

Motivational effect of objectives in practicing karate, boxing, football and wheelchair basketball

Authors' Contribution:

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

Katarzyna Kotarska ^{1AD}, Leonard Nowak ^{1AE}, Mirosława Szark-Eckardt ^{2B},
 Maria Alicja Nowak ^{1ACD}

¹Department of Physical Culture and Health, University of Szczecin, Szczecin, Poland

²Kazimierz Wielki University in Bydgoszcz, Bydgoszcz, Poland

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Abstract

Background and Study Aim:

We go from the general assumption that motivation in sport depends crucially on the work of a coach (or a sports psychologist) and their assistance in removing obstacles hindering the achievement of the objective, focusing the athlete's attention on the objective, and making them believe that it is possible to achieve it (perseverance in action). This study aims to investigate the motivational effect of objectives in people practicing karate, boxing, football and wheelchair basketball.

Material and Methods:

We investigated 476 people from the north-western part of Poland (mean age 26.69 ± 9.63 years, 69.1% men, 30.9% women) practicing individual and team sports, filled in a Inventory of Physical Activity Objectives Questionnaire (IPAO), as well as a questionnaire covering personal data and information on their involvement in a given sport. Non-parametric statistics were used. The value of $p \leq 0.05$ was assumed to be statistically significant.

Results:

The most important objective of the surveyed people practicing karate, boxing, football and wheelchair basketball was physical fitness. Everyone also indicated health and well-being, but in different orders. Higher scores on the scale of motivational values, time organization, motivational conflict and multidimensional objectives were characteristic for karatekas (K), boxers (B) and wheelchair basketball players (W). Footballers (F) required less motivation, and reported less difficulty in organizing time and reconciling different objectives. Perseverance was related only to sporting experience.

Conclusions:

In the motivational analyses of the functions of the objectives among karatekas, boxers, football players and wheelchair basketball players, no differences were observed on the scale of perseverance in action. Perseverance in action was related only to sporting experience, not to the frequency and volume of training. In shaping the motivation to take part in sport it is necessary to focus the work of a coach (sports psychologist) on helping the competitors in removing obstacles hindering the achievement of the objective, focusing attention on the objective, building the belief that it is possible to achieve it.

Key words:

Inventory of Physical Activity Objectives (IPAO) • motivational conflict • multidimensionality of objectives • organisation of time • perseverance in action

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Authors have declared that no competing interest exists

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Author's address:

Katarzyna Kotarska, Department of Physical Culture and Health, University of Szczecin, Al. Piastów 40 B, bud. 6, 71-065 Szczecin, Poland; e-mail: katarzyna.kotarska@usz.edu.pl

Motivation – is a regulatory process that controls behavior so that it leads to a specific effect (target). By stimulating and targeting energy, motivation organizes individual reactions into an integrated pattern and maintains the subject's activity until the conditions that triggered it have changed. The strength of striving for a specific objective (motivational strength) depends on both the perceived value (attractiveness) of the objective and the probability of achieving it (belief in the possibility of success). The motivational process depends on the existence of the inner motivational tension (motive) [1].

The Inventory of Physical Activity Objectives (IPAQ) –

by Lipowski and Zaleski [2] is used to study the motivational function of the physical activity's objective. The inventory can be used by coaches and instructors to analyse the objectives of practicing sports and to study the motivation of players, as well as by therapists who include physical activity as a preventive measure in the therapeutic process.

Motivational value – the force with which the objectives influence the activities of an individual [2].

Organisation of time – the level of concentration on planning, organizing and subordinating time to practicing sport [2].

Perseverance in action – level of contradiction; physical activity vs. other objectives [2].

Motivational conflict – effectiveness and durability of action and dealing with adversities [2].

Multidimensionality of objectives – calculated on the basis of the sum of individual objectives (also in the calculation of raw results into stens), with standards established for all scales [3].

Athlete – *noun* 1. someone who has the abilities necessary for participating in physical exercise, especially in competitive games and races
2. a competitor in track or field events [40].

Player – *noun* someone taking part in a sport or game [40].

INTRODUCTION

Motivation is an important element in the initiation and continuation of human action in every field [1]. This also applies in sport, where it is connected with the achievement of objectives that individuals have set for themselves. The motivational function of this objective may be evaluated by the theory of the motivational function [2, 3]. Zaleski defines an objective as a future-oriented, achievable state, which “ (...) has a value and regulatory power, and is pursued by an individual through their actions” [4, p. 60]. Objectives have a motivational function when they are significant and when one is confident they will be achieved when specific actions have been taken. There is an opinion that objectives set by an individual are more motivating than objectives imposed by others; the latter can only have a motivational value if they are combined with an individual's commitment [5].

In 2018, six out of 10 Poles took part in sport or exercise of their choice, a 5% drop compared to 2013. Football lost some of its popularity (5% less), while combat sports and martial arts remained at the roughly same level (including boxing and karate, 2%), and the number undergoing rehabilitation or doing therapeutic exercises recommended by a physician slightly increased (from 6% to 7%). The main motives of physical activity included health concerns (69%), pleasure (55%), well-being and the possibility of stress relief, staying in shape (44%), spending time with other people (27%), and taking care of one's figure (25%) [6]. Combat sports and martial arts are increasingly popular and fast-growing sport disciplines worldwide [7]. However, a recent survey in Poland showed that out of 12,405 respondents, only 124 (1%) declared involvement in these sports [8], despite their well-documented positive effect on psychophysical well-being [9, 10] and general health [11-13].

Another serious issue in Polish society is the physical activity of disabled people. According to a European Health Interview Survey carried out in 2014, and depending on the applied definitions of disability, there were between 4.9 million and 7.7 million people with biological disabilities in Poland, including 4.9 million people with legally confirmed disabilities [14].

The social and physical activity of disabled people have become a considerable social issue which poses significant challenges to the Polish society, with the need for modern solutions in

physiotherapy, means of transportation, adaptation of facilities, and the employment and education of disabled people. In particular, the physical activity of the disabled needs to be systematically supported and motivated by physiotherapist, doctors, trainers, as well as family members. Still, not only in Poland, the problem of prevention and therapy of bodily injury of disabled people and other groups at increased risk due to falling or colliding with vertical obstacles has not been systematically solved [15-17].

