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Personality traits and levels of anxiety and depression among martial artists: a cross-sectional study

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Abstract

Background In recent years, fighting arts (e.g., Karate, Judo, Jujitsu, Boxe) have gained broader attention due to their multiple benefits, involving both physical and psychological enhancements for practitioners. Despite that, studies revolving around specific psychological characteristics such as personality traits are scarce. This study explored potential connections between the personality traits of practitioners and the specific fighting art they engage in, and investigated levels of anxiety and depression in fighting artists.

Methods A web-based cross-sectional survey instrument was developed and disseminated across the entire Italian territory. Participants were eligible if adults (> 18 years old) engaged in any fighting arts for a minimum of one year, with no additional restrictions. The survey employed the Big Five Inventory (BFI) with 44 questions to explore personality traits using the OCEAN model, and the Hospital Anxiety and Depression Scale (HADS) to explore anxiety and depression levels.

Results A total of 770 questionnaires were collected from July to September 2023. Participants were mainly men (M = 571, 74.5%; F = 199, 25.8%; mean age 45.2 ± 14.8), and most of the participants practised in the North of Italy (*N* = 493, 64.0%). The mean age of practice was 28.5 ± 14.9 years and the most practised fighting arts were Judo (*N* = 349, 45.3%), Karate (*N* = 272, 35.3%) and Jujitsu (*N* = 42, 5.5%). Personality traits were identified as openness, conscientiousness, extroversion, agreeableness, neuroticism and the results were as follows: O) 40.1 ± 6.30; C) 37.1 ± 5.78; E) 28.2 ± 5.64; A) 35.1 ± 5.08; N) 19,8 ± 5,51. Anxiety and depression scored respectively 5.93 ± 3.14 and 3.67 ± 2.74.

Conclusions Fighting artists exhibit elevated levels of positive personality traits, such as openness, conscientiousness, extraversion, and agreeableness. Conversely, neuroticism tends to be lower among them. Moreover, anxiety and depression levels among fighting artists are lower than the Italian normative values. Fighting arts, particularly Karate and Judo, emerge as promising avenues for adults seeking innovative or complementary strategies to foster positive personality traits (e.g., openness, conscientiousness) while mitigating anxiety and depression. Future studies could explore other personality traits, including Machiavellianism, and explore additional psychological characteristics such as aggressiveness to provide a more comprehensive understanding.

Keywords Martial arts, Psychology, sports, Personality, Exercise, Sports Medicine

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Introduction

The widespread availability and diverse range of fighting arts (e.g., Judo, Karate, Tai Chi) have made them accessible to people of all ages worldwide, allowing practitioners to simultaneously focus on both physical and mental aspects, pursuing various objectives, whether geared towards athletic performance. With the growing interest in these disciplines, historical associations often link fighting arts practice to psycho-physical benefits [1–4], but evidence about some of their benefits is still to be confirmed [5].

Within the literature, research on fighting arts has delved into both physical and performance outcomes (e.g., VO2Max, Berg Balance Scale test) [6, 7], as well as psychological outcomes (e.g., Subjective Well-Being Scale (SWBS), mindfulness, depression) [8–10]. Additionally, there is growing interest in the psychological characteristics of fighting arts practitioners, although evidence in this domain is still limited [5, 11].

Psychological characteristics are characteristics (e.g., personality, temper, intelligence, emotional state) of a person that consistently influences their behaviour and thoughts, differentiating individuals' behaviours from each other's [12]. This area of study is extensively explored due to the potential to enhance performance in sports or physical activities by understanding the relationships between behaviours and psychological traits, eliminating the necessity for additional exercise, for instance. A main category of psychological characteristics is personality traits, defined as durable patterns of behaviours, thoughts and feelings that shape the unique characteristics and tendencies of everyone. Theories about these elements considered them stable over time and consistent, but others suggest that they can change during longer periods in adulthood [13]. Personality traits are commonly identified with the OCEAN acronym, referring to openness, conscientiousness, extroversion, agreeableness, and neuroticism [14].

