

Relationships between personality traits and resilience levels of jiu-jitsu and kickboxing Brazilian athletes

Authors' Contribution:

-  **A** Study Design
-  **B** Data Collection
-  **C** Statistical Analysis
-  **D** Manuscript Preparation
-  **E** Funds Collection

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Abstract

Background and Study Aim:

Resilience consists in the ability to cope with stressful events due to positive mental adaptations. Social and personal factors determine it, such as friendships, cultural experiences, temperament and personality traits. Therefore, the purpose of the present study was the relationship between a personality trait and resilience levels in a sample of Brazilian jiu-jitsu and kickboxing athletes.

Material and Methods:

The sample was composed of 15 jiu-jitsu athletes and 15 kickboxing athletes. The data collection instruments were the Eysenck Personality Questionnaire, the Connor-Davidson Resilience Scale and a sociodemographic questionnaire. The Eysenck Personality Questionnaire measures the personality traits of Extraversion/Introversion (E), Neuroticism/Stability (N), Psychoticism/Socialisation (P), and includes a Lie scale (L). The Connor-Davidson Resilience Scale assesses the subjects' perception of their ability to adapt to changes, overcoming obstacles, and keep going after illness, injury or other difficulties. The collected data were analyzed according to the guidelines of descriptive and correlational statistics.

Results:

There was a moderate negative correlation between resilience and psychoticism ($r = -0.56$). The lie scale exhibited moderate negative correlation with psychoticism ($r = -0.51$). There were statistically significant differences between the ages ($p = 0.036$) and the resilience levels ($p = 0.031$) of university education athletes compared to those who only attended high school.

Conclusions:

Resilience levels were negatively influenced by psychoticism and positively influenced by the athletes' schooling level. Future studies that consider issues of gender, income, social status and subjective perception of stress are important in determining how these variables relate to resilience levels. Conducting longitudinal researches is necessary to scale the variability of resilience levels over time.

Keywords:

Connor-Davidson Resilience Scale • education • Eysenck Personality Questionnaire • martial arts • psychological quality • temperament

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Personality – set of permanent and unique characteristics that confers individuality to a person's behavior.

Personality traits – relatively constant personality dimensions, which may be unique or common to groups.

Resilience – ability to positively cope with stressful events and overcome them.

Psychoticism – is a personality pattern typified by aggressiveness and interpersonal hostility.

Anxiety – *noun* the state of being very worried and afraid [40].

Depression – *noun 1.* a psychiatric disorder showing symptoms such as persistent feelings of hopelessness, dejection, poor concentration, lack of energy, inability to sleep and, sometimes, suicidal tendencies **2.** the act of lowering a limb [40].

Eating disorder – *noun* an illness that causes the usual pattern of eating to be disturbed, e.g. Anorexia or bulimia [40].

Pain – *noun* the feeling of severe discomfort that a person has when hurt (NOTE: Pain can be used in the plural to show that it recurs: *She has pains in her left leg.*) [40].

Stress – *noun 1.* physical pressure on an object or part of the body **2.** a factor or combination of factors in a person's life that make him or her feel tired and anxious **3.** a condition in which an outside influence such as overwork or a mental or emotional state such as anxiety changes the working of the body and can affect the hormone balance [40].

Fighter – *noun* a competitor in a full-contact sport such as boxing or taekwondo [40].

INTRODUCTION

Combat sports are individual sports modalities, whose practitioners face themselves physically through the application of body-fighting techniques, with or without the use of weapons. In general, these techniques consist of adaptations of movements originating from martial arts for purposes of personal or warlike defense. The movements can refer to both traumatic blows dealt against the opponent (punches, kicks, kicks off, elbow, and knee jabs) – such as kickboxing, taekwondo, and karate –, or to the application of falls, immobilizations, kinks and bottlenecks – like judo, Olympic wrestling, and jiu-jitsu [1, 2].

