



OPEN ACCESS

EDITED BY

Nemanja Stankovic,
University of Nis, Serbia

REVIEWED BY

Dusan Todorovic,
University of Niš, Serbia
Milos Stefanovsky,
Comenius University, Slovakia

*CORRESPONDENCE

Coşkun Yılmaz
✉ coskun.yilmaz@gumushane.edu.tr

RECEIVED 20 May 2025

ACCEPTED 12 June 2025

PUBLISHED 15 July 2025

CITATION

Köroğlu M, Yılmaz C, Tan Ç, Çelikel BE, Budak C, Kavuran K, Susuz YE, Barut Y, Ceylan T, Soyer F, Sezer SY and Şahin FN (2025) Judo exercises increase emotional expression, self-control, and psychological resilience. *Front. Psychol.* 16:1632095. doi: 10.3389/fpsyg.2025.1632095

COPYRIGHT

© 2025 Köroğlu, Yılmaz, Tan, Çelikel, Budak, Kavuran, Susuz, Barut, Ceylan, Soyer, Sezer and Şahin. This is an open-access article distributed under the terms of the [Creative Commons Attribution License \(CC BY\)](https://creativecommons.org/licenses/by/4.0/). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.

Judo exercises increase emotional expression, self-control, and psychological resilience

Mihraç Köroğlu¹, Coşkun Yılmaz^{2*}, Çetin Tan³, Baha Engin Çelikel³, Cemalettin Budak⁴, Korhan Kavuran⁵, Yunus Emre Susuz⁶, Yaşar Barut⁷, Tülay Ceylan⁸, Fikret Soyer⁹, Süreyya Yonca Sezer¹⁰ and Fatma Neşe Şahin¹¹

¹Faculty of Sport Sciences, Batman University, Batman, Türkiye, ²Kelkit Aydın Doğan Vocational School, Gümüşhane University, Gümüşhane, Türkiye, ³Faculty of Sport Sciences, Firat University, Elazığ, Türkiye, ⁴Faculty of Sport Sciences, Erzincan Binali Yıldırım University, Erzincan, Türkiye, ⁵Faculty of Sport Sciences, Bitlis Eren University, Bitlis, Türkiye, ⁶National Defense University, Ankara, Türkiye, ⁷Faculty of Health Sciences, Ondokuz Mayıs University, Samsun, Türkiye, ⁸Graduate Education Institute, Ondokuz Mayıs University, Samsun, Türkiye, ⁹Faculty of Sport Sciences, Kyrgyzstan-Türkiye Manas University, Bishkek, Kyrgyzstan, ¹⁰Faculty of Sport Sciences, Munzur University, Tunceli, Türkiye, ¹¹Faculty of Sport Sciences, Ankara University, Ankara, Türkiye

Background: The extant research on judo sports has principally concentrated on the physiological effects of training. Conversely, there has been limited attention paid to studies on psychological resilience, self-control, and emotional expression levels. The present study examined the effects of Judo exercises on psychological resilience, self-control, and emotional expression levels in healthy male subjects.

Methods: The present study comprised 50 healthy, sedentary male subjects. The subjects were randomly divided into two groups: one group participated in judo training (JT) and the other group served as the control group (CON). The sample sizes for the JT and CON groups were both 25. The JT group underwent judo training, while the CON group maintained their usual lifestyle. The Brief Psychological Resilience Scale, the Multidimensional Brief Self-Control Scale, and the Berkeley Emotion Expression Scale were administered prior to and following the 6-week training period.

Results: The study demonstrated that a 6-week judo training regimen exerted a significant effect on the psychological resilience score (e.s. = 1.047, $p < 0.001$), while no such effect was observed in the Control group (e.s. = 0.0091, $p = 0.751$). In the context of self-control levels, an effect was observed on the Initiation sub-dimension (e.s. = 1, 739, $p < 0.001$), yet no effect was found on the Inhibition dimension (e.s. = 0.052, $p = 0.892$). In the control group, a significant decrease was identified in the Initiation sub-dimension (e.s. = 0, 785, $p = 0.001$) and Inhibition sub-dimension (e.s. = 1, 861, $p < 0.001$). The findings indicate that impulse power (e.s. = 0.395) and concealment (e.s. = 0.428) exerted a negligible influence on the emotional expression sub-dimensions. Conversely, psychological resilience (e.s. = 0.886) demonstrated a substantial impact.

Conclusions: The judo exercises demonstrated a favorable impact on psychological resilience, self-control, and emotional expression levels in healthy male subjects. The findings of this study may offer significant insights into the

impact of judo exercises on psychological resilience, self-control, and emotion expression levels. These findings could serve as a guide for the development of future interventions and program design in the domain of sport psychology.

KEYWORDS

psychological resilience, sport psychology, judo, mental health, self-control, combat sports

Introduction

Regular physical activity has been demonstrated to have a multifaceted impact on mental and physical health, with studies showing its ability to enhance both psychological resilience and overall wellbeing (Eken et al., 2022; Kusan et al., 2025; Qiu et al., 2025; Koç et al., 2025). The evolution of judo from a martial art to an Olympic sport as a physical activity has also given rise to the need to maximize the performance of competitive athletes. In this context, Piskorska et al. (2016) emphasize that athletes' psychological and personality traits and cognitive abilities play a decisive role in performance, especially in combat sports. The unique characteristics of combat sports, including direct physical contact, pre-competition weight loss practices, the risk of pain and injury, and the constant fear of defeat, further underscore the significance of psychological and personality-based factors in determining sporting success in these disciplines (Stanković et al., 2022; Garrido-Muñoz et al., 2024). In this context, the concept of psychological resilience is of particular relevance to this sport. Psychological resilience has been defined as an important characteristic and process for athletic performance in combat sports in general (Litwic-Kaminska, 2013; Yang et al., 2019; Garrido-Muñoz et al., 2024). As a trait, it refers to a set of fixed and stable personal characteristics that enable an individual to cope with and adapt to or protect themselves from significant sources of stress or trauma (Lee et al., 2013; Garrido-Muñoz et al., 2024). The process is regarded as a dynamic response that facilitates positive adaptation to adversity (Luthar et al., 2003). In this case, the influence of personal characteristics is not fixed; rather, it varies according to the situation, the personal circumstances at that moment, and the intensity of the risk factors (Rutter, 2006). Irrespective of whether resilience is conceptualized as a process or a trait, these definitions underscore the notion that resilience signifies the capacity to confront and adeptly adapt to adversity, stress, or traumatic events, and to recuperate emotionally (Garrido-Muñoz et al., 2024).

The degree to which an individual exhibits psychological resilience is closely associated with the presence of self-control and adaptability (Rutter, 2000; Luthar et al., 2003; Epstein and Krasner, 2013; Garrido-Muñoz et al., 2024). Individuals with high resilience levels have been shown to more effectively utilize various resources to cope with challenging circumstances and maintain greater control over both their internal and external environments (Rutter, 2000; Epstein and Krasner, 2013). Psychological resilience, understood as a protective factor in the context of individual adaptive development, has been shown to minimize the physiological and psychological costs associated with

coping with stress and adversity. This, in turn, ensures positive and healthy development for the individual (Epstein and Krasner, 2013). Consequently, there will be an enhancement in self-control levels (Rutter, 2000).