Things that motivate disabled and non-disabled people to engage in sport activities are similar (the need to compete, achieve results, and the possibility of achieving personal aspirations) [18]. Although the motivation of people with disabilities is broader due to the significant role of sport in increasing their participation in social life and dealing with difficulties associated with disability, the involvement of disabled athletes in trainings and competitions does not really differ in terms of a pursuit of success or the realization of their own objectives and dreams [19, 20]. “People with disabilities who choose to train and compete want to succeed in their sports just as much as people with no disabilities” [21, p. 174]. The study by Sikorska et al. [22] found that amputees and able-bodied athletes did not differ in terms of mental resilience and locus of control. Amputee athletes even achieved better results in self-assessment. Finally, Perreault and Vallarand [23] found that wheelchair users and non-disabled basketball players did not differ significantly in their motivation and coping ability, suggesting no major differences between these two types of athletes.

Despite a considerable number of publications, there is still a need for research showing the objectives of people with different levels of ability and with disabilities who practice various sport disciplines. Therefore, the aim of this study the motivational effect of objectives people practicing karate, boxing, football and wheelchair basketball.

Our hypothesis was that athletes practicing combat sports would have different objectives compared to players practicing of team sports.

MATERIAL AND METHODS

The study included 476 participants of individual (karate, boxing) and team (football and wheelchair basketball) sports in north-western Poland. Three

of them are Olympic disciplines: football (since 1900), boxing (since 1904), karate (from 2020), with wheelchair basketball present in Paralympics since 1960. All the participants were affiliated to sports clubs. Karate was practiced by 148 persons (31.1%, mean age 23.36 ± 10.37 years); boxing by 96 (20.2%, mean age 24.98 ± 7.99 years), football by 122 (25.6%, mean age 24.82 ± 4.49 years), and wheelchair basketball by 110 (23.1%, mean age 34.75 ± 9.70 years). The mean age of the participants was 26.69 ± 9.63 . Fourteen (9.5%) karate athletes and seventeen (17.7%) boxers had achieved medal positions at national championships. The football players were amateurs. Wheelchair basketball players took part in various tournaments, mainly in Poland. 69.1% of the participants were male.

Our diagnostic survey was based on an original questionnaire covering age, gender, place of residence, education, financial situation and sporting activity (weekly frequency of exercises, duration of exercises per week, sporting experience in years, achievements) and the Inventory of Physical Activity Objectives (IPAO) used to study the motivational function of physical activity objectives [2]. IPAO can be used by trainers, instructors and therapists who use physical activity in the therapeutic process. The next part of the IPAO defines the motivational function of the physical activity objective. The questions were asked using a Likert scale (1-5).

Based on factor analysis (Cronbach's $\alpha = 0.78$) and the adjustment of individual items to the theory of the objective's motivational function, the following scales were distinguished: motivational value – (strong belief in achieving the objective; feeling pleasure in achieving the objective; feeling loss if the objective is not achieved; confidence that the efforts made will help to achieve the objective; devoting energy to achieving the objective; not feeling bored with the objective; belief that the objective is worth the effort; the set objective strongly motivates actions), organization of time (spending all free time on achieving the objective; not achieving the objective means wasting time; believing that the objective will be achieved on time; a lack of the objective would make life meaningless; getting up early to achieve the objective); persistence in action (easy diversion of attention from the objectives; fear of not achieving the objective; obstacles to achieving the objective); motivational conflict (level of contradiction:

physical activity objectives vs. other purposes; having other goals that are as important).

The IPAO test also determines the multidimensional nature of the objectives. The raw values were converted to stens [24].

A written informed consent was obtained from each participant in the study. The study protocol was approved by the appropriate Ethics Committee of the Kazimierz Wielki University No. KEBN 7/2018 and conformed to the ethical guidelines of the 1975 Declaration of Helsinki (chairman of the ethics committee – Marek Napierała).

Prior to the study, a written informed consent was obtained from the subjects, who were also informed that they could stop participating in the study at any time without consequences.

Statistical analysis

The study was based on purposeful sampling. The relationship between the single objectives of karatekas, boxers, football players and wheelchair players was determined by intra-group correlations. In qualitative analyses, the trait frequency and the chi-square independence test were used. The analysis of Kruskal-Wallis test (H test) and U test were used to determine the significance of differences between the scales of motivational values, time organization, perseverance in action, motivational conflict and multidimensionality of objectives in particular groups practicing individual sports (karate, boxing) and team sports (football, wheelchair basketball). These methods were also used to study the weekly frequency of training and the time spent on training during the week in the context of the motivational functions of objectives.

The effect size was calculated for each test: E^2_R for the Kruskal-Wallis H test, Glass rank biserial correlation (rg) for the Mann-Whitney U test, Cramér's V for the χ^2 test. The value of $p \leq 0.05$ was assumed to be statistically significant. Statistical calculations were made with Statistica 13.1 for Windows (StatSoft Sp. z o.o., Kraków, Poland).

RESULTS

The socio-demographic characteristics

Most were aged between 18-35 (70.6%). The karatekas were the youngest, and the wheelchair basketball players were the oldest. The majority of

Training session – noun
a period of time during which an athlete trains, either alone, with a trainer or with their team [40].

Combat sports – the group of sports disciplines, in which the gist of the competition is the direct clash of two competing athletes. They are affiliated to the national and international sports organizations in order to carry out official competition, classification, etc.: "every combat sport is martial arts but not vice versa" [41, p. 18].

respondents were male (69.1%). Wheelchair basketball players most often had a post-secondary education (62%). Respondents had a good (48.5%) and very good material situation (38.8%), worked in an office (34.7%), studied at the school/university (32.3%) (mainly karatekas 68.2% and boxers 44.8%, who also combined work with education). Persons with disability benefits constituted 5.7% of the respondents. The respondents practiced sport 3-4 times a week (42.3%). Boxers practiced

with the highest frequency (48.4% daily), wheelchair basketball players mainly twice a week (45.5%). Boxers spent more than 8 hours a week training (50%), and footballers up to 8 hours (41.8%). The sporting experience of the majority of respondents was shorter than 7 years (69.5%). The effect size with respect to women and men practicing the studied sports disciplines was moderate (Cramér's $V = 0.4425$); in other cases it was weak (Table 1).

