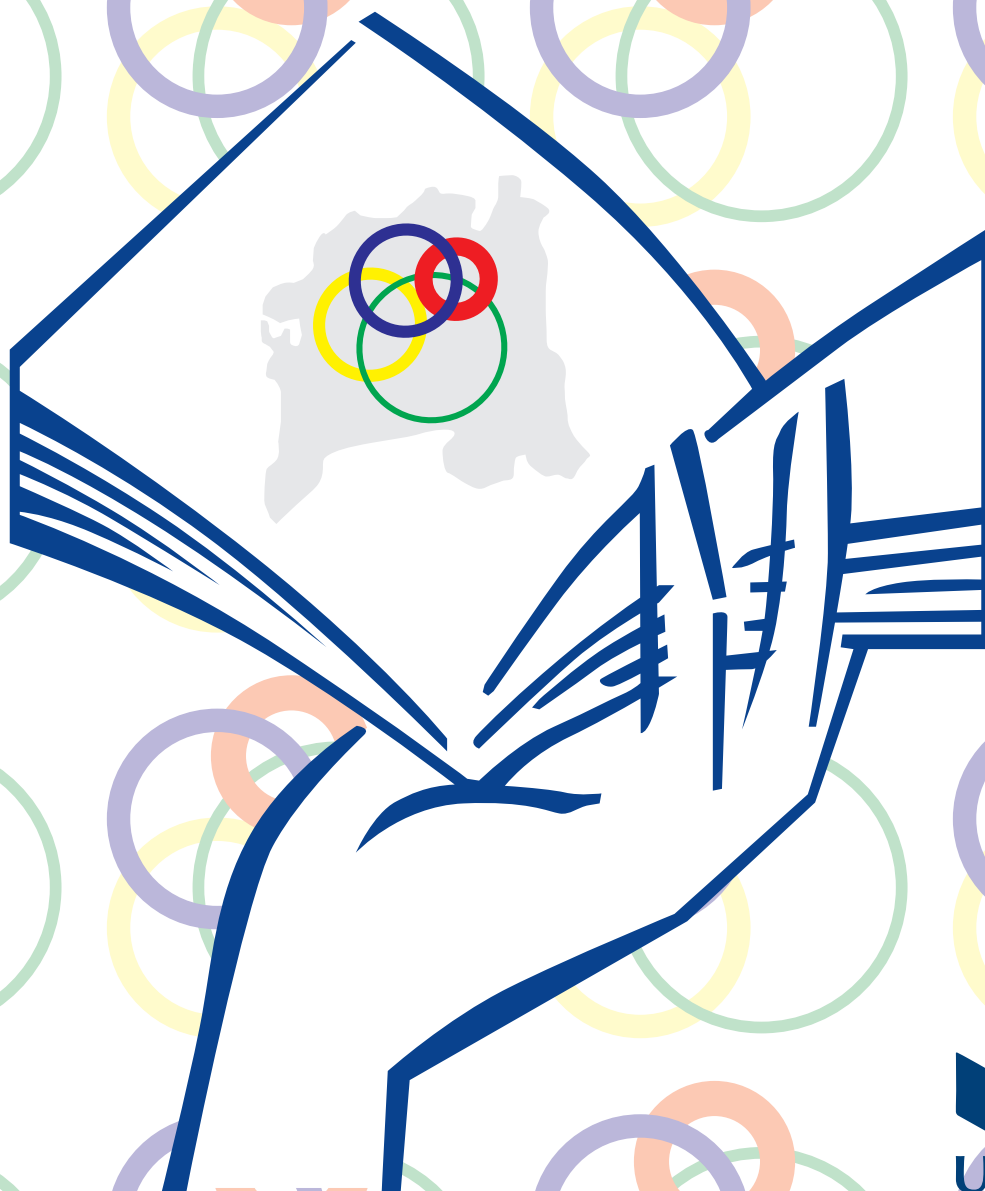


ISSN 1451-7485 eISSN 2337-0351

SPORT MONT

www.sportmont.ucg.ac.me

ISSN 1451-7485



CRNOGORSKA SPORTSKA AKADEMIJA
MONTENEGRIN SPORTS ACADEMY

Vol. 15

June 2017

No. 2

SPORT MONT

Publishers

Montenegrin Sports Academy
Montenegrosport
Faculty for Sport and Physical Education, University of Montenegro

Editorial Board

Marina Bujko | University for Peace of United Nations, Serbia
Georgi Georgiev | University Ss. Cyril and Methodius, Macedonia
Arben Kacurri | Institute of Sport Science Research, Albania
Miroslav Kezunović | University of Montenegro, Montenegro
Dejan Madić | University of Novi Sad, Serbia
Boris Maleš | University of Split, Croatia
Branimir Mikić | University of Tuzla, Bosnia and Herzegovina
Izet Rađo | University of Sarajevo, Bosnia and Herzegovina
Milan Čoh | University of Ljubljana, Slovenia
Junichiro Yamauchi | Tokyo Metropolitan University, Japan
Stig Arve Sæther | Norwegian University of Science and Technology, Norway
Ajit Korgaokar | The University of Tennessee at Martin, USA
Damjan Jakšić | University of Novi Sad, Serbia

Editor-in-Chief

Duško Bjelica | University of Montenegro, Montenegro

Editors

Stevo Popović | University of Montenegro, Montenegro
Selçuk Akpınar | Nevşehir University, Turkey
Zoran Milošević | University of Novi Sad, Serbia

Director

Batrić Marković

Managing Editor

Jovan Gardašević

Prepress

Boris Šundić

Print

“AP Print” | Podgorica

Print run

1500



SPORT MONT
International Scientific Journal

Vol. 15(2017), No.2 (1-71)

TABLE OF CONTENTS

Vazjwar Matin and Stig Arve Sæther (Original Scientific Paper) Talented High School Football Players' Perception of Talent Identification Criteria	3-7
Martin Musalek, Jakub Kokštejn, Pavel Papež, Jan Jírovec and Šárka Honsová (Original Scientific Paper) Relation Between Percent Body Fat and Fundamental Motor Skills in Pre-School Children age 3-6 years	9-13
Nimet Korkmaz, Serkan Pancar, Tuncay Alparslan and Ayça Ayan (Original Scientific Paper) Examination of the Effect of High School Students Physical Activity Levels on Their Problem Solving Skills	15-19
Robert Kuchar (Original Scientific Paper) Women, Sport and Baby-is it possible to do/have all?	21-24
Edin Brankovic and Muriz Hadzikadunic (Original Scientific Paper) Physical Education Experimental Program to Test the Effect on Perceived Competence	25-30
Fitim Arifi, Sami Sermaxhaj, Iber Alaj, Zenel Metaj and Admire Toverlani (Original Scientific Paper) Body Height and Its Estimation Utilizing Arm Span Measurements of both Gender Adolescents from Central Region in Kosovo	31-34
Mijo Curic, Edin Mujanovic, Tarik Huremović and Amra Nozinović Mujanovic (Original Scientific Paper) Body Segment Parameters During GS Turn in Recreational Skiers	35-38
Jovan Gardasevic, Dusko Bjelica and Ivan Vasiljevic (Original Scientific Paper) The Strength of Kicking the Ball after Preparation Period with U15 Football Players	39-42
Kristijan Slacanac, Mario Baic and Nikola Starcevic (Original Scientific Paper) Competition Efficiency Analysis of Croatian Junior Wrestlers in European Championship	43-47
Marija Jankovic (Original Scientific Paper) Application of Emotional Branding Strategy in the Model Development of Sports Brand of The Bottled Water Market	49-52
Guidelines for the Authors	53-71

Full-text available free of charge at <http://www.sportmont.ucg.ac.me/>

Index coverage

Scopus (evaluation process)

EBSCO Publishing Inc.

Index Copernicus

ERIH PLUS

Universal Impact Factor

Open Academic Journals Index

InfoBase Index

SafetyLit

Electronic Journals Library

UB Leipzig

MERCYHURST UNIVERSITY Libraries

EZB (Elektronische Zeitschriftenbibliothek)

WZB Berlin Social Science Center

Genamics JournalSeek

UTS: Library

Global Impact Factor

Google Scholar

Scientific Indexing Services

ROAD

CiteFactor

Journal Impact Factor

Talented High School Football Players' Perception of Talent Identification Criteria

Vazjwar Matin and Stig Arve Sæther

University of Science and Technology, Department of Sociology and Political Science, Trondheim, Norway

ABSTRACT

Talent identification (TID) is a major part of top-level football. Even so, most studies of talented players are skewed towards exploring the work of coaches who are already dealing with pre-defined "talented performers" and not a broader range of players, such as high school students in sport specialisation programs (SSP) and elite sport specialisation programs (ESSP). In this study, we explore which skills high school players find most important, how they assess their own skills compared to their schoolmates and which skills their school and club coaches find most important, comparing: girls and boys, an SSP and an ESSP school and players playing top-level versus low-level football. Included in this study were 111 high school football players (81 boys and 30 girls) representing one SSP and one ESSP. The results showed that the players ranked mental and tactical skills as most important compared to the school and club coach who ranked, respectively, technical and physical, and tactical and technical skills as most important. Girls considered both tactical and physical skills significantly (<0.01) more important than boys. Players from SSP considered mental skills as significantly more important, while the ESSP players considered the tactical skills as significantly more important. Furthermore, the top-level players considered technical and mental skills as significantly more important. These results could indicate that gender, school type and playing level could affect the players' perception of the most important skills in TID.

Key words: Talent identification, High school, Gender, Playing level

Introduction

Talent identification (TID) is a major part of top-level football. Simply put, the process of identifying participants with the potential to excel in a given domain is talent identification (Williams & Reilly, 2000). A large proportion of studies have tried to identify indicators of talent at an early stage by using different test batteries (Höner & Feichtinger, 2016; Williams & Reilly, 2000). Through the use of psychological, physiological, technical or tactical skills (Forsman, Blomqvist, Davids, Liukkonen, & Konttinen, 2016; Höner & Feichtinger, 2016; O'Connor, Larkin, & Williams, 2016), many have tried to identify TID criteria with alternating luck. The lack of consistency of "objective" means for the execution of talent identification has made authors claim that this process is fundamentally flawed (Vaeyens, Lenoir, Williams, & Philippaerts, 2008; Williams & Reilly, 2000) or potentially an ineffective process (Abbott & Collins, 2004; Vaeyens et al., 2008).

Even though quite a few researchers have focused on the talent identification process, few have paid attention to the criteria the coaches use to identify the soccer talents (Pankhurst & Collins, 2013), with a few exceptions. By adopting Bourdieu's concept of practical sense, Christensen (2009) found that coaches used classificatory schemes to characterize their preferred so-called "autotelic" players, that is, players that, from the coaches' perspective, exhibit a potential to learn, practice and improve. In this process, these coaches largely focused on specific skills and the importance of attitudes and described game intelligence as a vital factor in identifying talented soccer players. A review study on Norwegian football coaches concluded that the coaches had clear views of how to identify the

most talented players, even though the coaches demonstrate difficulties in defining which criteria they regarded as most important, since they reported technical, tactical, psychological, physical and social factors as equally important (Sæther, 2014).

An obvious explanation for the coaches' faltering use of identification criteria is the lack of common understanding of the term talent. Miller, Cronin and Baker (2015), for example, found that coaches of youth-elite football players regarded talent as highly trainable, not a static phenomenon and less innate. Others have pointed to the fact that the distinction between talent identification and talent development (TD) also could be described as less clear, since most coaches would rely upon observed skills and not the players' potential. Knowing that clubs often begin scouting players as young as nine to eleven years old with a view of identifying their largely underdeveloped "potential" (Ford, Le Gall, Carling, & Williams, 2008), the likelihood of seeing the potential is low, since the observed skills often are the only criteria.

As a part of youth football players' development, the ability to assess their own development and their abilities compared to their teammates could be essential (Kannekens, Elferink-Gemser, Post, & Visscher, 2009). Most players, however, often use their coaches as benchmarks for how they are progressing as footballers, indicating a strong relationship between the players' playing time and their assessment of their own skills (Sæther, Aspvik, & Høigaard, Submitted). Which skills and abilities they choose to develop could potentially affect the opportunity of becoming a professional football player. An earlier study found that girls focused more on basic skills and had a more dynamic understanding of their own talent, while boys focused more on the development of specific skills and had a more static definition of their own talent (Sæther & Mehui, 2016).

High school has been found to be an important breaking point in many junior players' careers. As the transition from junior to senior sport is a key point in young practitioners' careers, this transition is often described as challenging, as it also coincides with important changes in life in general (Enoksen, 2002; Stambulova, 2009). One knows that poor coordination between sport and education is among the most common reasons for dropping out of sports (Enoksen, 2002). It can also cause problems, stress and inner conflicts in the individual athlete (Christensen & Sørensen, 2009). Still, others have pointed out that education and the sports arena have conflicting demands and, thus, stand in a competitive relationship above athletes who want to be the best (Bourke, 2003; McGillivray & McIntosh, 2006). There are also, however, studies indicating that both football elite academy players and coaches de-value the importance of school in the TD process (Morley, Morgan, McKenna, & Nicholls, 2014). Naturally, most studies of talented players are skewed towards exploring the work of coaches who are already dealing with pre-defined "talented performers" and thereby focusing solely on pure "talent development" (Baker & Schorer, 2010; Christensen, 2009).

The aims of this study were: (1) investigate which skills high school players find most important to develop in their age-group (16 to 19 year olds) and how they assess their own skills compared to their schoolmates; (2) investigate the students' perception of the skills on which their school and club coaches focus in their TD process, and (3) to compare the players' perception of skill equation, comparing: girls and boys, the two schools and players playing in top-level versus low-level football.

Methods

Participants

The participants included 30 girls and 81 boys representing two Norwegian high schools offering an sport specialization programs (SSP) or elite sport specialization programs (ESSP). Players from School 1 represented an ordinary SSP, while players from School 2 represented an ESSP. The players had a mean age of 17.47 years (SD 0.77) and were born between 1997 and 1999.

Measures

Player self-assessment of skills. The questions used for self-assessed skills asked the players to evaluate their own skills compared to their teammates on the following: *technical, tactical, mental, social and physical* skills, on a 5-point Likert scale,

ranging from: *better than most on my team* (1) to *worse than most on my team* (5).

Skill expectations. The questions assessed the players' assessment of the importance of different skills as 16- to 19-year-old football players, according to the following: *Technical, tactical, mental, social and physical* skills, on a 5-point Likert scale, ranging from: *very important* (1) to *not important* (5).

School coach skills focus. The questions used to assess the school coaches' skills focus asked the players *how much the school coach focused on the following: Technical, tactical, mental, social and physical* skills, on a 5-point Likert scale, ranging from: *very important* (1) to *not important* (5).

Club coach skills focus. The questions used to assess the club coaches' skills focus asked the players *how much the school coach focused on the following: Technical, tactical, mental, social and physical* skills, on a 5-point Likert scale, ranging from: *very important* (1) to *not important* (5).

Procedures

The data were collected using a questionnaire among students from two high schools. Before answering the questionnaire, all participants were informed about the purpose of the study, that their participation was voluntary, that the survey was anonymous and that all information would be treated confidentially. The variable *Top-level* was characterised as playing at the two highest senior levels, while *Low-level* was characterised as below level 2, both among girls and boys. The study (ethics clearance) was in accordance with and approved by the Norwegian Social Science Data Services.

Statistical Analysis

All analyses were conducted using SPSS version 22.0. Means and standard deviations were calculated for player self-assessed skills, their expectations of skills to be developed and the club and school coaches' focus on talent identification criteria. The independent T-test was used to identify the differences between girls and boys, the players from two schools and the players playing at top-level versus those players at lower level. The significance level (alpha) was set to 0.05.

Results

The girls considered both tactical and physical skills to be significantly more important (<0.01) and technical skills to be

Table 1. Descriptive data and independent t-test on the players' self-assessment of skills, assessment of expected skills as a football player, and on which skills they feel the school and club coaches focus, according to gender

		<i>The players</i>		<i>The coaches</i>	
		Self-assessment	Expectations	School	Club
<i>Technical skills</i>	Boys	2.20 ± .97	1.55 ± .67	1.40 ± .61	1.90 ± .71
	Girls	2.26 ± .90	1.33 ± .60	1.50 ± .57	1.63 ± .55
	Total	2.22 ± .95	1.49 ± .66	1.42 ± .60	1.83 ± .68
<i>Tactics skills</i>	Boys	2.12 ± .87	1.42* ± .61	2.19 ± .87	1.77 ± 2.3
	Girls	2.36 ± .80	1.16 ± .37	2.33 ± .95	1.56 ± .67
	Total	2.18 ± .85	1.35 ± .56	2.23 ± .89	1.71 ± 2.0
<i>Mental skills</i>	Boys	2.07 ± .87	1.37 ± .55	2.54 ± .69	2.32 ± .75
	Girls	2.43 ± .77	1.27 ± .59	2.43 ± .81	2.36 ± .85
	Total	2.17 ± .86	1.34 ± .56	2.51 ± .73	2.33 ± .77
<i>Social skills</i>	Boys	2.25 ± .89	2.46 ± .80	2.36 ± .68	2.48 ± .68
	Girls	2.30 ± .79	2.46 ± 1.3	2.63 ± .85	2.10 ± .88
	Total	2.27 ± .86	2.46 ± .96	2.43 ± .74	2.37 ± .75
<i>Physical skills</i>	Boys	2.34 ± 1.0	1.90* ± .82	2.00 ± .65	2.16 ± .63
	Girls	2.51 ± .94	1.30 ± .46	1.83 ± .64	1.96 ± .76
	Total	2.39 ± 1.0	1.73 ± .78	1.95 ± .65	2.11 ± .67

close too significantly (<0.078) more important than boys did. Furthermore, no significant differences were ever found regarding their club-coach and school-coach skill focus (Table 1). Even so, comparing the players and the school and club coach, the players ranked mental and tactical skills as most important, while the school coach and club coach ranked, respectively, technical and physical, and tactical and technical. On the opposite end of the scale, the players ranked physical and social skills as least important, while the school coach and club coach both ranked, respectively, social and mental as the least important. The study found no significant differences between boys and girls in terms of assessment of their own skills.

Comparing the two schools' types and their evaluation of which skills the club and school coaches highlight in the TD process, the players from the SSP school considered the school coach to focus significantly (<0.01) more on technical skills than the club coach (Table 2). The players from ESSP, however, considered the club coach to focus on technical skills as compared to the school coach. Furthermore, the players from ESSP regarded the club coach to be significantly (<0.01) more focused on physical skills as compared to the players from SSP. No differences were found between the two schools in terms of the players' self-assessment, with the exception of the physical skills, which were regarded as significantly (<0.01) more important in SSP as compared to ESSP.

Table 2. Descriptive data and independent t-test on the players' self-assessment of skills, assessment of expected skills as a football player, and on which skills they feel the school and club coaches focus, according to school

		<i>The players</i>		<i>The coaches</i>	
		Self-assessment	Expectations	School	Club
<i>Technical skills</i>	School 1	2.18 ± .98	1.57 ± .68	1.29* ± .46	2.03* ± .66
	School 2	2.26 ± .92	1.41 ± .62	1.55 ± .68	1.63 ± .64
	Total	2.22 ± .95	1.49 ± .66	1.42 ± .60	1.83 ± .68
<i>Tactics skills</i>	School 1	2.09 ± .86	1.44* ± .60	2.58 ± .75	1.56 ± .57
	School 2	2.28 ± .84	1.26 ± .52	1.91 ± .90	1.85 ± 2.8
	Total	2.18 ± .85	1.35 ± .56	2.23 ± .89	1.71 ± 2.0
<i>Mental skills</i>	School 1	2.21 ± .91	1.29* ± .50	2.78 ± .67	2.41 ± .77
	School 2	2.12 ± .81	1.40 ± .62	2.26 ± .70	2.62 ± .77
	Total	2.17 ± .86	1.34 ± .56	2.51 ± .73	2.33 ± .77
<i>Social skills</i>	School 1	2.18 ± .86	2.56 ± 1.0	2.43 ± .80	2.21 ± .80
	School 2	2.35 ± .86	2.36 ± .86	2.44 ± .68	2.51 ± .68
	Total	2.27 ± .86	2.46 ± .96	2.43 ± .74	2.37 ± .75
<i>Physical skills</i>	School 1	2.23* ± .90	1.66 ± .70	2.16 ± .65	2.29* ± .72
	School 2	2.54 ± 1.1	1.80 ± .86	1.76 ± .60	1.94 ± .58
	Total	2.39 ± 1.0	1.73 ± .78	1.95 ± .65	2.11 ± .67

Comparing the players who played at the two highest senior levels to those who played at lower levels showed that the top-level players considered their own skills as significantly (<0.01) better regarding both technical and tactical skills (Table 3). They also considered technical and mental skills as signifi-

cantly (<0.01) more important. No differences were found between the top- and low-level players in terms of the skills on which the school and club coaches focused in the TD process, with the exception of mental skills, which were considered as significantly (<0.01) more important by the top-level players.

