

The personality traits of Polish junior and senior national team in Olympic karate and handball – comparative analysis

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:

Research on personality in sport often concerns the senior stage, that is why we are interested in the junior stage. The aim of this research is the personal profiles of athletes training combat sport and team sport at the level of the Polish representation of juniors and seniors.

Material and Methods:

The subjects of the study were members of the Polish junior and senior national teams in Olympic karate (n = 41) and handball (n = 39) from the 2020/2021 season. We based our comparative analysis on the Five-Factor Model of Personality, known as the Big Five, was used to measure personality. The NEO-FFI Personality Questionnaire was used as the research tool. The study was conducted electronically. Statistical analyses were performed using the Microsoft Excel methods package.

Results:

The Polish national junior and senior Olympic karate team sportsmen do not differ in personality (their profiles are identical and average level in all dimensions). Likewise, players of the Polish junior and senior handball teams do not differ in personality. However, their profiles are similar – the seniors are distinguished only by a high level of extraversion. Moreover, when comparing the personality of Olympic karate juniors and seniors (combat sport) with that of handball juniors and seniors (team sport), no statistically significant differences were found in the raw test results.

Conclusions:

The researched population of athletes, personality was probability formed at the junior level and remained unchanged at the senior level, apart from motor skills, technical-tactical skills, and sports experience that developed with age. Such a conclusion is valid on the assumption that seniors, when they were juniors, did not differ in personality from the young athletes we studied.

Key words:

Big Five • combat sport • sports psychology • sports stage • team sport

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Authors have declared that no competing interest exists

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Combat sport – *noun* a sport in which one person fights another, e.g. wrestling, boxing and the martial arts [63].

Team sport – *noun* any sport that is played between two or more teams, e.g. football, tennis or hockey [63].

Sports psychology – *noun* the scientific study of the mental state of sportspeople, looking at issues such as motivation, concentration, stress and self-confidence [63].

Sten (ten score) – indicates an individual's approximate position (as a range of values) with respect to the population of values and, therefore, to other people in that population. The individual sten scores are defined by reference to a standard normal distribution. Unlike stanine scores, which have a midpoint of five, sten scores have no midpoint (the midpoint is the value 5.5). Like stanines, individual sten scores are demarcated by half standard deviations. Thus, a sten score of 5 includes all standard scores from -5 to zero and is centred at -0.25 and a sten score of 4 includes all standard scores from -1.0 to -0.5 and is centred at -0.75. A sten score of 1 includes all standard scores below -2.0. Sten scores of 6-10 "mirror" scores 5-1 [Wikipedia].

INTRODUCTION

In each sports discipline, the development of an athlete proceeds in stages. In Poland, the following stages are distinguished: "żacy", "młodzicy", "kadeci", "juniorzy" (juniors), "seniorzy" (seniors) [1, 2]. In the field of sport psychology, research conducted in the field of personality using the five-factor personality model (Big Five) refers primarily to the senior stage. This is dictated by the specificity of personality theoretical construct (neuroticism, extraversion, openness to experience, agreeableness, conscientiousness), which assumes that the personality can be measured in people from the age of 15 [3-5].

We know from previous studies that physically active people are characterised by high conscientiousness compared to those who do not train [6-9]. On the other hand, athletes are distinguished from non-athletes by high extraversion and conscientiousness. The remaining dimensions of neuroticism, openness to experience and agreeableness, are, as in the case of non-athletes, at an average level [10-16]. But the personality data of the champions are low for neuroticism, high for extraversion and conscientiousness, and the average for the remaining personality dimensions [17-23]. Thus, athletes in relation to non-athletes are characterised by higher levels of extraversion and conscientiousness, while champions are additionally distinguished by a low level of neuroticism, and their openness to experience and agreeableness are at an average level [24-26]. Moreover, there are differences in the intensity of individual personality traits between combat sports [27], individual sports [28] and team sports [29].

The existing differences in personality traits between athletes occur depending on the practised sports. That is, athletes are distinguished by personality profiles specific to the sport they train. In each sports discipline, the intensity of personality dimensions is slightly different and a different dimension is dominant. This is because personality traits play a slightly different role in the sporting activities of athletes from different sports. The variation in the level of intensity of personality dimensions should be associated with the specificity of sports competition in the studied sports disciplines. Besides, there are differences between champions and other athletes in combat sports [27], individual sports [28] and team sports [29]. In each sport group, there are differences between champions and athletes

in the factors of neuroticism and extraversion. The other personality dimensions are different depending on the particular sports group. This confirms the idea of the significant influence of sports on human personality.