Table 1. Socio-demographic statistics of karatekas (K), boxers (B), footballers (F) and wheelchair basketball players (W) (independence χ^2 test, and Cramér's V).

Variables	Respondents (%)				Total (N = 476)		p for χ^2 Cramér's V
	karate (n = 148)	boxing (n = 96)	football (n = 122)	wheelchair basketball (n = 110)	n	%	
Age:							
<18	37.2	9.4	0.0	0.0	64	13.4	
18-25	31.8	53.1	55.6	11.8	180	37.8	
26-35	15.5	31.3	41.8	47.3	156	32.8	
>35	15.5	6.2	1.6	40.9	76	16.0	
Sex:							
- males	48.0	53.1	96.7	80.9	329	69.1	p = 0.0000
- females	52.0	46.9	3.3	19.1	147	30.9	0.4425
Education:							
- pre-secondary	36.7	9.7	0.8	13.9	79	16.8	
- secondary	21.8	50.5	58.2	24.1	176	37.5	p = 0.0000
- post-secondary	41.5	39.8	41.0	62.0	215	45.7	0.3227
Financial situation:							
- very good	44.6	25.0	41.8	39.8	184	38.8	
- good	46.6	56.3	40.2	53.7	230	48.5	p = 0.0022
- fair	8.8	18.7	18.0	6.5	60	12.7	0.1472
Type of work							
- schoolchildren, students	55.4	33.3	26.2	7.3	154	32.3	
- manual labour	6.1	20.8	35.3	12.7	86	18.1	
- intellectual	21.0	27.1	29.5	65.5	165	34.7	p = 0.0000
- science and work	12.8	11.5	7.4	4.5	44	9.2	0.3075
- pension	4.7	7.3	1.6	10.0	27	5.7	
Weekly exercise frequency:							
- daily	18.2	48.4	10.7	7.3	94	19.8	
- once a week	10.8	6.3	11.5	15.4	53	11.2	p = 0.0000
- Twice a week	26.4	5.3	27.0	45.5	127	26.7	0.2558
- 3-4 times a week	44.6	40.0	50.8	31.8	201	42.3	
Weekly exercise time:							
≤120 min	23.0	10.6	18.0	31.8	101	21.3	
121-240 min	35.1	18.1	30.3	45.5	156	32.9	p = 0.0000
241-480 min	19.6	21.3	41.8	19.1	121	25.5	0.2776
≥481 min	22.3	50.0	9.8	3.6	96	20.3	
Sporting experience:							
≤1 years	6.1	8.3	9.0	3.6	32	6.7	
1-7 years	68.9	61.5	82.8	62.7	331	69.5	p = 0.0000
7-12 years	13.5	14.6	1.6	15.5	53	11.3	0.1407
≥12 years	11.5	15.6	6.6	18.2	60	12.6	

Table 2. Frequency of selection of the most important objective (one) of practising sport (%).

The main objective of sport	Sports disciplines (%)				Total	
	karate (n = 148)	boxing (n = 96)	football (n = 122)	wheelchair basketball (n = 110)	n	%
1. Physical fitness	52.4	37.5	25.4	23.6	170	35.8
2. Health	19.0	21.9	18.8	12.7	86	18.1
3. Well-being	8.8	16.7	10.7	13.6	57	12.0
4. Shapely silhouette	4.1	6.2	17.2	15.6	50	10.5
5. Company of other people	2.0	4.2	6.6	13.6	30	6.3
6. Pleasure	4.1	5.2	8.2	2.7	24	5.1
7. Stress relief	5.4	1.0	4.9	0.9	16	3.4
8. Escape from everyday life	1.4	2.1	1.6	8.2	15	3.2
9. Need for physical activity	0.0	2.1	2.5	4.6	10	2.1
10. Promotion of physical activity	0.7	1.0	0.8	3.6	7	1.5
11. Higher self-esteem	1.4	0.0	3.3	0.0	6	1.3
12. Being fashionably "fit"	0.7	2.1	0.0	0.9	4	0.8

Preferred objectives by athletes

All respondents preferred physical fitness, health and well-being. A shapely silhouette was the third most important objective for football players (just after well-being) and second for wheelchair basketball players (after physical fitness). For wheelchair basketball players, socializing was as important as well-being. The lowest percentage (less than 3%) of people valued being "fit", increased self-esteem, promotion of physical activity, and satisfying the need for physical activity (Table 2).

Intra-group correlations

Health as the most important objective of practicing sport – indicated by all the respondents – showed a moderate, positive correlation with physical fitness. In the case of karatekas, the highest correlations concerned the following objectives: being fashionably "fit" and the opportunity to learn ($r = 0.78$), getting away from everyday life and the opportunity to relax ($r = 0.75$), satisfying the need for exercise ($r = 0.74$) or being accompanied by other people and well-being ($r = 0.63$) (Table 3).

Table 3. Intra-groups correlations between 12 sporting objectives preferred by surveyed athletes.

Sport discipline	Objectives	Intra-group correlations										
		2	3	4	5	6	7	8	9	10	11	12
karate (n = 148)	1. Health	0.48*	0.12	-0.05	0.05	-0.19	-0.13	0.06	0.00	-0.04	0.03	-0.07
	2. Physical fitness		0.20*	0.18	0.16	-0.14	-0.24*	0.33*	0.19	0.18	0.22*	0.10
	3. Company of other people			0.30*	0.63*	-0.19	-0.23*	0.46*	0.56*	0.44*	0.48*	0.25*
	4. Shapely silhouette				0.30*	0.14	0.20*	0.42*	0.33*	0.44*	0.25*	0.33*
	5. Well-being					-0.23*	-0.28*	0.55*	0.52*	0.39*	0.51*	0.30*
	6. Being fashionably „fit“						0.78*	-0.07	-0.18	-0.18	-0.29*	0.04
	7. Higher self-esteem							-0.07	-0.09	-0.06	-0.17	0.16
	8. Pleasure								0.58*	0.49*	0.54*	0.29*
	9. Escape from everyday life									0.75*	0.74*	0.37*
	10. Stress relief										0.65*	0.34*
	11. Need for physical activity											0.37*

