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ORIGINAL

PERSONALITY TRAITS OF PORTUGUESE SKYDIVERS

RASGOS DE PERSONALIDAD DE LOS PARACAIDISTAS PORTUGUESES

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ABSTRACT

The objectives of this study were to describe the personality traits of Portuguese skydivers and to study the differences in the 5 dimensions of personality traits: Neuroticism, Extraversion, Openness to Experience, Agreeableness and Conscientiousness. The variables were: experience, sex and age. One hundred and fourteen skydivers participated. We used the NEO-FFI questionnaire. The statistical tests used were the Chi-square, Pearson's correlation coefficient and multivariate data analysis (MANCOVA). The results show that the skydivers presented higher values in the Extraversion and Conscientiousness dimensions, and lower in the Neuroticism dimension. The multivariate analysis identified statistically significant differences in the Conscientiousness dimension based on experience, with the more experienced skydivers obtaining higher scores, although the effect size was small. The skydivers did not present significant differences, which allows us to conclude that they form a homogeneous group, with similar personality traits.

KEYWORDS: Skydiving, personality traits, 5-factor theory.

RESUMEN

Los objetivos de este estudio fueron describir los rasgos de personalidad de los practicantes de paracaidismo portugueses y estudiar las diferencias en las 5 dimensiones del rasgo de personalidad: Neuroticismo, Extraversión, Apertura a la Experiencia, Amabilidad y Responsabilidad. Las variables fueron: experiencia, sexo y edad. Participaron 114 paracaidistas. Usamos el cuestionario NEO-FFI. Las pruebas estadísticas usadas fueron el Chi-cuadrado el coeficiente de correlación de Pearson y análisis multivariado de datos (MANCOVA). Los resultados muestran que los paracaidistas presentaron valores más altos en la dimensión Extroversión y Responsabilidad, y menores en la dimensión Neuroticismo. El análisis multivariado identifica diferencias estadísticamente significativas en la dimensión Responsabilidad en función de la experiencia, obteniendo puntuaciones más altas para los paracaidistas más experimentados, aunque el tamaño del efecto sea pequeño. Los paracaidistas no presentaron diferencias significativas, lo que nos permite concluir que se trata de un grupo homogéneo, con rasgos de personalidad similares.

PALABRAS CLAVE: Paracaidismo, rasgos de personalidad, teoría de los 5 factores.

INTRODUCTION

The personality traits of athletes and the type of sport practised has been studied in many investigations in the last few decades (Silva, 1984; Fisher, 1984; García-Naveira & Ruiz, 2013). In spite of the number of studies, the topic is still scientifically important because it is associated with new lines of research that are emerging and link personality with sports success (Boldak & Guzkowska, 2016; Laborde et al., 2016; García-Naveira et al. 2016), personality differences between athletes and non-athletes (Allen et al., 2013), personality and levels of competitive demands (García-Naveira et al., 2011), the personality profile related to vulnerability to sports injuries (Prieto et al., 2014), and also the reasons that lead some individuals to be inclined to practise sports that can constitute a threat to their physical integrity, seeking experiences that can potentially cause them serious injury and even death (Watson & Pulford, 2004).

The different personality factors, according to Selosse (1998), are determinant in the predisposition of individuals to take on risky behaviours. Castanier et al., (2010) report that, although there is a strong correlation between different personality factors and the predisposition to trigger a determined type of behaviour, the complexity of these different personality factors can provoke ambiguous behaviours, especially in the decision to take risks. This complexity in the determination of the relations between behaviours and personality can also be influenced by the motivation of some individuals to explore paths in the search for fundamental human values, like mental and physical freedom, involving notions of desire and movement (Brymer & Schweitzer, 2013). Pawelec (2013) and Watson and Pulford (2004) found that

there exists a strong connection between certain personality traits and the choice of high-risk disciplines on the part of the individual. There are studies that recognise this relation (Guszkowska & Boldak, 2010), determining that the profile in the search for sensations among athletes from different extreme disciplines was not homogenous, suggesting that they should be individually analysed by discipline and not generalise the different high-risk sports (Kolluro et al., 2020).