Table 3. Descriptive data and independent t-test on the players' self-assessment of skills, assessment of expected skills as a football player, and on which skills they feel the school and club coaches focus, according to playing level

		<i>The players</i>		<i>The coaches</i>	
		Self-assessment	Expectations	School	Club
<i>Technical skills</i>	Top-level	1.97* ± .83	1.27* ± .50	1.40 ± .55	1.54 ± .64
	Low-level	2.35 ± .98	1.60 ± .70	1.44 ± .62	1.98 ± .65
	Total	2.22 ± .95	1.49 ± .66	1.42 ± .60	1.83 ± .68
<i>Tactics skills</i>	Top-level	2.08* ± .72	1.37 ± .54	2.24 ± .98	1.54 ± .60
	Low-level	2.24 ± .91	1.34 ± .58	1.22 ± .85	1.81 ± 2.5
	Total	2.18 ± .85	1.35 ± .56	2.23 ± .89	1.71 ± 2.0
<i>Mental skills</i>	Top-level	2.10 ± .80	1.22* ± .48	2.45 ± .73	2.29* ± .66
	Low-level	2.20 ± .89	1.41 ± .59	2.54 ± .73	2.35 ± .83
	Total	2.17 ± .86	1.34 ± .56	2.51 ± .73	2.33 ± .77
<i>Social skills</i>	Top-level	2.21 ± .78	2.29 ± .77	2.37 ± .68	2.56 ± .72
	Low-level	2.29 ± .90	2.54 ± 1.0	2.47 ± .77	2.27 ± .75
	Total	2.27 ± .86	2.46 ± .96	2.43 ± .74	2.37 ± .75
<i>Physical skills</i>	Top-level	2.58 ± 1.1	1.78 ± .85	1.89 ± .69	1.97 ± .68
	Low-level	2.29 ± .97	1.71 ± .75	1.98 ± .62	2.18 ± .66
	Total	2.39 ± 1.0	1.73 ± .78	1.95 ± .65	2.11 ± .67

Discussion

Even though quite a few researchers have focused on the TID process, few have paid attention to the criteria the coaches

use (Pankhurst & Collins, 2013). One obvious reason could be the lack of consistency of “objective” means for the execution of TID, which could indicate that it simply is an ineffective process (Abbott & Collins, 2004; Vaeyens et al., 2008) or is

fundamentally flawed (Vaeyens et al., 2008; Williams & Reilly, 2000), highlighting the high degree of subjectivity in this process (Christensen, 2009; Sæther, 2014).

The transition from junior to senior sport could be especially challenging, since education and the sports arena have conflicting demands and, thus, stand in a competitive relationship above athletes who want to be the best (Bourke, 2003; Christensen & Sørensen, 2009; Enoksen, 2002; McGillivray & McIntosh, 2006; Stambulova, 2009). The results show differences between the coaches' and players' rankings of the most important skills in the TID process, where the players considered mental skills as most important, while the coaches considered this as one of the least important. This result could be problematic for these players' TD process, since conflicting messages from different coaches representing the club and the school could potentially create a dilemma for the players (Stambulova, 2009). In light of the study of Christensen (Christensen, 2009) and the preferred so-called "autotelic" players, one could expect the coaches to be more able to see behind the players' skills, potentially identifying the players' potential to learn. Others have, however, questioned the coaches' ability to see this potential and mostly focus on the present skills (Ford et al., 2008). Interestingly, no significant gender differences were found regarding their club-coach and school-coach skill focus in the TD process.

Results from this study showed that girls considered both tactical and physical skills to be significantly more important than boys, while technical skills also were considered close to significantly more important. These results would indicate that one could expect gender differences regarding identification criteria. Even though there are few studies investigating gender differences, Sæther and Mehus (Sæther & Mehus, 2016) found talented girls to focus more on basic skills, as compared to boys who focused more on the development of specific skills. Surprisingly, in light of these results, the study found no significant differences between boys and girls in terms of assessment of their own skills, in relationship to these criteria. Even so, it might be that the girls have a stricter consideration of the identification criteria or a more realistic assessment of their own skills.

The relationship between football clubs and schools has been highlighted as important in the TD process, especially since the collaboration could be both conflicting and problematic. The results indicate that both players from SSP and ESSP have similar expectations, in terms of the criteria in the TID process. However, the players from SSP considered tactical skills to be significantly less important, as compared to the ESSP players, while the ESSP players considered mental skills to be significantly more important. Obviously, these two skills could be seen as related, but one could also argue that tactical skills are much more specific than mental skills, which cover a larger range of skills. The English Football Association (FA) uses, for instance, a "four-corner" model of player development: i.e., *Technical*, *Physical*, *Psychological* and *Social* (Simmons, 2004). This would indicate that they include the

tactical dimension in the psychological. While tactical skills are directly related to choices on the pitch, mental skills are also closely related to the pitch activity but also to mental abilities outside the pitch, i.e., overcoming injuries, burnout and mental toughness. This could be an argument for also including tactical as separate skills in both the TID and TD process.

Comparing the two schools' players and their evaluation of which skills the club and school coaches highlight in the TD process, revealed some potentially conflicting results (Bourke, 2003; McGillivray & McIntosh, 2006), since SSP coaches focused more on technical skills as compared to club coaches, while the club coaches focused more on technical skills as compared to ESSP coaches. Another potential interpretation of these results could be that the training sessions conducted by both the club coach and the school coach have different focuses, reflecting the coaches' roles. It should be noted that these coaches did not differ in terms of highlighting tactical, social and mental skills, while the players from ESSP regarded the club coach to be more focused on physical skills as compared to the players from SSP. The results could indicate that the players consider their skills to be similar in the two schools, since, with the exception of the physical skills, the results showed no differences between the two schools in terms of the players' self-assessment. Since there are indicators for a strong relationship between the players' playing time and their assessment of their own skills (Sæther et al., Submitted), one could expect that the players' self-assessment is related to the coaches' assessments.

The level of the players could be described as an essential factor in young, talented players' assessment of their own skills (Höner & Feichtinger, 2016). The results showed that top-level players considered technical and mental skills as significantly more important than the low-level players. These results are in line with what top-level coaches have highlighted as important in their talent identification process (Sæther, 2014). This could indicate that the players and coaches at the highest level agree on the heightened importance of these two skills. No differences were found between the top- and low-level players in terms of the TID criteria or the skills on which the school and club coaches focus, with the exception of mental skills, which were considered significantly more important by the top-level players. More naturally, the top-level players regarded their own skills as significantly better on both technical and tactical skills. Earlier studies have pointed to the fact that youth-level players are dependent on assessing their own playing skills (Kannekens et al., 2009).

This study has obvious limitations. Unfortunately, there was a skewness regarding the number of girls and boys, where only 30 of the respondents were girls. One could potentially expect somewhat other results if the respondents were more equal in numbers. Even so, the study compared girls and boys on all variables, excluding the potential of gender effect in the study. Furthermore, the study only includes two schools, even if the number of subjects was satisfactory at 111 players.

REFERENCES

- Abbott, A., & Collins, D. (2004). Eliminating the dichotomy between theory and practice in talent identification and development: considering the role of psychology. *J Sports Sci*, 22(5), 395–408. doi:10.1080/02640410410001675324
- Baker, J., & Schorer, J. (2010). Identification and development of talent in sport - introduction to the special issue. *Talent development & excellence*, 2(2), 119–121.
- Bourke, E. (2003). The dream of being a professional soccer player: Insights on career development options of young Irish players. *European Physical Education Review*, 5, 121–131.
- Christensen, M. K. (2009). "An eye for talent": Talent identification and the "practical sense" of top-level soccer coaches.

- Sociology of Sport Journal*, 26, 365-382.
- Christensen, M. K., & Sørensen, J. K. (2009). Sport or school? Dreams and dilemmas for talented young Danish football players. *European Physical Education Review*, 15, 115-133.
- Enoksen, E. (2002). Drop-out rate and drop-out reasons among promising Norwegian track and field athletes - A 25 year study. *Scandinavian Sport Studies Forum*, 2, 19-43.
- Ford, P. R., Le Gall, F., Carling, C., & Williams, A. M. (2008). 23 a cross-cultural comparison of the participation histories of English and French elite youth soccer players.
- Forsman, H., Blomqvist, M., Davids, K., Liukkonen, J., & Kontinen, N. (2016). Identifying technical, physiological, tactical and psychological characteristics that contribute to career progression in soccer. *International journal of Sports Science & Coaching*, 11(4), 505-513. doi:doi:10.1177/1747954116655051
- Höner, O., & Feichtinger, P. (2016). Psychological talent predictors in early adolescence and their empirical relationship with current and future performance in soccer. *Psychology of Sport and Exercise*, 25, 17-26.
- Kannekens, R., Elferink-Gemser, M. T., Post, W. J., & Visscher, C. (2009). Self-Assessed tactical skills in elite youth soccer players: A longitudinal study. *Perceptual and Motor Skills*(109), 459-472.
- McGillivray, D., & McIntosh, A. (2006). Football is my life: Theorizing social practice in the Scottish Professional Football Field. *Sport in Society*, 9, 371-387.
- Miller, P. K., Cronin, C., & Baker, G. (2015). Nurture, nature and some very dubious social skills: an interpretative phenomenological analysis of talent identification practices in elite English youth soccer. *Qualitative Research in Sport, Exercise and Health*, 7(5), 642-662. doi:10.1080/2159676X.2015.1012544
- Morley, D., Morgan, G., McKenna, J., & Nicholls, A. R. (2014). Developmental Contexts and Features of Elite Academy Football Players: Coach and Player Perspectives. *International journal of Sports Science & Coaching*, 9(1), 217-232. doi:10.1260/1747-9541.9.1.217
- O'Connor, D., Larkin, P., & Williams, A. M. (2016). Talent identification and selection in elite youth football: An Australian context. *European Journal of Sport Science*, 16(7), 837-844.
- Pankhurst, A., & Collins, D. (2013). Talent Identification and Development: The Need for Coherence Between Research, System, and Process. *Quest*, 65(1), 83-97. doi:10.1080/00336297.2012.727374
- Simmons, C. (2004). Fast Tracking and Player Development. *Insight*, 3(7), 24-25.
- Stambulova, N. (2009). Talent development in sport: A career transitions perspective. In R. L. D. H. E. E. Tsung-Min Hung (Ed.), *Psychology of sport excellence*: Morgantown: Fitness Information Technology.
- Sæther, S. A. (2014). Talent identification in Soccer. What do Coaches Look for? Downloaded from: <http://idrottsforum.org/sather140319/>.
- Sæther, S. A., Aspvik, N. P., & Høigaard, R. (Submitted). Norwegian football academy players - players' characteristics, stress and coach-athlete relationship.
- Sæther, S. A., & Mehus, I. (2016). "You're Not Born with Talent" Talented Girls' and Boys' Perceptions of Their Talents as Football Players. *Sports*, 4(1), 6.
- Vaeyens, R., Lenoir, M., Williams, A. M., & Philippaerts, R. M. (2008). Talent identification and development programmes in sport : current models and future directions. *Sports Med*, 38(9), 703-714.
- Williams, A. M., & Reilly, T. (2000). Talent identification and development in soccer. *J Sports Sci*, 18(9), 657-667.

S. A. Sæther

Norwegian University of Science and Technology, Department of Sociology and Political Science, Dragvoll, 7491 Trondheim, Norway

e-mail: stigarve@ntnu.no

Relation Between Percent Body Fat and Fundamental Motor Skills in Pre-School Children age 3-6 years

Martin Musalek, Jakub Kokstejn, Pavel Papez, Jan Jírovec and Sárka Honsová
Charles University, Faculty of Physical Education and Sport, Prague, Czech Republic

ABSTRACT

It is quite well known that excessive body fat in children is interpreted as a marker of inhibited physical activity and motor performance. This study aimed to establish whether severe impairment of fundamental motor skills (defined as performance under 5th centile of norms) will be significantly more frequently identified in pre-schoolers age 3-6 years with amount of body fat higher than 85th centile of norms. Research sample consisted of 496 (females=241, males=255) pre-schoolers selected from specific district of Prague, Czech Republic. The MABC-2 was used for the assesment fundamental motor skills. Equations for body fat estimation in children identified 35.8% children with body fat>85th centile of norms, 61.7% within 15th–85th centile, and 2.5% of children<15th centile of norms. Results revealed that children whose body fat was higher than 85th centile of norms or lower than 15th centile had double the frequency of severe motor problems. Interestingly on the other hand we found no significant differences in the frequency of high above average performances>90th centile in MABC-2 between fat 8.4% and non fat children 10.7%. We suggest that amount of body fat is not a clear predictor for the degree of fundamental motor skills.

Key words: fundamental motor skills, MABC-2, motor performance, pre-school children, adipose tissue, fat

Introduction

Previous research proved that the decreased amount of physical activity (PA) is a cause of poor performance in motor abilities in childhood (Deforche et al., 2003; Wedderkopp, Froberg, Hansen & Andersen, 2004; Pařízková, Sedlak, Dvořáková, Lisá & Bláha, 2012). A significant negative correlation between obesity and less daily moderate physical activity and daily vigorous physical activity in pre-school and middle school child populations is also a well-known fact (Trost, Kerr, Ward & Pate, 2001; Davies, Gregory & White 1995; Salbe et al., 2002; Graf et al., 2004). On the other hand, much less attention has been paid—and especially in pre-school children—to examining whether over-weight and obese individuals have higher prevalence for severe motor difficulties in fundamental motor skills (FMS). FMS is described by fine and gross motor skills, coordination and balance manifestations. The degree of FMS has a direct impact on motor development of an individual and plays a crucial role in early child's physical, cognitive and social development (Gallahue, Ozmun & Goodway, 2011; Cools, Martelaer, Samaey & Andries, 2009). Currently, a few studies suggested a potential relationship between preschoolers' level of FMS and the amount of PA (Butcher & Eaton, 1989; Saakslähti et al., 1999; Fisher et al., 2005). However, the revealed results have not provided a clear enough support to establish a clear link. In particular performance in FMS correlates low with the amount of PA. Moreover, results of study Cliff, Okely, Smith and McKeen (2009) showed that the relationship between FMS and PA may be conditioned in pre-schoolers by different variables including: gender, movement skill sub-domain or intensity of physical activity. Studies of the relation between body size measured by BMI and FMS performance show similar inconsistent results. Williams et al. (2008) revealed low non-significant correlations (from 0.03 to 0.13) in

pre-schoolers between z-BMI and FMS measured by Motor Skill Protocol performance. Siahkoughian, Mahmoodi and Salehi (2011), examined the relation between BMI and the degree in FMS measured by Motor Skill Protocol at 7 to 8 year old children also concluded that „hypothesis of a perceptual-motor deficit in obese children is rather speculative and must therefore be addressed further“. On the other hand, Okely, Booth and Chey (2004) found that results of six FMS (run, vertical jump, catch, overhand throw, forehand strike, and kick) are significantly related to BMI and waist circumference. In this research, normal weight middle age school children were two to four times more likely to be more advanced in FMS than over-weight and obese children of both sexes. Differences in FMS performance with the emphasis on the performance in each FMS sub-domains were provided by Morano, Colella and Caroli (2011). They revealed that overweight and obese children showed the poorest performance in locomotor and object-control tasks. D'Hondt, Deforche, De and Lenoir (2009), who examined relationship between FMS assessed by Movement assessment battery for children (MABC-2) and BMI in 5 to 10 year olds, also discovered significant relation between FMS and body size. However, in their study only obese children scored significantly worse in FMS in comparison to their normal-weight and overweight peers. Logan, Scrabis-Fletcher, Modlesky and Getchell (2011) did not reveal any significant relation between BMI and MABC-2 $r=-0.237$ in pre-school children. However, these authors pointed that pre-school children classified as over-weight and obese might have lower FMS than their normal weight and underweight counterparts.

It is evident from aforementioned studies that previous research has been mainly focused solely on the absolute difference in FMS performances between normal-weight, overweight and obese children. Therefore, there is a lack of information whether children with high adipose tissue generally expressed

more severe motor difficulties in FMS. Moreover, to date the majority of studies have used only one indicator for assessing of morphological composition of the BMI which has its definite limitations. Our hypothesis is that severe impairment of fundamental motor skills will be significantly more frequently identified in pre-schoolers aged 3-6 years with the amount of body fat higher than the 85th centile of norms.

Methods

Research sample

The research sample consisted of 496 (females=241, males=255) pre-schoolers aged 3 to 6.9 years ($\bar{x}$ =4.75; $\pm$ 1.21) selected from a specific district of Prague, the Czech Republic. Four kindergartens were selected randomly from a reference list of all general kindergartens (not private kindergartens) on the territory of Prague which do not have any specialization (e.g., sport, language). The research was approved by the Ethics Committee of the Faculty of Physical Education and Sport, Charles University, and the parents of all participants signed voluntary an informed consent. The data were anonymized.

Data collection

Anthropometry - all anthropometry markers were measured in the same time of the day from 2 pm to 4 pm by three trained research persons. All anthropometric measurements were done according to the reference manual Lohman, Roche and Martorell (1988) using standardized equipment. We measured:

Weight: medical calibrated weight type TPLZ1T46CLND-BI300 was used to assess weight to nearest 0.1 kg

Height: portable anthropometer P375. Measurements were taken to nearest 0.1 cm

Skinfolds: triceps and subscapular skinfolds were measured by Harpenden type caliper (skinfolder) with accuracy of 0.2 mm

Percentage of body fat (%BF): the amount of body fat was calculated according of equations Slaughter et al., (1988) using the data of skinfold measurement on triceps (SFT) and subscapular (SFS)

For male with the sum of skinfolds less than 35 mm the following equation was used: $\%BF = 1.21(SFT + SFSRr) - 0.008*(SFT + SFS)^2 - 1.7$

For female with the sum of skinfolds less than 35 mm the following equation was used: $\%BF = 1.33*(SFT + SFS) - 0.013*(SFT + SFS)^2 - 2.5$

For male with the sum of skinfolds higher than 35 mm the following equation was used: $\%BF = 0.783*(SFT + SFSRr) + 1.6$

For female with the sum of skinfolds higher than 35 mm the following equation was used: $\%BF = 0.546*(SFT + SFS) + 9.7$ (Slaughter et al., 1988)

Inter-rater reliability of measurement - Since skinfolds were measured by three examiners, firstly a pilot testing of measurement consistency on n=20 pre-schoolers from selected kindergartens was conducted.

Inter-rater reliabilities as intra-class correlation coefficients (ICC) of three examiners in skinfolds measurement were: ICC

triceps=0.91; ICC subscapula=0.95; ICC suprailiac=0.90; ICC calf=0.94.

The final classification of individuals into categories was done according norms (Schwandt, Eckerstein & Haas, 2012):

- 1) underfat<15th centile
- 2) proportionate fat 16th–85th centile
- 3) overfat>86th centile

Fundamental Motor Skills - The test of the Movement Assessment Test Battery for Children-2 (MABC-2) (Henderson, Sugden & Barnett, 2007) was used for assessing of the degree of FMS. In particular the age band (AB1) variant intended for children aged 3-6 years was used. Data collection from MABC-2 was carried out by three research trained teams. Each team contained five trained persons who measured FMS by MABC-2 in selected kindergartens in the same time of the day from 9 am to 11 am. Children were assessed individually.

According to Henderson et al. (2007), MABC-2 is a comprehensive diagnostic tool for evaluation of motor development and revealing of motor difficulties with different severity. MABC-2 AB1 included eight indicators divided into three domains.

- 1) dexterity – a) Post coins; b) Threading beads, c) Drawing trail
- 2) Aiming and Catching – a) Catching bean bag; b) Throwing bean bag onto mat
- 3) Balance – a) One-leg balance; b) Walking heels raised; c) Jumping on mats

According to the Examiner's manual (Henderson et al., 2007), all raw scores were converted to standard age-normed scores and further to a total test score (TTS PCT) In literature there are many solutions how to assess the degree of motor difficulties. In this study we adopted the recommendations of the following authors: Henderson et al. (2007); Schott, Aloff, Hultsch and Meermann (2007). According to these recommendations, TTS PCT $\leq$ 5th centile showed severe motor difficulties with high probability of developmental coordination disorder (DCD). TTS PCT $\leq$ 15th of centile is considered as an indicator of risk of DCD.

Data analysis

Frequencies of MABC-2 TTS PCT (i) $\leq$ 5th centile, (ii) $\leq$ 15th centile and (iii) $\geq$ 16th centile and their differences between 1) underfat children; 2) proportionate fat children and 3) overfat children were analysed by chi-square statistic: contingency tables and Fischer's exact test $p < 0.05$ and effect size $ES > 0.14$. The differences in total and standard scores from MABC-2 between proportionate fat children and overfat children were analysed by non-parametric Mann Whitney U test $p < 0.05$ $ES > 0.30$ (Cohen, 1988). All statistical procedures were carried out in the NCSS2007 program (Version 2007; NCSS, Kaysville, UT, USA).