Moreover, combat sports champions have significantly lower levels of neuroticism in relation to other sports champions [30]. A utilitarian factor, characteristic only for combat sports, has been revealed in the personality of combat sports competitors [31]. Furthermore, in general, there are differences between champions and other athletes in all personality dimensions. Champions have lower levels of neuroticism and higher levels of extraversion, openness to experience, agreeableness and conscientiousness in relation to other athletes [26, 30, 32]. In contrast, neuroticism is the only significant personality determinant predicting athletes' performance level: the lower the level of neuroticism, the more likely an athlete is to be classified as a champion. Therefore, low levels of neuroticism may be the only personality predictor of athletic performance [32].

Since there is no research in sport psychology on the relationship between age and athletes' personality [33], it has not been determined whether the personality conditions of the champions were formed only in the course of a long sports career or whether such conditions distinguished (future) champions already at the beginning of their sports practice. We agreed with the thesis that champions' personality is a consequence of their sports performance.

The aim of this research is the personal profiles of athletes training combat sport and team sport at the level of the Polish representation of juniors and seniors.

MATERIAL AND METHODS

Tested persons

The subjects were 80 competitors, Polish junior and senior representatives in Olympic karate (n = 41, representatives of a combat sport), and handball (n = 39, representatives of a team sport) from the 2020/2021 season. The participants' age range was between 16 and 29 years (the average age was 22 years). Their training experience ranged between 6 and 19 years (average training experience of 13 years). Olympic karate

athletes are the Polish Karate Union members, while the handball players belong to PGNiG Super league (Table 1).

The project has received a positive opinion of the Senate Committee for Research Ethics at the Wrocław University of Health and Sport Sciences, number 20/2019.

Study design

The Five Factor Model of Personality, referred to as the Big Five, was used to measure personality. This model is a theoretical construct of personality description that represents the correlation between traits, theoretical concepts, and personality scales. The Big Five considers five dimensions of personality that include many specific traits and are combined into categories but still contain a common underlying theme. The components of the Big Five are Neuroticism (reflects emotional adjustment versus emotional imbalance), Extraversion (characterises social interactions, their dimension and quality as well as our energy and activity levels), Openness to Experience (describes a person's tendency to

seek out and try new things, not being afraid of adventure, looking for new unconventional solutions), Agreeableness (a dimension characterising positive attitudes towards others versus negative ones – being ready to sacrifice oneself for another person versus aversion and putting one's own interests before others), Conscientiousness (a dimension distinguishing the level of organisation, persistence and motivation of an individual in pursuit of a goal) [5].

The NEO-FFI Personality Questionnaire was used as a research tool because it is specific to personality research in the field of sport psychology [34]. NEO-FFI is used to diagnose the personality of representatives of both sexes who are 15 years old and up. It contains 60 statements that need to be addressed according to one's own feelings. The five dimensions of the Big Five personality were included in the form of 12 statements for each factor, which were to be addressed on a 5-point scale: "I strongly disagree", "I disagree", "I have no opinion", "I agree", and "I strongly agree". To obtain the individual results, one needs to sum up the number

Table 1. List of karate and handball clubs whose members participated in the study.

Name of the represented club	
Olympic karate clubs	Handball clubs
1. ASW Nippon Krotoszyn	1. Energa MKS Kalisz
2. Bushido Karate Bydgoszcz	2. Grupa Azoty SPR Tarnów
3. Dynamic Akademia Karate	3. KPR Gwardia Opole
4. Inowrocławski Klub Sportowy Karate	4. KS Azoty-Puławy
5. Klub Karate Arashi Legnica	5. Łomża Vive Kielce
6. Klub Karate Bodaikan Szczecin	6. MKS Piotrkowianin Piotrków Trybunalski
7. Klub Karate Dragon Środa Wielkopolska	7. MKS Zagłębie Lubin
8. Klub Karate i Rekreacji Sonkei Gdańsk	8. MMTS Kwidzyn
9. Klub Karate Shotokan DOJO Toruń	9. NMC Górnik Zabrze
10. Klub Karate Shotokan w Lęborku	10. Sandra Spa Pogoń Szczecin
11. Klub Sportowy Gokken	11. SPR Chrobry Głogów
12. KS Olimp Łódź	12. SPR Stal Mielec
13. Kuzi Sport Karate	13. Torus Wybrzeże Gdańsk
14. LKS Zarzewie Prudnik	
15. LZS Karate-Do Głubczyce	
16. Obornicki Klub Karate	
17. Pleszewski Klub Karate	
18. UKS BUDO Grodzisk Mazowiecki	
19. WKS Budokan Wrocław	

Table 2. Raw scores of junior (n = 8) and senior (n = 33) Olympic karateka's.