Starting from this supposition, it is necessary to analyse the personality traits of practitioners of high-risk sports, like skydiving, in isolation, as few investigations cover this topic. Thus, the objectives of the present study were as follows: a) to describe the personality traits of the practitioners of skydiving; b) to study the differences among the five dimensions of personality: Neuroticism (N), Extraversion (E); Openness to Experience (O); Agreeableness (A); and Conscientiousness (C), bearing in mind the variables of level of experience, sex and age group of the skydivers.

METHODOLOGY

Characterisation of the sample

One hundred and fourteen Portuguese skydivers participated in the study, 97 men (85.1%) and 17 women (14.9%), between the ages of 19 and 72 years ($M = 42$ and $SD = 9.514$). The level of experience was according to the levels of federative qualification, that is all the athletes who were considered to be trainees at the federative level with A and B licences were considered as less experienced, and the athletes with a C and D licence were considered more experienced (Table 1).

Table 1. Characterisation of the sample

		Age group				Level of experience	
		19-36	37-42	43-47	48-72	Less experienced	More experienced
Men	N= 97	20	25	26	26	41	56
	85.1%	17.5%	21.9%	22.8%	22.8%	36%	49.1%
Women	N=17	9	4	3	1	12	5
	14.9%	7.9%	3.5%	2.6%	1%	10.5%	4.4%
Total	N=114	29	29	29	27	53	61
	100%	25.4%	25.4%	25.4%	23.7%	46.5%	53.5%

Instruments

The instrument used was the Portuguese version of the *NEO-FFI* (Lima et al., 2014), constructed from the Portuguese version of the *NEO-PI-R* (Lima & Simões, 1997; 2006). The *NEO-FFI* questionnaire, referred to by García-Naviera et al., (2016) is a tool used to study athletes' personalities to assess their main factors/dimensions: Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness. This is an instrument

which has been used previously in studies of the discipline of skydiving (Machado et al., 2021).

Costa and McCrae (1992) state that: Neuroticism is the tendency to experience negative emotions; Extraversion is related to the social participation of the individual; Openness to Experience is characterised by imagination, aesthetic sensitivity, listening to oneself, intellectual curiosity, looking for new experiences and living emotions intensely; Agreeableness is related to the behaviour of the individual towards others; and Conscientiousness is focused on discipline, organisation, control and the perseverance of the individual in the planning and execution of tasks.

A sociodemographic questionnaire (sex, nationality, sports licence number) and experience in the sport (level of federative qualification, number of jumps and year of starting to practise) was also used.

Dependent variables: Neuroticism (N), Extraversion (E), Openness to Experience (O), Agreeableness (A) and Conscientiousness (C).

Independent variables: level of experience, sex and age group of the skydivers.

Procedure

The first step was to get into contact with the President of the Portuguese Parachuting Federation (to inform him about the aim of the study (objectives, procedures, potentiality). Subsequently, the formal request was made to obtain authorisation to carry out the research and collaborate in the contacting of all the athletes.

A first inclusion criterion of the study was that the participants should have a current federal licence for the year 2020. The 114 parachutists who fulfilled the criterion were then contacted and invited to a meeting to inform them about the aim of the study. This was achieved in a session using the zoom platform to provide clarification to the participants about the confidentiality of their answers, as well as the voluntary nature of their participation and instructions about how to complete the form. The questions were answered using the Google Forms tool (Google Inc. Mountain View, U.S.A.) published on the FPP official page in Facebook in April and May of 2020. The study was approved by the Bioethics and Biosafety Committee at the University of Extremadura (N.R.: 205/2020).

Data

Different tests were conducted to define the models for the confirmation of the hypothesis. The *Kolmogorov-Smirnov* test for normality was performed for the variables of level of experience and the male sex ($n \geq 30$), and the *Shapiro-Wilk* test for the variable of age group and the female sex ($n < 30$). Levene's test was used for the homogeneity of variances (Tabachnick & Fidell, 2007). The results indicated the use of parametric parameters to confirm the

hypothesis. As well as descriptive statistics, basic exploratory and descriptive methods of analysis of the mean, standard deviation and distribution of frequencies were used to describe the most characteristic personality traits of each group of individuals.