The training and competition practices of athletes of combat modalities have specific physical, technical and tactical characteristics [3]. As examples of peculiarities inherent in these sports, it can be mentioned the processes of intentional reduction of body mass in the pre-competitive period through diets of caloric restriction and forced dehydration; the anticipated declassifications of tournaments because the fighter did not reach the weight limit of the category in which they were registered; the high incidence of musculoskeletal and osteoarticular, neurological, visceral, vascular and epidermal lesions among the practitioners; the need of the athletes to be resistant to the maximum to the situations of pain, what is considered an indicative of nobility of character and competitive spirit; the common-sense belief that fighters, in general, have socially aggressive behaviors. In the long term, constant exposure to such factors may negatively affect the emotional stability of these subjects, implying reductions in the expectation of personal effectiveness; loss of self-esteem; formation of negative self-concepts; anxiety; isolation; eating disorders; neuroses and depression [4-8].

Due to the possible occurrence of these effects, it is important for combat athletes to learn techniques for regulating personal emotions. Through them, they are expected to be able to better control anxiety, to stay motivated, to understand the singularities of the modality they practice, and to deal better with fear, anger, possible phobias and

other disturbing emotions. Thus, the therapeutic intervention of mental health professionals is not only recommended but also necessary [9-12].

A psychological quality whose assimilation and development are capable of helping combat athletes to deal better with adversities, as previously mentioned, is the resilience [13]. It refers to the ability to cope with stressful events as a result of positive mental adaptations to situations of risk or inconvenience, in which, after a period of exposure, the individual is able to adjust to the pressures suffered and then overcome them [13, 14]. Social and personal factors condition resilience. Socially, it is influenced by the cultural experiences to which the person is exposed during life, such as family interactions, friendships, and interpersonal relationships. At the individual level, temperament and personality traits in equal interfere in its improvement [14, 15-17].

Hence, in hypothetical terms, it can be said that the personality traits of combat athletes are able to exert influence on their resilience levels. Therefore, the objective of the present study was to investigate the relationship between personality traits and resilience levels in Brazilian jiu-jitsu and kickboxing athletes.

MATERIAL AND METHODS

Participants

The present study corresponds to an applied research of descriptive nature, of the survey type, with transversal cut [18]. The population was composed of 175 kickboxing and jiu-jitsu combat athletes, duly enrolled in four combat sports academies located in the city of Rio de Janeiro, Brazil.

As an inclusion criterion, the athlete had to be regularly training in the first half of 2018, between February and July, and be registered in the Kickboxing Federation of Rio de Janeiro and in the Rio de Janeiro Sports Jiu-Jitsu Federation to compete for state championships of the two modalities. It was excluded 30 individuals who

were unable to train due to injuries; 28 individuals who were undergoing recuperative treatment of physical therapy; 31 whose sports records lost their validity because they were outdated for over a year; and 56 individuals who were without previous registration in the Federations. Thus, the final sample consisted of 30 male fighters.

This study was approved by the Research Ethics Committee of the Rio de Janeiro State University (UERJ). The subjects who agreed to participate in the present study signed an informed consent form in accordance with the Resolution 466/2012 of the Brazilian National Health Council and the Declaration of Helsinki [19].

Procedures

The realization of this study was supported by the owners and managers of the Kickboxing and Jiu-Jitsu Academies. They were contacted in February 2018 in order to arrange a meeting with teachers and athletes duly enrolled in their establishments. In this meeting, held in March 2018, the athletes who attended were aware of the research objectives, their relevance, and confidentiality of the answers. The volunteers who decided to participate received the consent form. The questionnaires were applied from the second half of May to the first half of June 2018.

