THE INFLUENCE OF CONATIVE CHARACTERISTICS ON SUCCESS IN YOUNG TAEKWONDO COMPETITORS

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Abstract

The KON6 test by Momirović, Horga and Bosnar (1982) was applied on a sample of 100 young taekwondo competitors divided into two groups according to gender (N=50 boys and N=50 girls).The aim of this research was to determine the impact of conative characteristics on efficiency of young male and female taekwondo competitors, their correlation and the existence of gender differentiations. The obtained results indicated high sensitivity of the test applied in this age group.It is noticeable that the expression structure of conative factors was very similar in boys and girls, whereas the application of independent samples T-test determined a statistically significant gender differentiation for three conative factors: SIGMA – attack reaction regulator; DELTA – regulatory functions coordination system; ETA – regulatory functions regulation system, with all three measures more prominent in girls as opposed to boys.Intercorrelation of conative factors in male and female competitors was very similar on a high level of correlation of all factors except for the EPSILON factor, and in a relative "independence" of the EPSILON factor from other factors. A noticeable difference is the fact that the EPSILON factor in female subsample was related to the ALPHA factor, whereas in the male subsample it was related to the SIGMA factor.The application of discriminant analysis to both subsamples revealed no statistically significant differences between the groups of more successful and less successful athletes.In order to make any serious conclusions, the research should be repeated in other combat sports for easier interpretations and result comparison, the subject sample should be enlarged and metric characteristics of the applied KON6 test should be calculated on younger athletes as well.

Key words: Conative characteristics, efficiency, gender differentiations, KON 6.

Introduction

As a science that studies, among other, the laws of directing the exercise programme, as well as the consequences of those processes onto human organism (Mraković, 1992), kinesiology should answer numerous questions that can help understand the laws of certain sports. The relation between sports activity and sport success on one side and some characteristics of man on the other side is of special kinesiological interest. This is especially true for motor-functional abilities and morphological characteristics, since they are largely responsible for high quality adoption and realization of different movement structures (Malina and Bouchard, 1991).

In order to achieve elite sports results, one should dispose of scientific knowledge regarding the character of the sport, as well as the influence of certain factors on sports success. The scientific approach means to thoroughly and successively follow and test the complete anthropological status of an athlete through all phases of his sports career. The most commonly tested segments of anthropological status are motor-functional abilities and morphological characteristics of the athlete. The reason for this is the fact that the measuring instruments used in evaluation of these characteristics have satisfactory metric characteristics, so the obtained results are exact and interpretable, and are of great significance for almost every type of sport (Krstulović, 2006).

The equation of the taekwondo sport success specification, which should reveal the hierarchical structure and mutual relations between the factors important for achieving high taekwondo achievements, has not been adequately explored yet, at least not in the amount to use the collected scientific cognition in an exact way while selecting and preparing the athletes. Keeping this in mind, this research, to some

extent, helps the research of taekwondo sport.

Taekwondo is a relatively young and complex sport, which, besides the partial research of influence of certain areas on the success, has not been researched (Čular, Krstulović and Tomljenović 2011; Čular, Munivrana and Katić, 2013).

One should assume that the influence of personality structure in all, and especially combat sports, was of exceptional importance for the achievement of elite sports results. It is generally known that teams of psychologists contribute to the preparation processes of sport teams and individuals, with the aim of achieving elite sports results. The mode of achieving and maintaining high motivation level, such as the ability of aggression control, are only some of sports success predictors in different sports and sports disciplines.

Since we live in a time when the technical elements of all globally developed sports are perfected, while the tactical preparation includes individual approach and analysis of each individual opponent, it is not rare that the conative regulatory mechanisms make difference in sport success, i.e., achieving results and defeat.

In the research conducted by Horga and Gabrijelić (1983), a battery of tests later called KON6 – battery of conative tests, was used as a predictor group of variables (Momirović, Wolf and Džamonja, 1992).

By the MODEL OF CONATIVE FUNCTIONS Momirović, Horga and Bosnar (1982) assumed the existence of following regulation systems:

ε – Activity regulation system (EPSILON1),

χ – Organic functions regulation and control system (CHI1),

α – Defence reaction regulation and control system (ALPHA1),

σ – Attack reaction regulation and control system (SIGMA1),

δ – Regulatory processes coordination system (DELTA1),

η – Regulative functions integration system (ETA2).