Self-control is generally considered to be the ability to achieve long-term, valuable goals by suppressing short-term, satisfying impulses (Hofmann et al., 2012). A growing body of research has identified that exercise programs have been shown to enhance self-control (Baumeister et al., 2007; Zou et al., 2016; Boat and Cooper, 2019). The outcomes of these programs have been demonstrated to include increased socialization, academic success, and overall quality of life. Additionally, these programs have been observed to improve mental health, promote emotional expression, and contribute to enhanced psychological wellbeing (De Ridder et al., 2012; Situ et al., 2021; Kim et al., 2022).

Another concept that contributes to psychological wellbeing is the expression of emotions (Kuzucu, 2011). Emotional expression can be defined as the process of articulating one's thoughts and feelings to another individual through various forms of communication, including speech, expressive writing, facial expressions, and gestures (Cameron and Overall, 2018; Riggio, 2017). The ability to articulate one's thoughts and emotions, which are perceived as challenges, has been demonstrated to foster the development of positive emotions and mitigate the occurrence of negative thoughts and perceived stress (Major and Gramzow, 1999; Rimé, 2007; Cameron and Overall, 2018). Concurrently, this predicament can facilitate an increased awareness of the individual's own challenges (Major and Gramzow, 1999; Kuzucu, 2011; Çarkit and Yalçın, 2018).

Studies on self-control, psychological resilience, and emotional expression in martial arts have been conducted on mixed martial arts (MMA) and Brazilian jiu-jitsu (BJJ), karate and judo players and found to have a positive effect (Domaneschi and Ricci, 2022; Potoczny et al., 2022; Invernizzi et al., 2023; de Lorenzo-Lima et al., 2025). However, these studies neglected the interaction of judo training on sedentary male individuals. In this context, this study aims to make both a theoretical and methodological contribution. Due to methodological inconsistencies in the literature, the effect of judo training on self-control, psychological resilience and emotional expression levels of sedentary individuals is still unclear. The question of how self-control, psychological resilience, and emotional expression levels change in sedentary healthy male individuals in the context of judo training is sought to be answered with experimental data. The present study seeks to answer the following scientific question: Does judo training increase psychological resilience, self-control, and emotional expression in healthy sedentary men?

Materials and methods

Participants

The study included 50 healthy male subjects. The study was designed as a randomized, controlled experimental study. Participants were randomly assigned to two different groups: Judo group and CON group. The subjects assigned to the judo group underwent a 6-week training program focused on judo techniques, while the control group did not engage in any sport. GPower 3.1 programme was used to determine the required number of participants. The results of the power analysis sampling study showed that the study could be completed with 20 subjects in each group (effect size: 0.80; actual power: 0.89). To account for potential losses, an additional 25% was added for a total of 50 subjects, with 25 subjects allocated to each group (Control and Judo). In order to determine in which group the subjects forming the sample would be included, numbers between 1 and 50 were randomly assigned to two groups through a computerized programme (<https://www.randomizer.org/>). Participants with chronic or any disease were excluded from the study. Verbal and written informed consent was obtained from all participants before starting the study. The studies involving humans were approved by Approval was obtained with the decision of Munzur University, Non-Interventional Research Ethics Committee dated 27/02/2025 and numbered 2025/02. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Experimental design

Healthy male participants in the study were required to visit the laboratory environment three times. During the first visit, information about the training procedures and scales was given. Each subject received a detailed explanation of the Judo training procedure. At the next visit, which took place one week later, pre-exercise measurements were taken and values were recorded. At the end of the six-week training programme, final measurements were taken during the third and last visits (Figure 1).

Body composition measurement

In the study, body composition was measured with Gaia 359 Plus Body-pass bioelectrical impedance analyser to indicate that the participants had similar body characteristics. The Gaia 359 Plus BodyPass was used to determine the subject's height and body weight.

The means of the participants in the study were 173.4 ± 10.54 cm, 67.04 ± 10.01 kg, 20.23 ± 1.21 years for the Judo group and 173.6 ± 9.94 cm, 71.64 ± 12.01 kg, 20.52 ± 1.47 years for the Control group (Table 1).

Brief psychological resilience scale

The Brief Psychological Resilience Scale (BSRS), developed by Smith et al. (2008) and adapted to Turkish culture by Dogan (2015),

is a 5-point Likert-type scale consisting of six items and one sub-dimension developed to measure the psychological resilience levels of individuals. There are (2, 4, 6) reverse items in the scale. After the reverse coded items are corrected, the highest score that can be obtained from the scale can be 30 and the lowest score can be 6. A high score on the scale indicates a high level of psychological resilience. It is a scale that is easy to use and score, practical and can be applied in a short time. Dogan (2015) determined the Cronbach alpha reliability of the scale as 0.81 and the internal consistency coefficient of the scale as 0.83. As a result of these findings, it was shown that the scale is a measurement tool with high validity and reliability that can be applied in Turkish culture. In our study, the Cronbach's alpha reliability coefficient of the scale was 0.794.

The Brief Multidimensional Self-Control Scale (BMSCS)

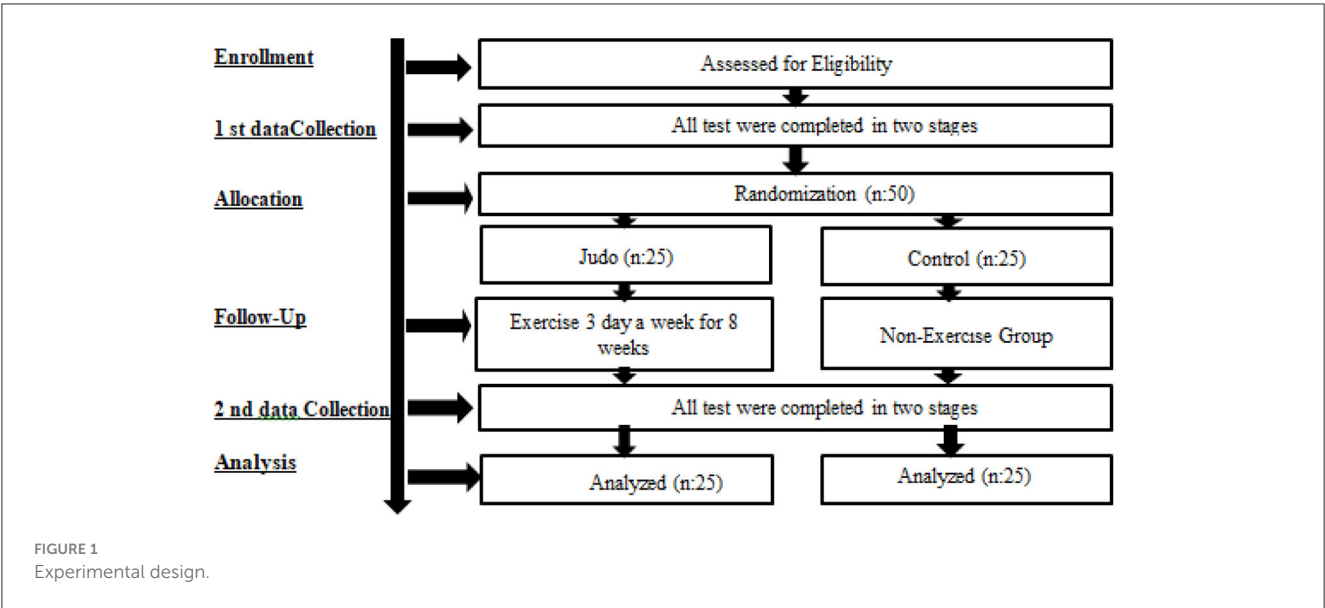
The scale, developed by Nilsen et al. (2020) and later adapted into Turkish by Koç et al. (2023), consists of eight items and two sub-dimensions, Inhibition and Initiation. Initiation sub-dimension consists of 2, 4, 5, and 8 items, while Inhibition sub-dimension consists of 1, 3, 6, and 7 items. Items 1, 3, 5, and 7 were reverse scored to ensure consistency and comparability. The scale is a five-point Likert type. In this study, Cronbach's alpha reliability coefficient was calculated as 0.665 for the Initiation subscale and 0.567 for the Inhibition subscale.

