

Comparative analyses of psychological and training characteristics in judo competitors and non-competitors: Mental strength, self-efficacy, grit, resilience, self-control, aggression, mental health, and life satisfaction

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Published online: July 31, 2025

Accepted for publication: July15, 2025

DOI:10.7752/jpes.2025.07147

Abstract

Judokas competing at the national and Olympic levels rigorously engage in numerous daily and weekly training sessions, potentially influencing the athletes' mental conditioning. Based on the nature of competition, peak physical and mental conditioning is a prerequisite to achieve the highest place on the podium. This study investigated the differences in training characteristics, mental strength, resilience, grit, self-efficacy, self-control, aggression, life satisfaction, and mental health disorders between judo competitors and non-competitors. A total of 146 judo athletes (77.4% male) from 18 to 45 years of age, representing 60 competitors (41.1%) 86 non-competitors (58.9%) participated in this study. Judokas answered training-related questions followed by the Mental Strength Scale, Brief Resilience Scale, Grit Scale, General Self-Efficacy Scale, Brief Self-Control Scale, Brief Aggression Questionnaire, Satisfaction with Life Scale, and Mental Health Disorders Screening Instrument for Athletes. Results showed that competitors were younger ($p = .007$; medium effect) and reported higher training frequency ($p = .012$; medium effect) and volume ($p = .005$; medium effect) than non-competitors. No statistically significant differences were found in mental strength, resilience, grit, self-efficacy, self-control, aggression, life satisfaction and mental health disorders between competitors and non-competitors. Significant positive relationships were found between judo training experience and resilience, grit, self-efficacy, self-control, and life satisfaction. Moreover, a significant negative relationship was found between judo training experience and mental health disorders. In conclusion, judo competitors presented higher training frequency and volume and were younger than non-competitors. Judo competitors present similar psychological characteristics that non-competitors. In addition, more experienced judo athletes were more likely to present higher resilience, grit, self-efficacy, self-control, life satisfaction and lower mental health disorders.

Keywords: martial arts, combat sports, sport psychology, mental toughness, mental performance

Introduction

As one of the most popular martial art and combat sport in the world, Judo officially became an Olympic sport for men in 1972 and for women in 1992 (Franchini & Takito, 2014; Gutierrez-Garcia et al., 2018) with medals won by 51 countries (Bagińska et al., 2022). Judo was initially designed to ward off and control another person based on the principle of "Seiryoku Zenyo" or maximum efficiency, often using the opponents' force and strength against themselves (Kowalczyk et al., 2022). Judo is widely regarded as a dynamic and intricate martial art with a combination of tactical, physical, and mental skills resulting in the performance of efficient and powerful techniques (Takagaki & Sharp, 2012).

During randori (live rounds) and in competitions, Judo athletes have as ultimate goal to score an Ippon, being achieved by either throwing, holding, submitting the opponent, or a combination of some of these tasks (Takahashi et al., 2005). Due to the grueling nature of competition, peak physical and mental conditioning is often a prerequisite to succeed at the highest levels (Franchini et al., 2011; Detanico & Santos, 2012). National and Olympic level judo training includes several daily and weekly hours of rigorous practice (Franchini & Takito, 2014). However, not all judokas participate in competitions. Judo was designed by its founder, Jigoro Kano (1860–1938), in part to be an educational and philosophical framework based on the principle of "Jita-Kyoei" or mutual benefit, aiming to improve oneself while being of service to the community (Jones & Hanon, 2010; Kowalczyk et al., 2022). Over the years, many dojos shifted away from the traditionalist model and moved towards an emphasis on competition, partly attributed to the rise of judo in the Olympic games (Moenig et al., 2023). This shift in priority has sparked a debate about whether the engagement with competitions may promote additional psychological benefits to the practice of judo non-competition focused.