ACTIVITY REGULATOR (ε) – EPSILON is one of the elementary and lowest set subsystems of the hierarchy. Its function is regulation and modulation of reticular formation activating function, and for that reason, it is immediately responsible for the activity and energy levels of function of the remaining subsystems, including the cognitive and motor processors. Therefore, this system of excitation and inhibition regulation is responsible for the regulation of activity level and the balance of excitation and inhibition process, and it can be characterised as extraversion-introversion system.

The components of extraversion-introversion are: affinity – aversion to the fast energy mobilisation and need – lack of excitation want, or more exactly, the need for increased intake of information into the system.

ORGANIC FUNCTION REGULATOR (χ) – CHI, formed by teaming the subcortical centres for organic function regulation, mostly located in the hypothalamic region and their superior cortical regulation and control systems.

Therefore, the organic function regulation and control system, responsible for all behaviour modes that can be chracterised as conversion or conversional reactions.

DEFENCE REACTION REGULATOR (α) - ALPHA, located in the (hypothetical) defence reactions centre, modules the tonic excitation, probably on the basis of adequate programmes carried by the genetic code or formed, generally under the influence of conditioning, during the ontogenetic development.

The defence reaction regulation and control system is responsible for all behaviour patterns that can be characterised as anxious, in a broad sense. It consists of reactions to situations presenting a threat to the physical integrity, self-esteem as well as reactions indicating inhibition and excitation reactions.

ATTACK REACTION REGULATOR (σ) - SIGMA, also located in the (hypothetical) attack reaction regulation centre (both centres, or at least their primary components, are probably situated in the limbic system), modulates, same as the defence reaction regulation centre, the primary tonic excitation, but based on the destructive reactions programme, formed during phylogenetic or ontogenetic development.

The attack reaction regulation and control system is responsible for all patterns of behaviour that can be characterised as aggressive. The efficiency of reaction control and regulation system, that is, aggression, is revealed through the reactions to the situations of the frustration character, and the reactions triggered by the tonal excitation of the attack reaction regulation and control system and the reactions caused by the excitation of the defence reaction regulation and control system, and only indirectly the attack reactions.

THE HOMEOSTATIC FUNCTION SYSTEM (δ) - DELTA, coordinates the functions of the subsystem that differ, functionally of hierarchically, including the cognitive processors functions. Because of this, this system is functionally superior to the organic functions regulators, attack and defence reactions`, and to a certain degree to the activity regulator, at least in the extreme areas of this regulator`s regulatory span.

The system for homeostatic regulation is responsible for all the behaviour patterns that can be characterised as dislocated, such as reactions that indicate clumsiness and confusion.

THE REGULATORY FUNCTION INTEGRATION SYSTEM (η) - ETA, has the highest position in the hierarchy of the conative regulatory systems. The basic function of this system is the integration of conative processes in the sense of psychological field structure (in the Levine sense of psychological field significance), and especially the structure of social field and changes in this field. Probably because of this, the group of programs defining the functions of this system is mostly formed during the upbringing process, not only by conditioning, but also strengthening, and possibly by internalisation.

Since this model supposes a hierarchical organisation of regulation systems, with collateral relations of the same hierarchical level system, the efficiency of every one of them depends on the efficiency of the total number or the great majority of remaining systems.

The efficiency of all conative regulation systems partly depends on the physiological factors, which determine the extent and stability of regulation, and partly, but dominantly in some systems, on the programmes formed under the influence of exogenous factors, as well as under the influence of interaction of exogenous, mostly social factors, and the physiological basis of regulation mechanisms (Momirović, Wolf and Đamonja, 1992).

Filaire, Maso, Sagnol, Ferrand and Lac, (2001a) researched the anxiety and hormonal activity and stress during judo competitions (Filaire, Sagnol, Ferrand, Maso and Lac (2001b).

Kim (1991), Skelton, Glynn and, Berta (1991) researched the area of sports psychology in taekwondo athletes.

It is important to mention the research by Martin and Pilcher (1994), who determined the influence of taekwondo practice on self-esteem, social attractiveness, success and social attention. The results showed several levels of measured characteristics after the training cycle. Taekwondo taught the practitioners self-control in highly structured environment, with the aim of decreasing anxiety related to competitive failure.