Berkeley emotion expressivity questionnaire

Berkeley Emotion Expressivity Questionnaire (BEEQ) was developed by Gross and John (1995). The scale consists of 16 items. The scale consists of 5-point Likert-type items scored from 1 to 5 and is scored from 1 (strongly disagree) to 5 (strongly agree). The points that can be obtained from the scale vary between 16 and 80. The higher the total score obtained from the scale means that the person expresses his/her emotions behaviorally to that degree. The expression of emotions sub-dimension consists of items 1, 3, 5, 6, 10, 13, and 16; the impulse strength sub-dimension consists of items 2, 4, 7, 11, 12, 14, and 15; and the concealment sub-dimension consists of items 8 and 9. The 1st, 3rd, 8th, and 9th items of the scale are reverse scored. The Turkish adaptation of the scale was conducted by Akan and Barişkin (2017). In this study, Cronbach's alpha reliability coefficient was calculated as 0.708 for the expression of emotions subscale, 0.645 for the impulse strength subscale and 0.703 for the concealment subscale.

Weekly training program

Judo training sessions were conducted over a period of 6 weeks, with the initial 4 weeks encompassing fundamental movements and techniques. The subsequent 2 weeks were designed to familiarize participants with combined strikes and techniques (Harrington, 2002; Broussal-Derval, 2021). Training sessions were conducted thrice weekly for a duration of 90 min, on non-consecutive days.



The training intensity was maintained within the moderate to high range on the basis of the perceived exertion.

Before the study, the participants were given theoretical information about Judo; in this context, the definition, history, purpose and basic principles of Judo were explained in detail. Before starting the 6-week training program; Rei Waza (greeting), Obi Waza (belt tying), Ukemi Waza (fall techniques), Shizei Waza (stance positions), Shintai Waza (walking techniques), Kumi Kata (grips), Tai Sabaki (body turns) and Happono Kuzushi (eight-way unbalancing) were included. This preliminary preparation process was planned to allow the participants to acquire basic judo skills. Each training session lasted 90 min in total, including 20 min of general warm-up, 60 min of technical training and 10 min of cooling down. Before starting the training, an additional warm-up protocol of ~10 min was applied to activate the lumbo-pelvic-hip complex muscles of the athletes. This protocol was structured based on the method developed by Crow et al. (2012) and consisted of exercises such as double-legged bridge, side-lying hip abduction, quadrupedal lower extremity lift, gluteal rest with 60° hip flexion, dirty dog (quadrupedal hip abduction), single-legged hip extension and balance ball wall squat. Subsequent to the general warm-up, fundamental movements such as Ukemi Waza (fall techniques) and forward/backward somersaults were rehearsed for a duration of 5 min at the commencement of each training session. Furthermore, at the commencement of each session, the techniques acquired in the preceding weeks were reinforced through a brief repetition process lasting ~5 min. During the initial 2 weeks of the training program, emphasis was placed on the fundamental principles and ground techniques (ne-waza) of Judo. In the third and fourth weeks, the technical training content was structured to learn advanced techniques such as Ippon Seoi Nage, O Goshi, and Kesa Gatame. In weeks five and six, the participants engaged in a review of previously learned techniques through Uchikomi (technique review). They were also introduced to Ouchi Gari, Yakusoku Geiko, Kumi Kata at 70% intensity (with controlled resistance) and Randori (competition-like practice) at low intensity (Table 2). In

TABLE 1 Descriptives.

Group	Height		Weight		Age	
	X	S.D.	X	S.D.	X	S.D.
Judo	173.40	10.54	67.04	10.01	20.23	1.21
Control	173.60	9.94	71.64	12.01	20.52	1.47

Yakusoku Geiko and Randori exercises, 3-min active rest and water breaks were given between sets.

Statistical analysis

Statistical analyses were performed via SPSS (Version 21.0 for Windows, Chicago, IL, USA) software, with the statistical significance set at 0.05. The Shapiro–Wilk normality test was performed to determine the homogeneity of the sample (Table 3). The pre-test and post-test results for each group were analyzed using a paired *t*-test. The difference values of the sub-dimension parameters of the scales used in the study were obtained by subtracting the post-test and pre-test difference values. To determine the differences between groups, a one-way analysis of variance was performed using the difference values. In addition, in the comparison of paired groups, the effect size was calculated according to Cohen’s *d* formula [(M2 – M1)/SD pooled]. Moreover, it was interpreted as follows: 0–0.19 insignificant, 0.20–0.59 small (*s*), 0.6–1.19 moderate (*m*), 1.20–1.99 large (*l*), and ≥2.00 very large (*v.l*) (Cohen, 2013).

Results

The study demonstrated that a 6-week judo training regimen exerted a significant effect on the psychological resilience score (*e.s.* = 1.047, *p* < 0.001), while no such effect was observed in

TABLE 2 Six-week judo training protocol.