Research findings have been inconsistent regarding the impact of competition on psychological variables. While some found no significant difference in mental toughness between competitive and recreational athletes (Cowden, 2017), others have shown that recreational athletes reported better mental health and psychological well-being than competitors (Riddick, 1984; Chatzisarantis & Hagger, 2007). Within combat sports, researchers have prioritized the psychological impact and differences between professional statuses and competitive accomplishments. For instance, Chen and Cheesman (2013) found that mixed martial arts athletes competing at the professional level scored higher on mental toughness and confidence compared to athletes at lower levels of competition. Chen et al. (2019) found positive correlations between higher levels of competition and self-efficacy and self-control. Lorenzo-Lima (2024) also found a positive correlation between competitive engagement and grit in combat sport athletes.

In judo, researchers have found several physiological and psychological benefits, including improved overall cognitive functioning, enhanced emotional regulation, increased self-confidence, and a general improvement in physical health, strength, and balance (Origua Rios et al., 2018; Eadie, 2023; Biedrzycki & Laskowski, 2024). Silva et al. (2018) found that competitive judokas of different levels identified resilience, emotional regulation, self-confidence, attention regulation, self-motivation, and optimism as common attributes in their perceived mental toughness within the sport. Regardless of this finding, in many dojos, judokas can advance through the belt ranking system through standardized tests and achieve the black belt without ever participating in a tournament. However, many dojos defend the approach that competition is crucial in developing certain psychological characteristics such as resilience and grit. Despite this divergence in approach, no research has investigated whether these psychological variables are associated with the judokas' engagement with competitions.

Based on the positive psychological impact of judo (Origua Rios et al., 2018; Eadie, 2023; Biedrzycki & Laskowski, 2024; Lorenzo-Lima, 2024) coupled with the limited number of studies addressing the psychological impact of competitive judo (Silva et al. 2018), the current measuring tools related to performance and well-being were selected to provide a comprehensive understanding of the potential psychological differences resulting from engagement with competitions.

The relevance and novelty of this study revolves around the understanding of whether engagement with competition is associated with augmented psychological outcomes. The findings of this study may inform judo coaches about the potential relevance of actively engaging in competitions. Therefore, the current study aimed to investigate the differences in training characteristics, mental strength, resilience, grit, self-efficacy, self-control, aggression, life satisfaction, and mental health disorders between judo competitors and non-competitors. It was hypothesized that judo competitors would present higher mental strength, resilience, grit, self-efficacy, self-control, life satisfaction, and aggression and lower mental health disorders than non-competitors. Moreover, competitors were expected to present a higher frequency (days/week) and volume (hours/week) of training than non-competitors.

Methods

Participants

The current sample consisted of 146 judo athletes, representing 113 males (77.4%) and 33 females (22.6%) from 18 to 45 years of age (33.8 ± 8.38). Participants included 67 novice (45.9%; white, yellow, orange, and green belts) and 79 elite judokas (54.1%; brown and black belts). Of the total sample, 60 participants (41.1%) reported engaging in a minimum of one competition over the previous years, and 86 participants (58.9%) reported no engagement with competitions during the previous year. Competitors reported 8.38 ± 8.11 and non-competitors 9.14 ± 9.00 years of experience.

A *priori* power analysis was performed with a medium effect size ($d = 0.50$), $\alpha = .05$, and power criterion of .80. The analysis revealed the need for a minimum of 102 participants for the proposed comparative analyses between competitors and non-competitors.

Procedures

Data was collected from May 16 to July 17, 2024, via Google Form. Participants were recruited via social media flyer (Instagram and Facebook). Inclusion criteria: males and females, from 18 to 45 years, all belt ranks (white, yellow, orange, green, blue, purple, brown, and black), and currently engaged in a minimum of one judo practice per week in the United States. Participants answered to demographic (age and biological sex) and training-related questions (belt rank, training experience, training frequency as days/week, training volume as hours/week, and number of competitions engaged over the previous year), followed by the Mental Strength Scale, Brief Resilience Scale, Grit Scale, General Self-Efficacy Scale, Brief Self-Control Scale, Brief Aggression Questionnaire, Satisfaction with Life Scale, and Mental Health Disorders Screening Instrument for Athletes.

Data was collected anonymously with no compensation offered for participation. Volunteers received an information sheet containing the details of the study. The current study received an exempt status by the Liberty University Institutional Review Board as per 45 CFR 46:104(d): Category 2. (i). clarifying that the data obtained by the author is recorded in a way that the identity of the human participants cannot readily be ascertained directly or through identifiers linked to the participants (*Electronic Code of Federal Regulations*, 2024).