Results

Table 1 shows basic descriptive information about mean values of the selected research sample. Mean values of weight

Table 1. Personal height, weight and amount of body fat in pre-school children

Variables	3 years (n=118)	4 years (n=139)	5 years (n=121)	6 years (n=118)
Age M(SD)	3.5 (0.27)	4.41 (0.29)	5.41 (0.29)	6.5 (0.30)
Height in cm M(SD)	100.44 (4.89)	107.26 (5.25)	113.7 (4.92)	119.72 (6.01)
Weight in kg M(SD)	15.80 (2.19)	17.58 (2.26)	19.66 (2.86)	22.59 (3.15)
Subcutaneous fat in % M(SD)	15.39 (2.41)	15(2.49)	15.27(3.37)	15.46 (3.7)

Note: M – mean, SD – standard deviation

and height in each age category of measured pre-school children reflected the 49th up to 52th centile of Czech norms (Vigneroová et al., 2006). However, average values of subcutaneous fat were in all age categories on the 75th centile of norms (Schwandt et al., 2012). This result confirmed a previously observed long term trend in increasing of adipose tissue even in pre-school children.

From the entire sample, 178 children (35.8%, 112 boys and

66 girls) were identified as having higher percentage of body fat than the 85th centile; 306 children (61.7%, 140 boys and 166 girls) had proportionate body fat and 12 children (2.5%, 6 boys and 6 girls) were identified as underfat with the percentage of body fat <15th of centile. Further it was revealed that overfat and underfat children have double the frequency of severe motor difficulties and risk of DCD in comparison to proportionate fat counterparts Chi-square=12.71, df=4, Effect size=0.16 (Table 2).

Table 2. Incidence of movement difficulties with regard to amount of adipose tissue

Proportion of children with and without motor difficulties	Under fat<15 th centile (n=12)	Proportionate fat 15 th –85 th centile (n=306)	Overfat>86 th centile (n=178)
Proportion of participants in each category in %	2.5	61.7	35.8
Proportion of children in risk of DCD MABC-2≤15 th centile	3 (25%)**	38 (12.4%)	38 (21.4%)**
Proportion of children with severe motor difficulties MABC-2≤5 th centile	2 (16.7%)**	17 (5.55%)	26 (14.6%)**
Proportion of children without motor difficulties MABC-2≥16 th centile	9 (75%)	268 (87.6%)	140 (78.6%)

Note: ** significantly higher frequency of severe motor difficulties and risk of DCS $p < 0.05$; Effect size > 0.14

From this perspective it seems that the amount of adipose tissue plays a crucial role in FMS performance. Nevertheless, we were interested to know whether the category of overfat children will have the average score in MABC-2 significantly worse in comparison to their peers. The analysis of differences

in MABC-2 total score (TTS), standard scores (TSS), and highly above TTS $PCT \geq 90^{\text{th}}$ centile are provided solely for overfat children and their proportionate counterparts as the sample size of underfat children ($n=12$) does not have adequate power.

Table 3. Difference in Total test score (TTS), total standard score (TSS) and proportion of high above centile score ($PCT \geq 90^{\text{th}}$ centile)

	Under fat<15 th centile (n= 12)	Proportionate fat 15 th –85 th centile (n=306)	Overfat>86 th centile (n=178)
Mean (SD) TTS	71.18 (16.7)	77.97 (10.02)	74.9 (12.5)*
Mean (SD) TSS	8.45 (3.2)	10.64 (8.4)	9.1 (3.29)*
PCT (proportion in %) $\geq 90^{\text{th}}$ centile	0 (0%)	32 (10.4%)	15 (8.4%)

Note: * significantly higher score $p < 0.05$ however with insufficient Effect size $r < 0.30$

Overall differences in the average TTS and TSS presented in tab 3 showed that overfat children scored significantly worse in MABC-2. However, these differences were identified as significant only in terms of statistical significance $z=2.37$ and $z=2.58$; $p < 0.05$. The effect sizes of TTS and TSS respectively between overfat and proportionate fat children were low $r=0.11$. Moreover, the results surprisingly revealed that in children with significantly high above average score TTS $PCT \geq 90^{\text{th}}$ centile is not significantly less overfat in comparison to their counterparts (Table 3).

Discussion

Our hypothesis is that severe impairment of fundamental motor skills will be significantly more frequently identified in pre-schoolers aged 3-6 years with the amount of body fat higher than the 85th centile of norms. Results from MABC-2 revealed that children whose body fat was >85th centile of norms or <15th centile had double the frequency of severe motor difficulties TTS $PCT \leq 5^{\text{th}}$ centile in comparison to peers with body fat in the range between 15th–85th centile. The finding of a higher frequency of motor difficulties in overfat pre-school children is in agreement with finding of Okely et al. (2004). In their research over-weight and obese pre-school children aged four and six years had double the frequency of the lowest mark on artificially established 5 point FMS scale in comparison to

their non-overweight peers. However, beside that our results interestingly showed that not only a high amount of adipose tissue but also a very low amount of tissue may represent a predisposition for poor FMS performance. Further, in conformity with previous studies (D'Hondt et al., 2009; Morano et al., 2011) we found that overfat pre-schoolers generally scored significantly worse in FMS performance in comparison to proportionate fat peers. However, in this research differences in the total score and standard score between proportionate fat children and overfat children significantly differ only statistically $p < 0.05$. When the effect size (practical significance) was checked, no significant differences were revealed $r=0.11$ between the two groups. This finding is in contrast with the results from previous researches because the degree of difference in FMS performance between sub-samples classified according to the centile rank of BMI was much larger. For instance, the results in Logan et al. (2011) showed that children with BMI >85th centile had MABC-2 average centile score TTS $PCT=38.7$ and children with BMI in the range between 25th–85th centile TTS $PCT=60.7$. It means the difference was 22 centile points.

However, in our study the average centile difference of 5.7 centile points on the scale between overfat TTS $PCT=42.28$ and proportionate fat TTS $PCT=47.98$ was found. According to many authors (Scheffler, Ketelhut, & Mohasseb, 2007; Rietsch, Eccard, & Scheffler, 2013) value of BMI is constituted by others body compartments in comparison to itself estimated

amount of subcutaneous body fat. Therefore one of possible cause of this inconsistency in results could be obviously due to different information which provides BMI in comparison to estimated amount of subcutaneous body fat. Although it seemed that overfat pre-school children generally have a lower level of FMS in comparison to their proportionate fat peers, one finding from this study goes contrary to it. Surprisingly, overfat and proportion fat children had proportionally almost the same distribution of scores in FMS >90th centile of MABC scale. Therefore, it seems that the high amount of subcutaneous fat may not have such an evident decreasing effect for FMS performance. However, it must be mentioned that even in early childhood there is evidence that overfat children have faster tempo of biology maturation (Pařízková, 2010). Therefore without information about biology age of children we can't confirm if similarity in frequency of above average performance between proportionate and fat children is not caused mainly due to their biological maturation diversity. However, these results suggest that detailed investigations of FMS performance levels with equally distributed sample sizes of underfat, overfat or overweight and obese children is necessary to understand the importance of the amount of adipose tissue in the domain of FMS. We do realize the highly unequal representation of individuals

in each sub-sample to be a definite source of limitations.

Children whose body fat was >85th centile of norms or <15th centile had double the frequency of severe motor difficulties TTS PCT ≤ 5th centile in comparison to peers with body fat in the range between 16th–84th centile. Interestingly, these results showed that not only a high amount of adipose tissue but also a very low amount of fat tissue may represent a predisposition for poor FMS performance. On the other hand, overfat and proportion fat children had proportionally almost the same distribution of high above average scores in FMS >90th centile of MABC scale. Therefore, it seems that amount of body fat in pre-school children doesn't represent sufficient predictors of the level of fundamental motor skills. We suggest that greater emphasize should be put on research where connection between FMS, body composition, cognitive abilities and motor experiences in pre-schoolers would be assessed.

Acknowledgment:

This study was supported by a Czech Science Foundation project No. 14-29358P and progres Q19 Social-Sciences Aspects of Human Movement Studies II.

REFERENCES

- Butcher, J., & Eaton, O. (1989). Gross and fine motor proficiency in preschoolers: Relationships with free play behavior and activity level. *Journal of Human Movement Studies*, 16, 27–36.
- Cliff, D.P., Okely, A.D., Smith, L.M., & McKeen, K. (2009). Relationships between fundamental movement skills and objectively measured physical activity in preschool children. *Pediatric Exercise Science*, 21(4), 436–449.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillsdale, NJ: Lawrence Earlbaum Associates.
- Cools, W., Martelaer, K., Samaey, C., & Andries, C. (2009). Movement skill assessment of typically developing preschool children: A review of seven movement skill assessment tools. *Journal of Sports Science and Medicine*, 8(2), 154–168.
- D'Hondt, E., Deforche, B., De, B.I., & Lenoir, M. (2009). Relationship between Motor Skill and Body Mass Index in 5- to 10-Year-Old Children. *Adapted Physical Activity Quarterly*, 26(1), 21–37.
- Davies, P.S., Gregory, J., & White, A. (1995). Physical activity and body fatness in pre-school children. *International Journal of Obesity and Related Metabolic Disorders: Journal of the International Association for the Study of Obesity*, 19(1), 6–10.
- Deforche, B., Lefevre, J., Bourdeaudhuij, I., Hills, A.P., Duquet, W., & Bouckaert, J. (2003). Physical Fitness and Physical Activity in Obese and Nonobese Flemish Youth. *Obesity Research*, 11(3), 434–441.
- Fisher, A., Reilly, J.J., Kelly, L.A., Montgomery, C., Williamson, A., Paton, J.Y., & Grant, S. (2005). Fundamental movement skills and habitual physical activity in young children. *Medicine and Science in Sports and Exercise*, 37(4), 684–688.
- Gallahue, D.L., Ozmun, J.C., & Goodway, J. (2011). *Understanding motor development: infants, children, adolescents, adults*. New York: McGraw-Hill Higher Education, London: McGraw-Hill.
- Graf, C., Koch, B., Kretschmann-Kandel, E., Falkowski, G., Christ, H., Coburger, S., Lehmacher, W., & Predel, H.G. (2004). Correlation between BMI, leisure habits and motor abilities in childhood (CHILT-project). *International journal of obesity*, 28(1), 22–26.
- Henderson, S.E., Sugden, D.A., & Barnett, A.L. (2004). *Movement Assessment Battery for Children-2*. London: Harcourt Assessment.
- Logan, S.W., Scrabis-Fletcher, K., Modlesky, C., & Getchell, N. (2011). The Relationship between Motor Skill Proficiency and Body Mass Index in Preschool Children. *Research Quarterly for Exercise and Sport*, 82(3), 442–448.
- Lohman, T.G., Roche, A.F., & Martorell, R. (1988). *Anthropometric standardization reference manual*. Human kinetics books.
- Morano, M., Colella, D., & Caroli, M. (2011). Gross motor skill performance in a sample of overweight and non-overweight preschool children. *International Journal of Pediatric Obesity*, 6, 42–46.
- Okely, A.D., Booth, M.L., & Chey, T. (2004). Relationships between Body Composition and Fundamental Movement Skills among Children and Adolescents. *Research Quarterly for Exercise and Sport*, 75(3), 238–247.
- Pařízková, J. (2010). *Nutrition, physical activity, and health in early life*. Boca Raton, Fla: CRC Press.
- Pařízková, J., Sedlak, P., Dvořáková, H., Lisá, L & Bláha, P. (2012). Secular Trends of Adiposity and Motor Abilities in Preschool Children. *Journal of Obesity & Weight Loss Therapy*, 2(9).
- Rietsch, K., Eccard, J.A., & Scheffler, C. (2013). Decreased external skeletal robustness due to reduced physical activity? *American Journal of Human Biology*, 25(3), 404–410.
- Saakslähti, A., Numminen, P., Niinikoski, H., Rask-Nissilä, L., Viikari, J., Tuominen, J., & Välimäki I. (1999). Is physical activity related to body size, fundamental motor skills, and CHD risk factors in early childhood? *Pediatric Exercise Science*, 11, 327–340.
- Salbe, A.D., Weyer, C., Harper, I., Lindsay, R.S., Ravussin, E., & Tataranni, P.A. (2002). Assessing Risk Factors for Obe-

- sity Between Childhood and Adolescence: II. Energy Metabolism and Physical Activity. *Pediatrics*, 110(2), 307-314.
- Scheffler, C., Ketelhut, K., & Mohasseb, I. (2007). Does physical education modify the body composition?: Results of a longitudinal study of pre-school children. *Anthropologischer Anzeiger*, 65(2), 193-201.
- Schott, N., Aloff, V., Hultsch, D., & Meermann, D. (2007). Physical fitness in children with developmental coordination disorder. *Research quarterly for exercise and sport*, 78(5), 438-450.
- Schwandt, P., Eckerstein Von, A., & Haas, G.M. (2012). Percentiles of percentage body fat in german children and adolescents: an international comparison. *International Journal of Preventive Medicine*, 3(12), 846-52
- Siahkoughian, M., Mahmoodi, H., & Salehi, M. (2011). Relationship between fundamental movement skills and body mass index in 7-to-8 year-old children. *World Applied Sciences Journal*, 15(9), 1354-1360.
- Slaughter, M.H., Lohman, T.G., Boileau, R., Horswill, C.A., Stillman, R.J., Van Loan, M.D., & Bembien, D.A. (1988). Skinfold equations for estimation of body fatness in children and youth. *Human biology*, 709-723.
- Trost, S.G., Kerr, L.M., Ward, D.S., & Pate, R.R. (2001). Physical activity and determinants of physical activity in obese and non-obese children. *International Journal of Obesity*, 25(6), 822-829.
- Vignerová, J., Bláha, P., Riedlová, J., Kobzová, J., Krejčovský, L., & Brabec, M. (2006). 6. *Celostátní antropologický výzkum dětí a mládeže 2001 Česká republika*. 6th National Anthropological research of children and youth 2001, Czech republic, Prague: SHI.
- Wedderkopp, N., Froberg, K., Hansen, H.S., & Andersen, L.B. (2004). Secular trends in physical fitness and obesity in Danish 9-year-old girls and boys: Odense School Child Study and Danish substudy of the European Youth Heart Study. *Scandinavian Journal of Medicine & Science in Sports*, 14(3), 150-155.
- Williams, H.G., Pfeiffer, K.A., O'Neill, J.R., Dowda, M., McIver, K.L., Brown, W.H., & Pate, R.R. (2008). Motor skill performance and physical activity in preschool children. *Obesity (silver Spring, Md.)*, 16(6), 1421-1426.

M. Musalek

Charles University, Faculty of Physical Education and Sport, Jose Martiho31. Praha 6 Veleslavin, 162 52, Prague, Czech Republic
e-mail: musalek.martin@seznam.cz

Examination of the Effect of High School Students Physical Activity Levels on Their Problem Solving Skills

Nimet Korkmaz, Serkan Pancar, Tuncay Alparslan and Ayça Ayan

Uludag University, Faculty of Sport Science and Physical Education, Bursa, Turkey

ABSTRACT

The purpose of this study is to be knowledgeable with demographic characteristics, Body mass index, physical activity levels, problem solving skills and sub-dimensions of the students receiving education at Anatolia High Schools and examine the effect of the physical activity levels of these students on their problem solving skills. The population of the study was included a total of 451 students (female=264; male=187) receiving education at the Anatolia High Schools in the Osmangazi district. In this study, the data was collected via the "International Physical Activity Questionnaire-Short Form" and the "Problem Solving Skill Scale" (PSS). It was determined that the males' physical activity values (3822.85 MET- min./week), were higher compared to those of the females (2103.17). On the contrary, the problem solving skills of the males (mean 2.91) were lower than those of the females (mean 2.95). The SPSS 23.0 for Windows program was used in the statistical analyses of the data. In order to see if the data distributed normally or not, Tabachnick and Fidell coefficients were used for the kurtosis and skewness values. For the comparison of the problem solving skills scores and the physical activity scores, the t test statistical method was used. In conclusion, no significant relationship at $p < 0.05$ level was determined between the students' problem solving skills and their physical activity states.

Key words: Problem solving skill, Physical activity, High School student

Introduction

Activities performed within daily life via energy consumption by using our muscles and joints, increasing heart and breathing rates and ending in different intensities of fatigue are called physical activities (Bek, 2008). Life conditions, technology, exams and social factors affect physical activity levels of school-age children. In the world, approximately one of every three children is overweight and is struggling with the health problems caused by obesity. Children cannot find time to do physical activities and is pushed into inactive life. According to studies, students doing physical activities have better concentration and cognitive skills (Karabulut & Ulucan, 2011).

American College of Sports Medicine and Centers of Disease Control and Prevention suggests that children should do a physical activity of moderate and high intensity for 60 minutes and preferably 7 days a week (Cengiz & İnce, 2013). It was stated that activities are a good opportunity for both personal development and socialization and the experience which participants live creates opportunities for them both to reveal their leadership characteristics and develop their social skills such as problem solving, communication, confidence, locus of control (Çelebi & Özen, 2004. Cited by Özen, 2015).

Problem solving is a cognitive, affective and behavioral process which a person creates and develops in order to find the most effective way of coping with problematic situations encountered in daily life (D'Zurilla & Nezu, 1990). One of the best ways of an individual's developing his problem solving skills is doing exercise. It is an important phenomenon not only achieving individual and social developments but also having individuals acquire a democratic personality by giving people such emotions as self-control and ambition and diverting people's destructive, aggressive offending, primitive impulses

again existing in human nature toward positive direction (Kuru, 1995). Doing a sport is not only a physical activity, but it also a process of socialization and adaptation to society (Başer, 1998. Cited by Özen, 2015). Individuals being obliged to make a decision in case of an experience or a problem are likely to use such strategies as depending on intuitions, delaying making decisions, behaving fatalistically, over thinking on a decision and wasting time, avoiding taking responsibility and risk related to decisions which they will make (Bowman, 1992; cited by Özen, 2015).

A great majority of students graduating from Anatolia high schools enter universities every year. Students are obliged to prepare for the Transition to Higher Education Examination and Higher Education Placement Examination. For the students, problem solving skills are of vital importance to pass those exams. The students preparing intensively for examinations and gradually falling away from physical activity, protecting body health through physical activity and eliminate negative situations. This study was carried out with the aim of determining the effect of the physical activity levels of the students receiving education at the Anatolia High Schools in the district of Osmangazi on their problem solving skills.

Methods

Research Group was composed of a total of 451 students (female=264; male=187) receiving education in the 2015-2016 educational year. The female students constituted 58.5% of the research group and the male students constituted 41.5% of it. The data analyzed was collected through using two different measurement tools, namely the Problem Solving Inventory and the International Physical Activity Questionnaire -Short Form.

Booth (1996) investigating into the relationship between the Health and Physical Activity Level organized a series of questionnaire studies and the International Physical Activity Evaluation Group developed the IPAQ based on this questionnaire. In order to determine the PALs of individuals, it was organized by Arabacı and Çankaya (2007) in a short and long form and its international validity and reliability studies were made by Craig et al. (2002) and its validity and reliability studies in Turkey were made by Karaca and Turnagöl (2007) ($r=0.86$). The questionnaire is composed of 7 questions and 4 separate sections and includes questions related to the physical activities done at least for 10 minutes in the last 7 days. In the questionnaire, it is determined that how many days in the last week and how long a day are; a) Heavy physical activities (HPA), b) Moderate intensity physical activities (MIPA), and c) Walking are done (W), d) In the last question, daily time spent without doing any exercise (sitting, lying down, etc.) is determined.

PA levels are determined in 3 categories; Those which are inactive: <600 MET min./week, Those which are minimum active: >600–3000 MET min./week, Those which are HEPA active: >3000 MET-min./week. In order to determine PA levels, the MET method is used. When resting, a person consumes 3.5 milliliters (ml) of oxygen per kilogram in a minute, that's MET=3.5 ml/kg/min. It is accepted that HPA=8.0 MET, MIPA=4.0 MET and W=3.3 MET are consumed in IPAQ. By determining how many days and for how long a person does HPAs, MIPAs and W's a week, the total amount of MET consumed is calculated from these three different PAs (Bozkuş et al., 2013).