The evaluation of personality traits was assessed through the Eysenck Personality Questionnaire (EPQ), consisting of 88 questions with an objective “yes” or “no” answers. In this questionnaire, besides the evaluation of the traits of Extraversion/Introversion (E), Neuroticism/Stability (N) and Psychoticism/Socialisation (P), there are questions regarding the control of the falsification of the answers called Lie or dissimulation scale (L). The EPQ is validated for the Brazilian population and translated into Portuguese [20]. The questionnaire presents key scores for each trait; to each “correct” answer of the subject in a particular question of the trait, a point in its index is added. In the EPQ, it is considered for E, N, P, and L scores between zero and 18 points; zero and 23 points; zero and 25 points; and zero and 22 points, respectively.

Resilience was measured by the Connor-Davidson Resilience Scale-10 (CD-RISC- 10), validated and translated into Portuguese for the Brazilian population [21]. This instrument is composed of 10 items, with a Likert scale of 0 to 4 points, assessing

the subjects’ perception of their ability to adapt to changes, overcoming obstacles, and keep going after illness, injury or other difficulties. The mean score ranges from zero to 40 points, and the closer to 40, the greater the resilience capacity of the athlete. This scale has been considered appropriate because the items reflect the ability to recover from negative challenges and experiences.

A supplementary sociodemographic questionnaire was also applied to collect information on age, sports practice time (SPT) and the educational level of the participants.

Statistical analysis

The data were analyzed by IBM SPSS Statistics 20 and presented as mean, standard deviation, and maximum and minimum values. Normality and homogeneity of the data were determined using the Shapiro-Wilk and Levene tests, respectively. The Student’s t-test for independent samples was used to compare the variables related to the degree of schooling and type of fight practiced. Pearson’s correlation test was applied to analyze the associations between the study variables. The study admitted the value of $p < 0.05$ for the statistical significance.

RESULTS

Estimation of indicators (arithmetic means, standard deviations minimum and maximum) characterizing 30 of the jiu-jitsu and kickboxing athletes (age and sports practice time) and also results of Eysenck Personality Questionnaire, and the Connor-Davidson Resilience Scale presents Table 1.

There is a strong positive correlation between sport practice time (SPT) and age of the fighters. Resilience has had a moderate negative correlation with psychoticism. The Lie scale also exhibited moderate negative correlation with psychoticism (Table 2).

There was a statistically significant difference ($p < 0.05$) in the ages of the athletes with higher education in relation to the ages of those with average schooling. A statistically significant difference was found in the resilience of the fighters who attended higher education in comparison with those whose schooling was limited to high school (Table 3). No statistically significant differences were detected between any factors (Table 4).

Table 1. The general characteristic and questionnaires results of the jiu-jitsu and kickboxing athletes (n = 30).

Variables	Mean	SD	Minimum	Maximum	p-value
Age (years)	31.97	10.99	18.00	55.00	0.047
SPT (years)	11.67	11.72	1.00	45.00	0.041
Resilience (points)	74.90	11.29	48.00	91.00	0.159
Psychoticism	4.57	2.73	1.00	11.00	0.044
Extraversion	12.63	3.11	5.00	18.00	0.212
Neuroticism	9.07	4.18	4.00	17.00	0.052
Lie scale (scores)	10.07	4.38	3.00	21.00	0.419

DISCUSSION

The aim of the current study was to investigate the relationship between personality traits and resilience levels in jiu-jitsu and kickboxing Brazilian athletes. As hypothesized, the results of the present study show a strong positive correlation between the age and the time of practice of the fighters. This finding is in line with another study [22] in practitioners of aikido and judo in the state of São Paulo, Brazil, older than 67 years. In this qualitative and descriptive study [22], the author identified, using the ethnographic method and semi-structured interviews, that among aikido and judo practitioners, practice time ranged from 23 to 48 years and from 30 to 65 years, respectively. Such longevity suggests that long-term adherence and permanence

in the practice of judo and aikido were relevant values for such subjects, which were not seasonal practitioners. The main reasons for the continuous practice, since the youth, were spiritual harmony, the acquisition of norms of social conduct, constant learning to overcome challenges, altruism, recognition of peers, feeling useful to others and the sense of belonging to a community [22].