Sport discipline	Objectives	Intra-group correlations										
		2	3	4	5	6	7	8	9	10	11	12
boxing (n = 96)	1. Health	0.40*	-0.03	0.19	0.32*	0.14	0.10	0.10	0.22*	0.20*	0.07	0.14
	2. Physical fitness		0.17	0.46*	0.41*	0.20*	-0.03	0.30*	0.08	0.10	0.29*	0.13
	3. Company of other people			0.27*	0.14	0.60*	0.50*	0.25*	0.32*	0.16	0.32*	0.29*
	4. Shapely silhouette				0.19	0.38*	0.29*	0.23*	0.20*	-0.03	0.29*	0.19
	5. Well-being					-0.03	-0.05	0.49*	0.12	0.40*	0.37*	0.02
	6. Being fashionably „fit“						0.68*	0.04	0.27*	-0.06	0.15	0.33*
	7. Higher self-esteem							0.00	0.27*	-0.04	0.05	0.33*
	8. Pleasure								0.34*	0.48*	0.57*	0.36*
	9. Escape from everyday life									0.57*	0.39*	0.22*
	10. Stress relief										0.51*	0.09
	11. Need for physical activity											0.27*
football (n = 122)	1. Health	0.46*	0.12	0.23*	0.28*	-0.09	0.02	0.25*	0.16	0.24*	0.12	-0.08
	2. Physical fitness		0.28*	0.62*	0.54*	0.05	0.23*	0.41*	0.23*	0.27*	0.22*	0.01
	3. Company of other people			0.37*	0.30*	-0.01	0.26*	0.37*	0.42*	0.32*	0.32*	0.08
	4. Shapely silhouette				0.63*	0.11	0.38*	0.24*	0.22*	0.25*	0.23*	0.02
	5. Well-being					0.03	0.20*	0.44*	0.30*	0.43*	0.25*	0.05
	6. Being fashionably „fit“						0.15	-0.17	0.11	0.04	0.14	0.40*
	7. Higher self-esteem							0.05	0.34*	0.10	0.18	0.08
	8. Pleasure								0.22*	0.39*	0.31*	-0.04
	9. Escape from everyday life									0.61*	0.36*	0.00
	10. Stress relief										0.40*	0.00
	11. Need for physical activity											0.16
wheelchair basketball (n = 110)	1. Health	0.42*	0.24*	0.16	0.23*	0.18	0.18	0.28*	0.06	0.14	0.19	0.24*
	2. Physical fitness		0.17	0.13	0.37*	0.01	0.12	0.35*	0.17	0.06	0.32*	0.15
	3. Company of other people			0.31*	0.19	0.37*	0.37*	0.24*	0.36*	0.45*	0.22*	0.34*
	4. Shapely silhouette				0.21*	0.43*	0.35*	0.33*	0.14	0.14	0.14	0.33*
	5. Well-being					0.17	0.06	0.44*	0.11	0.13	0.21*	0.23*
	6. Being fashionably „fit“						0.55*	0.12	0.27*	0.21*	0.15	0.52*
	7. Higher self-esteem							0.09	0.25*	0.21*	0.14	0.44*
	8. Pleasure								0.28*	0.26*	0.47*	0.19
	9. Escape from everyday life									0.56*	0.37*	0.29*
	10. Stress relief										0.32*	0.28*
	11. Need for physical activity											0.30*

*statistically significant for $p \leq 0.05$

Negative (low) correlations were found for the following purposes indicated by the karatekas: well-being and higher self-esteem ($r = -0.28$) and being fashionably “fit” ($r = -0.23$), physical fitness and higher self-esteem ($r = -0.24$), and people’s company and higher self-esteem ($r = -0.23$). High and moderate correlations were found between the following objectives indicated by boxers:

being fashionably “fit” and higher self-esteem ($r = 0.68$), companionship of other people and being fashionably “fit” ($r = 0.60$), companionship of other people and higher self-esteem ($r = 0.50$), pleasure and satisfying the need for exercise ($r = 0.57$), escape from everyday life and the possibility of stress relief ($r = 0.57$). High and moderate correlations were found in relation to the following objectives indicated by football players: physical fitness and shapely figure ($r = 0.62$),

physical fitness and well-being ($r = 0.54$), shapely silhouette and well-being ($r = 0.63$), escape from everyday life and stress relief (0.61). Moderate correlations between the sporting objectives indicated by wheelchair basketball players concerned: getting away from everyday life and stress relief ($r = 0.56$), being fashionably “fit” and higher self-esteem ($r = 0.55$) (Table 3).

Profiles of main empirical variables

Higher scores on the scale of motivational value were characteristic for karatekas and boxers (4-5-6

stems) and wheelchair basketball players (4). The weakest motivation was shown by the football players (2) (Figure 1). For team athletes, the organization of time was less important for the achievement of the objective compared to karate and boxers (Figure 2). Perseverance in action (Figure 3) of karatekas, footballers and wheelchair basketball players usually amounted to 3 stems. Boxers were characterized by more varied ratings. Motivational conflict (Figure 4) was felt more strongly by karate and boxers athletes (5-7 stems). On this scale,

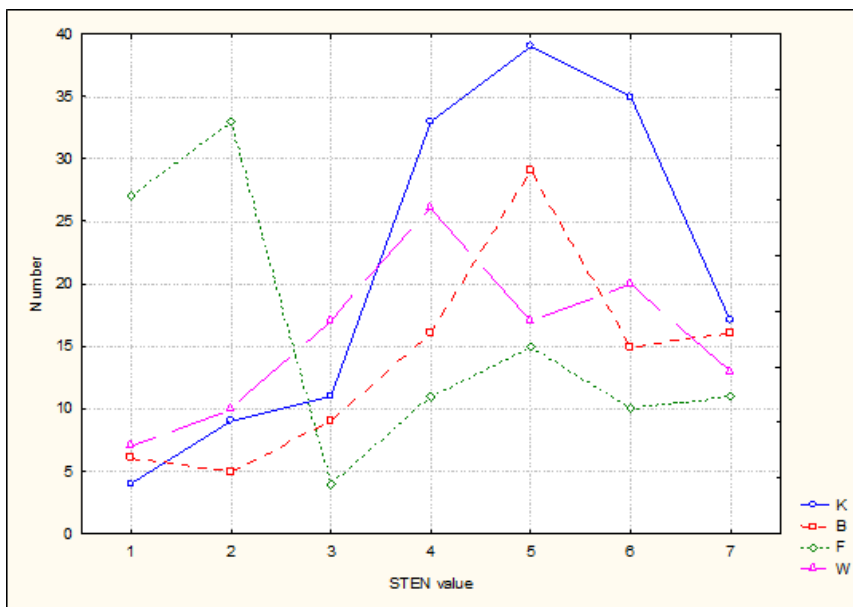


Figure 1. Profiles of motivational value of surveyed athletes.