Matsushigue. Hartmann and Franchini (2009) set the determination of structure and difference between winners and other athletes in the physiological reaction of the body during taekwondo competition as the aim of his research. Based on the fights recordings, the indicators of blood lactates and heart beat frequency, he concluded that the winners used fewer number of techniques, and that after the fight the values of lactates and heart frequency in winners did not statistically significantly differ from that of other competitors.

On the other side, researchers such as Gao (2001), Heller et al. (1998), Tan, Aziz and Chuan, (2000), Toriola, Adeniran and Ogunremi (1987), Watss, Martin and Durtschi (1993) agreed that the specific anthropometric characteristics alone cannot guarantee winning the gold medal. According to the mentioned group of authors, the competition success depends, besides the anthropometric characteristics, on the combination of motor abilities, talent, skill, technique, determination, strategy and psychological preparedness.

Filaire et al. (2001) evaluated athletes with low levels of anxiety, high ego and self-confidence potentially more successful in sports competition.

Regarding the mentioned researches, the aim of this scientific paper was defined: determining the influence of conative characteristics on success of young taekwondo male and female competitors, their mutual correlation and the existence of gender differentiations.

Methods

One hundred taekwondo competitors of younger cadet age group, divided by gender (50 female, 50 male), defined the sample of examinees. All the examinees were members of Croatian taekwondo clubs "Marjan" and "St-Kwan" from Split, and kinesiologically active since the age 5-7, competing in taekwondo competitions, from city to international competitions.

The average chronological age of young male taekwondo competitors was 13.82±1.4 years, body height was 161.81±12.79 cm while body mass was 51.06±11.10 kg.

The average chronological age of young female taekwondo competitors was 13.97±1.32 years, average body height was 158.20±9.14 cm while body mass was 46.86±8.51 kg.

Six conative characteristics evaluation regulators (KON6) by Momirović et al. (1982) represented the group of predictor variables. The *Activity regulator* – ε (One of the elementary and low set subsystems of the hierarchy, responsible for activity and energetic level on which other subsystems function, including the cognitive and motor processors). *Organic function regulato*r – χ (Formed by teaming the subcortical centres for organic function regulation, mostly located in the hypothalamic region and their superior cortical regulation and control systems). *Defence reaction regulator* - α (Located in the hypothetical defence reactions centre (in the limbic system), modules the tonic excitation, probably on the basis of adequate programmes carried by the genetic code or formed, generally under the influence of conditioning, during the ontogenetic development). *Attack reaction regulator* - σ (Located in the hypothetical attack reaction regulation centre (in the limbic system), modulates, same as the defence reaction regulation centre, the primary tonic excitation, but based on the destructive reactions programme, formed during phylogenetic or ontogenetic development). *The regulative functions coordination system* – δ (Coordinates the functions of the subsystem that differ functionally of hierarchically, including the cognitive processors functions. Because of this, this system is functionally superior to the organic functions regulators, attack and defence reactions, and somewhat the activity regulator). *Regulatory function integration system* - η (Superior to all conative regulatory systems, integrates conative processes in the sense of psychological field structure, especially the structure of social field and changes in this field, so that the level of socialisation depends on this system).

Each of six conative tests comprises 30 statements, and the examinee chooses one of the 5 offered agree-disagree statements on the Likert scale. The time for choosing was not limited (it takes about 30 min to finish the test), and the score of each test can amount to minimum 30 and maximum 150 points.

The criterion, that is, the variable by which we differed two groups of contestants (more successful or less successful contestants) was defined according to competitive success (medal winners at state level and other contestants).

The methods of data processing included the calculation of descriptive statistic indicators of six conative factors (regulators): arithmetic mean (AM), standard deviation (SD), minimum and maximum result (MIN and MAX), skewness and kurtosis (SKEW and KURT) as well as defining the MaxD values for determining normal variable distribution by using the KS- test.

The independent samples T-test was used to perform the analysis of conative regulators difference between young male and female taekwondo contestants. The Pirson correlation coefficient was used to determine the mutual relation between conative regulators for both genders, and the usage of discrimination analysis determined the differences of conative regulators according to the success criterion, separately for male and female contestants.