Similar results were observed in other countries [23, 24]. In Spain, Llopis-Goig [24] carried out a sociological investigation based on population data provided by the Sports Statistics Annual Directory, related to the year of 2014. This study showed that 11.3% of the total self-reported Spaniards in the 45-64 age group (22.9% of the national population) stated that they were

Table 2. Pearson correlation coefficient "r", personality traits, age, practice time and levels of resilience of the jiu-jitsu and kickboxing athletes (n = 30).

Variable	Statistic indicators	Age	SPT	Resilience	Psychoticism	Extraversion	Neuroticism
SPT	r	0.70					
	p-value	0.000					
Resilience	r	0.46	0.21				
	p-value	0.010	0.259				
Psychoticism	r	-0.26	-0.18	-0.56			
	p-value	0.174	0.334	0.001			
Extraversion	r	0.01	0.02	0.03	-0.12		
	p-value	0.938	0.937	0.880	0.527		
Neuroticism	r	-0.09	-0.15	-0.18	0.39	0.10	
	p-value	0.618	0.427	0.353	0.036	0.587	
Lie scale	r	0.21	0.05	0.22	-0.51	-0.04	-0.42
	p-value	0.255	0.799	0.236	0.004	0.820	0.021

Table 3. Mean and standard deviation of study variables by the level of educating of the jiu-jitsu and kickboxing practitioners.

Variables	High school (n = 10)		University education (n=20)		Δ	p-value
	Mean	SD	Mean	SD		
Age (years)	26.10	8.13	34.90	11.22	8.80*	0.036
SPT (years)	8.40	6.47	13.30	13.47	4.90	0.288
Resilience (points)	68.70	12.10	78.00	9.74	9.30*	0.031
Psychoticism	5.20	3.05	4.25	2.57	0.95	0.377
Extraversion	12.30	3.33	12.80	3.07	0.50	0.686
Neuroticism	8.60	3.24	9.30	4.65	0.70	0.674
Lie scale (scores)	9.10	4.93	10.55	4.12	1.45	0.402

*p<0.05

athletes of karate, taekwondo, and judo, training two to three times a week. In addition, they had begun practicing these sports in the 60s and 70s, totaling between 40 and 50 years of training. Regarding the reasons for remaining active in karate, judo, and taekwondo, they argued that training routines contributed to maintaining their emotional stabilities and sense of security when they had to make decisions under disadvantageous circumstances.

In the United States of America, Ko & Kim [23] conducted a survey-type research with judo, karate, jiu-jitsu, aikido, kung fu, and taekwondo aged over 45 years. They found that the main reasons to compete in the 4th World Martial Arts

Games, held in 2004, in the city of Columbus, Ohio, were the possibility of meeting friends, socializing with other athletes and exchanging experiences on matters related to the unfolding of spirituality and the updating of technical knowledge. The importance given to factors such as those presented indicates that the practice of combat sports is often an existential reference for many individuals, even becoming the foundation of their lifestyles [1, 25].

The present study also identified the occurrence of a moderate negative correlation between the personality trait called psychoticism and resilience. Personality traits correspond to consistent patterns of how people act, feel, think,

Table 4. Age, practice time, resilience and personality traits by combat sports modality.

Variables	Kickboxing (n = 15)		Jiu-jitsu (n = 15)		Δ	p-value
	Mean	SD	Mean	SD		
Age (years)	31.20	11.12	32.73	11.18	-1.53	0.709
SPT (years)	11.07	11.87	12.27	11.95	-1.20	0.785
Resilience (points)	73.87	10.08	75.93	12.66	-2.07	0.625
Psychoticism	4.60	2.35	4.53	3.14	0.07	0.948
Extraversion	13.53	2.95	11.73	3.10	1.80	0.115
Neuroticism	8.20	3.93	9.93	4.38	-1.73	0.264
Lie scale (scores)	9.33	3.85	10.80	4.87	-1.47	0.368