The Problem Solving Inventory (PSI) was developed by Heppner and Petersen (1982) with the aim of determining how people perceive themselves in relation to their problem solving capabilities and the dimensions of the problem solving method by considering such problem solving stages as “general orientation”, “definition of the problem”, “producing alternatives”, “making decisions” and “evaluation”. The inventory was composed of 35 items and prepared in a 6-point Likert scale type. Some of the items were composed of positive statements and the others included negative statements. The scale gives a total score and scores related to sub-scales. The answers are given scores varying between 1 and 6. In the scoring, 3 items (the 9th, 22nd and 29th) are not scored. Again, in the scoring, the 1st, 2nd, 3rd, 4th, 11th, 13th, 14th, 15th, 17th, 21st, 25th, 26th, 30th and 34th items are scored inversely and the scoring is done over 32 items. The scores to be taken from the inventory ranged between 32 and 192. An increasing total score taken from the scale indicates an individual's perceiving him/herself as having insufficient pro-

blem solving skills. However, a decreasing total score taken from the scale indicates a person's having a positive perception of his/her problem solving skills. In the scoring of the sub-scales, too, it is considered that while decreasing scores taken from the sub-scales measuring problem solving approaches which can be described as positive-desired indicate that related approaches are more frequently used, decreasing scores taken from the sub-scales measuring the problem solving approaches which can be described as positive-ineffective (impulsive approach and avoidant approach) indicate that related approaches are less frequently used (Çağlayan & Taşgin, 2008).

The reliability and validity study of the Problem Solving Inventory was carried out. As a result of the factor analysis made by N.H Şahin, N. Şahin and Heppner (1993), it was stated that the inventory was composed of 6 factors, namely; Impulsive Approach: The 13th, 14th, 15th, 17th, 21st, 25th, 26th, 30th and 32nd items, $\alpha=0.78$. Reflective Approach: The 18th, 20th, 31st, 33rd and 35th items, $\alpha=0.76$. Avoidant Approach: The 1st, 2nd, 3rd and 4th items, $\alpha=0.74$. Monitoring Approach: The 6th, 7th and 8th items, $\alpha=0.69$. Self-Confident Approach: The 5th, 11th, 23rd, 24th, 27th, 28th and 34th items, $\alpha=0.64$. Planfulness Approach: The 10th, 12th, 16th and 19th items, $\alpha=0.59$.

Data Collection

The Problem Solving Inventory and the International Physical Activity Questionnaire-Short Form were administered to the students based on voluntariness principle in the classroom environment. Prior to the study, the students' parents were asked to sign a permission form. The administration started following the required explanations made by the researchers took about 20 minutes. Prior to the study, 480 questionnaire forms were handed out and 451 filled-out questionnaires returned. In the analysis of the data, the ‘SPSS 23.0 for Windows’ program was used. In relation to if the data distributed normally or not, for the kurtosis and skewness values, the Tabachnick and Fidell coefficients were used. For the comparison of gender and physical activity score, for the comparison of gender and problem solving skill, finally for the comparison of problem solving skill and physical activity score, t test statistical method was used.

Results

Total 264 (58.5%) of the participant students ($n=451$) were female and 187 (41.5%) were male. Average age is 16.3 with 15 minimum and 18 maximum years old.

Table 1. Body Mass Index and Active-Inactive Status of the Students

Age / Gender	Body Mass Index				Physical Activity Level		
	Under weight	Normal	Over weight	Obese	Inactive	Active	Very active
15	4	23	2	1	7	16	7
16	73	173	22	2	67	128	74
17	29	88	9	1	32	60	36
18	4	19	1	0	2	16	6
Female	77	169	17	1	75	142	47
Male	33	134	17	3	33	78	76
Total	110	303	34	4	108	220	123

In Table 1, the participants BMI and physical activity level is shown also the variation of those parameters according to genders is analyzed. The male students are more active than

female students. Majority of the students has normal BMI and activity levels.

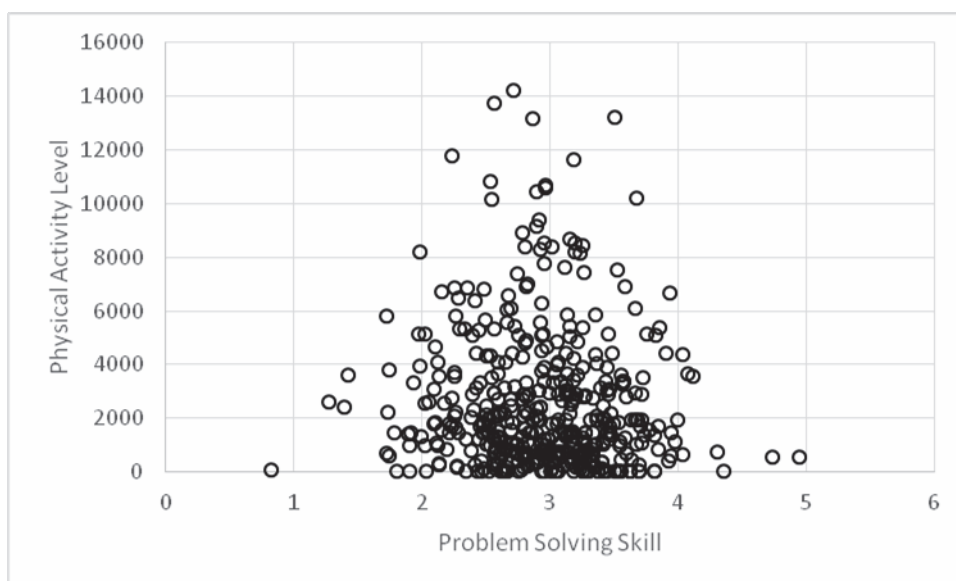
Table 2. Relationship between Problem Solving Skill and Age

Variable	Age	Mean Score	F	p
Problem solving inventory score	15	95.87	0.185	0.907
	16	94.08		
	17	93.34		
	18	93.12		
Problem solving confidence	15	29.72	1.819	0.143
	16	27.64		
	17	28.61		
	18	25.25		
Personal control dimension	15	14.75	0.499	0.683
	16	15.01		
	17	14.60		
	18	15.15		
Approach-Avoidant	15	39.43	0.542	0.653
	16	39.68		
	17	38.70		
	18	40.80		

In Table 2, if the students' problem solving skills differed according to their ages was examined, it was determined that p values were $p > 0.05$ for all the sub-dimensions. It can be concluded that there was not a significant difference between the students' scores which they took from the problem solving inventory and its sub-dimensions depending on age.

When the problem solving confidence sub-dimension was

examined, ($p > 0.05$) was determined. There was not a statistical difference in terms of the students' ages. When the personal control sub-dimension was examined, no significant difference was found according to age since p value was found higher than 0.05. When the approach-avoidant sub-dimension was examined, the values indicate that there was not a statistical difference according to age.

**Figure 1.** Comparison of the Students' Problem Solving Skill and their Physical Activity Scores

When the graph was examined in Figure 1, it was observed that the participants' problem solving skill levels were at mod-

erate and high levels and their physical activity levels concentrated at moderate and low levels.

Table 3. Relationship between the Students' Problem Solving Skills and Activity Status

Problem Solving Skill	Physical Activity Status		
	Inactive	Active	Very active
Low	4	10	7
Moderate	101	207	113
High	3	3	3

When the problem solving skills were examined in terms of gender, it was observed that the means were close (female mean=2.95, male mean=2.91) and there was not a significant difference at the level of $p > 0.05$. It was observed that there was

a statistical difference between the students' activity scores according to their gender at the significance level of $p < 0.01$. The males' activity status mean (2.23) was higher than the females' activity status mean (1.89).

The distribution of the participant's physical activity levels and problem solving scores is given in Table 3. according to this date distribution, it was concluded that there was not a relationship between PALs and PSS levels. The problem solving confidence score of the participant students ($n=451$) was determined as 2.53, their approach-avoidance score was found as 2.97 and their personal control score was calculated as 3.28. From the total of the sub-scales, the problem solving skill total score was found as 2.92.

Discussion

It is determined that 28.78% of the female students were weak, 63.63% of them were normal, 6.43% of them were a bit fat and 0.37% of them were obese. It was also found that 17.64% of the male students were weak, 71.12% of them were normal, 9.09% of them were a bit fat and 1.60% of them were obese. The BMIs of the participant students were at normal level and the rate of obesity is low. 28.40% of the participant female students were inactive, 56.06% of them were active, 17.80% of them were very active and 17.64% of the male students were inactive, 41.71% of them were active, 40.64% of them were very active. It is considered that the students' participating in sport activities and doing physical activities had an effect on their BMIs. Depending on this, it is considered that the number of the students whose BMIs are obese is low. The study with elementary and high school students in Ankara, the obesity frequency was found similar in males and females. When the age groups of 6-11 and 12-17 were compared, it was found that the obesity frequency was significantly higher in the age group of 12-17, which indicates that the obesity frequency increase in the adolescence period. In the study made in Van, too, Yuca et al. (2010) found that the obesity frequency was similar in both genders (females 2.3%; males 2.1%).

The problem solving skill score mean of the students was found as 89.91 ± 19.77 ; however, the score means of the sub-scales were calculated as follows: PSS= 28.63 ± 9.71 , AA= 45.74 ± 10.89 , PC= 15.50 ± 3.79 . The scores to be taken from the PSS scale ranged between 32 and 192 and the low score indicates the behavior and attitude related to effective and successful problem solving (Savaşır & Şahin, 1997). Total PSS scale score mean calculated as 89.91 ± 19.77 indicated that the students had nearly good level of problem solving skills. In our study, too, the PSS scale score mean was calculated as 93 ± 31.3 and PSC was found as 27.93 ± 10.53 , AA as 47.74 ± 12.59 and PC as 16.43 ± 5.12 .

Çağlayan (2007) found in a study aiming to investigate into the Problem Solving Skills of the students from the school of physical education and sports that the score mean of the students in relation to the sub-dimension of impulsive approach was $X=29.80$; the score mean belonging to the sub-dimension of reflective approach was $X=11.67$; the score mean of the sub-dimension of approach-avoidance was $X=11.03$; the score mean of the sub-dimension of monitoring approach was $X=7.03$; the score mean belonging to the sub-dimension of self-confident approach was $X=18.00$; the score mean of the sub-dimension of planfulness approach was $X=9.00$; the problem solving skills total score mean was $X=86.56$.

In this study, it was determined that there was not a significant difference between PSS and age ($p < 0.05$). Although it is expected that individuals' problem solving skills will increase as they grow, thanks to experiences and as a result of observing different problem solving strategies used by other people, it was surprising to find no difference between the age groups. This

finding can be interpreted in a way that since young people cannot evaluate their problem solving skills correctly, they perceive these skills better than they really are and fill out the scale accordingly.

The study made by Kapıkıran and Fiyakalı (2009) with high school students, total PSS score mean was low. Çağlayan and Taşgın (2008) found that the PSS sub-scale score mean with high school students doing a sport, was higher. The results found in the comparisons between PSS and age showed differences. Yıldırım, Hacıhasanoğlu, Karakurt and Türkleş (2011) determined that the students' PSS perceptions were better in the age group of 16-17 compared to the age group of 18 and over and it was determined that there was not a statistically significant difference between the ages of the students and their PSS scores. Çağlayan (2007) did not determine a significant difference between age and problem solving skills. In the study made by Işık, Kılıç and Kaplan (2016), the 10th and 11th grade students' problem solving skill levels were found higher than those of 9th and 12th grade students. Tümkaya and İflazoğlu (2000) found in a study with Çukurova University students' problem solving skill level that there was a significant relationship between the students from different years. The first year students stated that they perceived themselves as less sufficient compared to the fourth year students in terms of problem solving skills. Korkut (2002) determined that younger students were better at problem solving.

The results found in the comparisons between PSS and gender showed differences. In fact, Tümkaya and İflazoğlu (2000), Karabulut and Ulucan (2011) and Çağlayan (2007) did not determine a significant difference between gender and problem solving skill. On the other hand, in a study aiming to examine the students' problem solving skills, Korkut (2002) found a statistically significant difference between genders in terms of problem solving. When the means were examined, it was observed that the male students' problem solving skills were better than those of the female students. Differently, in a study aiming to examine the problem solving skills of the athletes playing basketball in the displacement league in Adana, İnce and Sen (2006) compared the athletes' genders and their problem solving skills and determined that the female athletes' problem solving skills (78.33 ± 11.32) were better than those of the male athletes (92.57 ± 20.85) and the difference was significant. In our study, it was determined that there was not a significant difference between PSS and gender ($p < 0.05$).

When the PSSs are compared according to doing a sport or not doing a sport, previous studies support the finding that doing a sport had a positive effect on PSS. In a study made by Işık et al. (2016), it was determined that the problem solving skills of the students doing a sport problem developed more than those of the students not doing a sport. Kuru and Karabulut (2009) determined that the students taking the courses of rhythm training and dance had higher level of problem solving skills compared to the students not taking those courses. Similarly, Barut and Yılmaz (2000) report that individuals doing a sport are more flexible and comfortable in case of problems compared to those who do not do a sport. In a different study, Karabulut and Ulucan (2011) found that the scores of the students not doing a sport were higher compared to the students doing a sport. This indicates that the students not doing a sport exhibit a more avoidant approach in problem solving compared to the students doing a sport.

In conclusion, in our study, not a significant relationship was found between the students' problem solving skills and their physical activity levels. However, in the literature, it is ob-

served that active individuals have higher level of problem solving skills. It can be suggested that the sample size of the

study should be increased and the data should be collected respect to the different sport activities.

REFERENCES

- Arabacı, R., & Çankaya, C. (2007). Beden Eğitimi Öğretmenlerinin Fiziksel Aktivite Düzeylerinin Araştırılması. *Eğitim Fakültesi Dergisi*, 20(1), 1-15.
- Barut, Y., & Yılmaz, M. (2000). *Beden Eğitimi ve Spor Bölümüne ve Eğitim Fakültesine Devam Eden Öğrencilerin Problem Çözme Becerilerinin Çeşitli Değişkenler Açısından İncelenmesi*. Uluslararası 1. Spor Bilimleri Kongresi Bildirileri, Gazi Üniversitesi, Ankara, 290-297.
- Bek, N. (2008). Fiziksel Aktivite Ve Sağlığımız. *Ankara. Sağlık Bakanlığı Yayın No: 730. 1. Basım.*, S: 9-11.
- Bowman, S.Y. (1992). Decision making styles of a medical center's management group: A case study. *Hospital Topics*, 70(3), 25-30.
- Bozkuş, T., Türkmen, M., Kul, M., Özkan, A., Öz, Ü., & Cengiz, C. (2013). Beden Eğitimi Ve Spor Yüksekokulu'nda Öğrenim Gören Öğrencilerin Fiziksel Aktivite Düzeyleri İle Sağlıklı Yaşam Biçimi Davranışlarının Belirlenmesi Ve İlişkilendirilmesi, *Spor Bilimleri Dergisi*, 1(3), 49-65.
- Cengiz, C., & Ince, M.L. (2013). Farklı Okul Ortamlarındaki Çocukların Okul Sonrası Fiziksel Aktivitelerde Algıladıkları Özyeterlilikler, *Yönetim Bilimleri Dergisi*, 11(21), 135-147.
- Craig, L.C., Marshall, A.L., Sjöström, M., Bauman, A.E., Booth, M.L., Ainsworth, B.E., Pratt, M., Ekelund, U., Yngve, A., Sallis, J.F., & Oja, P. (2002). International Physical Activity Questionnaire: 12-Country Reliability And Validity, *Medicine & Science In Sports & Exercise*, 1381-1395.
- Çağlayan, H.S. (2007). *Beden Eğitimi Ve Spor Yüksekokulu Öğrencilerinin Öğrenme Biçimleri İle Problem Çözme Becerileri Arasındaki İlişkinin İncelenmesi*, Yayınlanmamış. Doktora Tezi, Gazi Üniversitesi Eğitim Bilimleri Enstitüsü Beden Eğitimi Ve Spor Anabilim Dalı, Ankara.
- Çağlayan, H.S., & Taşgın, Ö. (2008). Spor Yapan Lise Öğrencilerinin Problem Çözme Becerilerinin Çeşitli Değişkenler Açısından İncelenmesi. *Niğde Üniversitesi Beden Eğitimi ve Spor Dergisi*, 2(1), 1-16.
- Çelebi, M., & Ozen, G. (2004, March). *University Students and Adventure Education Programmes: A Study of Meanings and Experience of Adventure Training Activities*. Symposium Conducted at the Meeting of the International Conference on Leisure, Tourism and Sport-Education, Integration, Innovation, Cologne, Germany.
- D'Zurilla, T.J., & Ve Nezu, M. (1990). Development and Preliminary Evaluation of the Social Problem-Solving Inventory: *Psychological Assessment. Journal of Consulting and Clinical Psychology*, 2(2), 156-163.
- Heppner, P.P., & Petersen, C.H. (1982). The Development And Implications Of A Personal Problem-Solving Inventory. *Journal Of Counseling Psychology*, 29(1), 66-75.
- Işık, M., Kılıç, İ., & Kaplan, O. (2016). Lise öğrencilerinin problem çözme becerileri üzerinde sporun rolü: Afyonkarahisar'da bir uygulama. *Journal of Human Sciences*, 13(3), 5449-5459.
- İnce, G., & Sen, C. (2006). Adana İli'nde Deplasmanlı Ligde Basketbol Oynayan Sporcuların Problem Çözme Becerilerinin Belirlenmesi. *Sportmetre Beden Eğit Ve Spor Bil Derg*, 4(1), 5-10.
- Kapıkıran, N.A, Fiyakalı, C.(2009). Lise Öğrencilerinde Akran Baskısı ve Problem Çözme. *Sportmetre Beden Eğit Ve Spor Bil Derg*, 4(1), 5-10.
- Karabulut, E.O., & Ulucan, H. (2011). Yetiştirme Yurdunda Kalan Öğrencilerin Problem Çözme Becerilerinin Çeşitli Değişkenler Bakımından İncelenmesi (Kırşehir İli Örneği). *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi*, 12(1).
- Karaca, A., & Turnagöl, H.H. (2007). Çalışan Bireylerde Üç Farklı Fiziksel Aktivite Anketinin Güvenirliliği Ve Geçerliliği, *Spor Bilimleri Dergisi Hacettepe J. of Sport Sciences*, 18(2), 68-84.
- Kuru, E., & Karabulut, E.O. (2009). Ritim Eğitimi ve Dans Dersi Alan ve Almayan Beden Eğitimi ve Spor Yüksekokulu Öğrencilerinin Problem Çözme Becerilerinin Çeşitli Değişkenler Bakımından İncelenmesi, *Gazi Eğitim Fakültesi Dergisi*, 29(2), 441-458.
- Kuru, E. (1995). *Farklı Branş ve Düzeydeki Erkek Sporcularla Spor Yapmamış Olanların Psikolojik İhtiyaçları ile Bazı Sosyal ve Sportif Özellikleri*, Gazi Üniversitesi, Doktora Tezi.
- Korkut, F. (2002). Lise öğrencilerinin problem çözme becerileri. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 23(23).
- Savaşır, I. & Ve Şahin, N.H. (1997). *Bilissel-davranışçı terapilerde değerlendirme: Sık kullanılan ölçekler*. Ankara: Türk Psikologlar Denegi Yayınları.
- Şahin, N.H., Şahin, N. & Heppner, P. (1993). Psychometric Properties of The Problem Solving Inventory in A Group of Turkish University Students, *Cognitive Therapy and Research*, 17(3), 379-385.
- Taylan, S. (1990). *Heppner'in problem çözme envanterinin uyarlama, güvenilirlik ve geçerlik çalışmaları*. Yayınlanmamış. Yüksek Lisans Tezi, A. Ü. Sosyal Bilimler Enstitüsü
- Tümekaya, S., & İflazoğlu, U.A. (2000). Ç Ü Sınıf Öğretmenliği Öğrencilerinin Otomatik Düşünce ve Problem Çözme Düzeylerinin Bazı Sosyo Demografik Değişkenlere Göre İncelenmesi. *Çukurova Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 6(6). http://activelivingresearch.org/sites/default/files/ALR_Brief_ActiveEducation_Jan2015.pdf
- Özen, G. (2015). Serbest Zaman Etkinliği Olarak Yapay Duvar Tırmanışının Çocukların Problem Çözme Becerisi Üzerine Etkisi. *Bedem Eğitim ve Öğretim Dergisi*, 5(2), 221-236.
- Yıldırım, A., Hacıhasanoğlu, R., Karakurt, P. & Türktaş, S. (2011). Lise öğrencilerinin problem çözme becerileri ve etkileyen faktörler. *Uluslararası İnsan Bilimleri Dergisi*, 8(1), 906-921.
- Yuca, A.S., Yılmaz, C., Cesur, Y, Dogan, M., Kaya, A., & Basaranoglu, M. (2010). Prevalence of overweight and obesity in children and adolescents in eastern Turkey. *J Clin Res Pediatr Endocrinol.*, 2, 159–163.

N. Korkmaz

Uludag University, Faculty of Sport Science and Physical Education, Görükle, Bursa, Turkey
e-mail: nhasil@uludag.edu.tr

Women, Sport and Baby-is it possible to do/have all?

