

Personality peculiarities that differentiate elite and sub-elite athletes

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Abstract:

Personality characteristics are important for successful performance. A study was carried out among 32 athletes in biathlon, handball, taekwondo, tennis, and football (12 elite and 20 sub-elite athletes) by means of four computerized test methods from Vienna test system, and two questionnaires. Their concentration, spatial orientation, ability to predict time of movement and direction of movement, field (in)dependence, physical aggression, neuroticism, age and years of sports practice were compared to find such attributes that could differentiate successfully the elite from the sub-elite athletes. Discriminant analysis revealed that age, spatial orientation, field (in)dependence, and concentration were the personality peculiarities that were more advanced in the elite athletes compared to the sub-elite athletes.

Key Words: aggression, anticipation, concentration, field independence, neuroticism, spatial orientation

Introduction

Sport is a social phenomenon, a powerful integrating factor and an educational means contributing for healthy way of life, tolerance and acceptance of differences between people since early childhood. Sports activity is performed in multicultural environment that supposes the increase of cultural and ethnic tolerance. It assures equality for athletes with diverse ethnic and social-economic background, including special educational needs. Sport creates some conditions for maintaining social contacts and co-operation between people from different nationalities, religious and social groups. Its role for states' well-fare is also fundamental.

Sport is a means for adaptation and socialization, social integration. It creates the spirit of team work by means of observation of rules, and honesty. Sport variegates the spare time. It improves the physical abilities. Sport is a factor for self-monitoring and self-knowledge (Dimitrova, 1995). Recognition of one's strengths and weaknesses permits the athletes to become confident in their abilities and to train further to overcome their weaknesses. Acquiring sports knowledge and honing skills is based on the study of the scientific concepts, methodology and fundamental laws in philosophy, pedagogy, psychology, physical education, anatomy and physiology, as well as on sports practice.

Sport gives a lot of opportunities for physical, moral, aesthetic, and intercultural education. It develops volition and respect (Tomova, 2012). Sport contributes to achievement of some values such as power, richness, glory, and pleasure (Popov, 1995), for example by means of participation in competitions and being admired by the sports fans. Elite athletes participate in the national, international, European, world and Olympic championships, whilst sub-elite athletes take part in the regional, local and state competitions. Socialization by means of sport is focused on mastering special skills, participation in competitions and striving for higher results, achievements, and attractiveness. These skills and values are developed intentionally in sport training. Some studies compared the elite and sub-elite athletes in their psychological and motor peculiarities in some selected sports (Meyers, Bourgeois, LeUnes, & Murray, 1999; Pashabadi et al., 2011). The current study compared the elite and sub-elite athletes' psychological characteristics in various sports.

Sport preparation is focused on four basic factors:

- Individual/personal factors contribute to sport talent and determine the capacities for a concrete activity. They could be differentiated as age, health status, anthropometric data; motor qualities; psychological qualities – intellectual, emotional, etc.
- The role of environment for getting habits and acquiring skills during education, training, competitions.
- Material and technical factors like sports equipment (stadiums, sports grounds, swimming pools, etc.); financial budgets and sponsorship; daily conditions for athletes' accommodation, food, recreation.
- Family status – the children growing up with their parents in psychosocial climate full of love and respect are given more possibilities for sports realization (Ivanov & Tomova, 2011, pp. 41-42).

This study focused on some personality factors that could contribute to successful performance and they may differentiate the elite and sub-elite athletes. Aiming to reveal the role of sport as a factor for personal

development, the elite and sub-elite athletes were compared. The hypothesis of the study was that some athletes' personality peculiarities would differentiate the elite competitors from the sub-elite competitors. This study focused on such personality peculiarities as concentration, spatial orientation, field independence, physical aggression, neuroticism, ability to predict time of movement and direction of movement, as well as age and years of sports practice.

It has been found that the athletes' age and period of sports experience were related (Stoyanova, Ivantchev & Petrova, 2016a) that seemed natural as more practice was achieved with the advance in age. Longer period of sports training was related to athletes' better spatial orientation, and spatial orientation was related with field independence, i.e. visual detection of more details in complex environment (Schuster, 2003; Stoyanova, Ivantchev, & Petrova, 2016b). Some personality traits were related, for example neuroticism and physical aggression in athletes (Brinkman, 2013; Stoyanova, Ivantchev & Petrova, 2016a), as well as in some other social groups (Zografova, 2001). Connections between personality attributes suggest that the more successful athletes, elite athletes could be differentiated from the sub-elite athletes by some personality features. The chosen personality characteristics included also some perceptual-cognitive peculiarities such as concentration that is important for every executed task, especially in sport. In sport, attention should be mainly goal-driven, not so much stimuli driven; selective, focused on a specific aspect, rather than divided - distributed in several simultaneous tasks; with external broadband attention focus, i.e. spread over a broader region (Afonso, Garganta, & Mesquita, 2012). That is why selective attention was studied together with concentration.