Week	Training content
First and second	Shizentai: normal body posture
	Jigotai: deep defensive posture
	Ushiro ukemi: falling backward
	Yoko ukemi: falling sideways, to the right and left
	Mae ukemi: falling forward
	Ayumi ashi: overtaking each other's feet while walking
	Mae mawari ukemi
	Tsugi ashi: walking with no overtaking the feet
Third and fourth	Kumi kata: grip techniques
	Tai Sabaki
	Throwing phases
	-Kuzushi: breaking equilibrium
	-Kake: throw execution
	-Tsukuri: throwing preparation, throw entrance
	-Nage: the fall of Uke
	Training the technique of Ippon Seoi Nage and O Goshi
Fifth and sixth	Reviewing the previous techniques (Uchikomi)
	Training 0 uchi Gari
	Training the technique of Kesa- gatame
	Fighting grips (Kumi Kata)
	Yakusoku Geiko
	Fight with 70% power (Randori)

the Control group (e.s. = 0.0091, $p = 0.751$) ($p = 0.06$, Table 4, Figure 2a). Judo training demonstrated a significant impact on self-control levels in the Initiation sub-dimension (e.s. = 1, 739, $p < 0.001$, Table 4, Figure 2b), while exhibiting no discernible effect in the Inhibition dimension (e.s. = 0.052, $p = 0.892$, Table 4, Figure 2c). In the control group, a significant decrease was found in the Initiation sub-dimension (e.s. = 0, 785, $p = 0.001$, Table 4, Figure 2b) and a significant increase was found in the Inhibition sub-dimension (e.s. = 1, 861, $p < 0.001$, Table 4, Figure 2c) ($p = 0.005$).

The impact of judo training on various physical and psychological outcomes was examined. The findings revealed a modest effect on impulse power (e.s. = 0.395), concealment (e.s. = 0.428), and a more pronounced effect on psychological resilience (e.s. = 0.886). The expression of emotions ($p = 681$), impulse power ($p = 159$), concealment ($p = 205$), and the total expression of emotions ($p = 465$) did not demonstrate a significant difference between the groups ($p > 0.05$, Table 4, Figure 3).

Discussion

The primary conclusions of this study indicated that a 6-week judo training regimen exhibited a substantial and robust

impact on psychological resilience. Furthermore, while the study demonstrated a positive impact on the initiation sub-dimension of self-control, no significant alterations were observed in the inhibition dimension. The impact of the training variable on emotion expression levels was found to have a small effect on impulse control and concealment, and it was determined to be moderate in relation to psychological resilience. This outcome substantiated the primary hypothesis of the study, which posited that judo training enhances psychological resilience, self-control, and emotional expression levels in healthy, sedentary men. This phenomenon can be attributed to the significant role of exercise in mental health, given its positive mental and physical effects.

The findings obtained in this study reveal that judo training has positive effects on psychological resilience, self-control, and emotion expression levels of sedentary university students. A substantial body of research has been conducted on the impact of physical activity on psychological wellbeing. In a cross-sectional study conducted by Özbek and Akyüz (2022) on soccer players, it was reported that the psychological resilience levels of the participants were moderate. This finding indicates that even athletes are amenable to enhancement in terms of psychological resilience, thereby underscoring the potential of physical activity in this domain. San Román-Mata et al. (2020) posited that active engagement in health-oriented physical activities has the potential to enhance psychological resilience and emotional regulation skills, thereby reducing the prevalence of psychological distress. In a similar vein, Dunston et al. (2022) reported that individuals engaging in more intense physical activity exhibited higher levels of resilience and perseverance. Lin and Gao's (2023) study revealed a mutual interaction between physical activity and social support, indicating a collective contribution to the psychological resilience levels of young individuals. Qiu et al. (2025) also identified a substantial and favorable correlation between physical activity levels and psychological resilience in young individuals. Analogous effects were observed in the context of disparate combat sports. As reported by Yilmaz et al. (2024), a 6-week taekwondo training program led to an enhancement in self-control levels among sedentary university women. In a recent study, Jeong (2024) examined the impact of judo training on adolescents' life satisfaction and found positive results. Hami and Mohammad Hassan (2024) study indicated that a period of 8 weeks of judo training had a substantial impact on the improvement of various health and wellbeing outcomes in visually impaired veterans. These outcomes encompassed enhanced life expectancy, improved mental health, and elevated levels of competition motivation. As demonstrated by Lindell-Postigo et al. (2023), judo training has been shown to be an effective intervention for the reduction of aggressive behaviors, in addition to the enhancement of emotional intelligence and self-concept levels.

The impact of judo on individuals across diverse age groups and with unique needs is a noteworthy consideration. Yamasaki (2023) reported that judo training had positive effects on physical (e.g., gait and balance) and cognitive (memory, executive functions) functions in elderly individuals. Morales et al. (2021, 2022) have demonstrated through empirical research that adapted judo programs in children diagnosed with autism spectrum disorder (ASD) result in significant improvements across multiple domains,

TABLE 3 Mean, reliability, skewness, and kurtosis values of the scales.

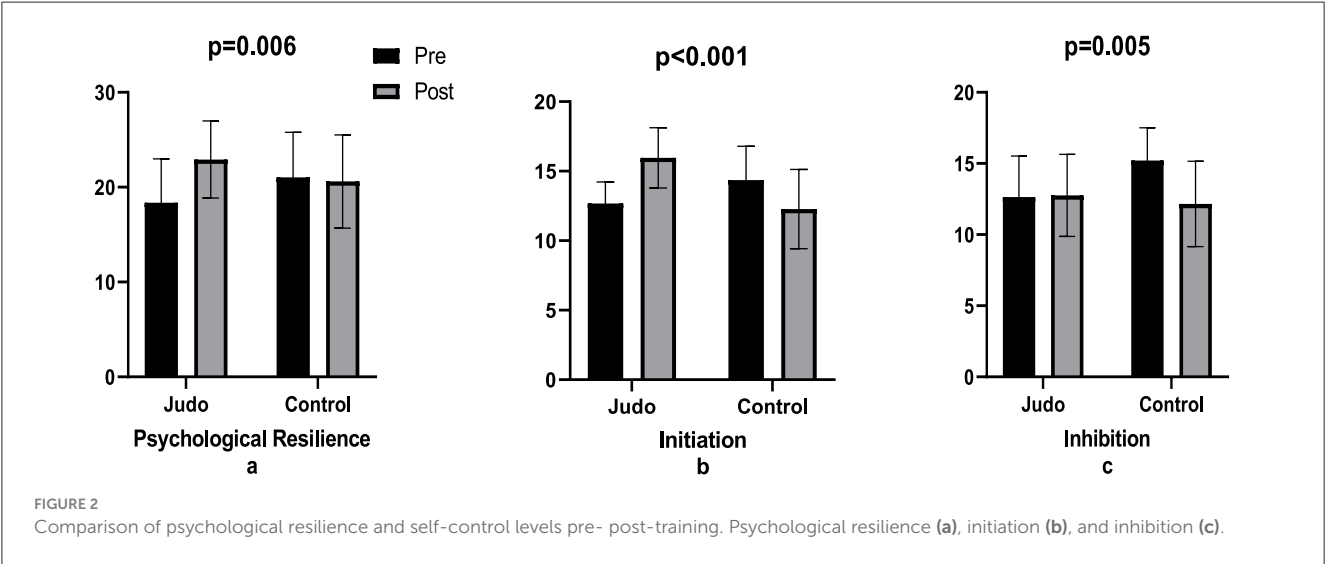
(n:50)	Sub-dimensions	Number of items	X	S.D.	α	p	Kurtosis	Skewness
Brief psychological resilience scale		6	20.39	4.6	0.794	0.004	−0.053	−0.534
The brief multidimensional self-control scale (α : 0.543)	Initiation	4	14.10	2.37	0.665	<0.001	0.462	−0.213
	Inhibition	4	12.23	2.73	0.567	<0.001	0.0819	1.228
Berkeley emotion expressivity questionnaire (α : 0.561)	Expression of emotions	7	21.25	2.9	0.708	<0.001	−0.227	0.220
	Impulse power	7	24.59	4.61	0.645	<0.001	−0.747	0.919
	Concealment	2	5.06	1.83	0.703	<0.001	0.732	0.919

α , Cronbach's Alpha; X, Mean; S.D., Standard deviation.