Variable	Mean		Min		Max		Me		SD	
	juniors	seniors	juniors	seniors	juniors	seniors	juniors	Seniors	juniors	Seniors
Neuroticism	19.8	16.9	10	1	27	36	21	15.5	5.9	8.4
Extraversion	32	29.6	21	17	46	41	32	30	5.7	6.0
Openness to experience	27.8	27.6	21	17	35	41	28	27.5	5.3	6.1
Agreeableness	29	29.6	19	17	36	40	29	29	4.4	5.1
Conscientiousness	29.5	31.9	18	20	38	43	30	30	6.02	5.8

of points obtained according to the key. The answers are scored from 0 to 4 points, thus the raw score for each dimension ranges from 0 to a maximum of 48 points and as a result the highest scores on the scale indicate the highest intensity of each trait. Interpretation of NEO-FFI scores can include both psychological and psychometric aspects. The psychometric aspect involves comparing a person's score with the results of a representative group, taking into account the standard error of measurement. In order to correctly interpret the results in psychometric terms, it is necessary to determine the severity of the score in stens (1-3: low score; 4-6: average score; 7-10: high score) of the individual and then, based on the obtained personality profile, we can proceed to psychological interpretation, which in turn can be described in profile or functional terms. The purpose of the profile interpretation is to provide a psychological description of the individual as a whole personality, its properties, so that we can infer other properties of the individual. Functional interpretation is to provide us with information about the person's adaptability to the environment. In our case, the environment would be contact sports and the dangers of not adapting to it.

Procedure

The study was conducted during the training camps of the Polish Olympic karate team and the Polish national handball team in electronic form through the Survio web portal in February 2021 due to the COVID-19 pandemic prevailing in Poland. Each respondent agreed to participate in the study after being informed about the objectives and principles of the study, expected effects and possible benefits. Respondents were also made aware of the risks associated with undergoing the study indicating the mode and possibility of withdrawal from participation in the study at any phase. All respondents consented to processing the obtained research results for scientific

purposes. The study was conducted in rooms isolated from noise. Respondents were given an hour to respond to the statements of the NEO-FFI personality questionnaire. The study was conducted in the evening, after dinner, at a time designated by the coaches. After the study was completed, the data were coded. If a research participant rejected 1/6 of all statements (10 items), i.e., those marked with the answer "I have no opinion", then the results of the study of such a person were considered invalid and excluded from further stages of the investigation.

Statistical analysis

Statistical analyses were performed using the Microsoft Excel methods package. The estimation of the results is based on the following indicators: mean (M); standard deviation (SD); median (Me); minimum (Min); Maximum (Max); uniform distribution meaning: equal probability (U); significance level, probability (p). Statistical significance was assumed at $p \leq 0.05$.

RESULTS

In the first stage of the study, the karateka's were divided into a junior group (15-19 years old; n = 8) and a senior group (20-29 years old; n = 33). Table 2 summarises the raw scores of the studied karateka's, while Table 3 presents their sten scores.

Table 3. Sten scores of junior and senior Olympic karateka's.

Variable	Juniors (n = 8)	Seniors (n = 33)
Neuroticism	5	5
Extraversion	6	6
Openness to experience	5	5
Agreeableness	6	6
Conscientiousness	6	6

Table 4. Comparison of raw sten scores for Olympic karateka's, juniors and seniors.

Variable	Juniors (n = 8)			Seniors (n = 33)			U	p
	M	SD	Me	M	SD	Me		
Neuroticism	19.8	5.9	21.0	16.9	8.4	15.5	1.24	0.8916
Extraversion	32.0	5.7	32.0	29.6	6.0	30.0	1.18	0.8809
Openness to experience	27.8	5.3	28.0	27.6	6.1	27.5	0.10	0.5379
Agreeableness	29.0	4.4	29.0	29.6	5.1	29.0	0.39	0.6511
Conscientiousness	29.5	6.0	30.0	31.9	5.8	30.0	1.18	0.8806

Table 5. Raw scores of junior (n = 5) and senior (n = 34) handball players.