and evaluate [26]. According to Eysenck, Nias & Cox [27], three personality traits are present in the individuals: Extroversion-Introversion (E); Neuroticism-Stability (N) and Psychoticism-Superego (P). In trait E, there are people who, at one extreme, are highly communicative and sociable (extroverted), while in the other extreme, there are very reserved (introverted) people. In relation to the neuroticism-stability trait, on one side are the very emotional and unstable subjects; on the other, there are emotionally stable. Finally, the psychoticism-superego trait situates the impulsive, hostile and aggressive individuals as opposed to the rational, friendly and receptive ones.

For Eysenck, Nias & Cox [27], individuals with a marked trait of psychoticism also tend to be ego-centric, calculating, and manipulative. In addition, they are less sociable and not prone to sensitization by the pain and suffering of others. On the other hand, the authors complement that individuals characterized by the intense presence of the superego in their actions and thoughts are adjusted, collaborative, discrete, organized, prudent and altruistic (doing good to others) [28, 29]. Current research in the field of psychophysiology and neurophysiology point to the hypothesis that high degrees of psychoticism and diminutive ones in superego reflect individual differences in the functioning of the brain regulatory systems responsible for behavioral restrictions, including the prefrontal cortex and the cingulate cortex [30]. Such discrepancy may represent a primary risk factor for the development of disorders in the control of psychic impulses, such as antisocial behavior, attention deficit and hyperactivity [31].

Feist & Feist [28] emphasize that individuals with a high level of psychoticism are generally less tolerant of the effects of continuous stress. In situations of reduced and occasional stress, they manage to live normally, but when high levels of psychoticism interact with high doses of permanent stress, psychotic disorders and outbreaks end up emerging. Psychoses and stress-related disorders, on the other hand, are less likely in people with the predominance of the superego factor. That is, the more intense the presence of the superego in someone, the less chance of succumbing to constant and elevated stress.

Studies with Olympic wrestling practitioners, boxers and judokas identified extroversion as the most prominent personality trait of these subjects [12,

32]. Eysenck, Nias & Cox [27] state that extroversion in athletes is usually associated with a low level of cortical arousal, which in theory makes them more resistant to the consequences of body pain. At first, this association was not observed in the present study, since the correlation between extroversion and resilience was negligible.

Since the mid-1980s, the category “mental toughness” has been used to designate certain personality traits that can function as a resilience resource in the face of stressful situations that demand strategies of overcoming [29]. The mental toughness has three facets: rational commitment to existence and perseverance; control, autonomy, and ability to manage one’s own destiny and the experiences that life offers; challenge, understood as the aptitude to interpret and adapt to unusual events, seeing them as chances for personal development. Clough et al. [33] point out that mental toughness is a common feature of competitive high-performance athletes who have to overcome adversity to succeed.

Litwic-Kaminska [34] identified high levels of mental toughness in judo and taekwondo fighters struck by concussions that temporarily prevented them from training and competing when compared to colleagues who only had minor injuries or never got injured. In an experimental research, Leźnicka et al. [35] reported that pugilists, mixed martial arts, and karate fighters coped better with the body pain compared to non-fighter college students. The fighters perceived pain as an opportunity to strengthen their ability to concentrate and test their physiological limits.

Another moderate negative correlation observed in the current study was between psychoticism and the Lie scale. The lie scale aims to measure how well respondents want to be morally adjusted, honest, and not violating social norms [20]. The observed correlation indicates that athletes with a strong superego were also inclined to lie because in their responses they exaggerated their intention to make it clear that they act in strict accordance with the behavioral patterns considered correct by society [36, 37].