Previous research did not directly explore distinct psychological elements but rather associated them with other factors, such as weight loss during the pre-match condition [15]. Notably, the literature lacks extensive studies that comprehensively examine the personality traits of fighting arts practitioners, often assessing only one trait individually rather than collectively [16].

This study would be the first, particularly within the Italian territory, to investigate the hypothesis of a possible relationship between the practitioner's personality traits and the fighting art practised. Moreover, a general description of the psychological characteristics of fighting arts practitioners will be provided, in particular personality traits, anxiety and depression levels.

Materials and methods

Design

This study adopted a quantitative national web-based cross-sectional survey instrument performed at the University of Genova, Italy. The main aims of the study were I) investigating the possible relations between fighting arts practised and the psychological characteristics of the participants, II) providing a general description of psychological traits of fighting arts practitioners. Specifically, the psychological characteristics investigated were personality traits, anxiety and depression. The study obtained the Ethical Committee approval from the University of Genoa (CERA N.2023/45) and was conducted following the ICH-GCP guidelines [17] and the Declaration of Helsinki [18]. The report of this observational study follows the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) recommendations [19].

Participants

Participants were considered eligible if aged 18 years or older and practising at least one fighting art for more than one year. Otherwise, they were excluded if they I) did not accept the data treatment, or partake in the study, II) if they were younger than 18 years old, and III) if they had been practising fighting arts for less than one year. Participants were informed in advance both about the time required to complete the questionnaire (10 min) and the anonymity of the information collected. Filling in the web-survey was voluntary, and it could be interrupted at any time without giving any explanation, and the data would not be saved. Furthermore, the exclusions were automated by the platform used to disseminate the questionnaire and, if decided to interrupt the survey, the participants were shown a 'thank you' message. No limits were set to the fighting arts practised to better describe the prevalence on the Italian territory. In case of more than one fighting art practised, participants were asked to indicate the most practised one.

To recruit as many participants as possible, national federations, sports clubs and associations, and individual people all over the national territory were contacted. Moreover, social media (i.e., Facebook, and Instagram) were used to promote participation in the study.

Web-survey

The International Handbook of Survey Methodology [20] was adopted to prepare the questionnaire. An anonymous web-survey hosted on the Microsoft Forms platform (Suite Office 365) was disseminated on the Italian territory between June 27th and October 2nd, 2023, among adults who practice fighting arts. The chosen platform guarantees the anonymity of data and is GDPR [21]

compliant. The survey was made, in Italian, by a team composed of a sport scientist, a physiotherapist and a psychologist.

Before accessing the survey, the participant could read both the informative note and the informed consent. After providing their consent, the actual survey could be filled in. To prevent multiple responses, Microsoft Forms was configured to disable the option of sending more than one questionnaire. Due to the large volume of responses, no reminders were sent to participants to complete the survey. The dataset was then reviewed for duplicate entries using Excel, checking variables such as age, gender, height, and weight if necessary, but no duplicates were found. The web-survey was structured in 3 sections: I) Demographic, II) Personality Traits, and III) Anxiety and Depression. The demographic section investigated the age, gender the participant identified with, height, weight, highest educational degree obtained, fighting art practised (e.g., Judo, Karate, Jujitsu), part of Italy where the practice took place (i.e., North, Centre, South and islands) and for how many years the participant had been practising.

The second section explores personality traits defined as OCEAN (i.e., openness, conscientiousness, extroversion, agreeableness, neuroticism) using the Big-Five Inventory 44 questions (BFI) [22] specifically via the level of agreement through 5-point Likert-type questions. For each question, possible answers were strongly disagree, a bit disagree, neither agree nor disagree, a bit agree, and strongly agree. Scores for each personality trait were calculated by adding the score of each question belonging to the specific trait. Higher scores indicated a bigger predisposition for that trait. Moreover, the BFI presented some reverse-scored questions to double-check the answers. The BFI scale scoring required for each trait that corresponding scoring for the answers were added up, specifically: I) Extraversion: 1, 6R, 11, 16, 21R, 26, 31R, 36, II) Agreeableness: 2R, 7, 12R, 17, 22, 27R, 32, 37R, 42, III) Conscientiousness: 3, 8R, 13, 18R, 23R, 28, 33, 38, 43R, IV) Neuroticism: 4, 9R, 14, 19, 24R, 29, 34R, 39, V) Openness: 4, 9R, 14, 19, 24R, 29, 34R, 39.