Variable	Mean		Min		Max		Me		SD	
	juniors	Seniors	juniors	seniors	juniors	seniors	Juniors	seniors	Juniors	seniors
Neuroticism	17.6	17.6	8	6	26	35	17	16	5.8	7.8
Extraversion	30.4	31.9	28	22	32	39	31	33	1.6	4.7
Openness to experience	25.2	25.0	20	16	29	34	26	25	3.3	4.5
Agreeableness	29.2	28.4	25	21	32	36	29	29	2.4	3.7
Conscientiousness	36.6	35.8	31	22	43	48	37	36	4.0	5.5

It is observed that in the sten scores, the personality of junior and senior Olympic karateka's is at the average level in all dimensions. Moreover, the sten scores are the same for junior and senior Olympic karateka's. In order to exclude any differences in the personality of karateka's, their raw scores were tabulated (Table 4).

There were no significant statistical differences between juniors and seniors of Olympic karate in raw scores. Thus, the validity of the sten results were confirmed: the personality of the studied karateka's: juniors and seniors, is identical.

In the second stage of the study, handball players were divided into the junior group (15-19 years old; n = 5) and senior group (20-29 years old;

n = 34). Table 5 summarises the raw scores of the handball players under study, while Table 6 presents their sten scores.

It was noted that in the sten results, the personality of junior handball players is at an average level with the exception of the conscientiousness dimension, which is at a high level. On the other hand, the senior handball group was found to have high scores in the dimensions of extraversion and conscientiousness and average scores in the other factors. Sten scores are at similar levels for juniors and seniors of handball, but in interpretation, they are different only in the extraversion dimension. To verify this difference in handball players' personality, their raw scores were tabulated (Table 7).

Table 6. Sten scores of junior and senior handball players.

Variable	Juniors (n = 5)	Seniors (n = 34)
Neuroticism	5	5
Extraversion	6	7
Openness to experience	5	4
Agreeableness	6	5
Conscientiousness	8	8

There were no significant statistical differences between junior and senior handball players in raw scores. Thus, the validity of the sten results was confirmed that the personality of the studied handball players: juniors and seniors, is at a similar level.

In the third stage of the research, the raw results of the junior karateka's were compared with junior handball players, and no statistically significant differences were found in any personality dimension (Table 8).

Table 7. Comparison of raw scores of junior and senior handball players.

Variable	Juniors (n = 5)			Seniors (n = 34)			U	p
	M	SD	Me	M	SD	Me		
Neuroticism	17.6	5.8	17.0	17.6	7.8	16.0	0.00	0.5016
Extraversion	30.4	1.6	31.0	31.9	4.7	33.0	1.42	0.9220
Openness to experience	25.2	3.3	26.0	25.0	4.5	25.0	0.12	0.5476
Agreeableness	29.2	2.4	29.0	28.4	3.7	29.0	0.61	0.7291
Conscientiousness	36.6	4.0	37.0	35.8	5.5	36.0	0.38	0.6489

Table 8. Comparison of raw scores of junior karateka's and handball players.

Characteristic	Karateka's (n = 8)			Handball players (n = 5)			U	p
	M	SD	Me	M	SD	Me		
Neuroticism	19.8	5.9	21.0	17.6	5.8	17.0	0.70	0.7588
Extraversion	32.0	5.7	32.0	30.4	1.6	31.0	0.86	0.8042
Openness to experience	27.8	5.3	28.0	25.2	3.3	26.0	1.20	0.8856
Agreeableness	29.0	4.4	29.0	29.2	2.4	29.0	0.12	0.5465
Conscientiousness	29.5	6.0	30.0	36.6	4.0	37.0	2.79	0.9974

The fourth stage of the study compared the raw scores of the seniors karateka's and senior handball players, and also found no statistically significant differences in any personality dimension (Table 9).

DISCUSSION

On the basis of the obtained raw results, no statistically significant differences were found between the competitors of the Polish junior and senior Olympic karate team. This result was confirmed by sten results, namely: personality profiles of juniors and seniors of Olympic karate are almost identical and are at the average level in all dimensions. Thus, we can conclude that in terms of personality, the Polish Olympic karate

team players do not differ from the average of the Polish population of non-trainees [34].