The present study also pointed out a statistically significant difference in the ages of the fighters with university education in relation to the fighters whose education was high school. In other words, those who were more educated also had

higher ages than the less educated. However, practice times did not differ statistically in relation to these two levels of schooling. This suggests that the decision to close the studies at the secondary level or pursue them to university follows particular criteria. More studies are needed in order to discern the reasons that lead to these choices and the factors that interfere in them (income bracket, ethnicity, family conditions).

The present study also showed a statistically significant difference in the resilience of fighters with higher education compared to fighters whose education is limited to high school. In this regard, Southwick et al. [38] argue that university education represents a challenging stage for incoming undergraduates, both undergraduate and postgraduate. The causes of stress considered by the authors are the need to meet deadlines, the great volume of information to be learned and the psychic pressures that the students impute to themselves not to be disapproved. The psychic pressures can be expanded by aspects of personal life, such as the need to reconcile study with work, control financial expenses in relation to food costs, clothing, purchase of courseware, among others, and married life. In the postgraduate context, the authors emphasize agents that equally cause anxiety, such as the periodical obligation to produce papers and studies for scientific journals and congresses, the writing of dissertations and theses, and the progressive introduction to teaching in higher education. Therefore, university education, notwithstanding the graduation or postgraduate sphere, represents a stage of challenges that require planning and focus to be overcome, being an event that demands too much of the physical and psychic faculties.

On the other hand, Elmore et al. [39] report that higher education provides the formation of communities of the most varied natures (gender, ethnicity, sports, geographical origin, social class) that serve as social supports because their members end up helping each other and thus, to overcome obstacles. In addition to this dimension, the authors highlight that due to the difficulties encountered and the imperative to confront them, several university students develop at this stage of life a feeling of helplessness that leads them to attach themselves to some religious creed or therapeutic follow-up by a professional of mental health. Adherence to a religion is

capable of provoking spiritual appeasement and inducing self-discipline. Therapeutic supervision can lead to self-knowledge and the resolution of obstacles in personal life. A third, but not less important factor, say Elmore et al. [39], has to do with the awakening of admiration for the posture and knowledge of the teacher on the part of the student, who starts to take the professor as a reference for professional and personal conduct and to aim to be like the teacher in the future. As for the teachers, they often also become an advisor to the students, guiding them on how best to proceed. The triggering of experiences such as these, specific to the dynamics of the university environment, are potential vectors of increased mental toughness and, consequently, resilience.

Some limitations related to this research should be made explicit. One of them has to do with the fact that the sample included only male fighters. In this sense, the gender issue was not contemplated. Another limitation refers to the fact that there was no information about the social status and family income of the athletes. Therefore, the relationship between these objective variables, personality traits and degrees of resilience remained unknown. Furthermore, because it is cross-sectional research, the present study did not make it possible to verify how levels of resilience behave on a timescale.

CONCLUSIONS

The present study showed that, in relation to the sample of selected combat athletes, only the personality trait called psychoticism and the level of schooling exerted influence on the levels of resilience. Contrary to the literature, extroversion did not impact resilience significantly, as did practice time and ages. Considering that, according to the present study, individuals with a psychotic trait were less likely to present high degrees of resilience, it is recommended to avoid their exposure to training regimes where stress is intense and constant because, in psychic terms, this can negatively affect their emotional balance due to the excessive generation of anxiety. For the same reason, encouraging their continued participation in tournaments with a high degree of competitiveness and short intervals between them needs to be viewed with caution. As for the language used by the coach to instruct them in training and championships, it should be prudent and thoughtful.

On schooling, since it has positively interfered in resilience, it is important to encourage athletes not to limit their studies in the secondary sphere, pursuing them in the university sphere. For those fighters from a less favored social class and with few financial conditions to pay for higher education, the offer of scholarships through partnerships between federations and universities could be a viable solution.

Future studies that consider issues of gender, income, social status and subjective perception of stress are important in determining how these variables relate to resilience levels. Finally, conducting longitudinal researches is necessary to scale the variability of resilience levels over time.

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