Robert Kuchar

University of Economics, Department of Strategy, Faculty of Business Administration, Prague, Czech Republic

ABSTRACT

Many women stand in their lives before one question-of family or child? When is the best time to have it, and what I want to accomplish before and also after childbirth. The same applies to the world of sport. On the contrary, many times it happens that successful athletes decide to end the career at an early age because of prioritizing the family, or vice versa—they prioritize sport at the expense of their family. The aim is to show that it may not always be the choice of either-or, but that it may be possible to combine maternal duties with the sport provided certain principles are followed. The research consists of two parts. The first part focuses on the period of pregnancy, ongoing changes in it (physical, psychological, etc.) and exercises that can be included in this period. The second chapter focuses on the period after childbirth and also on sports possibilities for mother and child life. To find the right path between sport and family life is not an easy way, but not impossible. Although motherhood is a relatively long time when a woman has to leave the sport, so it is not impossible to return and gain others sporting achievements. This study is descriptive and the data are secondary and were collected from valid documents. This study aims to investigate the way for girls and women's how to do not stop with sport and also have a „normal“ family.

Key words: mother, baby, sport, health, family

Introduction

Sport has always been an integral part of human life. Already in prehistoric times we can talk about some form of sport in the form of religious rituals, hunting and fighting simulation. At the beginning the sport was only the prerogative of men. For the first time women at the Olympic Games started from 1900 in Paris, where they were admitted to the races in tennis and golf (Novotný, 2011). Some opinions says, that sport can have a negative impact on women's health. He appeared to claim that the sport causes infertility and women change in men. Embarrassment evoked and sportswear for women. Although the contents of women's sports expanded, still where there a lots of doubts about women's in sport and impact of professional sport on the health of women. "Women's, are losing womanhood" (Yüksel, 2008).

Anyway the proportion of woman's at the Olympic Games continues to a rising trend, however it still does not correspond to the current development of women's sports industry and is significantly behind man's (Dovalil, 2004). So the question is: whether this distinction can be overcome in the future and achieve equality of men and women?

Much discussed is the fact that unlike men, woman often must choose between sports career and a family. Women athletes (and particularly the top), it never had in the sport easy. This paper are focusing on female athletes (professional and recreational), which decided to give up the sport even in the case of family. Aim is to show that it may not always be the choice of one or another way, but that may be path following by certain principles combine maternal duties with the sport, and even at professional level.

Many authors focus on the similar problem before this paper (Hargreaves, 1996; Hartmann-Tews & Pfister, 2003; Heywood & Dworkin, 2003), but any of those specifically on the same problem.

Methods

The paper consists of three parts. The first part focuses on the period of pregnancy, ongoing changes in it (physical, psychological, etc.) and exercises that can be included in this period. The second part of the paper focuses on the period after childbirth and also on sports possibilities for mother and child. Last part consists of some examples from the successfully comeback after child. This study is descriptive and the data are secondary and were collected from valid documents. This study aims to investigate the way for girls and woman's how to do not stop with sport and also have a „normal“ family life.

Results

Pregnancy

In pregnancy, it is necessary to compensate specifically targeted exercise unilateral burden that arises during this period. The whole body of a woman affects several processes: the development of the fetus and placenta, hormonal changes etc. Changes which take place in a woman's body during pregnancy, essentially concern all organs'.

With increasing weight of the embryo woman balances the weight of abdominal curl in the lumbar spine. Exceptions are backaches. Among others, also occurs to weaken or rectus abdominis muscles. Peristalsis slows down and there are frequent constipations, breast muscles are stretched and subsiding due to an increase in volume of the mammary gland, musculoskeletal system is burdened with increasing weight. Pregnancy is also associated with stomach and nausea, loss of appetite and moods, especially in the early months of pregnancy (Brown, 2014).

Doctors consider a reasonable increase in the weight of women during pregnancy from 11.5 to 14.0 kg. From this in-

crease should be a child 3.5 kg, 0.5 kg placenta, 1.5 kg increase in blood volume, 1.0 kg magnification uterus, 1.0 kg amniotic fluid, and 1.5 kg enlarge breasts, fat depot 2.5 to 5.0 kg. Especially because pregnancy affects the female body, it is appropriate to include adequate physical activity to offset the negative effects. Of course, only if it is a low-risk pregnancy. Examples of suitable health exercises may be:

- Exercise for pregnant women (Fit ball).
- Exercise for the development of habits of correct posture, focusing on the correct position of the pelvis.
- Exercises to strengthen muscle balance.
- Exercise to maintain good condition soles feet (Bejdáková, 2011).

For example is unsuitable training to the exhaustion or exertion, which increases body temperature above 38°C. It is certainly bad induces if the performance of long-term increase in abdominal pressure, or is subject to retention of breath. With such performance degrades supply oxygenated blood to the fetus.

Considerable influence on how a woman should do sports in the pregnancy, also will have a fact how was the woman sporty before becoming pregnant. If a woman is actively practiced sports before pregnancy, it is appropriate to certain attributes of sport pregnancy adapt. Among the sports that are recommended for pregnant women and can make women who have decided to start a sporting activity after pregnancy include:

- Walking. It may be even faster pace. The most suitable is obviously nature one.
- Swimming. Also good make same water exercise.
- Yoga. Pregnant are learned fixed posture, working with the pelvic muscles and will learn to breathe properly. Can help prevent varicose veins and pregnancy constipation. Also regulates hormonal imbalance, thereby avoiding fluctuations moods (Pařízek, 2008).

Inappropriate physical activity:

- Exercise uses of swing and quick movements.
- Jumps, exercise where you have to hold your breath.
- Lifting weights.

Specifically, they are unsuitable sports like tennis, ice skating, cross-country running. One can argue that it depends on how pregnant woman knows sports discipline and how often she was practicing before pregnancy time. In any case, these sports are caring a high risk in the second half of pregnancy. Furthermore shooting, especially of long guns (sporting or hunting) is unsuitable not only for women during pregnancy, but also during lactation. Throwback butt of a gun can cause extensive bruising of the arm or chest.

Pregnant women should be also careful with swim in public pools, ponds, rivers and seas, especially in the second half of pregnancy. There is increased risk of infection (Miňovský, 2008).

Puerperium

In the postpartum period, the uterus and birth canal returns to its original state. Even after birth, the uterus is quite large and retracts during the two weeks following the birth. To ensure that the uterus properly wrapped, it is advisable to exercise, lie on your stomach and breast-feeding. Although it may seem fast, but if a birth was without major complications a woman can begin with training almost immediately. The best positions for exercises are belly position. Particularly, impor-

tant exercises are to strengthen the pelvic. It is also advisable exercises using the shoulders work out, exercises to strengthen the pectoral muscles, positioning the legs (to increase blood circulation), or exercise to create the habit of correct posture.

Inappropriate physical activity:

- Mass load in the form of lifting.
- Strength and endurance exercises.
- Exercise leading to vibration, shock.
- One-sided physical activity.
- Belly work out (Beránková, 2012).

After birth

Movement is important for every human being from the first months of life. Mothers-sportswoman accustomed to regular exercise, are very often realizing this fact, so they are why trying to lead their kids to physical activity from an early age. It is particularly important in terms of psychomotor development. Due to the fact that during pregnancy a woman's body has undergone many changes, it is clear that it will also take some time before the mother returns to its original condition. In addition to impaired physical condition usually occurs as fatigue, gathered kilograms or health complications in the form of back pain or pelvic drop. The recommended rate of shedding excess pounds is around 0.5 kg per week.

Breastfeeding has an irreplaceable importance not only for the physical, emotional and psychosocial development of the child, but also for the mother alone, primarily due to a reduction in the risk of breast and ovarian cancer. Breastfeeding is one of the most energy intensive processes. One ml of human milk is about 3kJ, which means that after the conversion the quantity of breast milk during lactation fully baby breastfeeding is consumed about 2200-3000 KJ per day. During pregnancy, mom creates about 4 kilograms adipose tissue, from which it draws energy during lactation. According to the results of medical studies in developed countries, fully breastfeeding woman reduce her weight by about 0.8 kilograms per month, and that is cause only by breastfeeding (Skalska, 2014).

In the case of demanding physical activity, it is preferable to nurse a child either before exercise or after about 1.5 hours after the physical activity. During more demanding exercise occurs in the muscles of lactic acid, which gets into breast milk, and also affects its flavor, which may bother some babies, so they can even reject breast milk.

Experts recommend starting with a slight movement of the load such as brisk walking, swimming, yoga or pilates until after 6-8 weeks after birth. First, it is advisable to start a ten-minute block of exercise. If it is mastered without difficulty, a woman can gradually start adding the load (duration, intensity). Running, jumping, and similar activities are therefore not suitable movement for sagging pelvic muscles. After giving birth, women should focus as soon as possible to strengthen the pelvic muscles. First, it is recommended to started with Kegel exercises (Stefanik, 2013) and gradually add an additional workout exercises aimed at strengthening the body core. Another advantage of exercises to strengthen the pelvic muscles is also the fact that strength pelvic muscles protect incontinence of urine. If there is leakage of urine, should first strengthen these internal muscles and after than to start with adequate physical activity. A lots of women are asking very important question, when they are ready, after childbirth, to start with exercise. Most doctors leaves the decision about beginning of an adequate physical activity after childbirth on the individual status of the mother, depending on how they feel, but there are also some doctors who recommend to wait with all exercise until the expiration of postpartum period.

Another question is how the mother can manage a life with the child and the sport and consequently also the work. Very much depends on support from your partner and how she is able to organize time. It is normal when someone from family is helping with babysitting, and mother has a time for herself. So she can devote this time to sport. Some parents try to lead their kids specifically to the same sport, which run themselves. In terms of child development is appropriate show them widest possible range of movements, physical skills and sports, rather than specialized them at very early stage to one type of sport.

Examples

Mother sportswoman-RETURNS

This part is focus primarily on mothers - sportswoman. Same examples of athlete's who's managed a successful return to the sports scene, but also of those whose performance after giving birth was not good any more. Several names were chosen from the Czech and some of them from the rest of the Europe.

The factor that plays a big role in returning back to sports is psyche. Many mothers lose the motivation to race and the main purpose of life will be seen only in motherhood. Quite logically they are favors child's needs instead of their needs, such as sports. Sportswoman is also very hard to cope with the fact that they should leave small children in the care of someone else, leaving them and focus on training. Example, one of the best athlete Barbora Špotáková leaving the training group of Jan Zelezny, and the reasons was the fact that she wants to be more with her son.

According to Catherine Baďurová, she used to be in Czech national team in the pole vault, we can distinguish two kinds of athletes - mothers. She says: „I divide athletes into two categories. First one is in sports as long as they can and they are enjoying it. Then they start with a family and don't want to make a comeback anymore. The second one has a baby during a career break and after baby they returned. Sometimes, even in larger form than before pregnancy" (Baďurova, 2013).

Successful return Czech sportswoman

Barbora Špotáková (30. June 1981 Jablonec and Nisou) is a Czech javelin thrower. She is double Olympic champion, world and Europe champion and also she hold the world record. In November 2012 she takes a break in her careers due to pregnancy, and in May 2013 became the mother of a son Janek. Barbora Špotáková returned to training at the end of the year 2013, and began preparing for the season 2014. The peak of the incoming season was the European Championship in Athletics in Zurich. Her came back was outstanding. She won a gold medal at the European Championship, became the winner of the Diamond League and also she gets an honor athlete of the year 2014. Comeback on top was, in her opinion, easier than she expected. "You just have to learn how to manage your time that is the hardest issue. And also have huge support from family, without them I would not have it done"(Špotáková, 2014)

Katerina Neumannová (15. February 1973 Písek) is the Olympic champion and World champion in cross country skiing. Secondary, she was participant in road cycling races. Katerina Neumannová stop career after the Olympics in Salt Lake City (2002), where she won two silver medals. In 2003, her daughter Lucia was born. Katerina made comeback mainly because the Olympic Games in Turin (2006), where she wanted

to accomplish her successful career to gets gold medal at the Olympics. After a heroic performance, supported by a whole Czech republic, she succeeded at the last possible race and in finish she was celebrating in a big hug with her daughter Lucy. She says: "I came back mentally stronger, I wanted to win. Before motherhood I wanted to be good, but now I wanted to be first"(Neumannová, 2014).

Successful return European sportswoman

Kim Clijsters (8. June 1983 Bilzen-Belgium) won 41 WTA singles titles and 11 WTA doubles titles. She won four Grand Slam singles titles: three at the US Open, in 2005, 2009, and 2010 and one at the Australian Open in 2011. She was also runner-up in four Grand Slam singles tournaments and won the WTA Tour Championships singles title in 2002, 2003, and 2010. She won US Open as first mother in history. "We tried to plan her naptime a little bit later so she could be here today. It's the greatest feeling in the world, being a mother,"(Clijsters, 2009) a glassy-eyed Clijsters told the crowd after her remarkable comeback victory.

Anna Watkins (13. February 1983, Truro, Leek). She is an English rower. She competed at the 2008 Summer Olympics, where she won a bronze medal in Double Sculls and has won 4 medals in the World Championships, most recently a successful defense of her world title with Katherine Grainger, in Bled, Slovenia in 2011. She won a gold medal in the double sculls at the London 2012 Olympics. She says: "If it's disastrous I haven't lost anything in such a short space of time. And if it's a success then maybe we've achieved something bigger than the size of a rowing boat. I will hopefully show other women that we're not old and decrepit and washed-up after having children – as knackered as we all feel. We have plenty left in us and we shouldn't be afraid to use it"(Watkins, 2016).

Discussion

Paper takes a look on the topic of how sportswoman can deal with their carrier and gave us some viewed from several perspectives. Firstly, was focused on historical context associated with woman. Than is offering steps how to deal with a pregnancy and after then. Step by step showing the way how is it possible to became a great athlete and also have a family.

To find the right path between sport and family life is not an easy way, but not impossible. Although motherhood is a relatively long time when a woman has to leave the sport, so it is not impossible to return and gain others sporting achievements. This article points out that, when you progress in this period properly and responsibly with regard to the body and the child, return to the sport career is possible right after birth. As a proof of all this information was used in a paper some successful cases of comeback.

For the future this topics should be communicate more with young sportswomen, but certainly should not ignore this topic even with athletes-men. They are also basic members of family and they should have more information about how they can help and support theirs life partners at a time and after pregnancy. Because they have also their own dreams and desires to accomplish something in the world of sport, and therefore does not have a family to postpone until at the end of their careers, or quit sports career at the expense of the family.

REFERENCES

- Badurova, C. (2013). Zlaté sportovkyně rodí, aneb Když je máma hvězda. Retrieved 23/11, 2014, from <http://sip.denik.cz/pribehy-a-udalosti/slavne-matky.html>
- Bejdáková, J. (2011). Cvičení a sport vtěhotenství. Retrieved 07/11, 2014, from https://www.ereading.cz/nakladatele/data/ebooks/5248_preview.pdf
- Beránková, L. (2012). Gynekologická oslabení: Zdravotní tělesná výchova. Fakulta sportovních studií Masarykovy univerzity. Zdravotní tělesná výchova. Retrieved 07/11, 2014, from: <http://is.muni.cz/do/fsp/s/e-learning/ztv/pages/10-gynekolo-text.html>
- Clijsters, K., (2009). Retrieved 14/09, 2014, from <http://www.theguardian.com/sport/2009/sep/14/kim-clijsters-comeback-us-open-win>
- Dovalil, J. (2004) Olympismus: Český olympijský výbor. Praha: Olympia, from http://www.olympic.cz/www/docs/osmus/zeny_a_sport_v_olympijskem_hnuti.pdf
- Hargreaves, J. (1996). *Sporting Females: Critical Issues in the History and Sociology of Women's Sport*. North Amerika: Routledge.
- Hartmann-Tews, I., Pfister, G. (2003). *Sport and Women: Social Issues in International Perspective*. London: Routledge.
- Heywood, L., & Dworkin, S.L. (2003). *Built To Win: The Female Athlete As Cultural Icon* (Sport and Culture) North Amerika: Univ Of Minnesota Press; 1 edition.
- Majerová, J. (2009). Cvičení po porodu: Všechno, co vás zajímá. Retrieved 09/11, 2014, from <http://www.forexample.cz/view.php?cislocclanku=2010050006>
- Miňovský, J. (2008). Sportování v období těhotenství. Retrieved 17/11, 2014, from http://is.muni.cz/th/176170/fsp/s_b/Sportovani_v_období_tehotenství.pdf
- Neumannová, K. (2014). Když mám na sobě číslo, bouchají ve mně saze, říká Kateřina Neumannová. Retrieved 23/11, 2014, from: http://rungo.idnes.cz/katerina-neumannova-010-/behani.aspx?c=A140617_150728_behani_fro
- Novotný, J. (2011). *Sport v ekonomice*. Prague: Wolters Kluwer.
- Pařízek, A. (2009). *Knih o těhotenství a dítěti, 4. Editon*. Prague: Gálen.
- Stefanik, J. (2013). Kegelovy cviky: Medicína, nemoci, studium na 1. LF UK. Retrieved 09/11, 2014, from www.stefajir.cz/?q=kegelovy-cviky
- Skalska, M. (2014). Kila, kojení a cvičení po porodu: Stob Klub. Retrieved 09/11, 2014, from <http://www.stobklub.cz/clanek/kila-kojeni-a-cviceni-po-porodu/>
- Špotáková, N. (2014). Bojím se snít, ale vrátila jsem se úžasně. Retrieved 23/11, 2014, from <http://www.ceskatelevize.cz/sport/atletika/285524-nadsena-spotakova-bojim-se-snit-ale-vratila-jsem-se-uzasne/>
- Watkins, A. (2016). 'I want to show women we're not decrepit after having children' Retrieved 04/01, 2016, from <http://www.theguardian.com/sport/2016/jan/04/anna-watkins-interview>
- Yüksel, A. (2012). Womanhood is dying at Olympic. Retrieved 08/08, 2012, from <http://www.hurriyetdailynews.com/columnist-blasted-online-after-piece-on-chestless-man-like-female-olympians-.aspx?PageID=238&NID=27354&NewsCatID=341>

R. Kuchar

University of Economics, Department of Strategy, Faculty of Business Administration, Nám. W. Churchilla 4130 67, Prague, Czech Republic

e-mail: rkuchar21@gmail.com

Physical Education Experimental Program to Test the Effect on Perceived Competence

Edin Brankovic and Muriz Hadzikadunic

University of Sarajevo, Faculty of Sport and Physical Education, Sarajevo, Bosnia and Herzegovina

ABSTRACT

The first purpose of this study was to test effect of multidisciplinary and holistic experimental program (EP) in physical education program effect on the soul need perceived competence. The second purpose of this study was to analyse the relationship between attitudes of perceived competence in the experimental group before and after the application of program, mostly due the theoretical reason that perceived competence is predictor of Flow. The data was collected from 74 students of the 8th grade of elementary schools randomly divided in two groups (experimental: 53; control: 21). The system of variables consisted of perceived competence scale items. The t-test analysis was applied to test perceived competence attitudes before and after the EP. The experimental group attitudes of perceived competence after the EP were significantly more positive than before participation in it, while control group attitudes of perceived competence decreased after participation in the regular school program. The current findings support the authors' hypothesis that the holistic program has significant effect on the soul need perceived competence which is closest predictor of Flow. This study applied multidisciplinary EP which was designed on growth-mind set practices and sparks findings—both connected to flow experience and intrinsic motivation—to suggest future comprehensive program that could be potentially used as a regular tool for achieving both, Flow and intrinsic motivation. Findings with certainty provide a basis for future necessary qualitative research of the program effects on the intrinsic motivation.

Key words: perceived competence, experimental program, intrinsic motivation, flow experience

Introduction

Motivation is one of the most attractive problems for researches in the field of Physical Education (PE). Self-determination theory (SDT) (Deci & Ryan, 1985) ranges motivation from extrinsic to intrinsic. The theory suggests that motivation is a result of interaction between events in the environment and events in the person that effect levels of motivation. Intrinsic is ideal motivation (Ryan & Deci, 2000), but it is not explained clearly enough which means that we have not found yet a way to define intrinsic motivation and means to achieve it on a regular basis because the more we explore it, the more we find how personal and subjective it actually is. One attempt to define means to achieve intrinsic motivation and Flow experience—as its prototype—is through the multidisciplinary and holistic Experimental program (EP) in PE that teaches not only sport skills and healthy lifestyle but that also teaches students how sport concepts, philosophy of win, loose, effort can be embraced in daily life (Elliot & Dweck, 2005; Adler, 1982).