Results and Discussion

Questionnaires measuring conative factors, according to model by Momirović et al. (1982), have been applied in order to measure the expression of conative factors (regulators) in boys and girls training taekwondo. The results are shown in the first part, separately for girls and boys, and after that the determined differences are shown.

Table 1. Descriptive statistics of conative factors measures in female taekwondo contestants (N=50)

VARIABLE	N	AS	SD	MIN	MAX	SKEW	KURT	K-S TEST
EPSILON	50	59.62	13.13	36.00	88.00	-0.02	-0.69	0.09
CHI	50	121.06	20.46	71.00	150.00	-0.48	-0.61	0.14
ALFA	50	99.46	23.88	38.00	150.00	0.08	-0.22	0.09
SIGMA	50	93.80	16.25	65.00	144.00	0.36	0.57	0.07
DELTA	50	126.94	21.82	59.00	150.00	-1.11	0.83	0.15
ETA	50	115.26	21.19	61.00	149.00	-0.47	-0.60	0.11

The limit value of K-S test = 0.19

Legend: AS – arithmetic mean, SD – standard deviation, MIN – minimum value, MAX – maximum value, SKEW – skewness, KURT – kurtosis, K-S TEST – Kolmogorov- Smirnov test

The sensitivity of all measured variables on this sample of examinees was high, because all the indicators of sensitivity (the results of Kolmogorov-Smirnov test, skewness and kurtosis) were satisfactory. This shows that the calculated medium values (arithmetic means) were good representatives of conative factors measures, but also enables the application of parametric statistic procedures in the forthcoming data processing.

Among the measured conative factors the EPSILON factor – *activity regulator* (arithmetic mean was 59.62) was by far least expressed, followed by SIGMA – *attack reaction regulator* and ALPHA – *defence reaction regulator* (arithmetic means were 93.80 and 99.46). The following factors were mostly expressed: ETA – *regulative functions regulation system*, CHI – *organic functions regulator* and DELTA – *regulative functions coordination system*.

These finds show that EPSILON – *activity regulator*, as one of the elementary and low set regulation systems, responsible for activity and energetic level on which other systems in young taekwondo female competitors functions, was very low.

Among other regulators the CHI – *organic functions regulator,* was mostly expressed, as well as two *regulative function coordination and integration* systems – ETA and DELTA.

Table 2. Descriptive statistics of conative factors measures in taekwondo male contestants (N=50)

VARIABLE	N	AS	SD	MIN	MAX	SKEW	KURT	K-S TEST
EPSILON	50	63,46	15,54	30,00	112,00	0,18	1,13	0,10
CHI	50	118,48	24,35	30,00	150,00	-1,45	3,12	0,11
ALPHA	50	94,36	23,19	30,00	148,00	-0,42	1,42	0,12
SIGMA	50	81,14	16,86	38,00	124,00	-0,43	1,03	0,11
DELTA	50	114,76	23,41	41,00	149,00	-0,88	0,79	0,12
ETA	50	106,36	22,40	46,00	149,00	-0,40	0,48	0,09

The limit value of K-S test = 0.19

Legend: AS – arithmetic mean, SD – standard deviation, MIN – minimum value, MAX – maximum value, SKEW – skewness, KURT – kurtosis, K-S TEST– Kolmogorov- Smirnov test

Similar as on the sample of female taekwondo contestants, the sensitivity of measured variables on the sample of female contestants was satisfactory, since the indicators of sensitivity were mostly good (the results of Kolmogorov-Smirnov test). However, the skewness and kurtosis indicators in three (EPSILON, CHI and ALPHA) out of six measures were noticeably expressed. Still, the determined measures of sensitivity enabled the application of parametric statistic procedures in data processing.

Among the measured conative factors the EPSILON – *activity regulator* factor was least expressed (arithmetic mean was 81.14 and 94.36). The ETA – *regulative functions regulation system* factor was mostly expressed, as well as DELTA – *regulative function coordination system* and CHI – *organic function regulator*.

These results show that EPSILON – *activity regulator*, as one of the elementary and low set regulation systems, was responsible for the activity and energetic level of functioning for other systems, and it was very low in boys.