The third section investigated anxiety and depression using the Hospital Anxiety and Depression Scale (HADS) [23] test, composed of 14 closed-answer questions, 7 for depression and 7 for anxiety. For each question, 4 different Likert-like answers were available, but sentences for every answer were different for each question. Each answer corresponded to a possible score, between 0 and 3. Higher scores indicated a higher level of depression or anxiety. Total scores for anxiety and depression were calculated by adding up the scores of each question. Scoring ranges were 0–7 normal, 8–10 borderline abnormal, and 11–21, abnormal.

Data analysis

For the data analysis, Excel and the Jamovi 2.3.28 software were adopted. Results were reported as absolute and percentage frequencies for categorical variables, while continuous ones were reported as mean and standard deviation (SD). Likert-scale-type questions were reported as the percentage of agreement for each statement, divided into sections of interest. Correlation analyses (Pearson's correlation coefficient and 95% CI) were performed both among the personality traits investigated (i.e., O, C, E, A, N) [24] to compare our population with others. Moreover, a linear regression analysis was delivered to investigate the association between the level of anxiety (outcome) and the years of practice, the part of Italy in which the practice takes place and the gender of the participants (covariates). Another linear regression was performed for depression levels (outcome) according to the same covariates investigated for the anxiety levels. Parameter estimates and confidence intervals were reported.

Results

A total of 859 participants filled in the web-survey, 44 did not accepted the data treatment or had less than 18 years. Only 815 questionnaires were eligible for further analysis. Later, 13 participants were excluded because they did not meet the inclusion criteria and another 32 were excluded after the demographic section because they did not practice for at least one year, leaving a total of 770 questionnaires included in the final analysis. Participants' characteristics are detailed in Table 1.

For the reporting of the second section results (i.e., personality traits) we both presented the numerical values obtained (Table 2) and graphically reported them as a percentage of completion based on the maximum value reachable in each scale (Fig. 1).

Moreover, OCEAN elements were analysed one with the others to identify a possible correlation between them. The analysis reported that a small positive correlation between the first four elements (O, C, E, and A) exists, as well as the one between N and all the other elements but in the negative direction (Table 3). The correlation matrix results are visually represented in Fig. 2.

The third and last section of the questionnaire used the HADS questionnaire to provide two parameters, one for anxiety and one for depression. Anxiety scored 5.93 ± 3.14 (Min–Max: 0 – 18), while depression scored 3.67 ± 2.74 (Min–Max: 0 – 15). The sum of the two values has a mean ± SD corresponding to 9.60 ± 5.06. The results distributions of anxiety and depression scores are graphically presented in Fig. 3.

Table 1 Descriptive statistic of the sample

Participants (N)	**770**
Age (mean ± SD)	45,2 ± 14,8
Gender (N, (%))	
Women	199 (25,8%)
Men	571 (74,2%)
BMI (mean ± SD)	25,2 ± 3,8
Level of education (N, (%))	
Primary school diploma	72 (9,4%)
High school diploma	336 (43,6%)
BSc	132 (17,1%)
MSc	209 (27,1%)
Ph.D.	21 (2,7%)
Years of practice (mean ± SD)	28,5 ± 15,0
Italy (N, (%))	
North	493 (64,0%)
Centre	150 (19,5%)
South and Isles	127 (16,5%)
Fighting art practiced (N, (%))	
Aikido	28 (3,6%)
Aikijujutsu	1 (0,1%)
Brazilian Jujitsu	24 (3,1%)
Iaido	1 (0.1%)
Jeet Kune Do	1 (0.1%)
Judo	349 (45.3%)
Jujitsu	42 (5.5%)
Karate	272 (35.3%)
Kick Boxing	10 (1.3%)
Krav maga	1 (0.1%)
Wrestling	11 (1.4%)
MGA	2 (0.3%)
MMA (Mixed Fighting arts)	8 (1.0%)
Muay Thai	6 (0.8%)
Boxe	5 (0.6%)
Taekwondoo	3 (0.4%)
Tai Chi	6 (0.8%)