Before we explain design and implementation of the EP it is necessary to define measure of the success in this study. Knowing that SDT has proposed the most comprehensive framework for measuring motivation we choose to use soul need of perceived competence as success measure. The reason is clear, competence is closest quantitative measure in SDT to Flow experience. In a short SDT scale is—from extrinsic motivation to the intrinsic motivation—is on the one hand regulated by extrinsic, introjected, identified, integrated, and intrinsic regulations, while on the other hand the impact of these regulatory types is manifested on the soul needs which must be balanced in order to have intrinsic motivation. The more soul needs for

competence, autonomy and relatedness are in balance, the more regulation is intrinsic and integrated. The prototype of the intrinsic motivation—with competence as predictor—is the state of flow known as Flow Theory. The essence of the flow state is an autotelic activity (volitional activity) for which the reason for doing a certain activity is known internally (Nakamura & Csikszentmihalyi, 2002). The manifestations of the autotelic activity can be viewed and noted over a long period of time. It is primarily manifested as a will to continue doing activity in a long term and secondly, as an inclusion in a social activity (Csikszentmihalyi, 2014).

Study of Lonsdale, Taylor, Sabiston and Ntoumanis (2011) shows that it is not easy to define regulatory types of motivation for youth (14–18 years), but autotelic actions can be noticed as interest in a certain physical activity, as an overwhelming engagement in that activity and perceived competence (Benson & Scales, 2011). Studies (Benson & Scales, 2011) show that regular Flow experience (autotelic actions) is not recognized by the modern educational system. They have also shown that students are not encouraged enough to continue in that physical activity after they show interest and focus in. Those findings encouraged us to design EP and to test its effects intrinsic motivation and flow but first we had to test its effects on the perceived competence because it is closest predictor of both of them which are in the essence one, autotelic activity lately named “sparks” too (Benson & Scales, 2011).

The first purpose of this study was to test multidisciplinary and holistic EP in PE program effect on the soul need perceived competence. The second purpose of this study was to analyze the relationship between attitudes of perceived competence in the experimental group before and after the application of pro-

gram, mostly due the theoretical reason that if perceived competence proves significant than we can use experimental program as a tool for studying and testing Flow and intrinsic motivation.

Perceived competence and Experimental program in theory

The verb “motivate” has been referred to verb “to ignite” (Benson, 2008) too. Benson and his colleagues found that sport is one of the most applicable forms through which youth can be motivated (ignited) to feel and express their deep motivational interests so called “sparks”. Perceived competence, regulated through the “optimal challenge” (Csikszentmihalyi, 2014; Deci & Ryan, 2000), is the closest (González-Cutre, Sicilia, Moreno & Fernández-Balboa, 2009) soul need to the Flow. It is closer predictor to intrinsic motivation and flow than the other two soul needs of relatedness and autonomy (Deci & Ryan, 2000). Competence reflects the need to achieve desired outcomes and to feel effective in one’s efforts (White, 1959). It is a tendency of humans, to whom a curious assimilative nature is a defining feature (Deci & Ryan, 2000; Fahlberg, Fahlberg & Gates, 1992) which is connected more to Learning Goals than to Performance goals (Elliot & Dweck, 2005).

With this study we examined the impact of the EP in the PE on competence scale, and afterwards we analyzed data that we got from the scale. If significant effects of the EP would exist on the competence then deeper insights in perceived competence and means to achieve intrinsic motivation could be done in further studies. Ideally, in the future, if further EP shows significant in Flow theory, Sparks and Sport Motivation Scale too we could use EP design for making Flow climate regularly on the lessons. Also through those lessons we could find clearer understanding of autotelic activity (Nakamura & Csikszentmihalyi, 2002) which is at the same time clearer understanding of the intrinsic motivation and “sparks”.

Design of the EP was named holistic and multidisciplinary approach (Adler, 1988) to the student because it includes rational, emotional, spiritual and physical development in education process according to three intelligences: rational, emotional (Goleman, 1998) and spiritual (Zohar & Marshall, 2000) which are practically-in education and teaching process-described through “Growth Mindset” or “Learning goals” (Elliot & Dweck, 2005). Learning goals or Growth mindset behavior of the individual is not only to demonstrate own competence and sport, exercise achievement or to avoid it—which is characteristic of Performance goal or Fixed mindset—but to develop one’s competence and mastery through the exercise and achievement or setback which is Learning goal or Growth mindset (Elliot & Dweck, 2005).

Through the Growth mindset teaching techniques students are taught in the EP to embrace challenges, to persist in the face of setbacks, to see effort as the path to mastery, to learn from criticism which eventually brings them in higher perceived competence and to a desire to learn and tendency to continuously grow in their life experience (Yeager & Dweck, 2012). In those teaching techniques the learning process is emphasized over performance outcome, for example: “OK, so you didn’t do as well as you wanted to. Let’s look at this as an opportunity to learn; Congratulations—you really used great strategies for studying, managing your time; We need to raise the bar for you now; Let’s think about how to improve (the accuracy of) this exercise/part/movement/word/choice/logic/description/problem; You did hard work in it, and you can see achievement. In the Growth mindset teaching technique the person and result are not set in the first plan of a feedback because emphasizing on process in success or setback has a tendency to keep intrinsic motivation and perceived competence in students while empha-

sizing person or result has tendency to lead to low perceived competence and further lack in intrinsic motivation manifested through Performance goals and static intelligence which are Fixed mindset markers - opposite from Learning goals and strong perception of competence. At the same time during the lessons students were taught how to recognize Performance goals through its appearance signs such as avoiding challenges, early give up, seeing effort as fruitless or wasted, ignoring useful feedbacks. Educating students in Growth mindset manner is akin to Flow experience and Sparks because in all three—Growth Mindset, Flow Experience (Intrinsic Motivation), Sparks-students witness purpose of action and in all three perceiving competence is root of motivation. Practically Growth mindset teaching technique was applied in the EP through the innovative part of this study which included time for dialogue and discussions with students, reading meaningful stories for homework and exercising with music and songs that had a meaningful lyrics which were commented after the exercise with students. Studies name such innovative techniques as holistic techniques and they place them in the area of spiritual intelligence (Suzić, 2012; Zohar & Marshall, 2000), spiritual learning (Benson & Scales, 2011; Fahlberg & Fahlberg, 1991) or religious experience (Smith, 1976) which help students to find purpose in activity and strive to questioning “Why” in life (Adler, 1982). Finding meaning, purpose of exercise, Growth mindset characteristics such as to embrace challenges, to persist in the face of setbacks, to see effort as the path to mastery, to learn from criticism and their transfer in a daily life were mainly discussed through the conversation after reading the short meaningful stories “Mathnawi for kids” (Uysal, 2012) which students would get for reading homework after the lesson.

EP took into consideration recent studies of emotional (Goleman, 1998) and spiritual development (Zohar & Marshall, 2000) of youth. It considered usual motivational problems (Rutten, Boen, Visser & Seghers, 2015; Tenenbaum, Gershon & Eklund, 2007) in youth and it used techniques for increasing motivation for understanding the purpose suggested by the same authors, Adler (1988) and Smith (1976). Noticing usual motivational problems and using technique for increasing motivation were implemented together with the innovative part of the program application which included mentioned EP approach through dialogue, discussions, reading and exercising with music (Adler, 1988). The main goal of the EP was to ignite perceiving self competence (ignite creative thinking, self-potentials and interests) in students through the EP using free time on the lessons and to show that on the perceived competence scale. Organization of the EP is described below.

Methods

Participants

The sample consisted of 8th grade primary school students aged from 13 to 15 years, attending a primary school in the spring semester of 2015. The sample consisted of 74 students (male: 40; female: 34), randomly divided in two groups. The first group was the experimental one with 53 (male: 25, female: 28) students, while the second group was the control group with 21 students (male: 15, female: 6).

EP design

The EP of PE consisted of ten lessons, two per week, each lasting for 45 minutes. The first goal of the EP was to motivate students through the EP to the volitional activity which means increase in perceived competence. At the same time, the control group participated in the activities of the traditional PE lesson

organization and program. When planned, the EP did not make any special and separate curriculums from the one that is used by Ministry of Education and Science of Bosnia and Herzegovina. Two things were new and innovative in the EP. The first was Lesson organization, the second was feedback and conversation time with students.

The lesson organization (Figure 1.) was designed in a way that students are actively involved in the execution of the task, or, they are passively active while analysing and supporting their colleagues, or, they participate in the feedback time with professor during, before or after the lesson.

Teaching unit: EUROFIT Battery Test Day			
Type and main part of the lesson	Test (Test Zone 1); Preparation - warm up for test (Zone 2), conditioning (Zone 3) and fun (Zone 4).		
Teaching instruments	Cones, pads, volleyball, basketball, mats for gymnastics		
Goal	Measure and mark final state of students		
Anthropological task	Motor abilities (coordination, endurance, precision); Morphological (Musculature development); Functional (cardio respiratory stimulation, stimulation of digestion system)		
Education of skills	Complete TEST with Task Goal Approach (Growth mindset); Ignite responsibility for tracking personal level of condition		
Education of behaviour	Lead to an individual development and feeling of responsibility, Motivate self and the others		

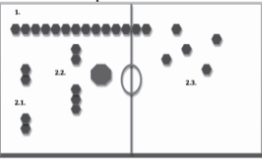
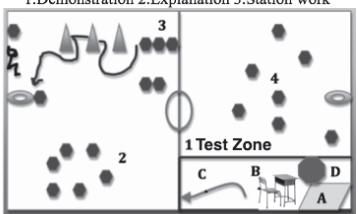
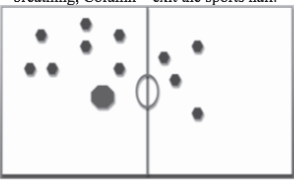
PART OF THE LESSON	CONTENT	ORGANIZATIONAL AND METHODOLOGICAL NOTES	EDUCATION OF BEHAVIOR NOTES
INTRODUCTION & PREPARATION 25-30 % (11-13 min)	- Check equipment before entrance in the hall - Present to students today's Objectives, remind on the Task Goal, Growth mindset technique. - Arrange students in formation to warm up (Intensity low-medium: regulated with space of working area) Boys: "Football ball is passed in a circle of players; two players are in the middle". Players standing in a circle pass ball to each other in various directions. Those in the middle try to catch the ball. The one whose pass is caught goes inside the circle instead of the one who catches the ball. Girls: Volleyball passes with tasks (overhead pass, bump pass, combined pass) Stretching exercises: shoulders, abdomen, back, hamstrings, quadriceps, calf, breathing exercises and "listen the silence" and present the Zones of the lesson "Main Part".	From the frontal work organization (1.) transfer in formation in 3 groups Groups 2.1. & 2.2. Volleyball warm up task (pass game; students stand in the groups (2-3 persons) looking opposite to each other (total 4-6 persons per ball), 2-2.5 m distanced. A player passes a ball to the opposite one then moves in the back of the of person who was behind him/her when (s)he passed the ball. Spontaneously, intensity increases and students warm up. Group 2.3. Students are in free formation, forming approximately round shape. They play warm up soccer game. Teacher encourages both groups to move more to warm up better. 	In the introduction part of the lesson slow work intensity increases. While exercising, keep talking to students about EUROFIT battery test: - Greet students, encourage them that they have done great work in the previous lessons. - Remind them that we are learning and growing with challenges - Remind them on Growth mindset technique - Explain briefly testing for today (explain stations) - Praise the process not person/outcome - Remind them to giving the best and to enjoy the tasks.
MAIN PART 60% (30 min)	EUROFIT Battery Test: TEST 1. lesson: - Flamingo balance - Plate tapping - Sit and reach - Standing broad jump Station 1: Test Zone Station 2: Volleyball in a circle Station 3: Basketball - dribble ball slalom + layup + shoot + pass the ball + hold against wall in sitting position + walk back for rest Station 4: Regular basket game	1.Demonstration 2.Explanation 3.Station work  Note: Formation of groups as shown. 4-5 persons per group. Station 1. TEST ZONE: A-D 2. Volleyball 3. Basketball with tasks 4. basketball. Teacher is in the TEST zone. Students who express will to track/note results are welcomed to do so. Each student goes from A to D then joins students in Zone 4, then 3, then 2.	Goal no. 10: Responsibility and embracing the challenge with Growth mindset - Teacher explains tasks and zones. Call students and divide in groups. - Remind them to motivate each other and give their best Other activities need to relax students. Once approaching test zone teacher reminds students that student worked well and to give his/her best. On Station 2: focus and relax On Station 3: focus on the task On Station 4: relax and enjoy
END 10 (5 min)	- Teacher and students feedback time shortly in a free formation about results, teacher praise process of all, students sit on the floor. - Afterwards, teacher gives direction for stretching (teacher leads) and breathing exercise on the sign - Students stand up and teacher starts applause for all, and students do the same. - Students are invited to help and remove the equipment from the field - Teacher gives new "homework" to students and they together, on 123, say "Bye" with smiles.	Free formation – feedback, Circle – stretching & breathing, Column – exit the sports hall. 	Feedback time: - Dialogue about challenges, success, setbacks on the lesson during stretching exercises. - Emphasize process to achievement not results and persons. - Give "homework to read": «Three fish» (Uysal, 2012) - Together, with smiles, say «Bye» in the end.

Figure 1. Experimental Program Example

The feedback and conversation time with students was mainly done short before the lesson where teacher welcomed students, asked about activities they had earlier, and, briefly introduced coming lesson, during the lesson with shorter feedbacks in Growth mindset method and in the cool down time or after the lesson. Students would have a stretching and breathing exercises and afterwards they had a conversation with the teacher about the lesson achievements and challenges. During

this time students were encouraged to listen and talk with teacher and colleagues about purpose of embracing challenges, persistence in setbacks, seeing effort as the path to mastery, learning from criticism, reasons and purposes (Yeager & Dweck, 2012; Adler, 1982) through the short and meaning full story that they had for homework to read after the previous lesson. Stories were taken from the book Jalaluddin Rumi "Mathnawi for kids" (Uysal, 2012) and teacher helped students

to make an interpretation of their meanings. Feedback and conversation time was also used to discuss students opinions about exercises they like/don't like to do. During this time students received announcement for testing day and they were encouraged to approach it with attitude of Learning goal which is attitude of Growth mindset and in the end effects perceived competence.

Measure

The system of variables consisted of 4 items, modeled by five-point Likert scale (1-fully disagree, 5-fully agree), of perceived competence scale items (Williams & Deci, 1996) due to the reason that perceived competence soul need is predictor of intrinsic motivation and Flow (Ryan & Deci, 2000): "I have participated in Physical activity because": 1) I feel confident in my ability to exercise regularly, 2) I now feel capable of exercising regularly, 3) I am able to exercise regularly over the long term, 4) I am able to meet the challenges of exercising regularly. All answers on the main statement were measured with

the "five scaled Likert scale", with the level of agreement: Fully Agree to Fully Disagree.

Quantitative measurements of perceived competence were performed twice. The first measurement was completed before the EP application, while the second was completed after applying the EP. The t-test analysis was used to test perceived competence attitudes before and after the EP and to find if there is a significant change in perceived competence between initial and final measurement in the experimental group after participation in the EP.

Results

Review of Table 1. with t-test shows that EP with multidisciplinary and holistic approach had positive effects in experimental group between initial and final measure (sig. 0.03).

Table 1. Comparison of T-test Between Both Group Initial and Final Measures and Between Control and Experimental Group in Initial and Final Measures

	T-test	
ICG : IEG	0.04	*P<0.05
FEG : FCG	0.08	
EFG : IEG	0.03	*P<0.05
ICG : FCG	0.1	

Legend: IEG: Initial Measure Experimental Group; ICG: Initial Measure Control Group; FEG: Final Measure Experimental Group; FCG: Final Measure Control Group

This result shows more valuable result if we take into consideration that grouping was done randomly and that in the initial measure difference between control and experimental group was significantly different (sig. 0.04). Control group showed statistically higher perceived competence than experimental group in initial measure. In the final measure control group did not change significantly in comparison to its initial measure because the control group did same program before initial period and during experiment period. Overall results confirm the study hypothesis that EP with a multidisciplinary approach has positive and significant effects on increasing soul need of perceived

competence.

By comparing the experimental group M (Table 2.) results of all statements in the final measurement with the mean result of all answers of the controlled group in the final measurement it can be seen that experimental group increased in ability "to meet the challenge of exercising regularly" while control group dropped (4.6-4.1), also experimental group "had more confidence in ability to exercise regularly" (3.87-4.24), and it was "able to exercise regularly over the long term", (4.05-4.22) while the control group stayed on quite the same level of confidence as in the initial measurement (4.13-4.15).

Table 2. Comparison of Descriptive Statistical Indicators of Initial and Final Measurement of Perceived Competence

	IEG (N=39)		ICG (N=15)		FEG (N=50)		FCG (N=20)	
I have participated in Physical activity because:	M	SD	M	SD	M	SD	M	SD
1.I feel confident in my ability to exercise regularly	3.87	1.18	4.4	0.8	4.24	0.95	4.2	1.03
2.I now feel capable of exercising regularly	4.18	0.87	4.33	0.7	4.24	1.12	4.25	0.77
3.I am able to exercise regularly over the long term	4.05	0.93	4.13	1.09	4.22	0.94	4.15	1.11
4.I am able to meet the challenge of exercising regularly	4.13	0.94	4.61	0.71	4.32	0.9	4.1	1.14
M	4.06	0.98	4.37	0.83	4.26	0.97	4.18	1.01

Legend: M: Mean; SD: Standard deviation; N: Number of students; IEG: Initial Measure Experimental Group; ICG: Initial Measure Control Group; FEG: Final Measure Experimental Group; FCG: Final Measure Control Group.

Discussion

The goal of this study was to examine the effects of multidisciplinary EP on the perceived competence through the subject of the PE. With this research we wanted to see if EP-based on the holistic and multidisciplinary approach which included Growth mindset teaching techniques-has positive effects on perceived competence in students. If yes than the same program could be used to test Flow experience, sparks and autotelic activity which are essentially synonyms for intrinsic motivation. The study confirmed hypothesis that EP has significant effect on the perceived competence which can be used as a predictor of Flow experience, autotelic activity and sparks.

Considerable changes in T-test (Table 1.) confirmed that EP has effect on perceived competence which means that it allows unique talents of individuals in a group to become maximized in niche-relevant ways which can produce benefit for all group (White, 1959). Significance of the t-test confirms the study of Cox, Smith & Williams (2008) that claims that increase in perceiving competence is related to continuing sport activities in students' spare time-which is also characteristic of the intrinsic motivation. Also, the EP consisted of tasks with oriented Learning goals (Elliot & Dweck, 2005) and as such it fulfils the criteria for potential use as a intrinsic motivation predictor and implicitly, this study confirmed importance of competence for building learning climate (Ferrer-Caja & Weiss, 2000). With

highest mean of 4.32 on the statement 4. “I am able to meet the challenge of exercising regularly” students were motivated to learn with understanding in the way of Learning goals where challenges are accepted and embraced and not denied such as in Fixed mindset-Performance goals. In this case, the activity is not compulsion but it is behaving with reason and understanding (Suzić, 2012; Adler, 1982).

Reviewing the other studies we can confirm that we may be faced with the fact that motives are not clearly recognizable in youth (Lonsdale et al., 2011; Standage, Duda & Ntoumanis, 2005; Chatzisarantis, Hagger, Smith & Wang, 2003) but that the intrinsic motivation is manifested and predicted through the perceived competence (Elliot & Dweck 2005; Deci & Ryan, 2000). Analysis of perceived competence results of the EP give us a solid base for further qualitative research of flow, autotelic activity and their managing through the EP as Hassandra,

Goudas and Chroni (2003) suggested.

Potential limitation of the study is that motivation atmosphere depends not only on the program but also on teacher and students. In order to overcome those challenges teachers should be well trained (Cheon & Reeve, 2015) because program itself does not make difference if there is no adequate teacher to implement it (Hassandra et al. 2003). For example, in our study students showed interest for combat sports - karate. Their interest was accepted with presence of a professional karate instructor on the next lesson. The karate lesson was used to promote the essential meaning of combat sport philosophy with emphasis on the kind and decent behaviour, attitudes, righteous reasoning and forming righteous ideals, because these are characteristics of the spiritual learning (Adler, 1982) which is fundamental part of holistic approach in education (Adler, 1988; Smith, 1976).