Among other regulators the CHI – *organic functions regulator,* was mostly expressed, as well as two *regulative function coordination and integration* systems – ETA and DELTA.

It is noticeable that the conative factors expressiveness structure was very similar in girls and boys, but it is necessary to determine the possible existence of differences in the expression of certain factors between boys and girls.

In concordance with the finds by Momirović et al. (1982), who determined the degrees of conative factors expression according to gender of the examinees, it was expected that gender differences would be determined in this sample of examinees as well.

Table 3 shows the differences determined using the independent samples T-test, according to the degree of measured conative factors, between girls and boys involved in taekwondo practices.

The statistically significant differences between male and female contestants were determined in three conative factors: SIGMA – *attack reaction regulator,* DELTA – *regulative functions coordination system* and ETA – *regulative functions regulation system*, and all three measures were more expressed in girls than in boys.

Table 3. Test of the conative factors gender differences in young taekwondo contestants

VARIABLE	GIRLS		BOYS		T-TEST	p
	AS	SD	AS	SD		
EPSILON	59,62	13,13	63,46	15,54	-1,33	0,19
CHI	121,06	20,46	118,48	24,35	0,57	0,57
ALPHA	99,46	23,88	94,36	23,19	1,08	0,28
SIGMA	93,80	16,25	81,14	16,86	3,82	0,00
DELTA	126,94	21,82	114,76	23,41	2,69	0,01
ETA	115,26	21,19	106,36	22,40	2,04	0,04

LEGEND: AS – arithmetic mean, SD – standard deviation, p – level of statistical significance of T-test results

SIGMA – *attack reaction control and regulation system,* more expressed in young female contestants, responsible for all types of behaviour that can be described as aggressive, displayed as reactions to frustration situations, reactions caused by tonal excitation of the attack reaction regulation and control system, as well as the reactions caused by the excitation of defence situations regulation and control system, and only indirectly by the attack reaction. The possible explanation of these results could be the fact that girls are more sensitive to aggression and they cope with aggression not as good as boys, and that their tonal excitation is on the higher level, resulting in the need of higher regulation and control of defence reaction, causing a greater reaction and attack control.

Girls also had greater values of DELTA – regulative functions coordination system conative factor, which is functionally superior to the attack and defence reaction regulator (SIGMA).

The disturbances of this system cause dissociation and disorganisation of cognitive and conative processes and disorders of motor functions, especially those that depend on the movement trajectory regulation system and synergic regulation and tone regulation system. This can be explained by the fact that female contestants were of same chronological age as their male colleagues, but they mature earlier and enter the puberty period, are more sensitive and emotional than young male taekwondo competitors, are weaker in taking blows, show more aggression, what causes greater clumsiness and confusion of attack reaction regulators - young male contestants are much better in coping with the fights and involve in contacts easier than the girls.

ETA - *regulative functions regulation system*, also more expressed in young female contestants, has the highest position in the conative regulative systems hierarchy.

Grouped with the regulative functions coordination system (DELTA), this system of regulative function integration is functionally superior to all conative regulation systems.

Therefore, it is no wonder that higher values of SIGMA and DELTA conditioned higher values of regulative functions regulation system (ETA) in young female competitors.

The results in this research indicate that girls have more expressed concordance of personal reactions with the social demands, which can be described as morality. The girls, unlike their male colleagues, have more sensible attitudes towards weaker or endangered ones, are more sensitive in defining trust and mistrust and they behave depending on the bearer of the moral information, that is, they identify themselves with the most important grown-ups or the group of peers and are more prone to accepting their moral attitudes.

Table 4. The relation of conative factors measures in female contestants (N=50)

VARIABLE	EPSILON	CHI	ALPHA	SIGMA	DELTA	ETA
EPSILON	1.00	-0.21	-0.37**	0.03	-0.20	-0.24
CHI	-0.21	1.00	0.80**	0.41**	0.72**	0.72**
ALPHA	-0.37**	0.80**	1.00	0.46**	0.70**	0.77**
SIGMA	0.03	0.41**	0.46**	1.00	0.49**	0.54**
DELTA	-0.20	0.72**	0.70**	0.49**	1.00	0.79**
ETA	-0.24	0.72**	0.77**	0.54**	0.79**	1.00

** - *statistic significance of coefficients on the p<.01 level*

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Table 4 shows the relations between the measured conative factors in girls – competitors. The factor EPSILON was relatively non-connected to the other factors because it was significantly connected only to ALPHA factor. All the remaining factors were mutually highly connected, and the correlation coefficients varied between medium 0.41 and high 0.80.