The results obtained in the five dimensions of personality were converted in the table into T scores (from 20 to 80) associating the respective scores with the categories “Very low”, “Low”, “Medium”, “High” and “Very high” (Costa & McCrae, 2007).

The association among the variables was assessed using the chi squared test and the relation among the variables with Pearson’s correlation coefficient. A multivariate analysis of covariance (MANCOVA) was conducted to ascertain the personality traits of the skydivers and the differences in the personality trait dimensions, in relation to the variables of experience, sex and age group (Tabachnick & Fidell, 2007).

Effect size of the MANCOVA was calculated using partial eta squared (η^2) defined as a low effect (.01-.06), a moderate effect (.06-.14) and a high effect (> .14) following Hopkins, et al. (2009).

The data were processed with SPSS v 25.0 (IBM Corp. 2017. IBM SPSS Statistics para Windows, version 25.0. Armonk, New York: IBM Corp. U.S.A.).

RESULTS

With regard to the different personality dimensions, bearing in mind the study variables (Table 2), it can be seen that the women participants had higher values in all the dimensions in comparison to the men, except Extraversion. Regarding experience, although the results are quite similar between the two groups, the group of more experienced skydivers showed higher mean scores in Extraversion, Conscientiousness and Neuroticism, while in Openness to Experience the mean was slightly higher in the less experienced group, and practically equal in Agreeableness. In the age group variable, we found that in Extraversion the 48 to 72 years age group had the lowest score with greater differences compared to the 43 to 47 years age group. In Openness, the youngest group recorded the highest score. In Agreeableness the scores were very similar among the age groups. In Conscientiousness the 43 to 47 years age group had the highest score and the 48 to 72 years age group the lowest. Regarding Neuroticism, these positions were reversed with the 48 to 72 years age group with the highest mean and the 43 to 47 years age group with the lowest mean.

Table 2. Personality dimensions according to the study variables

		Personality dimensions in relation to sex				
		Extraversion	Openness	Agreeableness	Conscientiousness	Neuroticism
Men	<i>M</i>	33.82	27.61	32.65	36.49	18.12
<i>n</i> (97)	<i>SD</i>	5.879	5.587	5.331	6.151	7.422
Women	<i>M</i>	33.41	31.35	33.35	38.53	19.35
<i>n</i> (17)	<i>SD</i>	6.145	4.499	4.568	6.866	7.705

Personality dimensions in relation to level of experience						
		Extraversion	Openness	Agreeableness	Conscientiousness	Neuroticism
Less Experienced <i>n</i> (53)	<i>M</i>	33.58	28.60	32.77	36.28	17.94
	<i>SD</i>	5.289	5.736	6.151	6.464	7.059
More Experienced <i>n</i> (61)	<i>M</i>	33.92	27.79	32.74	37.25	18.62
	<i>SD</i>	6.412	5.468	4.285	6.120	7.806

Personality dimensions in relation to age group						
		Extraversion	Openness	Agreeableness	Conscientiousness	Neuroticism
19-36 <i>n</i> (29)	<i>M</i>	34.66	30.48	33.28	36.59	18.00
	<i>SD</i>	5.038	5.920	5.161	5.967	7.723
37-42 <i>n</i> (29)	<i>M</i>	33.93	26.41	31.93	36.38	18.24
	<i>SD</i>	6.369	4.610	5.812	6.394	8.193
43-47 <i>n</i> (29)	<i>M</i>	35.31	28.55	33.41	38.55	17.07
	<i>SD</i>	5.211	5.992	5.322	6.733	7.186
48-72 <i>n</i> (27)	<i>M</i>	30.96	27.15	32.37	35.59	20.04
	<i>SD</i>	6.242	5.059	4.559	5.885	6.613

Personality dimensions in the whole sample						
		Extraversion	Openness	Agreeableness	Conscientiousness	Neuroticism
Total	<i>M</i>	33.76	28.17	32.75	36.80	18.31
	<i>SD</i>	5.893	5.584	5.212	6.273	7.443

The results of the personality dimensions in the whole sample show that Neuroticism had the lowest mean and Conscientiousness the highest.

Regarding the values obtained for the five personality dimensions (Table 3), we calculated a standardised scale to classify the scores (Costa & McCrae, 2007).