TABLE 4 Comparison of pre- and post-training group results.

	Judo		d	Control		d	p
	Pre	Post		Pre	Post		
P.P.	18.36 ± 4.62	22.92 ± 4.07↑	1.047 ^m	21.04 ± 4.74	20.60 ± 4.92	0.091	0.006
Initiation	12.68 ± 1.55	15.96 ± 2.17↑	1.739 ^l	14.36 ± 2.43	12.28 ± 2.85↓	0.785 ^m	$p < 0.001$
Inhibition	12.64 ± 2.89	12.76 ± 2.88	0.052	15.20 ± 2.31	12.16 ± 3.00↓	1.861 ^l	0.005
E.E.	21.44 ± 2.81	21.32 ± 2.79	0.042	21.28 ± 3.02	20.68 ± 2.78	0.207 ^m	0.681
I.P.	24.20 ± 4.92	25.80 ± 2.92	0.395 ^s	26.28 ± 2.98	26.12 ± 2.42	0.059	0.159
Concealment	5.36 ± 1.75	4.68 ± 1.41	0.428 ^s	4.96 ± 1.49	5.08 ± 1.29	0.086	0.205
E.E.T	51.00 ± 6.42	51.80 ± 3.79	0.886 ^m	52.52 ± 3.15	51.88 ± 4.06	0.17	0.465

↓ ↑ $p < 0.05$; P.P., psychological resilience; E.E., Emotion Expression; I.P., impulse power; E.E.T., Expression of emotions total; d , effect size; 0–0.19 insignificant, 0.20–0.59 small (s), 0.6–1.19 moderate (m), 1.20–1.99 large (l), and ≥ 2.00 very large ($v.l$).



including motor abilities, psychosocial behaviors, social interaction, and emotional regulation. Furthermore, Křižalkovičová et al. (2024) reported that judo practice can support central nervous system (CNS) maturation in young children. According to Lo et al. (2019), judo training has the potential to facilitate cognitive development in school-age children and individuals diagnosed with executive dysfunction. Furthermore, Renziehausen et al. (2022) reported that short-term adapted judo programs have the capacity to reduce stress, enhance satisfaction with the activity, and promote

improvements in social relationships. Ennigkeit and Beek (2019) reported that judo increases empathy levels and reduces aggressive behaviors. Meanwhile, Sterkowicz-Przybycień et al. (2014) stated that this sport contributes to psychosocial areas such as self-discipline, serenity, effective problem solving, and socio-moral sensitivity. Biedrzycki and Laskowski (2024) underscored the notion that regular participation in judo confers a comprehensive array of benefits, encompassing both intellectual and psychosocial dimensions of wellbeing in individuals.

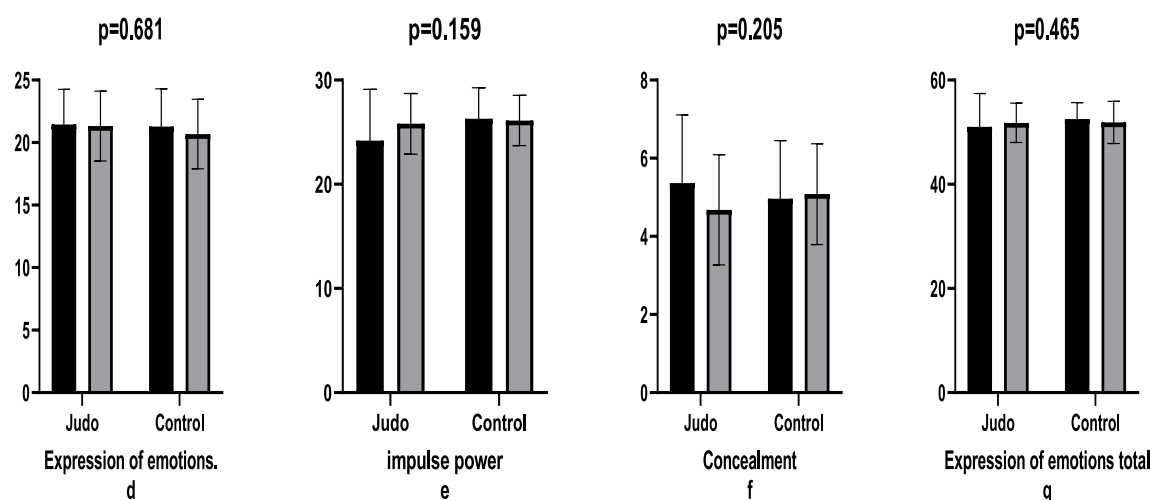


FIGURE 3

Comparison of expression of emotions levels pre- post-training. Expression of emotions (d), impulse power (e), concealment (f), and expression of emotions total (g).

The rise in mental health issues (e.g., anxiety, depression, low self-esteem) among university students has been shown to have a detrimental effect on both academic performance and quality of life (Karyotaki et al., 2020; Yousif et al., 2022; Levante et al., 2024). Conversely, physical activity has been identified as a crucial factor in safeguarding both physical and psychological wellbeing (Bull et al., 2020; Qiu et al., 2025). However, the majority of students do not meet the recommended levels of physical activity (Ruiz et al., 2011; Brunet et al., 2013). This phenomenon has the potential to contribute to the development of adverse lifestyles and mental health challenges. In this context, psychological resilience is defined as a dynamic concept that increases an individual's capacity to cope with stress and supports characteristics such as self-control. This concept can be strengthened by physical activity (Qiu et al., 2025; Rutter, 2023). The extant research indicates that regular physical activity can support students' mental health by increasing psychological resilience and self-control levels (Fleshner, 2005; Ouergui et al., 2020; Micheletti Cremasco et al., 2021; Stanković et al., 2022). The present study hypothesizes that the minor impact observed on the subdimensions of emotional expression can be attributed to their common presence within the same social environment.

Research conducted in relation to judo has predominantly centered on professional or experienced athletes. These individuals have been documented to exhibit elevated levels of psychological resilience (Garrido-Muñoz et al., 2024). Conversely, the present study's focus on sedentary university students offers a distinctive contribution to the existing literature by demonstrating that judo training can have beneficial effects on mental health even at the introductory level. Moreover, the utilization of random sampling methods in the examination of judo, a widely practiced combat sport, contributes to the study's methodological rigor. The findings suggest that educational institutions and families should encourage young male university students to engage in

structured physical activities such as judo. While these activities do not have a substantial impact on individuals' emotion expression skills, they have the potential to contribute to the development of psychological resilience and self-control skills.