Materials

Mental strength was assessed through the Mental Strength Scale (5-point Likert) based on its good reliability (Lorenco-Lima, 2024). Total scores were calculated through the average of the ten items, higher scores indicate higher mental strength. The current sample's Mental Strength Scale Cronbach's alpha was .76.

Resilience was measured through the Brief Resilience Scale (5-point Likert) due to its good reliability (Smith et al., 2008). Total scores were calculated through the average of the six items, and higher scores indicate higher resilience. The current sample's Brief Resilience Scale Cronbach's alpha was .84.

Grit was assessed through the Grit Scale (5-point Likert) based on its good reliability (Duckworth et al., 2007). The total scores were calculated through the average of the 12 items, and higher scores indicate higher grit (Duckworth et al., 2007). The current sample's Grit Scale Cronbach's alpha was .82.

Self-efficacy was measured through the General Self-Efficacy Scale (4-point Likert) due to its good reliability (Schwarzer & Jerusalem, 1995). Total scores were calculated through the sum of the 10 items, and higher scores indicate higher self-efficacy. The current sample's General Self-Efficacy Scale Cronbach's alpha was .85.

Self-control was assessed through the Brief Self-Control Scale (5-point Likert) based on its good reliability (Tangney et al., 2004). Total scores were calculated through the sum of the 13 items, and higher scores indicate higher self-control. The current sample's Brief Self-Control Scale Cronbach's alpha was .85.

Aggression was measured through the Brief Aggression Questionnaire (7-point Likert) due to good reliability (Webster et al., 2014; Webster et al., 2015). The questionnaire represents four subscales: physical aggression (items 1, 2, and 3), anger (items 4, 5, and 6), verbal aggression (items 7, 8, and 9), and hostility (items 10, 11, and 12). Total scores were calculated through the average of the 12 items, and higher scores indicate higher aggression. The current sample's Brief Aggression Questionnaire Cronbach's alpha was .75.

Life-satisfaction was assessed through the Satisfaction with Life Scale (7-point Likert) based on its good reliability (Diener et al., 1985). Total scores were calculated through the sum of the 5 items, and higher scores indicate higher life satisfaction. The current sample's Satisfaction with Life Scale Cronbach's alpha was .88.

Mental health disorders were measured through the Mental Health Disorders Screening Instrument for Athletes (7-point Likert scale) due to its good reliability (Donohue et al., 2023). Total scores were calculated through the sum of the 14 items, and higher scores indicate higher mental health disorders. The current sample's Mental Health Disorders Screening Instrument for Athletes Cronbach's was .79.

Statistical Analyses

All assumptions of normality were met in the current data. Independent samples *t*-tests were performed to compare the group differences between judo competitors and non-competitors in mental strength, resilience, grit, self-efficacy, self-control, aggression, life satisfaction, mental health disorders (DVs), and training characteristics. Multiple linear regressions were performed to explore the relationship between training experience (years), training frequency (days/week), training volume (hours/week), and number of competitions (over the previous 12 months) and the DVs. Data was analyzed using IBM SPSS Statistics (Version 30) with an alpha level of .05.

Results

Table 1 presents the participants' demographic and training characteristics of judo competitors and non-competitors. Independent samples *t*-tests were conducted to investigate the differences in age, training experience (years), training frequency (days/week), and training volume (hours/week) between groups. Results revealed that judo competitors were significantly younger $t(144) = 2.509, p = .007$, Cohen's $d = -.422$ (medium effect), 95% CI [-6.54755, -.77726], reported significantly higher training frequency $t(144) = 2.277, p = .012$, Cohen's $d = .383$ (medium effect), 95% CI [.05638, .79788], and training volume $t(144) = 2.610, p = .005$, Cohen's $d = .439$ (medium effect), 95% CI [.26101, 1.89092] than non-competitors. Moreover, no statistically significant difference was found in training experience $t(144) = -0.520, p = .302$, Cohen's $d = -.088$, 95% CI [-3.62922, 2.11682] between competitors and non-competitors.