Table 3. Standardised scale for the five personality dimensions

	Extraversion	Agreeableness	Openness	Conscientiousness	Neuroticism
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)
Very Low	1 (.9)	6 (5.3)	21 (18.4)	3 (2.6)	34 (29.8)
Low	10 (8.8)	23 (20.2)	47 (41.2)	9 (7.9)	42 (36.8)
Medium	43 (37.7)	51 (44.7)	35 (30.7)	36 (31.6)	30 (26.3)
High	36 (31.6)	28 (24.6)	11 (9.6)	43 (37.7)	6 (5.3)
Very high	24 (21.1)	6 (5.3)	0(0)	23 (20.2)	2 (1.8)

Table 3 shows that the dimensions of Neuroticism and Openness are the ones in which the parachutists recorded the lowest percentages (the majority are in the intermediate zone (very low, low and medium). Regarding Agreeableness the majority are located in the intermediate zone (levels low, medium and high), and the dimensions of Conscientiousness and Extraversion are those that showed the highest scores (the majority are in the medium, high and very high zones).

The analysis of the association between the standardised scale for the five personality dimensions and experience, sex and age group, assessed using

the chi squared test (Table 4) allows us to state that sex is not associated with any of the five personality dimensions.

Table 4. Association between the standardised scale for the five personality dimensions and level of experience, sex and age group.

	Extraversion <i>p.</i> (χ^2)	Agreeableness <i>p.</i> (χ^2)	Openness <i>p.</i> (χ^2)	Conscientiousness <i>p.</i> (χ^2)	Neuroticism <i>p.</i> (χ^2)
Level of Experience	.871(1.24)	.033(10.5)	.793(1.03)	.678(2.31)	.507(3.31)
Sex	.444(3.72)	.713(2.12)	.050(7.80)	.351(4.42)	.680(2.30)
Age Group	.197(15.88)	.879(6.67)	.027(18.7)	.637(9.76)	.859(6.97)

With respect to the level of experience of the skydivers there is only an association with Agreeableness, with a tendency that the more experienced show a medium level in this dimension (57.4% of the more experienced, with a standardised adjusted residual of 2.9). The more experienced skydivers tend to show medium levels in traits that reflect generosity, altruism and interpersonal relations. With regard to age group, there is only an association with Openness, identifying a tendency for the skydivers between 19 and 36 to present a high score in this dimension (24.1% of this age group, with a standardised adjusted residual of 3.1). This indicates that the younger skydivers show higher values in personality traits related to creativity, aesthetic sensitivity and a greater willingness to experience new situations in daily life.

Table 5 shows the relations among the different personality dimensions. There is a negative and very significant correlation between Neuroticism and Extraversion, Agreeableness and Conscientiousness. Thus, the skydivers with personality traits linked to more depressive/negative states, are inversely associated with wellbeing, satisfaction with life, happiness, confidence and competence. We also found a very significant correlation between Extraversion and Conscientiousness, that is the facets linked to positive emotions are associated with those related to organisation, skills and self-discipline.

Table 5. Relations among the five personality dimensions

	Extraversion	Openness	Agreeableness	Conscientiousness
Neuroticism	-0.492**	-0.005	-0.290**	-0.358**
Extraversion	-	0.163	0.282**	0.360**
Openness	-	-	0.059	0.095
Agreeableness	-	-	-	0.232*

* Statistically significant correlation at the $p < .05$ level

** Statistically significant correlation at the $p < .01$ level

Multivariate analysis

Multivariate analyses were used to study the relation between the different dependent (personality dimensions) and independent (sex, level of experience and age group) variables.

Assumptions were tested for MANCOVA:

1) Normality was assessed using the *Kolmogorov-Smirnov* ($n \geq 30$) and *Shapiro-Wilk* ($n < 30$) tests for the five dimensions in each of the groups defined for the variables of level of experience, sex and age group and 35 pairs of dimension/independent variable. This was only not the case in the following dimensions and groups: Neuroticism in the more experienced group ($p = .023$); Conscientiousness in men ($p = .044$) and women ($p = .028$); and Conscientiousness in the 43 to 47 years age group ($p = .033$). This does not question the assumption of general normality, especially because the asymmetry was not significant, and there were no outliers.