Sport is characterized by a lot of movements and dynamic body positions, so the abilities of anticipation of time of movement and direction of movement of own body, the other players and the objects on the sports ground are important for athletes' successful performance. Time anticipation and movement / spatial anticipation were also studied. Moreover, good spatial orientation supposes also good spatial anticipation, as perceptual abilities, observation, precision, disposition to act and skilled moves are included together in the psychomotor taxonomies of learning objectives (Stoyanova, & Yovkov, 2016).

Material & methods

The study was conducted in the laboratory of Psychology at South-West University "Neofit Rilski". This study was funded by Bulgarian Ministry of Education and Science as a grant on Decree 9 for the project "Models of psycho-functional studies in sport" SRP-B12/12.

Participants- The subjects were 32 athletes, 12 of them were the elite athletes (5 competitors in biathlon - 4 men and 1 woman, and 7 male competitors in taekwondo); and the other 20 athletes were sub-elite (7 male competitors in handball, 4 competitors in tennis-court - 2 men and 2 women; and 9 male competitors in football). They have practiced sport from 3 to 20 years, $M = 10.13$, $SD = 3.8$. Their age varied from 16 to 35 years old, $M = 22$, $SD = 3.5$.

Instruments- Four computerized and two paper-pencil methods were used. The computerized test methods were ZBA, GESTA, 2D and LVT from Vienna Test System of the firm Schuhfried. Each method of this test system has a training phase followed by the phase of the real experiment. The presentation, execution, registration, and assessment are realized automatically (Schuster, 2003).

ZBA estimated the ability to predict speed and movement of objects in space. Its short form (S2 with 12 items) was used. A moving ball followed diverse trajectories on the screen and it disappeared at a point, and two lines were displayed instead. One of the lines was situated at the point where the ball had disappeared. The other line was the goal. To measure time anticipation, the respondent pressed a button in the moment when he/she anticipated that the ball should have reached the second line. To measure movement anticipation, the respondent indicated the position where the ball would have reappeared. Median deviation time (in hundredth of seconds) indicated the ability of time anticipation. Median direction deviation of position in pixels indicated the ability of movement anticipation (Bauer, Guttman, Leodolter, Leodolter, & Neuwirth, 2007), or spatial anticipation (Fernandes et al., 2005).

GESTA assessed the cognitive style of field (in)dependence by identifying a specific shape integrated into a pattern for 20 seconds per item. A participant with a high number of correctly solved items was field-independent, who perceived different structures in a more differentiated way, with more details. Field-dependent persons perceived situations in a complex way and clung to outstanding structures (Schuster, 2003).

2D measured spatial orientation. A given figure had to be completed. One, two or three parts of it were missing and the respondent selected them from 16 segments given below for a time limit. High number of correctly solved items meant better spatial orientation (Bratfisch, Hagman & Bogner, 2004).

LVT measured concentration and visual perception. Its screening form S3 was used. The subject was presented with an array of lines and had to as quickly as possible find the end of a specified line. High score meant fast and accurate visual perception, high concentration and selective attention in visual perception (Biehl, Wagner, Karner, & Sommer, 2007).

Two paper-pencil questionnaires were used:

The scale Physical aggression from Buss-Durkee Hostility Inventory was used (Buss & Durkee, 1957) that was published in Bulgarian by Angelova & Krastev (1997). The scale Neuroticism from Eysenck

Personality Questionnaire measuring emotional stability/instability was used (Paspalanov, Shtetinski & Eysenck, 1984). The participants agreed or disagreed with the statements in both scales.

Statistical analysis- Data were statistically processed by means of SPSS 20 applying discriminant analysis for classifying the competitors as elite or sub-elite on the basis of their results on the studied variables. Mann-Whitney U nonparametric method was used for comparing the time period of sports practice of the elite and sub-elite athletes.

Results

Discriminant analysis revealed that age, spatial orientation ability, field (in)dependence, and concentration could be used for classifying the competitors as elite or sub-elite, and their explanatory power was moderate to high (Box’s $M = 104.897$ and $p = .276$ indicated equality of covariances; Canonical correlation = 0.802; Wilk’s lambda = .357, Chi-square = 24.754; $df = 10$; $p = .006$ for the total discriminant function; see Table 1 for Wilk’s lambdas for all independent variables in the discriminant functions, as well as for correlation coefficients between discriminant functions and the independent variables; group centroids were 1.635 for the elite competitors and -1.033 for the sub-elite competitors).

93.8% of original group cases were correctly classified – 100% of the studied elite competitors ($N = 12$) and 90% of the studied sub-elite competitors ($N = 18$).

The elite competitors were slightly more advanced in age ($M = 23.6$; $SD = 4.6$), with better spatial orientation ($M = 13.1$; $SD = 2.5$), more field independent ($M = 21.9$; $SD = 4.5$), and better concentrated ($M = 16.0$; $SD = 2.5$) than the sub-elite competitors who were younger ($M = 20.7$; $SD = 2.02$), with worse spatial orientation ($M = 10.1$; $SD = 2.9$), more field dependent ($M = 18.5$; $SD = 4.1$), and worse concentrated ($M = 14.3$; $SD = 2.1$).