Legend: *N* Number, *SD* Standard deviation, *BMI* Body mass index, *BSc* Bachelor's of Science, *MSc* Master's of Science, *Ph.D.* Doctor of Philosophy, *MGA* Metodo Globale Autodifesa

Table 2 Descriptive statistics OCEAN traits

***N* = 770**	**Mean ± SD**	**CI 95%**		**Maximum value of the scale**
		Min	**Max**	
O	40,1 ± 6,30	39,7	40,6	50
C	37,1 ± 5,78	36,7	37,5	45
E	28,2 ± 5,64	27,8	28,6	40
A	35,1 ± 5,08	34,8	35,5	45
N	19,8 ± 5,51	19,4	20,2	40

Legend *CI 95%* Confidence interval, *SD* Standard deviation, *O* Openness, *C* Conscientiousness, *E* Extroversion, *A* Agreeableness, *N* neuroticism

Moreover, associations between anxiety and depression were investigated with sociodemographic data (i.e., gender, age, level of education, fighting arts practiced, years of practice, part of Italy) but no correlations were found (Table 4 and Table 5). A linear model was adopted. Considering gender, the standardized mean difference for anxiety and depression were Cohen's d = 0,57, 95% CI (0,41, 0,73) and d = 0,22, 95% CI (0,06, 0,38), respectively.

Discussions

The number of participants at this study was very high considering the topic investigated and the average participation in similar studies [8, 25–27]. Mean values for height and weight were in the normative ranges [28]. BMI also corresponded to the normative values [28] but was interestingly identified in the borderline overweight category. A possible explanation is that BMI evaluation does not consider body composition: athletes can be identified as overweight because their fat-free and fat mass are not properly evaluated [28]. Indeed, fat mass and fat-free mass and are crucial elements in the life of an athlete and in the weight-loss process before matches [29]. Fighiting artists who participate in tournaments must maintain their weight in specific divisions for the tournaments, but, commonly, they are heavier in the preparation season [30]. In our work, we did not evaluate the moment in which the web-survey was filled in, but it cannot be excluded that many participants were athletes in their preparation season. Fighting artists were mainly from the Northern part of Italy, but a good distribution was reached for the whole national territory. Despite that, results might be influenced by a greater prevalence of participants from the North, especially when considering factors such as sociocultural elements, sports participation and lifestyle [31].

The mean ages of practice were surprisingly high, and this element might be crucial for other deeper analyses regarding the psychological characteristics of practitioners, as many years of practice can shape an individual's psychological characteristics [32, 33]. One of the strengths of this study is that it involved people with any belt colour, not limiting it just to black belts, and practicing any type of fighting art. Despite that and the number of results collected, most of the participants were Karatekas and Judokas. Therefore, a comparative analysis was delivered only for these two groups, but no differences were found between the two groups even though Judo and Karate present some major differences. It might be supposed that no differences were detected as these disciplines are different in habitual practice and training but have very similar traditional principles they refer to. These principles might be the most shaping elements

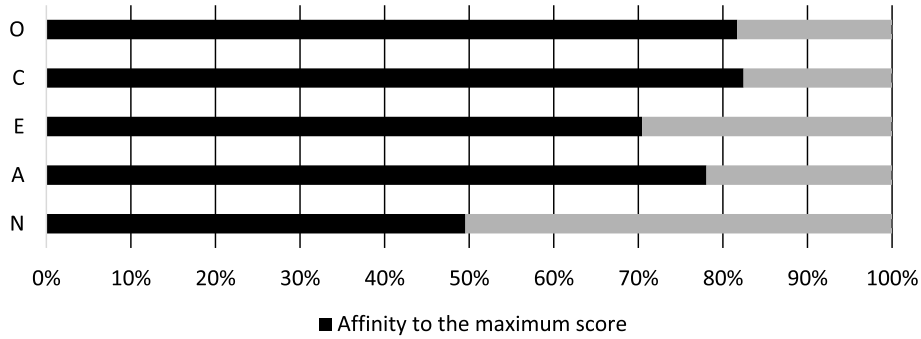

Fig. 1 OCEAN personality traits. O, openness; C, conscientiousness; E, extroversion; A, agreeableness; N, neuroticism. Note: the affinity to the maximum score indicates the mean value obtained by the sample for each personality trait