Table 1
Participants' Demographic and Training Characteristics

	Competitors (<i>N</i> = 60)	Non-Competitors (<i>N</i> = 86)
Demographic		
Age (SD)	31.62 (8.44)*	35.28 (8.84)*
Male <i>n</i> (%)	50 (83.3)	63 (73.3)
Female <i>n</i> (%)	10 (16.7)	23 (26.7)
Training		
Experience (SD)	8.38 (8.11)	9.14 (9.00)
Days/Week (SD)	2.57 (1.24)*	2.14 (1.02)*
Hours/Week (SD)	4.87 (2.73)*	3.79 (2.24)*
Competitions (SD)	3.08 (3.28)	-

Note $p < .05$

Psychological Characteristics

Independent samples *t*-tests were conducted to investigate the differences in mental strength, resilience, grit, self-efficacy, self-control, aggression, life satisfaction, and mental health disorders between judo competitors and non-competitors (Table 2). No statistically significant differences were found in mental strength, resilience, grit, self-efficacy, self-control, aggression (total, physical, anger, verbal, and hostility), life satisfaction and mental health disorders between judo competitors and non-competitors.

Table 2*Competitors and Non-Competitors Psychological Profiles*

	Competitors (<i>N</i> = 60)	Non- Competitors (<i>N</i> = 86)	<i>t</i>	<i>df</i>	<i>p</i>	95% <i>CI</i>	
						<i>Lower</i>	<i>Upper</i>
Mental Strength	4.08 (0.48)	3.95 (0.45)	1.646	144	0.051	- 0.02605	0.28504
Resilience	3.76 (0.61)	3.61 (0.69)	1.361	144	0.088	- 0.06859	0.37208
Grit	3.69 (0.51)	3.70 (0.53)	- 0.070	144	0.472	- 0.18052	0.16824
Self-Efficacy	33.85 (3.48)	33.13 (3.67)	1.195	144	0.117	- 0.47259	1.91677
Self-Control	45.57 (7.29)	44.69 (7.23)	0.722	144	0.236	- 1.53117	3.29241
Aggression	3.03 (0.86)	2.97 (0.91)	0.412	144	0.340	- 0.23421	0.35759
Physical aggression	2.99 (1.59)	2.96 (1.42)	0.110	144	0.456	- 0.46753	0.52283
Anger	2.21 (0.88)	2.14 (0.90)	0.476	144	0.317	- 0.22581	0.36896
Verbal aggression	4.00 (1.41)	3.81 (1.21)	0.915	144	0.181	- 0.23106	0.62977
Hostility	2.91 (1.28)	2.96 (1.52)	- 0.216	144	0.415	- 0.52596	0.42234
Life Satisfaction	25.38 (5.84)	25.62 (6.69)	- 0.223	136.892	0.412	- 2.29583	1.82994
Mental Health Disorders	32.67 (8.76)	33.8 (10.07)	- 0.721	144	0.236	- 4.33658	2.01875

Note **p* < .05

Multiple Linear Regressions

Multiple regressions analyses were conducted to investigate the extent to which judo training characteristics (experience in years, training frequency in days/week, training volume in hours/week, and number of competitions over the previous 12 months) could predict mental strength, resilience, grit, self-efficacy, self-control, aggression, life satisfaction, and mental health disorders (Table 3).

The result was statistically significant for resilience $F(4, 141) = 3.473, p = .010$. Approximately 9% of the variance in resilience was accounted for by its linear relationship with the training characteristics as a unit. Judo experience explained the most unique variance in resilience, explaining 7.3% of the variance in resilience above and beyond what was explained by the other variables.

Results were significant for grit $F(4, 141) = 6.398, p < .001$. Approximately 15.4% of the variance in grit was accounted for by its linear relationship with the training characteristics as a unit. Judo experience explained the most unique variance in grit, explaining 6.8% of the variance in grit above and beyond what was explained by the other variables.

Results were significant for self-efficacy $F(4, 141) = 6.412, p < .001$. Approximately 15.4% of the variance in self-efficacy was accounted for by its linear relationship with the training characteristics as a unit. Judo experience explained the most unique variance in self-efficacy, explaining 12.7% of the variance in self-efficacy above and beyond what was explained by the other variables.

