there is a significant difference between experience groups $F(2,326) = 4.027$, $p = .019$, $\eta^2 = .0241$. Tukey's post hoc analyses revealed that the >4 group presented higher grit than the 1-4 group ($p = .024$, see Table 4).

Table 4. Analysis of variance (Tuckey's post hoc) between competition engagement groups.

	Non-competitors	1-4	>4
Sample size	207	100	22
Grit score	3.84 ± 0.56	$3.71 \pm 0.54^{*}$	$4.05 \pm 0.52^{*}$

Note. $^{*} p < .05$.

DISCUSSION AND CONCLUSIONS

The present study aimed to explore the potential correlations between grit and age, combat sports experience, and competitive engagement and compare group differences in grit based on sex, age, competition engagement, and combat sports experience.

The findings confirmed hypotheses 1 and 5, indicating a positive correlation between grit and age (small effect). The group comparison demonstrated higher grit in the 38-47 and 48-57 groups than the 18-27 group. This result is compatible with the findings of Griffin et al. (2016), where age was found as a predictor of grit in a linear regression model.

Hypotheses 2 and 6 were retained, with results indicating a positive correlation between grit and combat sports experience (small effect). The group comparison showed higher grit in the >5 years of experience group compared to the <2 and 2-5 groups. Although no other study correlating grit and combat sports

experience was found, Pujszo et al. (2019) determined a significant positive relationship between resilience and training experience.

Hypothesis 3 was confirmed through a positive correlation between grit and competition engagement (small effect). This result converges with Sawyer et al. (2018) findings that instructor-rated grit is significantly higher in competitors than in non-competitors. Hypothesis 7 was partially confirmed as the >4 competitions per year group showed higher grit than the 1-4 group, but not than the non-competitors group. This finding is inconsistent with the results by Shamshirian et al. (2021), who found wrestlers to have higher resilience than non-wrestlers but with no significant difference between the level of competition engagement (national versus international).

Hypothesis 4 was motivated by the finding of Pujszo et al. (2019), where resilience was higher in males than females. The author speculated that the difference found in resilience between sexes could be attributed to the higher training experience of males (Pujszo et al., 2019). Although the present study also found a significant difference in training experience between sexes (males > females), hypothesis 4 was rejected as results demonstrated no significant differences in grit between males and females. However, this result is congruent with Sigmundsson et al. (2021) findings, who also encountered no differences in grit between sexes.

This study presents some limitations. First, the cross-section nature of the present study may prevent causality assumptions. Second, the self-reported characteristic of the questionnaire potentially results in social desirability bias. The author recommends future studies to address grit in combat sports through a longitudinal experimental design. Moreover, the subcategorization of grappling versus striking arts could provide additional insights about the styles.

In conclusion, age, combat sports experience, and competitive engagement were shown to influence grit. These findings contribute to the combat sports field, suggesting a beneficial impact of combat sports on the development of grit. The current finding provides robust evidence of the role of combat sports in fostering grit and, therefore, all associated and grit-related outcomes.

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DISCLOSURE STATEMENT

No potential conflict of interest was reported by the author.

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