Table 3 Correlation matrix of OCEAN traits

		O	C	E	A	N
O	**Pearson's r**	-				
	95% CI Higher	-				
	95% CI Lower	-				
C	**Pearson's r**	0,373	-			
	95% CI Higher	0,432	-			
	95% CI Lower	0,311	-			
E	**Pearson's r**	0,499	0,357	-		
	95% CI Higher	0,551	0,417	-		
	95% CI Lower	0,444	0,293	-		
A	**Pearson's r**	0,331	0,345	0,344	-	
	95% CI Higher	0,392	0,406	0,405	-	
	95% CI Lower	0,267	0,282	0,280	-	
N	**Pearson's r**	-0,205	-0,423	-0,347	-0,290	-
	95% CI Higher	-0,136	-0,363	-0,283	-0,224	-
	95% CI Lower	-0,271	-0,479	-0,408	-0,353	-

Legend: *95% CI* Confidence Interval, *O* Openness, *C* Conscientiousness, *E* Extroversion, *A* Agreeableness, *N* Neuroticism

regarding an individual's psychological characteristics, despite the actual fighting arts practised.

Personality traits

In general, each personality trait can influence the personal practice of a fighting art: for example, the fighting technique can be influenced by the personal attitudes of the practitioners [34] other than the competition rules [35], enhancing a more aggressive style rich in striking techniques rather than defensive actions [36]. On the contrary, a more conscientious person might choose a defensive strategy.

For investigating the personality traits, the OCEAN model was used. A slight positive correlation was found among the first four traits (openness, conscientiousness, extraversion, agreeableness) and a negative one for the first four traits compared to the latter, namely neuroticism. These results are according to literature [22]. Comparing our results with a recent literature review [37] about personality traits based on the OCEAN model and sports practice, we can highlight some interesting topics, also considering that personality traits might predict sports performance and well-being in combat sports [38].

The first personality trait to be investigated was openness, often associated with positive behaviours such as adaptability, appreciation of diversity, interest in new experiences and curiosity. In our sample of fighting artists, this trait scored high, indicating a notable attitude towards these types of actions. Interestingly, previous research identified non-athletes scores of openness as higher than athletes' and additionally, participants of team sports scored higher than participants in individual sport [39]. Openness is also a personality trait that is considered in the selection process of American Football athletes [37]. Revolving around the results of our sample,

