

PSYCHOLOGICAL CHARACTERISTICS AND TRAITS IN MALE HANDBALL PLAYERS – OPTIMISM, ATHLETE ENGAGEMENT AND MENTAL ENERGY

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Abstract

The main goal of the research is to determine the differences in certain dimensions in the battery of the psychological questionnaires within Multidimensional Scale of Sports' Psychological Talents (MSSPT) in male handball players, according to their club, age group, winning medals and membership in junior national team. Second goal was to determine the profiles of male handball players in all examined psychological characteristics in MSSPT. The purposeful sample of 127 male handball players was examined, members of the teams Prvo plinarsko društvo, Metalac (Zagreb) and Zamet (Rijeka). In this study, three instruments from the battery MSSPT are used: Mental Energy Scale (MES), Athletic Engagement Scale (AES) and Optimism Scale (OS). The results revealed that the most significant differences are found in dimensions of MSSPT between the players of different age groups, while no differences are found according to winning medals in junior state championship, or according to the membership in the junior national team. K-means clustering revealed two profiles of male handball players. In the first cluster are older players with higher means in Self-esteem and Energy as strength while making errors, while in the second cluster are grouped younger players with higher means in all other psychological characteristics.

Keywords: *psychological profiles, male handball, sport performance*

INTRODUCTION

Being a dynamic sports game, handball imposes high-level demands on the athletes. Highly intensive motor activity of the game requests high level of basic and specific motor abilities, such as explosive strength, agility and speed, along with other relevant elements of sport fitness and sport-related characteristics (morphological, psychological, motor, etc.) (Rogulj, Nazor, Srhoj & Božin, 2006). Numerous studies have been conducted in order to explore important psychological characteristics of athletes that could essentially determine their sport efficiency. These studies were focused on athletes' motivation (Seifriz, Duda & Chi, 1992; Mead, Drowatzky & Hardin-Crosby, 2000) as well as psychological characteristics, such as athletes' traits and moods (Berger, Grove, Prapavassis, & Butki, 1997). Psychological characteristics are strongly influenced by cultural and social environment athletes are situated in (Kran & Baird, 2005). Except in essential mainly motivational factors, athletes' behaviors in critical situations during a competition or training process or in situations which emphasize anxiety are particularly important (Dunn & Nielsen, 1996; Wiggins, 1998).

In this study, several psychological characteristics have been chosen to be examined among male handball players, within new battery of potential measuring instruments called Multidimensional Scale of Sports' Psychological Talents (MSSPT), used for the first time in the study of Sindik, Missoni & Horvat (2015), but without

examination of construct validity of some questionnaires within the battery MSSPT. One of the abovementioned characteristics is **Mental energy** (ME), which is a construct that describes specific biological processes involved in the capacity of brain neurons to do physical work, i.e. to perform physical activity. ME is related to one's mood or motivational and cognitive processes (Sindik, Botica & Fiškuš, 2015) so self-reported feelings could be the best method for assessing mood (O'Connor, 2006). One's performance during a sport competition requires complete focus upon the task, i.e. trying to achieve desired outcome. Attention allows selection of information, sensations and perceptions that are relevant in the moment. Namely, vigilance and choice reaction time are convenient for assessing mental energy (Lieberman, 2006). Sleepiness, fatigue, alertness etc. are associated with mood states corresponding to mental energy. Therefore, the tests of reaction time and vigilance are approximately equivalent to the sensitivity. In previous research of the Sindik et al. (2015), ME is used for estimating mood within Multidimensional Inventory of Sport Excellence (MUSI). However, ME could be perceived as stable psychological characteristic. Hence, it is included in both batteries, MUSI and MSSPT. **Athlete's engagement** (AE) in sport environment is a concept studied by Lonsdale, Hodge & Jackson (2007_a). In the elite sport context, the antecedents (basic psychological needs) and consequences (dispositional flow) of AE were identified (Hodge, Lonsdale & Jackson, 2009). Expert performance results from a long-term