2) The homogeneity of the matrices of covariance was tested with Box's M test. ($p = .702$) and the homogeneity of variances with the Levene test (Neuroticism: $p = .636$; Extraversion: $p = .118$; Openness: $p = .624$; Agreeableness: $p = .072$; and Conscientiousness: $p = .474$).

3) The Residual SSCP Matrix was used to test multicollinearity and unicity (sum of squares and cross product) which were proved, in this study, with correlations among the five factors (the highest correlation was between the factors of Neuroticism and Extraversion with a value of $-.492$).

Table 6. Multivariate analysis (MANCOVA)

Effect	Sig. Wilks Lambda	Partial eta squared	Dimension	p	Partial eta squared
Sex	.055	.105	Neuroticism	.359	.008
			Extraversion	.238	.014
			Openness	.050	.038
			Agreeableness	.967	<.001
			Conscientiousness	.114	.025
Age Group	.303	.057	Neuroticism	.538	.021
			Extraversion	.069	.068
			Openness	.689	.015
			Agreeableness	.335	.033
			Conscientiousness	.063	.070
Level of Experience	.263	.064	Neuroticism	.861	<.001
			Extraversion	.387	.007
			Openness	.981	<.001
			Agreeableness	.792	.001
			Conscientiousness	.022	.052

Analysing for the five dimensions in total, the principal effects (Table 6) using Wilks Lambda, shows that Sex ($p = .055$; $\eta_p^2 = .105$), Age group ($p = .303$; $\eta_p^2 = .057$) and Experience ($p = .263$; $\eta_p^2 = .064$), are not statistically significant. Moreover, neither were the effects of the interactions between the different independent variables (Sex * Age group $p = .637$, $\eta_p^2 = .042$; Sex * Experience $p = .436$, $\eta_p^2 = .048$; Age group * Experience $p = .716$, $\eta_p^2 = .038$; Sex * Age group * Experience $p = .871$, $\eta_p^2 = .019$).

In the analysis by personality dimension, significant effects were only identified in the Conscientiousness dimension with regard to experience ($p = .022$, $\eta_p^2 = .052$). The more experienced skydivers recorded a higher mean score in this dimension (37.25) compared to the less experienced (36.28); that is, that the more experienced skydivers showed a greater focus on discipline, organisation, control and persistence in the planning and execution of the tasks.

DISCUSSION

The aim of this study was to describe the personality traits of skydivers and analyse the differences regarding the five personality dimensions: Neuroticism, Extraversion, Openness to Experience, Agreeableness and Conscientiousness, bearing in mind the variables level of experience, sex and age group of the athletes. Higher values were found in the Extraversion and Conscientiousness dimensions and lower values in Neuroticism. The descriptive analysis of the sample regarding sex made it possible to present an identical finding to that of other investigations that studied practitioners of extreme disciplines, in which the majority are men who look for this type of sport (Monasterio et al., 2012; Nasimba & Chirivella, 2020).

Comparing the results of the present study with those of Lima et al. (2014) who also used the *NEO-FFI* to characterise the personality traits in the Portuguese population, it can be seen that the findings show higher values in the dimensions of Extraversion and Conscientiousness and lower in the dimension of Neuroticism (ESMAEILI et al., 2017). Regarding the dimensions of Agreeableness and Openness to Experience, the values were similar in the two studies. This supports the results of previous studies in which the practitioners of extreme sports tend to be more extraverted, methodical, and disciplined, but also less inclined to develop neurotic states (Watson & Pulford, 2004; Marczak & Ginszt, 2017; McEwan et al., 2019). These characteristics of greater emotional stability, openness to experience and higher levels of extraversion are also recorded when comparing athletes with non-athletes, reinforcing the theory that the practice of sport raises self-esteem thus reducing depressive states (Nelson et al., 2007; González & Valadez, 2016).