This study has several limitations. The limited sample size precluded the ability to generalize the findings. The research focused on a 6-week time period and did not assess long-term outcomes, which limits the understanding of sustained impacts. The participants were exclusively drawn from a single department of a single university, a limitation that renders the results' generalizability to other student populations uncertain. The study did not address potential gender differences that could affect the results. Notwithstanding this limitation, the reliability of the results is ensured by the utilization of fully validated instruments adapted to the sample. In the future, researchers should endeavor to include larger and more diverse samples in their studies. Furthermore, they should examine long-term effects, address gender as a variable, and explore a wider range of Judo exercise protocols. These efforts will provide a more comprehensive understanding of the subject.

Conclusions

This study offers substantial evidence that integrating Judo martial arts exercises into the academic curriculum of university students results in significant enhancements in various domains of sport psychology and mental health. The present findings suggest that judo martial arts exercises in a non-agonistic environment at the beginner level improve levels of psychological resilience, self-control, and emotion expression. These results underscore the critical role of judo martial arts training in the optimization of mental health and sport psychology. The observed enhancements in psychological resilience and self-control levels, in conjunction with regulated levels of emotional expression, suggest that judo

exercises make a valuable contribution to mental health and sport psychology.

Data availability statement

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found in the article/supplementary material.

Ethics statement

Approval was obtained with the decision of Munzur University, Non-Interventional Research Ethics Committee dated 27/02/2025 and numbered 2025/02. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

MK: Conceptualization, Data curation, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Writing – original draft, Writing – review & editing. CY: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. ÇT: Project administration, Resources, Software, Validation, Writing – original draft, Writing – review & editing, Investigation, Supervision. BÇ: Project administration, Resources, Software, Validation, Writing – original draft, Writing – review & editing, Data curation, Formal analysis, Methodology. CB: Resources, Supervision, Validation, Writing – original draft, Writing – review & editing, Investigation, Methodology, Visualization. KK: Investigation, Project administration, Resources, Software, Supervision, Validation, Writing – original draft, Writing – review & editing, Methodology. YS: Methodology, Project administration, Resources, Software, Supervision, Validation, Writing – original draft, Writing – review & editing, Conceptualization, Data

curation. YB: Conceptualization, Data curation, Methodology, Resources, Validation, Writing – original draft, Writing – review & editing, Formal analysis. TC: Conceptualization, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Writing – original draft, Writing – review & editing. FS: Investigation, Methodology, Project administration, Supervision, Writing – original draft, Writing – review & editing, Funding acquisition. SS: Writing – original draft, Writing – review & editing, Data curation, Supervision, Investigation, Project administration, Resources. FNS: Conceptualization, Formal analysis, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Writing – original draft, Writing – review & editing.

Funding

The author(s) declare that no financial support was received for the research, authorship, and/or publication of this article.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The author(s) declare that no Gen AI was used in the creation of this manuscript.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

References

- Akan, S. T., and Barişkin, E. (2017). Reliability and validity indicators of berkeley expressivity questionnaire in the context of culture and gender *Türk Psikiyatri Dergisi* 28, 43–50. doi: 10.5080/u13378
- Baumeister, R. F., Vohs, K. D., and Tice, D. M. (2007). The strength model of self-control. *Curr. Dir. Psychol. Sci.* 16, 351–355. doi: 10.1111/j.1467-8721.2007.00534.x
- Biedrzycki, J., and Laskowski, R. (2024). The impact of judo training on the development of cognitive functions-a systematic review. *Balt. J. Health Phys. Act.* 16:7. doi: 10.29359/BJHPA.16.4.0
- Boat, R., and Cooper, S. B. (2019). Self-control and exercise: a review of the bi-directional relationship. *Brain Plast.* 5, 97–104. doi: 10.3233/BPL-190082
- Broussal-Derval, A. (2021). *Training and Conditioning for Judo*. Champaign: Human Kinetics Publishers.
- Brunet, J., Sabiston, C. M., Chaiton, M., Barnett, T. A., O'Loughlin, E., Low, N. C., et al. (2013). The association between past and current physical activity and depressive symptoms in young adults: a 10-year prospective study. *Ann. Epidemiol.* 23, 25–30. doi: 10.1016/j.annepidem.2012.10.006
- Bull, F. C., Al-Ansari, S. S., Biddle, S., Borodulin, K., Buman, M. P., Cardon, G., et al. (2020). World Health Organization 2020 guidelines on physical activity and sedentary behaviour. *Br. J. Sports Med.* 54, 1451–1462. doi: 10.1136/bjsports-2020-102955
- Cameron, L. D., and Overall, N. C. (2018). Suppression and expression as distinct emotion-regulation processes in daily interactions: longitudinal and meta-analyses. *Emotion* 18, 465–480. doi: 10.1037/emo0000334
- Çarkit, E., and Yalçın, S. B. (2018). Thought errors of the university students and how their expressing emotions predict their perfectionism attitude. *Sakarya Univ. J. Educ.* 8, 195–210. doi: 10.19126/suje.367429