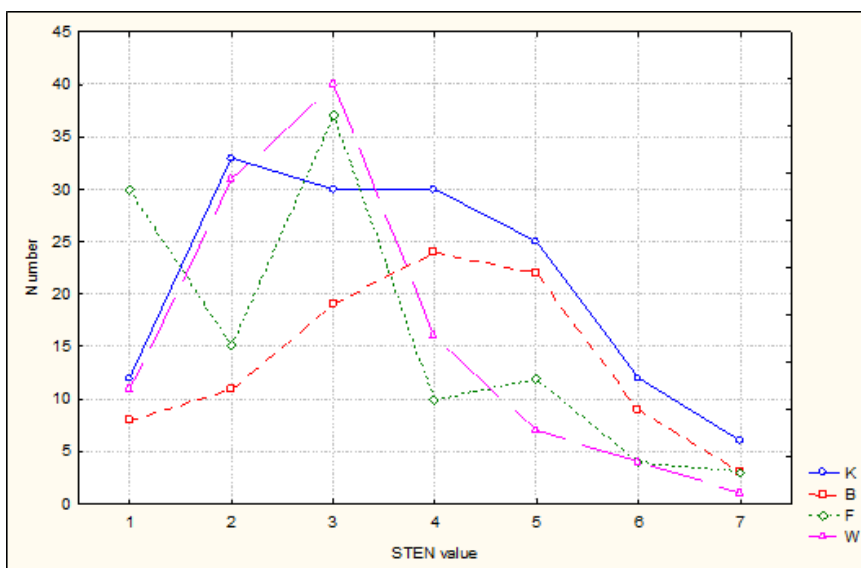


Figure 2. Profiles of organisation of time of surveyed athletes.

wheelchair basketball players occupied an intermediate position between karatekas and boxers. Football players exhibited the lowest level of motivational conflict. The highest scores on the scale of the multi-dimensionality of objectives were obtained by karatekas (Figure 5). Boxers, who occupied an intermediate position, had more varied grades on this scale. Team athletes achieved similar but lower results on this scale compared to individual athletes.

The differences between the individual motivational functions of sport objectives and the effect sizes

Higher motivational values were characteristic for karatekas in comparison to football players and basketball wheelchair players, and for boxers compared to football players. Lower values on this scale were also achieved by football players compared to wheelchair basketball players. The differences between karatekas

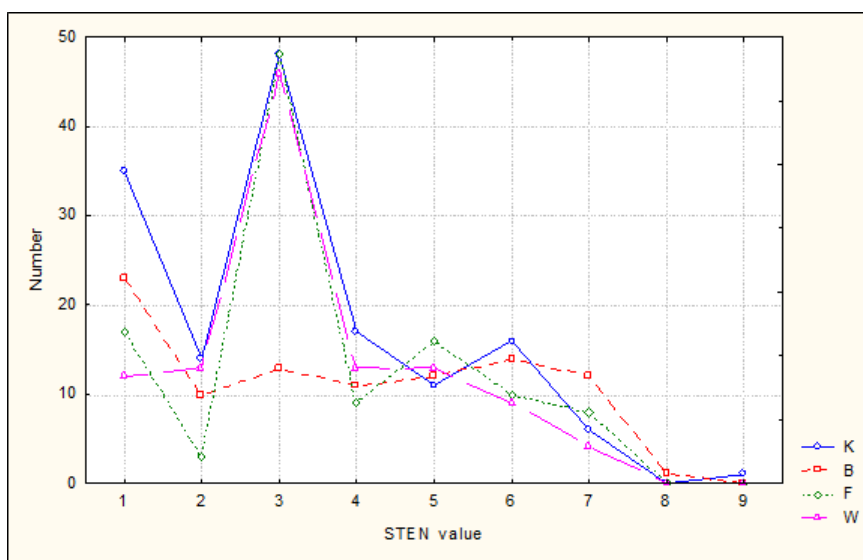


Figure 3. Profiles of perseverance in action of surveyed athletes.

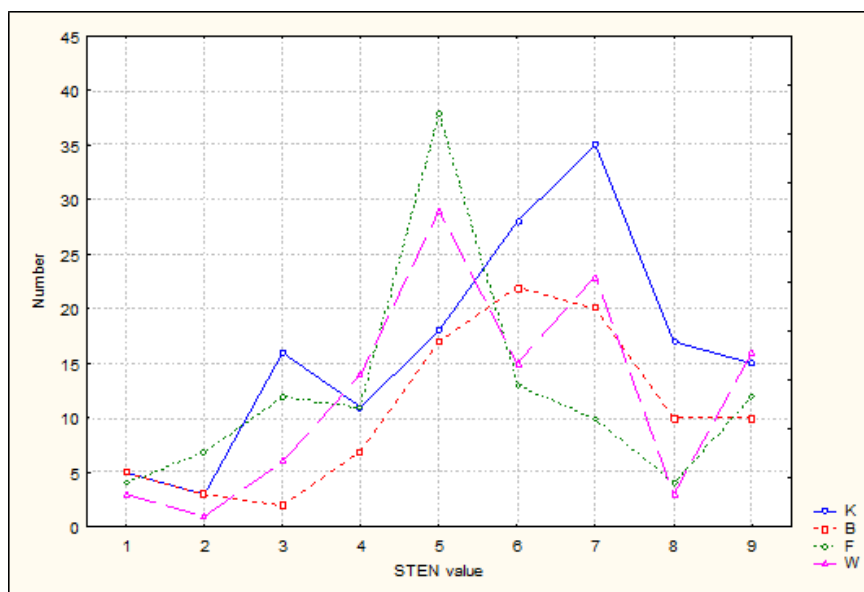


Figure 4. Profiles of motivational conflict of surveyed athletes.