REFERENCES

- Adler, M.J. (1982). *The Paideia Proposal: An Educational Manifesto*. New York: Collier Books.
- Adler, M.J. (1988). *Reforming Education* (rev. ed.). New York: Collier Books.
- Benson, P. (2008). *Sparks: How parents can ignite the hidden strengths of teenagers*. Wiley, John & Sons.
- Benson, P.L., & Scales, P.C. (2011). Thriving and sparks. In R. J. R. Levesque (Ed.), *Encyclopedia of adolescence*, 2963–2976.
- Chatzisarantis, N.L., Hagger, M.S., Smith, B., & Wang, C.K. (2003). A meta-analysis of perceived locus on causality in exercise, sport, and physical education contexts. *Journal of Sport and Exercise Psychology*, 25, 284-306.
- Cheon, S.H., & Reeve, J. (2015). A classroom-based intervention to help teachers decrease students' amotivation. *Contemporary Educational Psychology*, 40, 99-111.
- Cox, A.E., Smith, A.L., & Williams, L. (2008). Change in physical education motivation and physical activity behavior during middle school. *Journal of Adolescent Health*, 43, 506-513.
- Csikszentmihalyi, M. (2014). *Applications of Flow in Human Development and Education: The Collected Works of Mihaly Csikszentmihalyi*. Dordrecht: Springer.
- Deci, E., & Ryan, R. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum Press.
- Deci, E., & Ryan, R. (2000). The “what” and “why” of goal pursuits: human needs and the self-determination of behavior. *Psychological Inquiry*, 11, 227-268.
- Elliot, A.J., & Dweck, C.S. (2005). Chapter 1-Competence and Motivation: Competence as the Core of Achievement Motivation: Chapter taken from *Handbook of Competence and Motivation*. The Guilford Press.
- Fahlberg, L.L., Fahlberg, L.A., & Gates, W. (1992). Exercise and existence: Exercise behavior form an existential-phenomenological perspective. *The Sport Psychologist*, 6, 172-191.
- Fahlberg, L.L., & Fahlberg, L.A. (1991). Exploring spirituality and consciousness with expanded science: Beyond ego with empiricism, phenomenology, and contemplation. *American Journal of Health Promotion*, 5(4), 273-281.
- Ferrer-Caja, E., & Weiss, M.R. (2000). Predictors of intrinsic motivation among adolescent students in physical education. *Research Quarterly for Exercise and Sport*, 71, 267–279.
- Goleman, D. (1998). *Working with emotional intelligence*. New York: Bantam Books.
- González-Cutre, D., Sicilia, A., Moreno, J. & Fernández-Balboa, J. (2009). Dispositional Flow in Physical Education: Relationships With Motivational Climate, Social Goals, and Perceived Competence. *Journal of Teaching in Physical Education*, 28, 422-440.
- Hassandra, M., Goudas, M., & Chroni, S. (2003). Examining factors associated with intrinsic motivation in physical education: a qualitative approach. *Psychology of Sport and Exercise*, 4(3), 211-223.
- Lonsdale, C., Taylor, I., Sabiston, C., & Ntoumanis, N. (2011). Measuring student motivation for physical education: Examining the psychometric properties of the perceived locus of causality questionnaire and the situational motivation scale. *Psychology of Sport and Exercise*, 12, 284-292.
- Nakamura J., & Csikszentmihalyi, M. (2002). Chapter 7-The concept of flow: Chapter taken from *Handbook of positive psychology*, 1, 89-105.
- Rutten, C., Boen, F., Visser, N., Seghers, J. (2015). Changes in children's autonomous motivation toward physical education during transition from elementary school: A self-determination perspective. *Journal of Teaching in Physical Education*, 34, 442-460.
- Ryan, R.M., & Deci, E.L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55, 68-78.
- Smith, H. (1976). *The Purpose of Higher Education*. Harper & Brothers, New York.
- Standage, M., Duda, J.L., & Ntoumanis, N. (2005). A test of self-determination theory in school physical education. *The British Journal of Educational Psychology*, 75, 411–433.
- Suzić, N. (2012). *Futurology in the science of pedagogy and social sciences-Futurologija u pedagoškim i socijalnim naukama*. Banja Luka: EKTOS.
- Tenenbaum, Gershon & Eklund, Robert C. (2007). *Handbook of Sport Psychology, 3rd Edition*. John Wiley & Sons, Inc., Hoboken, New Jersey.
- Uysal, M. (2012). *Mevlana Jalaluddin Rumi Mathnewi for kids – Mesnevija za djecu*. Libris, Sarajevo.
- White, R. (1959). Motivation reconsidered: The concept of competence. *Psychological review*, 66, 297–333.
- Williams, G.C., & Deci, E.L. (1996). Internalization of biosychosocial values by medical students: A test of self-determination theory. *Journal of Personality and Social Psychology*, 70, 767-779.

Yeager, D.S. & Dweck, C.S. (2012). Mindsets that promote resilience: When students believe that personal characteristics can be developed. *Educational Psychology*, 47, 302-314.

Zohar, D. & Marshall, I. (2000). *Spiritual Intelligence and Why It Matters*. Bellaire TX.: Conscious Pursuit Inc.

E. Brankovic

University of Sarajevo, Faculty of Sport and Physical Education, Patriotske lige 44, 71.000, Sarajevo, Bosnia and Herzegovina
e-mail: edin.brankovic@yahoo.com

Body Height and Its Estimation Utilizing Arm Span Measurements of both Gender Adolescents from Central Region in Kosovo

Fitim Arifi

University of Montenegro, Faculty for Sport and Physical Education, Niksic, Montenegro
AAB College, Faculty of Physical Education and Sport, Prishtina, Kosovo

Sami Sermahaj

University of Montenegro, Faculty for Sport and Physical Education, Niksic, Montenegro
Universe College, Department of Physical Culture, Sport and Recreation, Prishtina, Kosovo

Iber Alaj

University of Montenegro, Faculty for Sport and Physical Education, Niksic, Montenegro

Zenel Metaj

University of Montenegro, Faculty for Sport and Physical Education, Niksic, Montenegro
AAB College, Faculty of Physical Education and Sport, Prishtina, Kosovo

Admire Toverlani

State University of Tetova, Faculty of Physical Education, Tetovo, Macedonia

ABSTRACT

This study is based on measurements of Central region Kosovar adolescents. The aim of this study was to examine the Body Height of adolescents from Central region as well relationship between arm span and Body Height in both Kosovar genders. A total measured subject participated in this research was 193 out of which (93 girls and 100 boys), females average of age is 18.15 ± 0.35 years old (range 18-20 years) and for male 18.26 ± 0.44 years old (range 18-20 years). The anthropometric measurements were done by trained people and were taken according to the ISAK manual. Relationship between Body Height and arm span has been analyzed by the simple correlation coefficient at a 95% confidence interval. The linear regression analysis was carried out to examine extent to which arm span can reliably predict of Body Height. Statistical importance was placed at level $p < 0.05$. As a result anthropometric measurements for both sexes showed that the average of Body Height for boys adolescents from Central region are 180.62 ± 5.88 centimeters and have the arm span average of 181.36 ± 7.08 centimeters, while girls from Central 166.77 ± 4.71 centimeters tall, and have the arm span average of 167.08 ± 5.03 centimeters. The results have shown that the arm span was estimated as a reliable indicator of Body Height assessment to the both genders adolescents from Central region of Kosovo population. This study also confirms the necessity for developing separate height models for each region in Kosovo.

Key words: Body Height, armspan, region, boys and girls, Kosovo

Introduction

Kosovo is geographically clearly defined at the center of the Central part of the Balkan Peninsula. Throughout Kosovo's territory pass roads, which connect Adriatic Sea, Aegean Sea with the center of Balkan Peninsula. Mountain ranges consist of about 63% of the Kosovo's territory. Sorted by their location or altitudes, they would be: peripheral and central mountains, high, average and low mountains. Dinaric Mountains extend in the western and interior part of the land. In central part of the land, such as Mokna Forest, Dry Forest (Mali i Thatë) and Cursed Mountains (Bjeshkët e Nemura), with their geographical position create special climate conditions in Kosovo. Considering that Kosovo's population is part of the central area of population from the Dinaric Race, it was of special significance to complete a professional study and a realistic assessment of morphometric evaluation adolescents from the Central Region of Kosovo, mostly due to the reason some regional differences were confirmed in Kosovo (Arifi, 2017) and in Montenegro

(Bubanja, Vujovic, Tanase, Hadzic, & Milasinovic, 2015; Milasinovic, Popovic, Jaksic, Gardasevic, & Bjelica, 2016a; Milasinovic, Popovic, Matic, Gardasevic, & Bjelica, 2016b; Popovic, 2017; Popovic, Bjelica, Tanase, & Milasinovic, 2015; Vujovic, Bubanja, Tanase, & Milasinovic, 2015) as well as some socio-demographic characteristics (Quanjer et al., 2014).

In scientific literature is known that the measurement of Body Height is important in many settings: it is an important measure of body size and gives an assessment of nutritional status (cited in Datta Banik, 2011; Bjelica et al., 2012; Gardasevic, Rasidagic, Krivokapic, Corluka, & Bjelica, 2017), as well as in the determination of basic energy requirements, physical capacity abilities based on drugs quantity, as well as the evaluation of children growth, predicting and standardization of physiologic standards such as lungs capability, muscle strength, glomerular filtering, metabolism, etc (cited in Popovic, Bjelica, & Hadzic, 2014a; Golshan, Amra, & Hoghogi, 2003; M. Golshan, Crapo, Amra, Jensen, & R. Golshan, 2007; Mohanty, Babu, & Nair, 2001; Ter Goon, Toriola, Musa, &

Akusu, 2011). The Body Height might also be a relevant factor that can success of some athletes in various sports (Popovic, Bjelica, Petkovic, & Muratovic, 2012; Popovic, Bjelica, Jaksic, & Hadzic, 2014b). The researches by European anthropologists a century ago, which have studied body height of the population living in the surrounding of Dinaric Alps (Pineau, Delamarche, & Bozinovic, 2005). As the modern Kosovars, belongs Dinaric racial classification, it is assumed by the authors of this study that adolescents that live in Central region, It can be as tall from other parts of Kosovo (Arifi, 2017) and might by equally tall or at least very close to Europe's top nations (Popovic, 2016; Popović et al., 2015), Bosnian and Hercegovinians (male 183.9 cm; female 171.8 cm) Dutch (male 183.8 cm; female 170.7 cm), Montenegrins (male 183.21 cm; female 168.37 cm) and Serbians (male 182.0 cm; female 166.8 cm). Wherefore, the first purpose was to examine the Body Height in Kosovar adolescents from Central region as the authors did believe this is the place where the population can reach the full potential of the Kosovo plain, while the second purpose of this research was to examine the Body Height in both Kosovar genders and its relationship between arm span.

Methods

The subject of this study was 193, students from high schools, in total there, Included are from Central region of Kosovo, Prishtina, 100 are male and 93 females average of age is 18.15 ± 0.35 years old (range 18-20 years) and for male 18.26 ± 0.44 years old (range 18-20 years). The Criteria for the selection was that the researches have excluded from the data analysis the individuals with physical deformities as well as those without informed consent. The exclusion criterion was also being non-Kosovar and non-Central region. Anthropomet-

ric measurements of Body Height and arm span have been conducted according to the protocol of the International Society for the Advancement of Kinanthropometry (Marfell-Jones, Olds, Stewart, & Carter, 2006). The trained measures have measured selected anthropometric indicators (same measurer for each indicator), while the quality of their performance was evaluated against the prescribed "ISAK Manual".

The data was analyzed by Statistical Package for Social Sciences (SPSS) for Windows 23.00. The results obtained were analyzed through descriptive parameters: Means and standard deviation (SD) of the Body Height and arm span of Kosovars, the ratio between Body Height and arm span have been analyzed through correlation coefficient according to Pearson with reliability level of 95%. The linear regression analysis was carried out to examine extent to which arm span can reliably predict of Body Height. In the end, these relationships were plotted as scatter diagram for both genders. Statistical significance was set at $p < 0.05$.

Results

A summary of the anthropometric measurements for both sexes is shown in Table 1. Arithmetic average of Body Height for boys is 180.62 ± 5.88 centimeters, ranked with minimum and maximum results as 170.3-198.8 centimeters. For girls the average was 166.77 ± 4.71 centimeters, ranked with minimum and maximum results as 157.3-185.0 centimeters. These are the results of the arm span for both sexes; the arm span arithmetic average length for boys is 181.36 ± 7.08 centimeters, ranked with minimum and maximum results 162.4-197.7 centimeters. For girls this was 167.08 ± 5.03 centimeters, ranked with minimum and maximum results 157.5-180.0 centimeters.

Table 1. Anthropometric Measurements of the Adolescents

Subjects	Body Height Range (Mean $\pm$ SD)	Arm Span Range (Mean $\pm$ SD)
Male	170.3-198.8 (180.62 $\pm$ 5.88)	162.4-197.7 (181.36 $\pm$ 7.08)
Female	157.3-185.0 (166.77 $\pm$ 4.71)	157.5-180.0 (167.08 $\pm$ 5.03)

The simple correlation coefficient and their 95% confidence interval analysis between the anthropometric measurements are presented in Table 2. For both sexes correlative relation be-

tween Body Height and arm span is significant ($p < 0.000$), with these correlation coefficients (boys 0.812; girls 0.692).

Table 2. Correlation between Body Height and Arm Span of the Study Subjects

Subjects	Correlation Coefficient	95% confidence interval	Significance p-value
Male	0.812	0.577–0.771	<0.000
Female	0.692	0.507–0.788	<0.000

Table 3. shows the results of linear regression where high values of regression coefficient are shown suggesting a positive relation (boys 0.812; girls 0.692) which shows that arm span

predicts Body Height for both Kosovar sexes (boys $t=13.792$, $p < 0.000$, girls $t=9.139$, $p < 0.000$), which confirms the R-square (%) for boys (66.0), and for girls (47.9).

Table 3. Results of Linear Regression Analysis Where the Arm Span Predicts the Body Height

Subjects	Regression Coefficient	Standard Error (SE)	R-square (%)	t-value	p-value
Male	0.812	3.448	66.0	13.792	0.000
Female	0.692	3.423	47.9	9.139	0.000

The relationships between armspan measurements and Body Height among the above models is plotted as a scatter diagram (Figure 1).

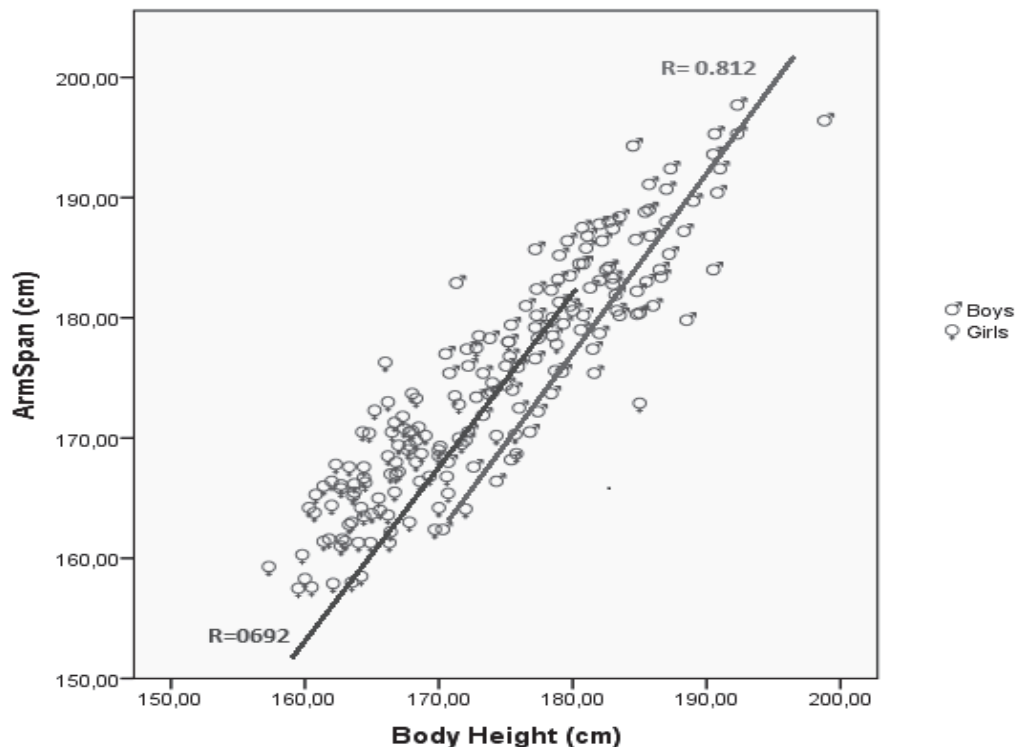


Figure 1. Scatter Diagram and Relationship between Arm Span Measurements and Body Height among the Above Models

Discussion

Throughout this work we can prove that the adolescents from Central region of Kosovo are very tall with an average of 180.62 centimeters for boys and 166.77 centimeters for girls. The results proved that the adolescents from Central region are tall on average, taller than boys population in Southeast region in Kosovo with 177.68 centimeters and taller than girls population 164.1 (Arifi, 2017), taller than male population in Macedonia with 178.10 centimeters and taller than female population in Macedonia with 164.58 centimeters (Popovic, Bjelica, Georgiev, Krivokapic, & Milasinovic, 2016), and is very close to the data that was reached in the measurement of Serbians female 166.8 centimeters (Popovic, Bjelica, Molnar, Jaksic, & Akpinar, 2013), but not taller than male population.

However, there is a hypothesis that both sexes adolescents from Central region of Kosovo did not reach their full genetic potential yet, since they have been influenced by various envi-

ronmental factors (wars, in the former Yugoslavia, poor economic situation, etc.) in the last few decades (Popovic et al., 2016). Wherefore, the authors believe that these circumstances had a negative bearing on the secular trend in Kosovo, while it is expected that the secular changes influencing Body Height will ascend in following two decades, comparing it to developed countries where this trend has already completed such as Dutch (Schönbeck et al., 2013).

The results of this study confirm that the arm span reliably predicts Body Height, with significant (p -value 0.000) by linear regression analysis based on results achieved for male and female. The relationship between Body Height and arm span we have been able to verify throughout Pearson's correlation analysis with validity of 95% in male as well as female, which have given very high value (0.812 and 0.692) of correlations between them. The results of this study confirm the necessity for developing height models for each region in Kosovo.

REFERENCES

- Arifi, F. (2017). Stature and Its Estimation Utilizing Arm Span Measurements of both gender Adolescents from Southeast Region in Kosovo. *Sport Science*, 10(1), 2017.
- Bjelica, D., Popovic, S., Kezunovic, M., Petkovic, J., Jurak, G., & Grasgruber, P. (2012). Body Height and Its Estimation Utilizing Arm Span Measurements in Montenegrin Adults. *Anthropological Notebooks*, 18(2), 69–83.
- Bubanja, M., Vujovic, D., Tanase, G.D., Hadzic, R., & Milasinovic, R. (2015). Body Height and Its Estimation Utilizing Arm Span Measurements in Female Adolescents from Central Region in Montenegro. *Sport Mont*, 43,44,45/XII, 277-282.
- Datta Banik, S. (2011). Arm span as a proxy measure for height and estimation of nutritional status: A study among Dhimals of Darjeeling in West Bengal India. *Ann. Hum. Biol.*, 38(6), 728-35.
- Gardasevic, J., Rasidagic, F., Krivokapic, D., Corluca, M., & Bjelica, D. (2017). Stature and Its Estimation Utilizing Arm Span Measurements in Male Adolescents from Federation of Bosnia and Herzegovina Entity in Bosnia and Herzego-

- vina. *Montenegrin Journal of Sports Science and Medicine*, 6(1), 37-44.
- Golshan, M., Amra, B., & Hoghogi, M. A. (2003). Is arm span an accurate measure of height to predict pulmonary function parameters? *Monaldi Arch. Chest Dis.*, 59(3), 189-92.
- Golshan, M., Crapo, R. O., Amra, B., Jensen, R. I., & Golshan, R. (2007). Arm span as an independent predictor of pulmonary function parameters. *International Society for the Advancement of Kinanthropometry*, 12(3), 361-366.
- Marfell-Jones, M., Olds, T., Stewart, A., & Carter, L. (2006). International standards for anthropometric assessment. Potchefstroom: Arm span as an independent predictor of pulmonary function parameters: validation and reference values.
- Milasinovic, R., Popovic, S., Jaksic, D., Vasiljevic, I., & Bjelica, D. (2016a). Body Height and its Estimation Utilizing Arm Span Measurements in Female Adolescents from Central Region in Montenegro. *Sport Mont*, 14(3), 15-18.
- Milasinovic, R., Popovic, S., Matic, R., Vasiljevic, I., & Bjelica, D. (2016b). Body Height and its Estimation Utilizing Arm Span Measurements in Male Adolescents from Central Region in Montenegro. *Sport Mont*, 14(2), 21-23.
- Mohanty, S.P., Babu, S.S. & Nair, N.S., (2001). The use of arm span as a predictor of height. A study of South Indian women. *J. Orthop. Surg. (Hong Kong)*, 9(1), 19-23.
- Pineau, J. C., Delamarche, P., & Bozinovic, S. (2005). Average height of adolescents in the Dinaric Alps (in French). *Comptes Rendus Biologies*, 328(9), 841–846.
- Popovic, S. (2017). Local Geographical Differences within Adult Body Heights in Montenegro. *Montenegrin Journal of Sports Science and Medicine*, 6(1), 81-87.
- Popovic, S. (2016). Body Height and its Estimation Utilizing Arm Span Measurements in Montenegrin Adults: National Survey. In *Book of Summaries of 11th FIEP European Congress "Anthropological Aspects of Sport, Physical Education and Recreation"*, (5-6), Banjaluka: University of Banjaluka, Faculty of Physical Education and Sport.
- Popovic, S., Bjelica, D., Georgiev, G., Krivokapic, D., & Milasinovic, R. (2016). Body Height and its Estimation Utilizing Arm Span Measurements in Macedonian Adults. *Anthropologist*, 24(3), 737-745.
- Popovic, S., Bjelica, D., Tanase, G.D., & Milasinovic, R. (2015). Body Height and Its Estimation Utilizing Arm Span Measurements in Bosnian and Herzegovinian Adults. *Montenegrin Journal of Sports Science and Medicine*, 4(1), 29-36.
- Popovic, S., Bjelica, D., & Hadzic, R. (2014a). Average body height of adolescents in Montenegro. In *Proceedings book of the 13th International Sport Sciences Congress* (462-463). Konya: Selcuk University.
- Popovic, S., Bjelica, D., Jaksic, D. & Hadzic, R. (2014b). Comparative Study of Anthropometric Measurement and Body Composition between Elite Soccer and Volleyball Players. *International Journal of Morphology*, 32(1), 267-274.
- Popovic, S., Bjelica, D., Molnar, S., Jaksic, D., & Akpinar, S. (2013). Body Height and Its Estimation Utilizing Arm Span Measurements in Serbian Adults. *International Journal of Morphology*, 31(1), 271-279.
- Popovic, S., Bjelica, D., Petkovic, J., & Muratovic, A. (2012). Comparative Study of Anthropometric Measurement and Body Composition between Elite Soccer and Handball Players. In *Proceedings Book of the 4th International Scientific Conference "Contemporary Kinesiology"* (102-108). Split: Faculty of Kinesiology, University of Split.
- Schönbeck, Y., Talma, H., Van Dommelen, P., Bakker, B., Buitendijk, S., Hirasings, R., & Van Buuren, S. (2013). The world's tallest nation has stopped growing taller: the height of Dutch children from 1955 to 2009. *Pediatric Research*, 73(3), 371-377.
- Ter Goon, D., Toriola, A.T., Musa, D.I., & Akusu, S. (2011). The relationship between a span and Body Height in Nigerian adults. *Kinesiology*, 43(1), 38-43.
- Quanjer, P.H., Capderou, A., Mazocioglu, M.M., Aggarwal, A., Popovic, S., Datta Banik, S., Tayie, F.A. K., Golshan, M., Ip, M.S.M., & Zelter, M. (2014). All-age relationship between arm span and height in different ethnic groups. *European Respiratory Journal*, 44, 905-912.
- Vujovic, D., Bujanja, M., Tanase, G.D., & Milasinovic, R. (2015). Body Height and Its Estimation Utilizing Arm Span Measurements in Male Adolescents from Central Region in Montenegro. *Sport Mont*, 43,44,45(XII), 283-288.