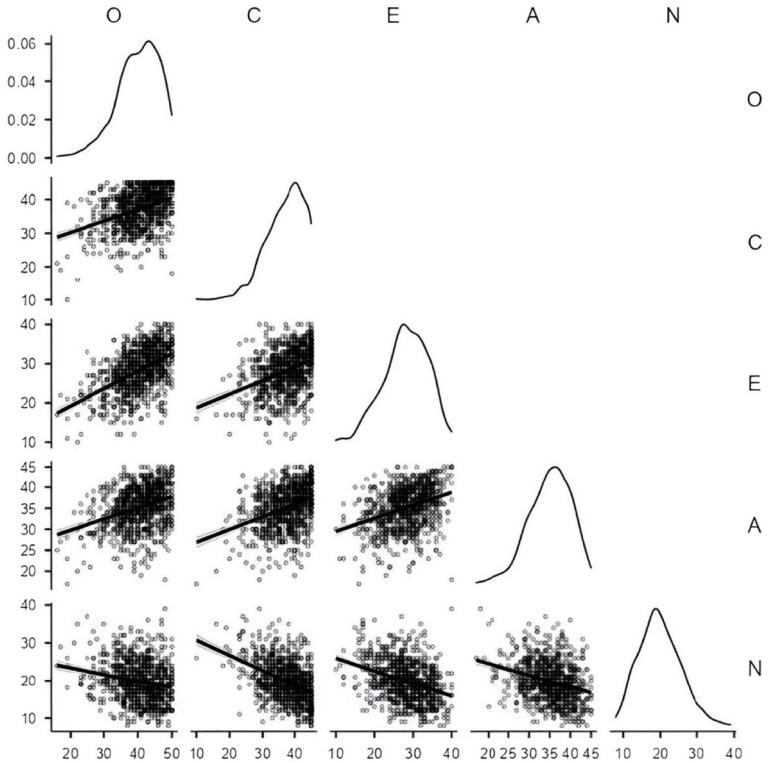

Fig. 2 Correlation matrix of OCEAN personality traits. Legend: O, openness; C, conscientiousness; E, extroversion; A, agreeableness; N, neuroticism. In the correlation matrix, the horizontal and vertical axes represent the range of values obtained for each personality trait (from minimum to maximum, e.g., from 0 to 45). The dots show the distribution of scores for each trait, while the straight lines indicate the correlation trends between them (linear regression)

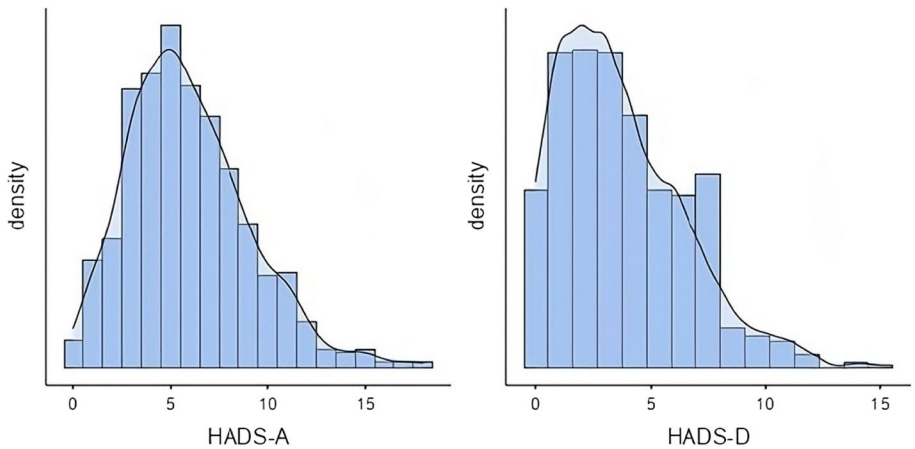

Fig. 3 Results distributions for anxiety and depression. Legend: HADS-A, anxiety; HADS-D, depression. In the HADS-A and HADS-D scales, the horizontal axes represent the total scores given by participants, ranging from 0 to 18 for HADS-A and from 0 to 15 for HADS-D. These scores reflect the sum of participants' responses on each scale. For example, in the HADS-A scale, a larger portion of participants scored between 4 and 5

openness might be associated with the wide range of knowledge that is expected to be learnt by practitioners and with the traditional aspects of martial arts related to their philosophy.

Conscientiousness can be represented by discipline and organization, and it is more easily found in team sports that require cooperation among players [37]. Despite that, Karate and Judo practitioners have a high

Table 4 Coefficients of the model HADS-A

Predictor	Estimate	Standard Error	95% CI		t	*p*
			Min	Max		
Intercept	6,1128	0,35,567	5,41,462	6,8111	17,19	< .001
Years of practice	-0,0402	0,00738	-0,05474	-0.0258	-5,45	< .001
Italy						
North – South and Isles	0,7133	0,29,724	0,12,976	1,2968	2,40	0.017
Centre – South and Isles	0,7094	0,35,962	0,00349	1,4154	1,97	0,049
Gender						
Women—Men	1,4301	0,25,112	0,93,715	1,9231	5,69	< .001

Legend: 95% *CI* Confidence Interval; *SE* Standard Error

R^2=0,102

Table 5 Coefficients of the model HADS-D

Predictor	Estimate	SE	95% CI		t	*p*
			Min	Max		
Intercept	4,0625	0,33,715	3,4006	4,72,434	12,049	< .001
Years of practice	-0,0197	0,00669	-0,0328	-0,00656	-2,943	0,003
Italy						
North – South and Isles	0,6886	0,26,956	0,1594	1,21,776	2,555	0,011
Centre – South and Isles	0,2363	0,32,612	-0,4039	0,87,647	0,725	0,469
Gender						
Women—Men	-0,4249	0,22,773	-0,8719	0,02216	-1,866	0,062