Table 1 Wilks' Lambdas and correlation coefficients for all independent variables in discriminant functions classifying the competitors as elite or sub-elite

	Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions	Wilks' Lambda	F(1, 29)	p
2D - spatial orientation score	0.405	0.772	80.571	.007
Age	0.328	0.837	50.637	.024
GESTA - field (in)dependence score	0.299	0.861	40.682	.039
LVT – concentration score	0.285	0.872	40.242	.049
ZBA- median deviation of movement anticipation	-0.271	0.883	30.849	.059
Physical aggression score	-0.15	0.961	10.180	.286
Neuroticism score	0.112	0.978	0.651	.426
Years of sports practice	-0.031	0.998	0.051	.823
ZBA – median deviation of time anticipation	-0.01	10.000	0.005	.942

The athletes’ physical aggression, neuroticism, ability of time anticipation and ability of movement anticipation or spatial anticipation, and years of sports practice did not contribute significantly for differentiating the elite and sub-elite athletes (see Table 1). The studied elite and sub-elite competitors practiced sport for similar time periods (Mann-Whitney $U = 94$; $p = .326$).

Discussion

The findings supported the hypothesis that some athletes’ personal peculiarities would differentiate the elite competitors from the sub-elite competitors. The elite athletes outperformed the sub-elite competitors on a variety of personality traits (mainly perceptual-cognitive attributes). There were not found any personality characteristics more expressed in the sub-elite competitors than in the elite athletes.

There are also some other similar findings established by means of comparing the athletes in only one kind of sport. It has been found that the elite equestrian athletes had better concentration than the sub-elite equestrian athletes (Meyers, Bourgeois, LeUnes, & Murray, 1999). Our study confirmed this finding for the athletes in various sports.

Low neuroticism is typical for athletes (Dhesi & Bal, 2012; Mackreth, van Wely, Ireland, Carnell & Powell, 2010, p. 202; Stoyanova, Ivantchev, & Petrova, 2016a; Velichovska, Naumovski, Strezovski, Markovski & Meshkovska, 2012) that is why it did not differentiate the elite from the sub-elite competitors.

It has been found that the athletes (for example, basketball players, footballers, sportsmen practicing martial arts) were efficient in time anticipation of the others’ actions (Abreu, 2014; Aglioti, Cesari, Romani, & Urgesi, 2008; Fernandes et al., 2005; Mori, Ohtani, & Imanaka, 2002; Nadin, 2015), as well as the badminton elite players were accurate in time anticipation and movement/spatial anticipation (Alder, Ford, Causer, & Williams, 2016). The studied elite and sub-elite competitors did not differ in their abilities of time anticipation and movement anticipation, because such abilities were essential for success in sports activity. Broadbent, Causer, Williams, & Ford (2015) reported different accuracy of time and movement anticipation between experienced and inexperienced footballers. The sub-elite athletes in our study were not novice, inexperienced in sport training and

practice, all of the studied athletes practiced sport for more than three years at the moment of study. Besides, another study has not found any significant differences between time anticipation abilities of the sub-elite athletes practicing open and closed skills sports (Omar, Kuan, Knight, Manan, & Padri, 2017). Each group of the elite and the sub-elite athletes in our study practiced both open and closed skills sports that could also explain the lack of significant differences in time and movement anticipation between them.

Assertiveness and physical force are required in many sports for success. As differences between own and the opponent's scores increase, frustration can lead to aggression that sports rules try to control (Praveen, 2015). Aggressive acts could be provoked in different sports situations, because of ambition for the excellence in the athletic performance, some degree of hostility between opponents, and encouragement from some audiences of sports events (Tomar, & Singh, 2012). Especially the combat sports allow aggression and violent physical contacts (Krishnaveni, & Shahin, 2014), and a huge part of the studied elite athletes were practicing combat sports (taekwondo) compared to large numbers of the studied sub-elite athletes who practiced team sports with a lot of physical contacts with the opponents. The results from this study indicate that the elite and sub-elite competitors could not be differentiated in their aggressiveness. Besides, a study did not report any significant differences between athletes and non-athletes in their hostile aggression (Lemieux, Mckelvie, & Stout, 2002) who should be more dissimilar than the elite and sub-elite athletes.

This study has some limitations related to few athletes from the different types of sports, few female athletes, and the sample consisting of only Bulgarian athletes. However, some authors have already reported no gender differences in athletes' personality variables (Lopez & Santelices, 2011), including in their spatial orientation (Stoyanova, Ivantchev, & Petrova, 2016b), neither in their time anticipation (Aktağ, Acar, & Nakib, 2015), so a further study should focus on comparing more numerous elite and sub-elite participants from the same types of sports and selected from different countries, more than one country.

Conclusions

This study continued a trend in sports psychology related to comparisons between psychological qualities, perceptual and cognitive features of more and less experienced and successful athletes in order to be found such attributes that may distinguish elite, outperforming athletes that should be developed and be paid special attention by coaches. Some personality qualities did not distinguish the elite and the sub-elite competitors, but they are important for successful sports performance that is suggested by some of the studies that were reviewed in this paper and it could be pointed out by means of further comparisons of athletes with non-athletes.

Conflicts of interest - The authors have declared that any conflicts of interest do not exist.

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