systematic engagement in a deliberate practice in a certain sport domain (Lonsdale, Hodge & Raedeke, 2007_b). Examining the role of AE in different competitive levels may appear as very important factor in understanding their motivation for improving their skills, or to be persistent in practicing their sports (Martin, 2008; Ericsson, Krampe & Tesch-Römer, 1993). Self-reported measures of athletes' cognitive engagement are extremely important in understanding the multidimensional nature of engagement in different sport environments (Appleton et al., 2006). Several studies became focused on development of measurement tools to assess athletes' perceived engagement with sports activities (Lonsdale et al., 2007_a; Lonsdale, Hodge & Raedeke, 2007). In an exploratory study, New Zealand elite athletes have been examined, which resulted in developing the Athlete Engagement Questionnaire (AEQ) consisting of four dimensions: confidence, dedication, vigor and enthusiasm (Lonsdale et al., 2007). Lately, Lonsdale et al. (2007_b) examined the proposed factor structure of AEQ using a larger sample of New Zealand and Canadian elite athletes, revealing good psychometric properties. Finally, **Optimism** is defined as expectancies in the future. While pessimists are more doubtful, hesitant and anticipate disaster, optimists assume adversity can be handled successfully (Seligman, 1990). Optimism appeared as a very important feature in the project related to development of psychological talents in U.S. Olympic champions (Gould, Dieffenbach & Moffett, 2001).

Only one study (Sindik, Missoni & Horvat, 2015_b) was already published about psychological constructs which are included in Multidimensional Scale of Sports' Psychological Talents (MSSPT) battery. One pilot study was conducted on a sample of members of one (the most successful) handball team (Prvo plinarsko društvo from Zagreb), applying three instruments from MSSPT were used for the first time. The results show that no differences were found between age groups of handball players regarding optimism and personality traits. Seniors perceived themselves to be mentally prepared better than younger players. The youngest handball players (age of 12) were the most motivated, confident and concentrated when compared to other age groups (Sindik et al., 2015_b). This study is the extension of this pilot study (Sindik et al., 2015_b). **First goal** of the research is to determine the differences in certain dimensions in the battery of the psychological questionnaires within MSSPT in male handball players, according to their club, age group, winning medals and membership in junior national team. **Second goal** was to

determine the profiles of male handball players in all examined psychological characteristics in MSSPT.

METHODS

Subjects

The research was conducted in the beginning of 2015 on a purposeful sample of 127 male subjects, members of three handball teams: Prvo plinarsko društvo (N=78) and Metalac (N=14) from Zagreb, with Zamet (N=14) from Rijeka. Average subjects' age was 14.20±4.14 years, while their experience of training handball was 5.38±3.67 years. Only three players had won a medal in senior state championship, 22 of them had won medals in junior state championship, 7 of them had won medals on junior European championship, while 18 of them are members of junior national team.

Measuring instruments

Three instruments from Multidimensional Scale of Sports' Psychological Talents (MSSPT) are used. The theoretical frameworks of these three instruments are obtained from belonging measuring instruments, but with significant modifications: Revised Life Orientation Test (LOT-R; Scheier, Carver, & Bridges, 1994), Athlete Engagement Questionnaire (AEQ; Lonsdale, Hodge & Jackson, 2007) and Mental Energy Scale (MES; Sindik et al., 2015). MES consists of 14 items based on self-evaluation of the level of mental energy (Sindik et al., 2015). Optimism Scale (OS), a 10-item scale that assesses individual levels of optimism, follow the framework of LOT-R (Scheier, Carver, & Bridges, 1994). Athlete Engagement Scale (AES) follow AEQ framework, comprising 16 items which measure the aspects of AE: dedication, self-esteem, enthusiasm and energy (Lonsdale et al., 2007_a). Five-point Likert-type scale is used in all questionnaires (from 1-Absolutely disagree to 5-Absolutely agree). All belonging subscales revealed satisfying reliability in range from 0.62 to 0.87 (Cronbach's alpha).

Procedure

According to the Ethical Codex of the Croatian Psychological Chamber, psychologists conducted the measurement of psychological characteristics. The subjects voluntarily and anonymously took part in the research, with the consent of their coaches, clubs' managements and the signed parents' informed consent for the players younger than 18 years of age.

Statistical analysis

Statistical analyses were performed using the statistical program IBM SPSS 20.0, while all statistical significances are commented on the

level of $p < 0.05$. Kruskal-Wallis test and t-test were used to determine the differences for independent variables in research, while non-hierarchical method of K-means clustering is used to determine the profiles of handball players.

Among all the dimensions of MSSPT, the only statistically significant difference between the clubs (from different levels of the sport excellence) is found for the dimension *Energy lowering pressure*, where the highest means have the players from the club PPD Zagreb, while the lowest mean is found for MRK Metalac (Table 1).