Legend: *95% CI* Confidence Interval, *SE* Standard Error

R^2=0,0319

level of conscientiousness. Fighting arts are often identified as individual activities but their practice, especially for Judo for example, requires the presence of a partner and a great cooperation among practitioners. Hence, high levels of conscientiousness might be associated in this case not with the presence of a team but with the presence of one or more training partners, named as Ukes. This trait was also noticed higher in high-level athletes compared to low-level ones [39]. Moreover, conscientiousness seems to be higher in fighting artists who compete rather than in team sports competitors due to the nature of the fighting arts themselves, as they foster the practitioners to rely on their own strengths and confidence [40].

Extraversion indicates people characterised by affability, confidence, and talkativeness. Our sample scored high levels of this trait and it could be further explained by both the need for a partner for the training and the constant need to have physical contact with other practitioners and the sensei. Physical touch has been proven to be an important element in sports dynamics [41] and in the shaping of relationships [42].

Agreeableness is characterised by behaviours such as trustworthiness and altruism. Our sample of fighting artists reached a high score on these personality traits and the reason behind that can rely on the needs required by the discipline. During both the training sessions and the matches, practitioners need to trust their Uke and always be aware of not mistakenly hurting him, also taking into account Ukes' safety and being altruistic towards them. These behaviours were reported to be more present in female athletes [43], but it might be argued that in our sample there is a higher prevalence of men, thus suggesting that agreeableness might also depend on the type of sports practiced. Agreeableness scores are higher in athletes, both of individual and team sports, compared to non-athletes [39].

The last personality trait investigated was neuroticism, associated with negative attributes such as anxiety, arousal, and hindered self-confidence. Neuroticism plays a crucial role in reaching an optimal performance during competitions, as it has been observed that champions and professionals often have lower levels of it and additionally, for fighting arts outcomes, it has been identified

as an important element [37, 44]. Moreover, in our sample, lower values of neuroticism were found, compared to other sports [37, 40] and it might be due to the research on self-control and focus, other than the higher average age of our sample. Confronting our average age to another study, it seems that younger people scored higher values of neuroticism compared to normative values [45].

Anxiety and depression

Regarding anxiety and depression, the scored obtained in our sample were located in the lowest part of the scale that is identified as "normal". Considering Italian normative values for the HADS scale [23], we should consider both the mean value obtained in our sample and its standard deviation. This evaluation identifies 4 categories of age ranges: I) 25–34, II) 35–44, III) 45–54, IV) 55–64. Our mean value relies in the III range, where Italian normative values for anxiety and depression are respectively 7.9 ± 4.5 and 5.5 ± 3.9. It can be highlighted that the scores obtained by fighting artist are lower, especially for depression. The same applies if we consider our mean values obtained with the age ranges II and IV. If range I is considered, our value aligns with the normative ones. Hence, we can claim that Karate and Judo practitioners have lower values of anxiety and depression than the normal population. This element might be important in the evaluation of innovative strategies to support the treatment of anxiety and depression in the adult population. An additional evaluation was made for the gender, and it identified a slight influence in the anxiety levels that for men were lower than women ones. It can be discussed that due to the nature of the fighting arts investigated and their strong connection with the work on personal self and personal growth [46], these elements might help reduce anxiety and depression. Moreover, it is likely that in our sample there were professional and agonistic athletes, and this strengthen the hypotheses of using fighting arts as a treatment for anxiety and depression. Moreover, a further hypothesis might be that depression levels might be lowered by the need to constantly train with one or more partners during the fighting art trainings, as there is evidence about social interactions to help confine depression [47]. Anxiety might be influenced by the state of calm that is often researched in the fighting arts practice, especially for dojos that have a traditional emphasis rather than a competitive or agonistic one.