Table 5. The relation between conative factors measures in male competitors

VARIABLE	EPSILON	CHI	ALPHA	SIGMA	DELTA	ETA
EPSILON	1.00	-0.09	-0.10	0.33*	0.11	0.02
CHI	-0.09	1.00	0.77**	0.30*	0.54**	0.59**
ALPHA	-0.10	0.77**	1.00	0.44**	0.47**	0.59**
SIGMA	0.33*	0.30*	0.44**	1.00	0.41**	0.39**
DELTA	0.11	0.54**	0.47**	0.41**	1.00	0.81**
ETA	0.02	0.59**	0.59**	0.39**	0.81**	1.00

** - statistic significance of coefficients on $p<.01$ level
* - statistic significance of coefficients on $p<.05$ level

Table 5 shows the relations between the measured conative factors in boys – competitors. The EPSILON factor was relatively non-connected to the other factors because it was significantly connected only to SIGMA factor. All the remaining factors were mutually highly connected, and the correlation coefficients varied between medium 0.41 and high 0.81.

The conative factors intercorrelation tables in boys and girls are very similar in high degree of relation between all factors, besides the EPSILON factor, and in the relative "independence" of the EPSILON factor of the other factors.

The noticeable difference is the fact that the EPSILON factor in the subsample of girls was related to ALPHA factor, and in the subsample of boys, with the SIGMA factor.

The obtained results of relation between EPSILON factor, which is in charge of activity level regulation and the excitation and inhibition process balance, which can be characterised as extroversion-introversion, with the ALPHA regulator that conditions different modalities and anxiety symptoms in young female contestants, is possible to define by the assumption that the tendency towards fast energy mobilisation, need for excitation and the increased information entrance into the system causes the increase of the defence reaction regulators, that is, the increased activity and energetic level of the subsystem of cognitive and motor processed conditions the increase of anxiety in girls – competitors.

The relation between EPSILON regulator and the SIGMA regulation system in boys – competitors, can be to some extent explained by the fact that in young taekwondo competitors the attack reaction regulation was more expressed than the defence reaction, as the consequence of the increase of activity level and the balance of excitation and inhibition process.

Since the available reading could not provide the researches in which KON6 tests were used on younger age categories, it is necessary to repeat the research in other combat sports to bring forth serious conclusions, and it is necessary to increase the number of examinees. The higher number of longitudinal studies would bring forth some more significant claims.

Since significant differences in the conative factors expression degree were determined between boys and girls, and the significant correlations between the conative factors on the subsamples of boys and girls, the discriminative analysis has been applied for each individual subsample so as to determine do the conative factors influence the taekwondo success of the examinees.

The multivariate discriminative analysis of the complete predictor group of conative factors was conducted with the aim of differentiating groups of girls according to the degree of taekwondo success, but the existence of statistically significant discriminative function was not determined. Therefore, the measured conative factors of this sample were in no significant relation with their success as combat sport athletes. The arithmetic means of all the observed regulators, besides the EPSILON, indicated lower values in successful taekwondo female competitors.

Table 6. Discriminative analysis of groups of girls of different success levels according to conative factors expression

DF	λ	Rc	Wilks' lambda	χ^2	SS	P =
1	0.19	0.40	0.84	7.87	6	0,25

VARIABLE	Structure matrix	
	1	
EPSILON	0.77	
CHI	-0.44	
ALPHA	-0.48	
SIGMA	-0.38	
DELTA	-0.19	
ETA	-0.32	
GROUPS ACCORDING TO SUCCESS	Group centriods	
	1	
0 – LESS SUCCESSFUL	-0.29	
1 – MORE SUCCESSFUL	0.62	