Results were significant for self-control $F(4, 141) = 3.266, p = .014$. Approximately 8.5% of the variance in self-control was accounted for by its linear relationship with the training characteristics as a unit. Judo experience explained the most unique variance in self-control, explaining 5.9% of the variance in self-control above and beyond what was explained by the other variables.

Results were significant for mental health disorders $F(4, 141) = 4.237, p = .003$. Approximately 10.7% of the variance in mental health disorders was accounted for by its linear relationship with the training characteristics as a unit. Judo experience explained the most unique variance in mental health disorders, explaining 9.2% of the variance in mental health disorders above and beyond what was explained by the other variables.

Table 3
Multiple Linear Regressions

	<i>b</i>	<i>t</i> -value (<i>p</i>)	<i>sr</i> ²	<i>F</i> -Value (df)	<i>p</i>	<i>R</i> ²
Mental Strength				.888 (4, 141)	.473	.025
Intercept	3.882					
Experience	0.006	1.219 (.225)	0.0103			
Days/Week	0.060	1.229 (.221)	0.0104			
Hours/Week	-0.017	-0.821 (.413)	-0.0047			
Competitions	0.003	0.171 (.864)	0.0002			
Resilience				3.473 (4, 141)	.010*	.090
Intercept	3.389					
Experience	0.021	3.367 (.001*)	0.0732			
Days/Week	-0.009	-0.135 (.893)	-0.0001			
Hours/Week	0.030	1.067 (.288)	0.0073			
Competitions	-0.009	-0.383 (.702)	-0.0009			
Grit				6.398 (4, 141)	< .001*	.154
Intercept	3.292					
Experience	0.016	3.368 (.001*)	0.0681			
Days/Week	0.079	1.569 (.119)	0.0148			
Hours/Week	0.030	1.406 (.162)	0.0119			
Competitions	-0.034	-1.967 (.051)	-0.0232			
Self-Efficacy				6.142 (4, 141)	< .001*	.154
Intercept	31.288					
Experience	0.150	4.601 (<.001*)	0.1271			
Days/Week	0.060	0.174 (.862)	0.0002			
Hours/Week	0.152	1.042 (.299)	0.0065			
Competitions	0.026	0.216 (.829)	0.0003			
Self-Control				3.266 (4, 141)	.014*	.085
Intercept	41.873					
Experience	0.205	3.009 (.003*)	0.0588			
Days/Week	1.386	1.915 (.057)	0.0238			
Hours/Week	-0.409	-1.342 (.182)	-0.0117			
Competitions	-0.087	-0.347 (.729)	-0.0008			
Aggression				1.361 (4, 141)	.251	.037
Intercept	3.008					
Experience	-0.016	-1.926 (.056)	-0.0253			
Days/Week	-0.031	-0.337 (.736)	-0.0008			
Hours/Week	0.040	1.036 (.302)	0.0073			
Competitions	0.025	0.801 (.424)	0.0044			
Life Satisfaction				1.746 (4, 141)	.143	.047
Intercept	23.463					
Experience	0.149	2.446 (.016*)	0.0404			
Days/Week	0.446	0.691 (.490)	0.0032			
Hours/Week	-0.026	-0.097 (.923)	-0.0001			
Competitions	-0.139	-0.625 (.533)	-0.0026			
Mental Health Disorders				4.237 (4, 141)	.003*	.107
Intercept	36.892					
Experience	-0.338	-3.811 (<.001*)	-0.0919			
Days/Week	-0.627	-0.666 (.506)	-0.0028			
Hours/Week	0.306	0.770 (.443)	-0.0038			
Competitions	-0.318	-0.977 (.330)	-0.0060			

Note. **p* < .05

Significantly positive relationships (semi-partial) were found between judo training experience and resilience ($p = .001$; 7.3% variance), grit ($p = .001$; 6.8% variance), self-efficacy ($p < .001$; 12.7% variance), self-control ($p = .003$; 5.9% variance), and life satisfaction ($p = .016$; 4.0 % variance). Moreover, a significant negative relationship was found between judo training experience and mental health disorders ($p < .001$; 9.2% variance).