RESULTS AND DISCUSSION

Table 1: Differences in the dimensions of Multidimensional Scale of Sports' Psychological Talents (MSSPT), according to the club

	Club	Mean	Std. Deviation	Kruskal-Wallis test
enthusiasm and energy	Metalac	-0.158	0.780	0.213
	Zagreb	0.026	0.992	
	Zamet	-0.004	1.104	
dedication	Metalac	-0.123	1.047	0.871
	Zagreb	0.049	0.969	
	Zamet	-0.070	1.075	
self-esteem	Metalac	0.279	1.240	0.139
	Zagreb	0.067	0.899	
	Zamet	-0.252	1.107	
energy as motivator	Metalac	-0.092	1.198	0.095
	Zagreb	0.124	1.023	
	Zamet	-0.235	0.832	
energy as strength while errors	Metalac	0.313	1.106	0.346
	Zagreb	-0.043	1.034	
	Zamet	-0.031	0.880	
energy lowering pressure	Metalac	-0.322	1.178	0.026*
	Zagreb	0.142	1.014	
	Zamet	-0.183	0.851	
energy as stable performance	Metalac	-0.207	1.338	0.381
	Zagreb	0.072	1.003	
	Zamet	-0.075	0.842	
optimism/ happiness	Metalac	0.330	0.906	0.214
	Zagreb	-0.057	1.073	
	Zamet	0.014	0.852	
optimism/ energy	Metalac	0.542	1.121	0.060
	Zagreb	-0.131	0.986	
	Zamet	0.106	0.941	

Legend: difference statistically significant at $p < 0.05$

Statistically significant differences between age groups are revealed in four dimensions (Table 2). In dimension *Enthusiasm and energy*, the youngest age group (≤ 12) shows highest mean, while the lowest is found in the oldest (> 18) age group. In the *Self-esteem*, players 17-18 years old show highest means (in 15-16 years

age group mean was lowest). In the dimension *Energy as motivator*, highest mean is found for the youngest age group (≤ 12), while boys from the age group 15-16 years show lowest mean. In *Energy lowering pressure*, players aged 17-18 showed highest mean, while the oldest (> 18) age group had the lowest mean.

Table 2: Differences in the dimensions of Multidimensional Scale of Sports' Psychological Talents (MSSPT) according to players' age group

		Mean	Std. Deviation	Kruskal-Wallis test
enthusiasm and energy	<=12	0.237	0.550	0.029*
	13-14	0.197	0.833	
	15-16	-0.516	1.451	
	17-18	-0.041	1.117	
	>18	-0.640	1.416	
dedication	<=12	-0.010	0.930	0.129
	13-14	0.322	0.804	
	15-16	-0.358	1.357	
	17-18	0.160	0.933	
	>18	-0.342	0.966	
self-esteem	<=12	0.207	1.007	0.049*
	13-14	-0.025	0.884	
	15-16	-0.501	1.201	
	17-18	0.319	0.972	
	>18	-0.217	0.634	
energy as motivator	<=12	0.278	1.032	0.003**
	13-14	0.141	0.821	
	15-16	-0.551	1.031	
	17-18	-0.108	0.736	
	>18	-0.546	0.918	
energy as strength while errors	<=12	-0.039	0.971	0.231
	13-14	-0.285	1.233	
	15-16	0.085	0.974	
	17-18	0.574	0.702	
	>18	0.309	0.343	
energy lowering pressure	<=12	-0.141	1.066	0.004**
	13-14	0.208	1.069	
	15-16	0.305	0.625	
	17-18	0.449	0.364	
	>18	-0.701	0.945	
energy as stable performance	<=12	0.130	0.898	0.159
	13-14	-0.095	1.099	
	15-16	0.031	1.272	
	17-18	0.128	0.764	
	>18	-0.442	0.795	
optimism/ happiness	<=12	0.210	0.780	0.055
	13-14	0.140	0.946	
	15-16	-0.452	1.486	
	17-18	0.123	0.458	
	>18	-0.560	0.961	
optimism/ energy	<=12	0.024	0.996	0.751
	13-14	0.138	1.092	
	15-16	-0.269	1.042	
	17-18	0.100	1.092	
	>18	-0.089	0.645	

There were no statistically significant differences revealed in the dimensions of MSSPT, according to winning medals in junior state championship,

or according to actual (or previous) membership in the junior national team.