VARIABLE	GROUPS ACCORDING TO SUCCESS			
	0 – LESS SUCCESSFUL N = 34		1 – MORE SUCCESSFUL N = 16	
	AS	SD	AS	SD
EPSILON	56.76	14.11	65.69	8.20
CHI	123.71	21.23	115.44	18.06
ALPHA	102.79	25.65	92.38	18.37
SIGMA	95.59	16.61	90.00	15.28
DELTA	128.18	23.11	124.31	19.22
ETA	117.24	20.72	111.06	22.24

LEGEND: λ – value of discriminative function; Rc – cannon correlation coefficient; Wilks' lambda – Wilks` lambda coefficient (Wλ) of discriminative function; χ^2 – discriminative function significance test – χ^2 test; *** – level of significance DF of p<.001; SS – degrees of freedom: P= – level of statistical significance of DF (χ^2 -test)

Table 7. Discriminative analysis of different success level groups of boys in the *conative factors* expression

DF	λ	Rc	Wilks' lambda	χ^2	SS	P =
1	0.07	0.26	0.93	3.16	6	0,79

VARIABLE	Structure matrix	
	1	
EPSILON	-0.21	
CHI	-0.52	
ALFA	-0.59	
SIGMA	-0.46	
DELTA	0.10	
ETA	-0.30	
GROUPS ACCORDING TO SUCCESS	Group centroids	
	1	
0 – LESS SUCCESSFUL	0.23	
1 – MORE SUCCESSFUL	-0.31	

VARIABLE	GROUPS ACCORDING TO SUCCESS			
	0 – LESS SUCCESSFUL N =29		1 – MORE SUCCESSFUL N = 21	
	AS	SD	AS	SD
EPSILON	62.72	16.22	64.48	14.88
HI	115.66	29.84	122.38	13.39
ALPHA	91.31	25.95	98.57	18.51
SIGMA	79.38	18.62	83.57	14.15
DELTA	115.28	25.50	114.05	20.75
ETA	104.86	26.81	108.43	14.67

LEGEND: λ – value of discriminative function; Rc – cannon correlation coefficient; Wilks' lambda – Wilks` lambda coefficient (Wλ) of discriminative function; χ^2 – discriminative function significance test – χ^2 test; *** – level of significance DF of p<.001; SS – degrees of freedom: P= – DF level of statistical significance (χ^2 -test)

The multivariate discriminative analysis of the complete predictor group of conative factors was conducted with the aim of differentiating groups of boys according to the degree of taekwondo involvement success, but it did not show any statistically significant discriminative function. Therefore, on the sample of boys, the measured conative factors were not significantly related to their success as combat sport athletes. The arithmetic means of all the regulators, except for DELTA, had higher values in successful taekwondo athletes.

Both subsamples showed that there was no statistically significant differences between the groups of more successful athletes in relation to groups of less successful athletes.

The results of discriminative analysis of female and male athletes were highly uninterpretable, because previous research did not include the application of KON6 on the athletes of younger age categories. It is possible that some other factors had more influence than the used ones, perhaps the results were somewhat insincere and "masked", since they were not anonymous due to the need of determining the success criterion, and the increase of the number of examinees is also desirable.

Conclusion

Since we live at an age when the technical elements of all globally developed sports are brought to perfection, and the tactical preparation includes the individual approach and the analysis of each individual opponent, it is not uncommon that the conative regulatory mechanisms make difference in sport success, that is, the result achievement and defeat.

The obtained results indicate high sensitivity of test application for this age group. It is noticeable that the structure of conative factors expression was very similar for boys and girls, while the individual samples T-test determined a statistically significant gender differentiation in all three conative factors: SIGMA – attack reaction regulator; DELTA – regulative function coordination system; ETA – regulative functions regulation system. All three measures were more highly expressed in girls than in boys.

The intercorrelation of conative factors in female and male contestants was very similar in high degree of relation of all factors except for the EPSILON factor, as well as the relative "independence" of EPSILON factor of other factors. The noticeable difference is the relation of EPSILON factor to ALFA factor in the subsample of girls, while in the subsample of boys it was related to SIGMA factor.

The application of discriminative analysis on both subsamples showed that there were no statistically significant differences between the groups of more successful athletes and the groups of less successful athletes.

In order to bring forth higher quality conclusions in future research the sample of examinees should be more numerous, athletes from other combat sports should be included and metric characteristics of the applied KON6 test on the athletes of younger age groups should be calculated.

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