In high-risk disciplines it is fundamental to analyse the relation between the dimensions, in order to attempt to predict what type of response will be generated in a situation of stress, and even the acceptance to comply with the safety norms. The interpretation of the results, obtained using Torgersen's model (Torgersen, 1995; Vollrath & Torgersen, 2002), according to the values recorded in the dimensions of Neuroticism, Conscientiousness and Extraversion, indicate that the skydivers are enterprising, proactive, responsible, and confident individuals, who trust their capabilities and have low levels of impulsiveness, suggesting that in terms of operativity before the jumps, they check their equipment (parachute), plan the jump, and manage the stressing situations using the emergency procedures acquired during their training, thus triggering motor responses and adequate measures that minimise the physical risk associated with this discipline. It is important to mention that a positive

relation was identified between the dimension of Extraversion and Conscientiousness and a negative relation of both with Neuroticism. This finding was also considered by Castanier et al., (2010), when they concluded that the combination of the different personality traits of the practitioners of extreme sports resulted in a greater possibility of potential accidents. That is to say, that those practitioners who reveal a low level of Conscientiousness and a high level of Extraversion and Neuroticism present a greater probability of suffering an accident during their sports practice; in contrast to those who record a high level of Conscientiousness combined with low Neuroticism and high Extraversion who present a lower probability of suffering an accident during their sports activity.

A positive relation was also found among Extraversion, Agreeableness, Conscientiousness and Openness to Experience. The involvement that sport encourages at the social level, especially in disciplines that expose all types of emotions and feelings, can enhance sociability, sharing dreams and fears, agreeableness and curiosity for new experiences.

The dimension of Conscientiousness reveals a statistically significant value in the experience variable, with the more experienced skydivers recording the highest scores. This finding indicates that the more experienced show that they are more cautious and conscious of the risks that the sports practice entails. A possible explanation could be that a higher number of jumps contributes to accumulating experiences and knowledge that are imperative for an athlete to be able to practise skydiving with high levels of safety, focusing on all the tasks and procedures before, during and after the jump.

Future research could give more robust support to the relation between the experience variable and the personality dimensions, because apart from such studies being scarce, opposite results have been found. Price and Bundesen (2005) obtained a different result in the dimension of Neuroticism recording lower values in more experienced skydivers. Their study was carried out in Australia with a sample of 105 skydivers, of whom 62 were men and 43 women, with a better balance between sexes, contrary to this study which included a large majority of men.

These results do not question the motivations or reasons for choosing these disciplines and the intensity in sensation seeking. Boldak and Guskowska (2013) found that skydivers were a heterogeneous group, differing significantly in the necessary personality characteristics for feeling and taking risks. Guskowska and Bołdak (2010) did not record differences between experienced skydivers and novices in their search for sensorial traits.

The obtained results show the absence of personality differences between experienced and less experienced skydivers, as well as between age groups and sex, suggesting that they are a homogenous group, in spite of the more experienced showing significant mean values in the dimension of Conscientiousness. It is important to underline that the variables: level of experience, sex and age group, are not factors that determine a specific

personality pattern in the sample analysed with regard to their personality dimensions.

CONCLUSIONS, LIMITATIONS AND PROPOSALS FOR THE FUTURE

The skydivers present higher values in the dimensions Extraversion and Conscientiousness, and lower values in the dimension Neuroticism. Thus, it can be said that the skydivers that participated in this study are usually extraverts, assertive, warm, disciplined, and organised with low levels of anxiety and depression. These personality characteristics are fundamental for minimising the risk of accidents.

Of the three independent variables studied (sex, level of experience and age group), statistically significant differences were only identified in the Conscientiousness dimension according to the level of experience. The more experienced skydivers recorded a higher score in this dimension compared to the less experienced, showing more consistent personality traits linked on discipline, organisation, control and persistence. The younger skydivers showed a greater tendency in the personality characteristics related to creativity, a sense of aesthetics and a greater willingness to experience new situations in daily life. However, independently of sex, age group or level of experience, they did not present significant differences in their personality traits, forming a homogeneous group with similar characteristics.

For future research it would be very relevant to analyse the relation between the model of the five personality factors with the level of intensity of the search for sensations in practitioners of skydiving and motivations for practising sport. Due to the limitations imposed by the Covid 19 situation, participation in this study was only through digital platforms, which may have been an impediment for those skydivers who do not have access to social networks.

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