Discussion

The current study aimed to investigate potential differences in training characteristics (experience in years, training frequency in days/week, training volume in hours/week, and number of competitions over the previous 12 months), mental strength, resilience, grit, self-efficacy, self-control, aggression, life satisfaction, and mental health disorders between judo competitors and non-competitors.

The current results showed that competitors were younger, trained more frequently, had a larger volume of training than non-competitors, and participated on average in 3 competitions in the past 12 months. The higher training frequency and volume may be explained by the athletes' notion of the critical role of peak physical

conditioning for performance (Detanico & Santos, 2012; Franchini et al., 2011). In addition, judo competitions are divided into several weight classes, prompting some athletes to increase their training frequency and volume to reduce their body weight (Artioli et al., 2010). The current training volume (4.87 hours/week) in competitive judokas was substantially lower than previous findings. For instance, Garrido-Muñoz et al. (2024) found an average 8.13 hours per week in a study with 702 judokas from Spain. Prokopczyk and Sokołowski (2021) found that the women's National Polish Judo team practiced an average 17.63 hours per week. Furthermore, Tubic et al. (2022) reported that elite sambo practitioners trained on average 24 hours per week.

Despite a significant difference in training frequency and volume between competitors and non-competitors in the current study, there was no significant difference in mental strength, resilience, grit, self-efficacy, self-control, life satisfaction, aggression, and mental health between the two groups. These findings did not support the researchers' hypotheses, and the results suggest that judo competitors and non-competitors present similar psychological characteristics. It is plausible that there were factors not accounted for such as timing of self-report in the participants' competitive cycles (i.e., pre- versus post-competition). Timing may potentially influence psychological self-reports based on the effect of negative experiences and the consequential tension, anger, and anxiety for those who lose (Rossi et al., 2022). For those who win, competitive success can lower anxiety and increase self-confidence (Filaire, 2001; Rossi et al., 2022). Additionally, stress and experience of weight cutting has been found to exacerbate a judoka's mood states leading to potential irritability before competitions (Lakicevic et al., 2024) which can in turn affect performance outcomes (Brandt et al., 2021). Breistøl et al. (2017) found that the association between sports engagement and mental health was stronger in competitors than non-competitors. However, in the same study, the authors suggest that participating in sports, regardless of whether it is competitive or non-competitive, can positively impact mental health.

The current results also showed that more experienced judo athletes, regardless of competition status, were more likely to present higher resilience, grit, self-efficacy, self-control, life satisfaction and lower mental health disorders. When looking at the impact of sports experience, Hanton and Jones (1999) reported that more experienced swimmers developed more effective mental skills to cope with anxiety and competitive stressors. Hanton et al. (2008) found that more experienced athletes from various sports reported higher levels of self-confidence and lower levels of anxiety than their counterparts. In addition, the current findings are in accord with prior research that has found positive correlations between training experience and resilience in judo and grit in combat sports (Garrido-Muñoz et al., 2024; Küçük, 2020; Pujszo et al., 2019).

This study presents some limitations that should be acknowledged. First, the current cross-sectional design prevents any causal observation. Second, the self-selection sampling process and the assessment via self-reported instruments may have resulted in response and social desirability bias. Third, the selection of participants training in the United States may restrict the generalizability of the findings. Future studies are encouraged to address in a longitudinal design whether the engagement with competitions may directly impact the investigated psychological variables.

Conclusion

In summary, judo competitors presented higher training frequency and volume and were younger than non-competitors. The results suggest that judo competitors and non-competitors present similar psychological characteristics with no significant differences in mental strength, resilience, grit, self-efficacy, self-control, aggression, life satisfaction, and mental health disorders between groups. In addition, more experienced judo athletes were more likely to present higher resilience, grit, self-efficacy, self-control, life satisfaction and lower mental health disorders.

In practice, the results suggest that engagement with judo competitions may not be a critical factor in determining augmented scores in the investigated psychological variables. Despite the strong competitive approach to judo in the United States, the results may inform coaches that the recreational, non-competitive practice of judo may be sufficient for many practitioners to reap several previously established benefits related to martial arts practice.

Data Availability Statement

The data presented in this study are available upon request to the corresponding author.

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