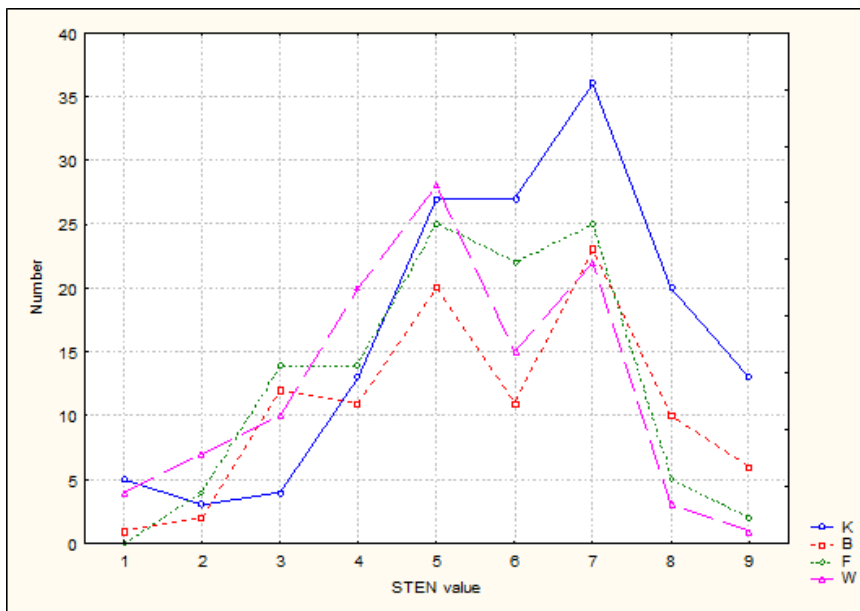


Figure 5. Profiles of multidimensionality of objectives physical activity of surveyed athletes.

and boxers and football players confirm a high effect size ($rg = 0.8$; 0.9 respectively) and moderate effect size for footballers and wheelchair players ($rg = -0.6$). On the scale of time organisation, karatekas and boxers had higher scores compared to football and wheelchair basketball players. These differences are confirmed by the close to moderate and high effect size ($rg = 0.5$; 0.4 ; 0.9 ; 0.8 respectively). Individual groups did not differ in the scale of perseverance in action. On the scale of the motivational conflict,

differences were found between karatekas and football players, boxers and football players, and between wheelchair basketball players and footballers (effect size close to moderate). The values of individual scales influenced the multidimensionality of the objectives. On this scale, karate athletes scored higher than team players and boxers compared to wheelchair basketball players. These differences were confirmed by close to moderate and moderate effect size ($rg = 0.4$; 0.6 ; 0.5) (Table 4).

Table 4. Motivational functions of sport objectives for karatekas, boxers, footballers and wheelchair basketball players (H test, E^2_R , U test, rg).

Specification	Rank means	Athletes across disciplines	p value for U statistics			Glass ranked biserial correlation		
			boxers	football players	wheelchair basketball players	boxers	football players	wheelchair basketball players
Motivational value H (3.465) = 43.89 $E^2_R = 0.0946$ $p = 0.0000$	266.21	karatekas	0.8764	0.0000*	0.0296*	0.1	0.8	0.3
	262.10	boxers		0.0000*	0.0872		0.9	0.3
	164.09	footballers			0.0000*			-0.6
	232.45	wheelchair basketball players						
Organisation of time H (3.465) = 32.88 $E^2_R = 0.0709$ $p = 0.0000$	254.18	karatekas	0.1302	0.0004*	0.0019*	-0.2	0.5	0.4
	281.51	boxers		0.0000*	0.0000*		0.9	0.8
	193.28	footballers			0.4313			-0.1
	202.25	wheelchair basketball players						

Specification	Rank means	Athletes across disciplines	p value for U statistics			Glass ranked biserial correlation		
			boxers	football players	wheelchair basketball players	boxers	football players	wheelchair basketball players
Motivational conflict H(3,465) = 14.37 E ² _R = 0.0310 p = 0.0024	249.02	karatekas	0.9872	0.0012*	0.4488	-0.0	0.4	0.1
	251.60	boxers		0.0013*	0.3590		0.6	0.2
	192.63	footballers			0.0142*			-0.4
	235.95	wheelchair basketball players						
Multidimensional target H(3,465) = 27.43 E ² _R = 0.0591 p = 0.0000	272.87	karatekas	0.0752	0.0006*	0.0000*	0.3	0.4	0.6
	240.65	boxers		0.2002	0.0082*		0.2	0.5
	216.51	footballers			0.1041			0.2
	189.32	wheelchair basketball players						

*statistically significant for p≤0.05

The differences in the effect size between the individual motivational functions of sport objectives, depending on the frequency of training

The motivational values show differences between people practising daily, once and twice a week and between people practising weekly, twice and 3-4 times a week. These differences are confirmed by the effect size (rg = 0.5-1.0 respectively). Differences in the organization of time apply to all the participants with different

frequencies of exercise. The effect size was high for those who trained daily and once a week. There were no differences in the scales of perseverance in action and motivation conflict between the players training with different weekly frequencies of trainings. The multidimensionality of the objectives differed between the athletes practicing every day and those practicing twice a week. Training twice a week differed in this scale from those training 3-4 times a week (similar to the average effect size) (Table 5).

Table 5. Motivational functions of the sport objective depending on the frequency of trainings (H test, E²_R, U test, rg).

Specification	Rank means	Weekly frequency of exercises	Values of p for U statistics			Glass ranked biserial correlation		
			Once a week	2 times a week	3-4 times a week	Once a week	2 times a week	3-4 times a week
Motivational value H(3,464) = 36.81 E ² _R = 0.0795 p = 0.0000	275.82	daily	0.0000*	0.0021*	0.0606	1.8	0.5	0.2
	146.25	once a week		0.0007*	0.0000*		-0.8	-0.8
	220.19	2 times a week			0.1351			-0.1
	243.19	3-4 times a week						
Time organization H(3,464) = 48.83 E ² _R = 0.1055 p = 0.0000	307.05	daily	0.0000*	0.0000*	0.0000*	1.5	1.1	0.5
	198.99	once a week		0.5324	0.0743		0.1	-0.3
	186.20	2 times a week			0.0011*			-0.3
	236.46	3-4 times a week						
Multidimensionality of objectives H(3,464) = 9.62 E ² _R = 0.0208 p = 0.0220	244.79	daily	0.1832	0.0492*	0.8778	0.4	0.4	-0.1
	213.61	once a week		0.8166	0.1049		0.1	-0.3
	206.67	2 times a week			0.0046*			-0.3
	248.73	3-4 times a week						