Table 3: K-means cluster analysis – male handball players, grouped according to their psychological characteristics

	Cluster	
	1	2
enthusiasm and energy	-0.338	0.108
dedication	-0.184	0.032
self-esteem	0.008	-0.009
energy as motivator	-0.414	0.124
energy as strength while errors	0.178	-0.037
energy lowing pressure	-0.188	0.064
energy as stable performance	-0.075	0.022
optimism/ happiness	-0.369	0.102
optimistic energy	-0.108	0.016
Number in cluster	21	101
Metalac	0	11
Zamet	10	24
PPD Zagreb	11	66
Younger (<17)	4	97
Older (≥17)	17	4

The results of K-means clustering revealed two profiles of male handball players. In the first cluster, relatively small number of handball players are grouped, with higher means in *Self-esteem* and *Energy as strength while making errors*. In first cluster, older handball players are grouped, while in the second cluster younger players are grouped (with higher means in all other psychological characteristics).

Age group appeared to be a key factor for differentiating male handball players according their psychological characteristics. However, even when statistically significant differences are found, there is no clear age trend in certain psychological characteristics. *Energy focused on lowing pressure* is the highest in top-level team PPD Zagreb and lowest in team (Metalac) which is included in lowest rank of the competition. Higher requests in higher levels of competition could explain differences in this psychological feature. Some previous studies indicate that concentration skills (such as mental energy) are improving with age (Nideffer & Bond, 2012; Kovářová & Kovář, 2010), what is not proved in this study. One of the explanations of the absence of clear differences could be that (independently of competition level), all handball players share general satisfaction with sport (Soyer, 2012) and/or satisfaction with life (Pavot & Diener, 1993). However, the motivation and mental preparation are often useful indicators, which differentiate between elite and sub-elite athletes (Weinberg & Gould, 2003; Soyer, 2012), while AE, ME and optimism are conceptually very close to these constructs. The motivation could be mirrored in these three concepts (AE, ME and optimism).

The advantage of this study is the use of these (new) measuring instruments, providing the insight in differences between Croatian male

handball players of various age and competition level. The main lack of the research is the fact that it is still pilot study. In spite of including players from different competition levels, according to their age, this is still heterogeneous sample of participants. The sample of participants has to be additionally stratified by stages of athletes' sports development (especially in younger age groups), and has to be larger and more representative for the population of handball players in future research. However, even this differentiation (by gender, level of sport excellence, type of sport, age group), which is used in this study, could be regarded as useful information for sport coaches, as well as for sport psychologists. Namely, orientation standards obtained in this study could serve as the start point to develop individualized training programs to improve studied psychological characteristics (Nideffer & Bond, 2012).

CONCLUSION

The results revealed that the most significant differences are found in dimensions of MSSPT between the players of different age groups, while no differences are found according to winning medals in junior state championship, or according to the membership in the junior national team. Only one difference is found between the teams that play in different completion levels (*Energy focused on lowing pressure* is the highest in top-level team PPD Zagreb). K-means clustering revealed two profiles of male handball players. In the first cluster are older players with higher means in *Self-esteem* and *Energy as strength while making errors*, while in the second cluster are grouped younger players with higher means in all other psychological characteristics.

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PSIHOLOŠKA OBILJEŽJA I CRTE KOD RUKOMETAŠA – OPTIMIZAM, SPORTSKI ANGAŽMAN I MENTALNA ENERGIJA

Sažetak

Osnovni cilj istraživanja bio je utvrditi razlike u nekim dimenzijama baterije psiholoških upitnika u okviru Višedimenzionalne skale psiholoških sportskih talenata (VSPST) kod rukometaša, u odnosu na pripadnost klubu, dobnoj skupini, osvajanju medalja i članstvu u juniorskoj reprezentaciji. Drugi je cilj bio utvrditi profile muških rukometaša u svim ispitanim psihološkim karakteristikama u VSPST. Ispitan je namjerni uzorak od 127 rukometaša, članova momčadi Prvo plinarsko društvo, Metalac (Zagreb) i Zamet (Rijeka). U ovom istraživanju, korištena su tri instrumenta iz baterije VSPST: Skala mentalne energije (MES), skala sportske angažiranosti (AES) i Skala optimizma (OS). Rezultati su pokazali da su najznačajnije razlike pronađene u dimenzijama VSPST između igrača različitih dobnih skupina, a nisu pronađene razlike prema osvajanju medalja na juniorskom državnom prvenstvu, ili prema članstvu u juniorskoj reprezentaciji. K-means klasteriranje otkrilo je dva profila rukometaša. U prvom su stariji igrači s većim samopoštovanjem i energijom koja se pokazuje kao snaga nakon počinjenih pogrešaka, dok su u drugom klasteru grupirani mlađi igrači s većim prosjecima u svim ostalim psihološkim karakteristikama.

Ključne riječi: psihološki profili, muški rukomet, sportska izvedba

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