- Cohen, J. (2013). *Statistical Power Analysis for the Behavioral Sciences*. New York, NY: Routledge. doi: 10.4324/9780203771587
- Crow, J. F., Buttifant, D., Kearny, S. G., and Hrysomallis, C. (2012). Low load exercises targeting the gluteal muscle group acutely enhance explosive power output in elite athletes. *J. Strength Cond. Res.* 26, 438–442. doi: 10.1519/JSC.0b013e318220dfab
- de Lorenco-Lima, L., Gaines, S. A., and Waterbury, E. M. (2025). Rank-based psychological characteristics in brazilian jiu-jitsu athletes: mental strength, resilience, grit, self-efficacy, self-control, aggression, life satisfaction, and mental health. *J. Funct. Morphol. Kinesiol.* 10:100. doi: 10.20944/preprints202501.0339.v1
- De Ridder, D. T., Lensvelt-Mulders, G., Finkenauer, C., Stok, F. M., and Baumeister, R. F. (2012). Taking stock of self-control: a meta-analysis of how trait self-control relates to a wide range of behaviors. *Pers. Soc. Psychol. Rev.* 16, 76–99. doi: 10.1177/1088868311418749
- Dogan, T. (2015). Adaptation of the brief resilience scale into Turkish: a validity and reliability study. *J. Happiness Well-Being* 3:93.
- Domaneschi, L., and Ricci, O. (2022). “I don’t teach violence, I teach self-control”; the framing of mixed martial arts between mental health and well-being. *Front. Sociol.* 6:750027. doi: 10.3389/fpsyg.2021.750027
- Dunston, E. R., Messina, E. S., Coelho, A. J., Christ, S. N., Waldrup, M. P., Vahk, A., et al. (2022). Physical activity is associated with grit and resilience in college students: is intensity the key to success? *J. Am. Coll. Health* 70, 216–222. doi: 10.1080/07448481.2020.1740229
- Eken, Ö., Yagin, F. H., Eken, I., Gabrys, T., Knappova, V., Bayraktaroglu, S., et al. (2022). Diurnal variation in Uchikomi fitness test performance: influence of warm-up protocols. *Front. Psychol.* 13:1059727. doi: 10.3389/fpsyg.2022.1059727
- Ennigkeit, F., and Beek, F. L. (2019). The effect of judo on social behavior with special consideration of periods of reflection. *J. Martial Arts Res.* 2:7. doi: 10.15495/ojs_25678221_22_100
- Epstein, R. M., and Krasner, M. S. (2013). Physician resilience: what it means, why it matters, and how to promote it. *Acad. Med.* 88, 301–303. doi: 10.1097/ACM.0b013e318280c0f0
- Fleshner, F. (2005). Physical activity and stress resistance: sympathetic nervous system adaptations prevent stress-induced immunosuppression. *Exerc. Sport Sci. Rev.* 33, 120–126. doi: 10.1097/00003677-200507000-00004
- Garrido-Muñoz, M., Blanco-García, C., Díez-Vega, I., García-Merino, S., Acebes-Sánchez, J., and Rodríguez-Romo, G. (2024). Psychological resilience, athletic experience, and competitive level of judokas. A transversal study. *Front. Psychol.* 15:1440412. doi: 10.3389/fpsyg.2024.1440412
- Gross, J. J., and John, O. P. (1995). Facets of emotional expressivity: three self-report factors and their correlates. *Pers. Individ. Dif.* 19, 555–568. doi: 10.1016/0191-8869(95)00055-B
- Hami, M., and Mohammad Hassan, F. (2024). Effect of judo training on life expectancy, motivation, and mental health of blind and visually impaired veterans in Tehran. *Iran. J. War Public Health* 16, 233–238. doi: 10.58209/ijwph.16.3.233
- Harrington, P. (2002). *Judo Basics: Principles, Rules, and Rankings, 1st Edn.* Tokyo: Kodansha International.
- Hofmann, W., Baumeister, R. F., Förster, G., and Vohs, K. D. (2012). Everyday temptations: an experience sampling study of desire, conflict, and self-control. *J. Pers. Soc. Psychol.* 102:1318. doi: 10.1037/a0026545
- Invernizzi, P. L., Trecroci, A., Scurati, R., Signorini, G., Formenti, D., Bosio, A., et al. (2023). Acute effects of a combat sport environment on self-control and pain perception inhibition: a preliminary study in a new ecological framework. *Sustainability* 15:8418. doi: 10.3390/su15108418
- Jeong, Y. (2024). An analysis of the relationship between the adolescents’ intention to continue exercising judo training as sports for all and the satisfaction of life. *Int. J. Martial Arts* 9, 1–10. doi: 10.22471/martialarts.2024.9.0.01
- Karyotaki, E., Cuijpers, P., Albor, Y., Alonso, J., Auerbach, R. P., Bantjes, J., et al. (2020). Sources of stress and their associations with mental disorders among college students: results of the World Health Organization World Mental Health surveys international college student initiative. *Front. Psychol.* 11:1759. doi: 10.3389/fpsyg.2020.01759
- Kim, Y., Richards, J. S., and Oldehinkel, A. J. (2022). Self-control, mental health problems, and family functioning in adolescence and young adulthood: between-person differences and within-person effects. *J. Youth Adolesc.* 51, 1181–1195. doi: 10.1007/s10964-021-01564-3
- Koç, H., Şimşir Gökulp, Z., and Seki, T. (2023). The relationships between self-control and distress among emerging adults: A serial mediating roles of fear of missing out and social media addiction. *Emerg. Adulthood* 11, 626–638. doi: 10.1177/21676968231151776
- Koç, K., Arslan, T., Pepe, O., Kaynak, K., Yüce, M. S., Dalbudak, I., et al. (2025). Impact of exercise on psychological well-being in patients with pediatric cancer: an experimental study. *Children* 12:404. doi: 10.3390/children12040404
- Křižalkovičová, Z., Szabó, P., Kumli, K., Štefanovský, M., Makai, A., and Szentpéteri, J. (2024). Neurodevelopmental benefits of judo training in preschool children: a multinational, mixed methods follow-up study. *Front. Psychol.* 15:1457515. doi: 10.3389/fpsyg.2024.1457515
- Kusan, M., Başoglu, B., Aydogmuş, M., Ermiş, S. A., Sekban, G., Bayraktar, M. T., et al. (2025). The impact of physical exercise on esports players: a monitoring perspective. *Front. Public Health.* 13:1558247. doi: 10.3389/fpubh.2025.1558247
- Kuzucu, Y. (2011). Adaptation of the emotional expression questionnaire: validity and reliability studies. *Kastamonu Educ. J.* 19, 779–792.
- Lee, J. H., Nam, S. K., Kim, A., Kim, B., Lee, M. Y., and Lee, S. M. (2013). Resilience: a meta-analytic approach. *J. Couns. Dev.* 9, 269–279. doi: 10.1002/j.1556-6676.2013.00095.x
- Levante, A., Quarta, S., Massaro, M., Calabriso, N., Carluccio, M. A., Damiano, F., et al. (2024). Physical activity habits prevent psychological distress in female academic students: the multiple mediating role of physical and psychosocial parameters. *Heliyon* 10:e26626. doi: 10.1016/j.heliyon.2024.e26626
- Lin, Y., and Gao, W. (2023). The effects of physical exercise on anxiety symptoms of college students: a meta-analysis. *Front. Psychol.* 14:1136900. doi: 10.3389/fpsyg.2023.1136900
- Lindell-Postigo, D., Zurita-Ortega, F., Melguizo-Ibáñez, E., González-Valero, G., Ortiz-Franco, M., and ve Ubago-Jiménez, J. L. (2023). Ortaöğretim Öğrencilerinde Judo Müdahale Programının Psikososyal Alana Etkisi. *Spor* 11:140. doi: 10.3390/sports11080140
- Litwic-Kaminska, K. (2013). Resiliency and stress experience among judo and taekwondo athletes. *J. Combat Sports Martial Arts* 4, 167–172. doi: 10.5604/20815735.1090669
- Lo, W. L. A., Liang, Z., Li, W., Luo, S., Zou, Z., Chen, S., et al. (2019). The effect of judo training on set-shifting in school children. *Biomed Res. Int.* 2019:2572016. doi: 10.1155/2019/2572016
- Luthar, S. S., Cicchetti, D., and Becker, B. (2003). The construct of resilience: a critical evaluation and guidelines for future work. *Child Dev.* 71, 543–562. doi: 10.1111/1467-8624.00164
- Major, B., and Gramzow, R. H. (1999). Abortion as stigma: cognitive and emotional implications of concealment. *J. Pers. Soc. Psychol.* 77, 735–745. doi: 10.1037/0022-3514.77.4.735
- Micheletti Cremasco, M., Mulasso, A., Moroni, A., Testa, A., Degan, R., Rainoldi, A., et al. (2021). Relation among perceived weight change, sedentary activities and sleep quality during COVID-19 lockdown: a study in an academic community in Northern Italy. *Int. J. Environ. Res. Public Health* 18:2943. doi: 10.3390/ijerph18062943
- Morales, J., Fukuda, D. H., Garcia, V., Pierantozzi, E., Curto, C., Martínez-Ferrer, J. O., et al. (2021). Behavioural improvements in children with autism spectrum disorder after participation in an adapted judo programme followed by deleterious effects during the COVID-19 lockdown. *Int. J. Environ. Res. Public Health* 18:8515. doi: 10.3390/ijerph18168515
- Morales, J., Pierantozzi, E., Fukuda, D. H., Garcia, V., Guerra-Balic, M., Sevilla-Sánchez, M., et al. (2022). Improving motor skills and psychosocial behaviors in children with autism spectrum disorder through an adapted judo program. *Front. Psychol.* 13:1067310. doi: 10.3389/fpsyg.2022.1067310
- Nilsen, F. A., Bang, H., Boe, O., Martinsen, Ø. L., Lang-Ree, O. C., and Røysamb, E. (2020). The Multidimensional Self-Control Scale (MSCS): development and validation. *Psychol. Assess.* 32, 1057–1074. doi: 10.1037/pas0000950
- Ouergui, I., Ardigò, L. P., Selmi, O., Levitt, D. E., Chtourou, H., Bouassida, A., et al. (2020). Changes in perceived exertion, well-being, and recovery during specific judo training: impact of training period and exercise modality. *Front. Physiol.* 11:931. doi: 10.3389/fphys.2020.00931
- Özbek, S., and Akyüz, O. (2022). An investigation of the psychological robustness levels of football players in terms of some variables. *Spor ve Performans Araştırmaları Dergisi* 13, 245–256. doi: 10.17155/omuspd.1110243
- Piskorska, E., Mieszkowski, J., Kochanowicz, A., Sielski, Ł., and Niespodziński, B. (2016). Stress and anxiety disorders-prognostic significance of various biochemical indicators in combat sports athletes. *Arch. Budo Sci. Martial Arts Extreme Sports* 12, 25–36.
- Potoczny, W., Herzog-Krzywoszańska, R., and Krzywoszański, L. (2022). Self-control and emotion regulation mediate the impact of karate training on satisfaction with life. *Front. Behav. Neurosci.* 15:802564. doi: 10.3389/fnbeh.2021.802564
- Qiu, W., Huang, C., Ma, W., Xiao, H., Nie, Y., Du, K., et al. (2025). The correlation between physical activity and psychological resilience in young students: a systematic review and meta-analysis. *Front. Psychol.* 16:1557347. doi: 10.3389/fpsyg.2025.1557347
- Renziehausen, J. M., Rivera, P. M., Leahy, N. A., Fukuda, D. H., and Garcia, J. M. (2022). The feasibility of a community-based judo program and cortisol collection in children with autism. *Adv. Neurodev. Disord.* 6, 100–105. doi: 10.1007/s41252-022-00237-x
- Riggio, H. R. (2017). “Emotional expressiveness” in *Encyclopedia of Personality and Individual Differences*, eds V. Zeigler-Hill and T. K. Shackelford (Cham:

Springer International Publishing), 1–8. doi: 10.1007/978-3-319-28099-8_508-1

Rimé, B. (2007). “Interpersonal emotion regulation,” in *Handbook of Emotion Regulation*, ed. J. J. Gross (New York, NY: Guilford Press), 466–485.

Ruiz, J. R., Ortega, F. B., Martínez-Gómez, D., Labayen, I., Moreno, L. A., De Bourdeaudhuij, I., et al. (2011). Objectively measured physical activity and sedentary time in European adolescents: the HELENA study. *Am. J. Epidemiol.* 174, 173–184. doi: 10.1093/aje/kwr068

Rutter, M. (2000). “Resilience reconsidered: conceptual considerations, empirical findings, and policy implications,” in *Handbook of Early Childhood Intervention*, eds J. P. Shonkoff and S. J. Meisels (Cambridge: Cambridge University Press), 651–682. doi: 10.1017/CBO9780511529320.030

Rutter, M. (2006). “The promotion of resilience in the face of adversity,” in *Families Count: Effects on Child and Adolescent Development*, eds A. Clarke-Stewart and J. Dunn (New York, NY: Cambridge University Press), 26–52. doi: 10.1017/CBO9780511616259.003

Rutter, M. (2023). “Resilience: some conceptual considerations,” in *Social Work* (Routledge), 122–127. doi: 10.4324/9781003178699-23

San Román-Mata, S., Puertas-Molero, P., Ubago-Jiménez, J. L., and González-Valero, G. (2020). Benefits of physical activity and its associations with resilience, emotional intelligence, and psychological distress in university students from southern Spain. *Int. J. Environ. Res. Public Health* 17:4474. doi: 10.3390/ijerph17124474

Situ, Q. M., Li, J. B., Dou, K., and Wang, Y. J. (2021). Bidirectional association between self-control and internalizing problems among college freshmen: a cross-lagged study. *Emerg. Adulthood* 9, 401–407. doi: 10.1177/2167696819862174

Smith, B. W., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., and Bernard, J. (2008). The brief resilience scale: assessing the ability to bounce back. *Int. J. Behav. Med.* 15, 194–200. doi: 10.1080/10705500802222972

Stanković, N., Todorović, D., Milošević, N., Mitrović, M., and Stojiljković, N. (2022). Aggressiveness in judokas and team athletes: predictive value of personality traits, emotional intelligence and self-efficacy. *Front. Psychol.* 12:824123. doi: 10.3389/fpsyg.2021.824123

Sterkowicz-Przybycień, K., Klys, A., and Almansba, R. (2014). Educational judo benefits on the preschool children's behaviour. *J. Combat Sports Martial Arts* 5, 23–26. doi: 10.5604/20815735.1127449

Yamasaki, T. (2023). Benefits of judo training for brain functions related to physical and cognitive performance in older adults. *Encyclopedia* 3, 981–995. doi: 10.3390/encyclopedia3030071

Yang, J., Lim, T., Kwon, O., and Han, H. (2019). Structural relationship among resilience, psychological skills and performance of taekwondo sparring athletes. *Arch. Budo* 15, 45–56.

Yilmaz, C., Erail, S., Budak, C., and Demiroglu, T. (2024). Effect of taekwondo training on self-control, quality of life and self-defense levels in sedentary women. *J. ROL Sport Sci.* 5, 508–520. doi: 10.5281/zenodo.13908026

Yousif, M. A., Arbab, A. H., and Yousef, B. A. (2022). Perceived academic stress, causes, and coping strategies among undergraduate pharmacy students during the COVID-19 pandemic. *Adv. Med. Educ. Pract.* 13, 189–197. doi: 10.2147/AMEP.S350562

Zou, Z., Liu, Y., Xie, J., and Huang, X. (2016). Aerobic exercise as a potential way to improve self-control after ego-depletion in healthy female college students. *Front. Psychol.* 7:501. doi: 10.3389/fpsyg.2016.00501