*statistically significant for p≤0.05

The differences between the motivational functions of sport objectives depending on the weekly exercise time, and the size effect

Athletes practising 120 minutes differed in the scale of the motivational value compared to all other groups spending more time on training sessions. Those who were spending 8 hours (480 min) per week on training differed from those spending more hours in sport. These differences are confirmed by the high and moderate effect size ($rg = 0.5-1.0$). Differences in time organization apply to all groups practicing for less than 480 minutes vs. those who practised for the longest time per week (high effect size: $rg = -0.7; -0.8; -0.8; -0.9$). The multidimensionality of the objectives differed between those training 120 min a week and those training 480 min and more ($rg = -0.4; -0.5$) (Table 6).

Motivational functions of sports objectives depending on training internship

The athletes with sporting experience ranging from 7 to 12 years had a higher motivation to train than those practicing only for 1 year, which was confirmed by the very high effect size ($rg = -1.5$). On the scale of time organization, differences were shown between those with sporting experience ranging from 1 to 7 years and those with the sporting experience of 7 to 12 years (low effect size). Perseverance in action differed between athletes with 1 to 7 years of training as well those with 7 to 12 years of

experience, and those training for more than 12 years ($rg = 0.2; 1.0$). Analogous differences were observed in the multidimensionality of objectives, i.e. between those practicing from 1 to 7 years as well those from 7 to 12 years and those training for more than 12 years (small effect size) (Table 7).

DISCUSSION

Our results showed that the hypothesis was correct, but only with regard to certain objectives and motivational functions. Our research shows that systematic training by karate participants, boxers, football players and wheelchair basketball players gave improved physical fitness as the most important objective of practicing sport. Better health as an objective of practicing sport – also mentioned by all the respondents, but in different orders – showed a positive correlation with physical fitness. These results are confirmed by previous research [3, 18, 25].

For example, in a survey of 72 sumo athletes, half of which were world champions, European champions and Polish champions, it was found that the dominant objectives of those athletes included improved physical fitness and health [11]. In a survey including 60 people with disabilities (mainly with paraparesis) [18] practicing swimming, wheelchair basketball and wheelchair fencing, the main objective was also the highest possible physical fitness (apart from experiencing

Table 6. Motivational functions of sport objectives in relation to weekly exercise time (H test, E^2_r , U test, rg).

Specification	Rank means	Weekly exercise time	Values of p for U statistics			Glass ranked biserial correlation		
			240 min	480 min.	>480 min	240 min	480 min.	>480 min
Motivational value $H(3.463) = 34.93$ $E^2_r = 0.0756$ $p = 0.0000$	170.06	120 min	0.0000*	0.0041*	0.0000*	-0.6	-0.5	-1.0
	243.62	240 min		0.3725	0.0397*		0.1	-0.3
	227.87	480 min.			0.0075*			-0.5
	280.07	>480 min						
Time organisation $H(3.463) = 36.81$ $E^2_r = 0.0797$ $p = 0.0000$	207.59	120 min	0.7342	0.2247	0.0000*	0.1	-0.2	-0.9
	204.83	240 min		0.1196	0.0000*		-0.2	-0.8
	230.07	480 min.			0.0001*			-0.7
	301.58	>480 min						
Multidimensionality of objectives $H(3.463) = 7.54$ $E^2_r = 0.0163$ $p = 0.0564$	202.43	120 min	0.1068	0.0286*	0.0142*	-0.2	-0.4	-0.5
	230.04	240 min		0.4006	0.2463		-0.1	-0.2
	243.19	480 min.			0.6772			-0.1
	250.39	>480 min						

*statistically significant for $p \leq 0.05$

Table 7. Motivational functions of sports objectives depending on training internship (H test, E^2_R , U test, rg).

Specification	Rank means	Exercise internship (in years)	Values of p for U statistics			Glass ranked biserial correlation		
			1-7	7-12	≥12 years	1-7	7-12	≥12 years
Motivational value H (3.465) = 5.65 $E^2_R = 0.0122$ p = 0.1296	203.96	≤1 years	0.4076	0.0387*	0.1270	-0.1	-1.5	-1.1
	227.59	1-7 years		0.0675	0.2653		-0.2	-0.1
	264.42	7-12 years			0.6185			0.3
	249.71	≥12 years						
Time organization H (3.465) = 8.10 $E^2_R = 0.0175$ p = 0.0438	250.33	≤1 years	0.3072	0.4443	0.8802	0.2	-0.6	0.2
	223.27	1-7 years		0.0083*	0.3417		-0.3	-0.1
	276.21	7-12 years			0.1742			0.6
	241.88	≥12 years						
Persistence in action H (3.464) = 6.52 $E^2_R = 0.0141$ p = 0.0889	254.39	≤1 years	0.4557	0.8972	0.0580	0.1	0.1	1.4
	234.17	1-7 years		0.4248	0.0478*		-0.1	0.2
	250.35	7-12 years			0.0307*			1.0
	195.54	≥12 years						
Multi-dimensionality of objectives H (3.465) = 9.31 $E^2_R = 0.0201$ p = 0.0254	185.43	≤1 years	0.0372*	0.0920	0.6478	0.3	-1.6	-0.3
	240.71	1-7 years		0.6847	0.0218*		-0.1	0.2
	247.32	7-12 years			0.0840			0.9
	197.19	≥12 years						

emotions accompanying the competition). Other research on highly-skilled karatekas confirmed that for male athletes the main purpose of karate was physical fitness, then pleasure from physical activity and well-being [3].

In our survey, all the athletes (karate, boxers, football players, wheelchair basketball players) also mentioned the possibility to escape from everyday life, which was highly correlated with the objective of stress relief. These objectives were also common for individual and team athletes.

The company of other people was an important motive for practicing sports for karate athletes, boxers and basketball wheelchair players. The company of other people positively correlated with well-being in karatekas and being fashionably "fit" in boxers. For wheelchair basketball players, the company of other people was important (it correlated with most of the objectives), as well as well-being. This is in line with the definition of sport by [26], for whom the most important function of sport is getting out to meet other people.