Referring to the raw results of the Polish national handball team's junior and senior handball players, no statistically significant differences were also found between the studied players. On the other hand, one difference in personality profiles between the handball players was noted in the sten results. That is, handball players at the junior stage are characterised by high conscientiousness, and the other dimensions are at an average level. Moreover, handball players at the senior stage are characterised by high extraversion and high conscientiousness. However, their other dimensions are at an average level. The difference in extraversion in the sten score is excluded by the absence of this difference

Table 9. Comparison of raw scores of seniors karateka's and handball players.

Variable	Karateka's (n = 33)			Handball players (n = 34)			U	P
	M	SD	Me	M	SD	Me		
Neuroticism	16.9	8.4	15.5	17.6	7.8	16.0	0.34	0.6323
Extraversion	29.6	6.0	30.0	31.9	4.7	33.0	1.73	0.9581
Openness to experience	27.6	6.1	27.5	25.0	4.5	25.0	1.94	0.9739
Agreeableness	29.6	5.1	29.0	28.4	3.7	29.0	1.06	0.8550
Conscientiousness	31.9	5.8	30.0	35.8	5.5	36.0	2.75	0.9970

in the raw score. This result is dictated by the membership of the sten scores to specific ranges of interpretation: low score, average score, high score. Therefore, we can conclude that the personality profiles of junior and senior handball players are similar and differ only in extraversion. However, at the same time, players of the Polish national handball team differ from the average Polish population of non-trainees [34] in the dimension of conscientiousness (juniors) and in the dimensions of extraversion and conscientiousness (seniors).

Analysing the obtained raw results of comparisons of the Polish junior and senior national team in Olympic karate with the Polish junior and senior national team in handball, no statistically significant differences were found between the studied athletes. But in the results of juniors' sten comparisons it is handball players who are more conscientious than karateka's. Additionally, in the results of seniors' sten comparisons, handball players are also more conscientious and more extroverted than karateka's.

Our study plainly showed that the personality of karateka's is similar to the personality of handball players, but at the same time, it is not the same in the interpretation of the results and in relation to the Polish population of non-training people. This indicates that there are differences in athletes' personalities depending on the sport they practice. The obtained data indicate a significant influence of sport on the personality formation of the researched athletes and confirm previous research reports [10-26]. Differences between athletes and non-athletes [6-9] as well as between athletes due to the sport practised should be considered here [27-29, 32]. Research on the personality determinant of purposeful behaviour in sport has been confirmed [35-37]. Sports activity shapes personality and the shaped personality traits have an impact on making decisions in the starting situation. This should be associated with the specificity of sports competition and somewhat different psychological requirements that sports disciplines place on athletes.

Therefore, there were no significant differences among karateka's in all five personality factors, while among handball players (despite the lack of differences in raw results) high conscientiousness and – additionally, in seniors – high extraversion were noted. It should be noted that in Olympic karate (combat sport) [22, 27, 38] and handball (team sport) [39, 40], there is direct contact with the opponent, but it is karate that is characterised as a method of self-defence [41-46], which is a utilitarian factor specific only to combat sports [30, 31, 47]. In our study, we did not note this difference in the studied personality profiles. But the significant result is that the personality of the studied juniors and seniors is similar. This implies that the personality of the research subjects is formed at the junior stage and remains appreciably unchanged at the senior stage. Relating this result to the field of sport theory [1], we can state that between the junior and senior stages, there is a progression in the development of motor skills, technical-tactical skills, accumulated sports experience [48]. However, this cannot be stated in the sphere of personality in the studied population of the Polish national junior and senior Olympic karate and handball teams.

Our study does not exhaust the topic, but it does complement the knowledge of sport psychology [49, 50] and sport theory [1]. We believe that in order to further verify the research problem, the National Teams of as many sports as possible at all stages of the athlete's career should be studied. We are guided by the health-promoting mission of sport for all and with an innovative approach to various aspects of motor, performance, mental adaptation etc. [51-62].

CONCLUSIONS

The researched population of athletes, personality was probability formed at the junior level and remained unchanged at the senior level, apart from motor skills, technical-tactical skills, and sports experience that developed with age. Such a conclusion is valid on the assumption that seniors, when they were juniors, did not differ in personality from the young athletes we studied.

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