Limits

Despite the strengths of this work, some limits should be taken into account. Firstly, the level of practice (e.g., professional, agonistic or amatorial) and the athletic level was not asked, precluding the possibility of performing sub-group analysis on these characteristics. Moreover, the low number of females that took part in the study, prevented a sub-group analysis based on gender. Despite that, the prevalence of females that took part in our study is similar to other studies (i.e., about 25% and 38%) [48, 49] suggesting that even in other countries men might be more involved in fighting arts than women. Additionally, from the sociocultural point of view, these practices were seen as more masculine and therefore men were more interested in them [50].

Additionally, the study did not evaluate whether pre- or post-match conditions might have impacted the results. This omission stems from the primary focus of the research, which aimed to provide a comprehensive overview of stable personality traits rather than delving into more dynamic and volatile conditions. The moment of questionnaire completion was not considered for assessing immediate influences from match-related circumstances. Regarding this point, it might be supposed that levels of anxiety and depression were not influenced by the pre-match conditions since the values obtained were in the lower part of the HADS scale. Moreover, it is suggested that anxiety and depression levels might not have been significantly influenced by pre-match conditions. This assumption is based on the comparison of our data with normative values for the Italian population. Moreover, comparing results of anxiety and depression with the HADS normative values, it cannot be ascertained that in the sample of people that provided the normative values there were or not fighting artists. Collecting data exclusively in a digital way may have represented a selection bias as participants with poor digital literacy may not have filled in the questionnaire. Despite that, the number of collected questionnaires is remarkably high and results may have not been hindered thou. Finally, it might not be excluded that people who participated in this study were more interested in the topic investigated.

Conclusions

Fighting artists on the Italian territory who practice Karate and Judo have a positive tendency on reaching high scores of openness, conscientiousness, extraversion, and agreeableness, while the neuroticism scores were lower. Finally, lower levels of anxiety and depression were identified in Karatekas and Judokas compared to the normative values. Results obtained in this study, particularly for Karate and Judo, suggest potential applications for trainers and coaches. These applications include modifying the type of training offered based on participants' psychological characteristics. The identified positive tendencies in openness, conscientiousness, extraversion, and agreeableness, along with lower neuroticism scores, among fighting artists may guide tailored training approaches. Moreover, the findings might suggest that

individuals aiming to enhance traits such as openness, conscientiousness, extraversion, or agreeableness may benefit from engaging in these fighting arts. Finally, the study might imply that Karate and Judo could serve as innovative approaches for supporting or treating anxiety and depression in the adult population while addressing also physical health.

Future perspectives

Future studies could explore whether practicing fighting arts positively or negatively influences personality traits. This research could provide insights into the long-term psychological effects of fighting arts training. This aspect might be crucial for adults but should also be addressed for young people. Additionally, based on the results obtained in the current study, there is potential for deeper analysis of specific psychological characteristics such as aggressiveness. Further investigations could also delve into the influence of match conditions on fighting artists' psychological well-being. Building on the insights gained from the psychological traits of the OCEAN model, future research could extend its focus to explore the Dark Triad elements [51, 52], including Machiavellianism, narcissism, and psychopathy within this population. Investigating these traits can provide a deeper understanding of personality characteristics often concealed in surveys due to self-serving bias [53] and the Hawthorne effect [54]. The results obtained in the study could have practical applications, especially in the context of fighting arts practice, particularly for Karate and Judo and their trainings. Coaches and sensei should be aware of the results of this study to have a broader understanding of the benefits and influences the practice of a fighting arts can have on their practitioners and exploit their role to further improve the benefits.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s40359-024-02096-8.

Supplementary Material 1.

Supplementary Material 2.

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Authors' contributions

GL and MT performed study conceptualization; GL and BG performed methodology. GL and EP did investigation, and data extraction. GL and FR conducted the analysis. GL did writing for the original draft preparation; GL, BG, EP, FR, AB and MT did reviewing and editing. All authors read and approved the final manuscript.

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Data availability

Data available on reasonable request from the authors.

Declarations

Ethics approval and consent to participate

The study obtained the Ethical Committee approval from the University of Genoa (CERA N.2023/45). All participants gave their informed consent to participate in the study before being able to fill in the web-survey.

Consent for publication

NA.

Competing interests

The authors declare no competing interests.

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