Skordilis et al. [27] showed that athletes with and without disabilities practiced because they liked this activity. Improvement of sports skills, good fun and the possibility of making new

acquaintances were important objectives for disabled Chinese athletes [28]. According to the 2018 study [6], footballers practiced this sport mainly for pleasure (56%), company (44%), health (34%), well-being (23%) and a shapely silhouette (4%). For those undergoing rehabilitation, health (97%) and well-being (17%) were most important. In our research, the pleasure of physical activity, as well as the company of other people were important objectives of sports, valued by individual athletes (karate, boxing) and team players (basketball wheelchair players valued the company of other people the most).

In 2002, Bogdal and Syska [29] conducted a survey among 300 Polish karatekas. As the most important objective, karate athletes indicated the new way of life (66%), the possibility of achieving sports success (20%) and improved health (12%). These objectives changed with sporting experience and age. Improved health, similar to our research that included also karatekas, was the third most important factor.

In a survey of 307 martial arts athletes [30], the most important objectives included the development of moral values (46%), self-esteem (44%), physical fitness (42%), self-defence (38%), self-fulfilment (36%), mastering sports skills (30%),

stress relief (8%) and cultural awareness (7%). Regardless of the discipline (judo/jujitsu, aikido/hapkido, kung fu/wushu, karate, taekwondo), aesthetic motives were important for all participants.

A survey of professional basketball players and wheelchair basketball players [31] showed a reduced self-esteem among the latter, which was similar to our results, where the objectives of being physically active (“fit”) correlated with the objective of higher self-esteem. The high scores for the objective of being appreciated, indicating its crucial importance for wheelchair basketball players, indicate the important role of coaches that should try to do their best to nurture a sense of self-esteem among athletes they work with. In a study by Molik et al. [32] involving, among others, 46 wheelchair basketball players, sports emotions related to sport activity, teamwork, developing skills and practising skills were indicated as the most important motives to practice sports. With age, there was a significant increase in the proper body weight, health benefits, and spending time with friends.

A shapely silhouette was an important objective mentioned in our survey. Football players valued it higher than general well-being. For wheelchair basketball players, this objective was mentioned after physical fitness, and before the company of other people, well-being and health. In our opinion, this may be associated with the entertaining character and popularity nature of team sports, but also with the age of wheelchair basketball players, who were the oldest in our survey. The aforementioned correlation between the objective of being physically active (“fit”) with higher self-esteem indicates that a need for appreciation and a desire to show one’s sporting skills are very strong among players with disabilities.

The IPAO applied as a standardized research tool allowed determining the differences in motivational functions of a sports objective [2] by karatekas, boxers, football players and basketball wheelchair players.

Higher motivational values were characteristic of karatekas in comparison to football players and wheelchair basketball players and for boxers compared to football players. Lower values on this scale were also achieved by football players compared to wheelchair basketball players. Karate and boxer athletes and wheelchair basketball players had greater motivation (motivational

values) to practice sports. Lower scores on the scale of motivation values were characteristic of football players.

On the scale of leisure time organisation, karate and boxers had higher scores compared to football and wheelchair players. In organising time, concentrating on planning, organising and subordinating time to sport, by karate and boxers, more difficulties were encountered by karate and boxers than by football and wheelchair players. The surveyed competitors did not differ on the scale of perseverance in action. On the scale of motivational conflict, differences were found between karate and boxers and football players, as well as between wheelchair basketball players and football players. The motivational conflict between the sport objectives and other equivalent objectives was experienced less by football players than karate, boxing and wheelchair basketball players.

The values of individual scales influenced the multidimensionality of the objectives. On this scale, karate athletes scored higher than team players and boxers compared to basketball wheelchair players. The multidimensionality of karate and boxer objectives is the result of higher scores on the scale of motivational value and motivational conflict. This shows the difficulty of karatekas and boxers in reconciling sports with other activities, but also more varied choices. Football players were less motivated, with lower motivational conflict, and found it less difficult to organise their time to train. The results obtained by Lipowski et al. [3] on the motivational function of objectives among karatekas (especially in terms of time management and perseverance) may indicate that despite the fact that the participants were experienced athletes, regular trainings and competitions were not the most important factor around which they organized their lives.

Motivational functions of the sport objectives were also influenced by the frequency of exercises, weekly volume of training and sporting experience. Daily training sessions (more often boxers and karate athletes) were more motivating than training less often. Athletes training for 7-12 years and more (more often karatekas, boxers, and wheelchair basketball players) had a greater motivation in comparison with those training for 1 year or less. Perseverance in action was related only to the sporting experience, not to the frequency and volume of training. The relationship between training experience and motivation was confirmed

in a study on 243 professional and amateur footballers in the 2016/2017 season [33], in whom motivation increased with their calendar age.

The motivational systems of combat sports and martial arts are similar in terms of meaning and content, but the hierarchy of objectives can be very different according to cultural contexts. Further research should take this into account also in relation to other sports [34, 35]. Not without significance are also the upbringing opportunities of the young generation created by practising sports, including sports and martial arts [36, 37]. Despite the existing, often common opinions about the negative effects of practicing combat sports, no statistically significant difference in aggression (verbal aggression, physical aggression, hostility, anger) was observed between 60 Czech baseball and Brazilian jiu-jitsu athletes [38]. However, the latter results need to be confirmed due to the small sample size. This remark is important, among others, due to the latest research results of Litwiniuk et al. [39] – the athletes practicing kyokushin karate were characterised by higher levels of aggressiveness as compared with those practicing in soft style kumite (aikido and traditional karate).

CONCLUSIONS

In the motivational analyses of the functions of the objectives among karatekas, boxers, football players and wheelchair basketball players, no differences were observed on the scale of perseverance in action. Perseverance in action was related only to sporting experience, not to the frequency and time of training. In shaping the motivation to take part in sport it is necessary to focus the work of a coach (sports psychologist) on helping the competitors in removing obstacles hindering the achievement of the objective, focusing attention on the objective, building the belief that it is possible to achieve it.

LIMITATIONS

The small number of female football players made it impossible to compare sport objectives between genders. The IPAO does not contain the objective for practicing combat sports and martial arts associated the ability to defend oneself or attack. This information should be taken into account in future studies.

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