F. Arifi

University of Montenegro, Faculty for Sport and Physical Education, Narodne omladine bb, 81400 Niksic, Montenegro
e-mail: fitim_arifi@yahoo.com

Body Segment Parameters During GS Turn in Recreational Skiers

Mijo Curic

OS Antun Mihanovic, Osijek, Croatia

Edin Mujanovic, Tarik Huremović and Amra Nozinović Mujanovic

University of Tuzla, Faculty of Physical education and Sport, Bosnia and Herzegovina

ABSTRACT

Study aim was to analyze the kinematic parameters of the body of the examinees, without competitive experience in skiing, in order to determine the competitive efficiency. The participants in this research were 23 male students from the Faculty of physical education and sport, aged 22 ± 6 months, who attended the classes in the subject alpine skiing. Examinees were divided into two categories, according to duration of the course run, in order to determine whether there is the differences in body segment parameters during giant slalom turn. Using Independent Samples t-test we see that the examinees differ on a statistically significant level in variables duration of the turn $p=0.000$, duration of the course run $p=0.000$ and inclination of the body $p=0.030$, and that the differences are in favor of faster examinees. The analysis of the results in this research has shown that there is a relation between the measured body segment parameters and duration of the course run, or that the technique of skiing has a direct impact on the competition in alpine skiing.

Key words: kinematic parameters, center of gravity, students, competition

Introduction

In competitive skiing, in addition to choosing the tactics of skiing, there are other factors (specific motor knowledge of alpine skiing technique, the ability to maintain certain lines of skiing, weather conditions, psychological and physical preparation, start number...) that affect the final result. Z. Hraski and M. Hraski (2009) state that for every skier main goal is to perform turns, from start to finish, with as much as possible efficiency because the slightest error in the technique of skiing can affect the loss of speed and therefore the result. By rules (FIS, 2011), performance is defined as the shortest time from start line to finish line, losing the speed therefore is not an option.

According to the authors (Franjko, Maleš, & Kecerin, 2006), success in the Alpine disciplines depends primarily on the level of the adopted ski specific motor knowledge which require exceptional skiers agility, coordination, strength and endurance. Mujanović, Atiković, Nožinović Mujanović and Nurković (2014) state that the technique of skiing is undoubtedly an important factor for rational performance of movement that can be easily determined by careful observation of skiers by the examiner because exact knowledge of movement execution and highly differentiated tactile and kinesthetic sensations and anticipation of external circumstances are the factors that enable a skier to apply the optimal technique in unpredictable conditions. It is obvious that the evaluation of the efficiency of the ski turn execution and the final results of the race can be made with an adequate assessment of the parameters of the body during the execution of turns.

Since the competition in alpine skiing is increasingly interesting for recreational. In this study we will analyze the kinematic parameters of the body of the examinees, without com-

petitive experience in skiing, in order to determine the competitive efficiency.

Methods

Participants

The participants in this research were 23 male students from the Faculty of physical education and sport, aged 22 ± 6 months, who attended the classes in the subject alpine skiing. The teaching process of the subject alpine skiing that takes place in the winter semester of the third and fourth year of university studies contains exercises in the form of a field course for 30 hours during the semester and lectures for 30 hours during the semester. The first course of elements of basic ski technique lasted 7 days. The second course of elements of advanced ski technique took place a year after the first course, and also lasted 7 days, after which the examinees access the competition. Ski lessons were executed by 3 teachers following the identical program. None of the examinees had prior experience with skiing and giant slalom (GS) competition. All students from the sample were without expressed morphological, motor and psychological aberration and they were able to regularly attend lectures and courses on third and fourth year of the university study. The Ethical Committee of Tuzla University approved the study and the procedures conformed to the principles of human experimentation outlined in the Declaration of Helsinki. All participants were informed of the procedures and potential risks, and gave their written consent to participate in testing.

Variables

Measuring instruments of this study were the body segment

parameters during the giant-slalom (GS) turn. The examinees were evaluated in: CoGH–height of center of gravity of the body–represented by the distance between the center of gravity of the body and the snow surface perpendicular to the fall line, TT–duration of the turn–represented by the time elapsed between the moment when the skier pass the imaginary vertical line positioned 2.5 m laterally, before and after the turn pole, T–duration of the course run–represented by the time elapsed between the moment when the skier start and finish the course run, IB–inclination of the body–represented by the angle determined by line that goes from the CoG to the center of outside ski and the line perpendicular to the fall line and HA–hip angulation–represented by the angle determined between the torso and the upper leg.

Procedure

Testing was conducted on the slope marked by safety fence, with start at an altitude of 490 m and the finish line at an altitude of 325 m, on an incline between 20° and 21° . The giant slalom course was with a gate set-up of 13 gates, with distance between the gates of 15 meters as a constant value and a horizontal offset of 7 meters between first and second, fifth and sixth and eighth and ninth gate and 8 meters between the re-

maining gates. A slope meets all the needs of measurement and we approached a noninvasive method for diagnosis (Mejovšek, Hraski & Medved, 1997). The area was adequate with all the criteria and conditions for carrying out skiing, and suitable for the equipment setup. The cameras had enough light as to further increase the video quality. Start time was at 19:00. Two video cameras recorded the passing of the second gate and all parameters are registered when a skier was in the frontal plane with a gate observed from a position down by the fall line. The reason for the testing of this phase of turn, is because at this stage skiers finishing inclination of the body and trying to maintain a dynamic balance with hip angulation.

The acquisition of the video required for kinematic analysis was performed with two digital cameras (Casio EX-F1) with a frequency of 200 frames per second. The cameras were placed at an angle of 90 degrees relative to the plane of recording and were at a distance of 10 m (Figure 1). Before the recording, there was a preparation that includes calibration of space, with calibration frame (200x200 cm) with the purpose that allows precise calibration of space in the analysis (Huremović, Biberović & Pojskić, 2009). An advanced video analysis program Contemplas was used in order to acquire kinematic parameters (Joerg, Ruediger & Peter, 2007).

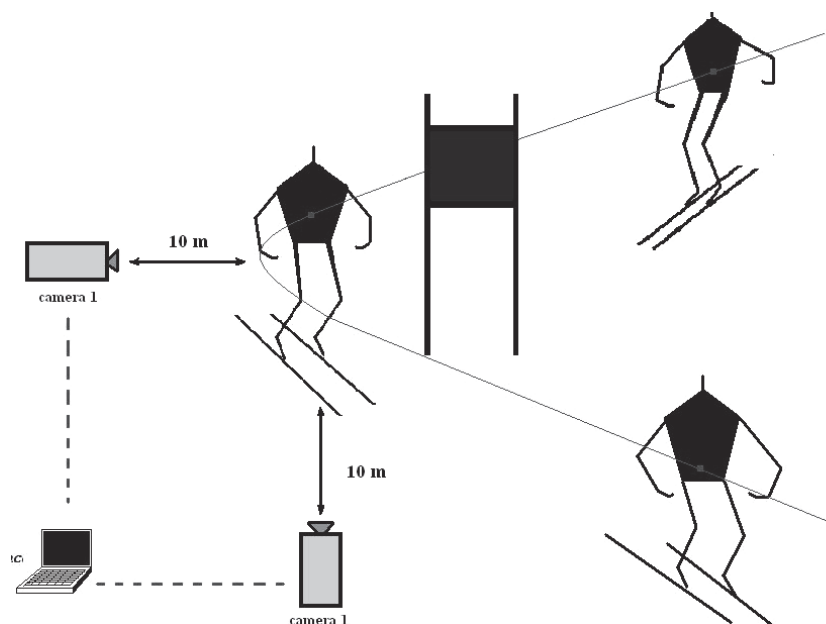


Figure 1. Schematic Representation of Data Collection Procedures

The data for giant slalom competition was collected during the race was performed. For evaluation we used results in 1/100 s, which the examinees achieved in modified giant slalom race. Time is measured by TAG Heuer wireless race timing system equipped with start gate, photocell and chronoprinter timer with timing calculation (speed) to the 1/100.000 of a second (Heuer, 2016).

Data analysis

Data obtained in this study were analyzed using a software system for data. We used standard statistical procedures to determine the basic descriptive parameters of variables. Descriptive statistics (M–arithmetic mean, SD–standard deviation, Min–minimum value and Max–maximum value) were calculated for each variable. Hypothesis that a variable is normally distributed were checked for normality using KS–Kolmogorov Smirnov test. In order to determine whether there are differ-

ences between the groups, based on the time of skiing, we used Independent Samples t-test.

Results

Reviewing the results of the descriptive statistics (Table 1) it is noted that the height of center of gravity (CoGH) varies from 0.70-0.90 m, duration of the turn (TT) varies from 2.32-3.60 s, duration of the course run (T) varies from 27.26-39.90 s, inclination of the body (IB) varies from 31.90° - 46.16° and hip angulation (HA) varies from 171.79° - 178.74° . According to the KS test results (below 1.00), we can see that there are no statistically significant differences (p) between the obtained distribution of results from a normal distribution of results.

Table 1. Descriptive Parameters

	N	Min	Max	M	SD	KS	p
CoGH	23	0.70	0.90	0.7648	0.05712	0.164	0.113
TT	23	2.32	3.60	2.9252	0.26082	0.133	0.200
T	23	27.26	39.90	32.9370	3.95526	0.115	0.200
IB	23	31.90	46.16	39.0739	4.54978	0.138	0.200
HA	23	171.79	178.74	174.6526	2.04456	0.103	0.200

Legend: N-number of examinees; M–arithmetic mean; SD–standard deviation; Min–minimum value; Max–maximum value; KS–Kolmogorov-Smirnov test; p–level of statistical significance for KS-test

According to duration of the course run (T) that we got for each skier (Table 1), based on the value of the M (32.9370), examinees were divided into two categories in order to determine whether there is the differences in body segment parameters

during GS turn. This variable we named GROUP and the first category (1) consists of faster examinees (score lower than 32.9370) while the second category (2) consists of slower examinees (score higher than 32.9370).

Table 2. The Results of Independent Samples t-test

	GROUP	N	M	SD	Std. Error M	p
CoGH	1	12	0.7633	0.06597	0.01904	0.902
	2	11	0.7664	0.04884	0.01473	
TT	1	12	2.7458	0.15383	0.04441	0.000**
	2	11	3.1209	0.20710	0.06244	
T	1	12	29.7108	1.66994	0.48207	0.000**
	2	11	36.4564	2.28804	0.68987	
IB	1	12	41.0075	4.66709	1.34727	0.030*
	2	11	36.9645	3.49291	1.05315	
HA	1	12	174.1258	1.79710	0.51878	0.204
	2	11	175.2273	2.22435	0.67067	

Legend: GROUP 1 faster examinees; GROUP 2 slower examinees; N-number of examinees for each group; M–arithmetic mean; SD–standard deviation; Std. Error M–standard error of mean; p–level of statistical significance **p<0.01; * p<0.05

If we look at the results of the mean (M) in t-test (Table 2) in used variables, we see that the differences are in favor of first group (1), of faster examinees. Results of the Independent Samples t-test (Table 2) have shown that the examinees differ on a statistically significant level in variables TT p= 0.000, T p= .000 and IB p= 0.030.

Discussion

Comparing the results of this research with the research Z. Hraski and M. Hraski (2009) which was carried out on the Croatian National Children Team, entering category for FIS races, we can see that M for duration of the turn (TT) was 1.7296 s which is faster compared to examinees in this study, where M for inclination of the body (IB) was 47.8014° which is the greater angle compared to examinees in this study and where M for hip angulation (HA) was 158.1739° which is the smaller angle compared to examinees in this study.

Gurshman (2005) says that the IB in simple terms is a movement of the entire body forward and inward in the direction of the center of the future turn. He also says that while inclining, racer keeps his hips and shoulders level and hips stay almost square to the skis in the beginning of the turn and progressively "open up" into the fall line helping to maintain an edge grip and a racer who can carve turns most cleanly while holding the tightest line throughout the course will have the most overall speed. On the other hand angulation is the result of lateral movements of the parts of the body relative to one another and is achieved by abduction/adduction movements of the femurs and lateral flexion (NZSIA, 2013). If hip angulation is done properly, body mass above the pelvis moves laterally, towards the outside of the turn, shifting more weight to the outside ski (Schnellmann, 2015). Angulation serves for maintain-

ing an edge grip when forces build up in a second part of a turn and allows the skier to adjust the edge angle without necessarily affecting the degree of inclination, as Gurshman (2005) says in reality just compliments inclination.

Based on the above it can be said that the examinees who had a faster overall time in this study, based on the ski specific motor knowledge, achieve better time of turns and larger angles of IB necessary for execution of turns and maintaining balance, that is according to mentioned explanation of IB essential for a better result in the ski competition. Also since the HA does not have statistical significance, and it is said that in reality just compliments inclination, it can be said that the speed of skiing is conditioned by higher angles of IB and consequently better maintaining edge grip throughout the course, while probably HA depends directly on the IB with a goal to shifting more weight to the outside ski, in the second part of the turn, which is necessary to maintain balance through the course. The analysis of the results in this research has shown that there is a relation between the measured body segment parameters and duration of the course run, or that the technique of skiing has a direct impact on the competition in alpine skiing. This is also a good indicator of the technical efficiency of subjects during the performance of turns, which may in the future be the parameters for determining the effectiveness of a technique of skiing, but the question is whether examiners and how accurately can notice the details of characters, without the use of certain technologies.

This study has certain shortcomings, which are reflected in the small number of kinematic parameters. So it is necessary to include other parameters that are considered to have an impact on the technique of skiing and consequently on the result in competition in order to bring even more complete and better conclusions and thus facilitate the adoption of ski knowledge and results in ski competitions.

REFERENCES

- FIS, (2011). International Ski Federation, Competition Rules ICR 2011, Retrieved July 16, 2012, from http://www.fis-ski.com/data/document/icr-2011july_web.pdf
- Franjko, I., Maleš, B., & Kecerin, I. (2006). The level of the specific motor skills directly determine the giant slalom performance in skiing demonstrators (In Croatian). *Proceedings of the 1st International Conference "Contemporary Kinesiology"* (98–101), Kupres, Croatia.
- Gurshman, G. (2005). *Inclination As Integral Part of Modern Giant Slalom Technique*. Retrieved May 15, 2015, from <http://www.youcanski.com/en/coaching/inclination.htm>
- Hraski, Z., & Hraski, M. (2009). *Influences of the skiers body geometry on the duration of the giant slalom turn*. Science and skiing IV, Meyer and Meyer Sport(UK) Ltd.
- Huremović, T., Biberović, A., & Pojskić, H. (2009). Predictive value of kinematic parameters on the results of the long jump with students. *Sport scientific and practical aspects*; 6(2), 19-24.
- Joerg, S., Ruediger, J., & Peter, S., (2007). *Motion Analysis using Contemplas—for applications in ski school*. Retrieved February 15, 2014, from http://www.contemplas.com/div/icss_2007_poster_ski_school_carving.pdf
- Mejovšek, M., Hraski, Z., Medved, V. (1997). Biomehanička dijagnostika. *Zbornik radova 6. Zagrebački sajam sporta - "Dijagnostika treniranosti sportaša"*, (63-67), Zagreb, Croatia.
- Mujanović, E., Atiković, A., Nožinović Mujanović, A., & Nurković, N. (2014). Predicting students performance in giant slalom. *Centr Eur J Sport Sci Med.*; 7(3), 45–54.
- NZSIA (n.d.). (2013). *Skiing – a sport of movement*. New Zealand Snowsports Instructors Alliance, Retrieved March 15, 2015, from <http://www.nzsia.org/downloads/nzsia-section-2.pdf>
- Schnellmann, R. (2015). *Glossary Angulation*. Retrieved June 15, 2014, from <http://www.yourskicoach.com/glossary/SkiGlossary/Angulation.html>
- Heuer, T. (2016). Global solution for skiing. Retrieved June 15, 2016, from http://www.tagheuer-timing.com/resources/Sport/5/Manuel/en-US/Skiing_0516.pdf

E. Mujanovic

University of Tuzla, Faculty of Physical Education and Sport, 2. Oktobra br.1, 75000 Tuzla, Bosnia and Herzegovina
e-mail: edin.mujanovic@untz.ba

The Strength of Kicking the Ball after Preparation Period with U15 Football Players

Jovan Gardasevic, Dusko Bjelica and Ivan Vasiljevic

University of Montenegro, Faculty for Sport and Physical Education, Niksic, Montenegro

ABSTRACT

The main aim of the research was to identify a level of quantitative changes of the strength of kicking the ball with fifteen years old football players under the influence of the programmed football training of a six weeks' preparation period. The training programme covered forty-four training units. The research was made on a sample of 120 cadet level football players. To estimate the strength of kicking the ball three tests have been used: the strength of kicking the ball with foot, ball on the ground, the strength of kicking the ball with foot, ball in the air, the strength of kicking the ball with head. In the area of comparative statistics, we used discriminant parametric procedure t-test for big paired samples. It can be concluded that there are statistically significant differences in all three variables to estimate the strength of kicking the ball. This confirmed the hypothesis that the expected significant positive quantitative changes of situational-motor abilities influenced by the proposed model of training in preparation period with fifteen years old football players. The authors were guided by the fact that this kind of training program in preparation period is very effective in terms of raising the strength of kicking the ball level with fifteen years old. The obtained results can be directed towards innovation plans and programs in the preparation period, and the adaptation of the same needs of the respective population.

Key words: football, effects preparation period, strength of kicking the ball

Introduction

Football is a sport that is characterized by numerous and varied complex dynamic kinesiology activities that are characterized by a large number of cyclic and acyclic movements (Gardasevic & Bjelica, 2013). It is evident that all four moments of play, possession of the ball, the opponent's possession of it, the transformation after winning the ball and the transformation after losing the ball depends on the ability of players to perform certain movements of varying intensity, in different directions and the different sections of the field (Gardasevic & Bjelica, 2014). They must have developed basic and specific motor abilities (Gardasevic, Bjelica & Popović, 2015). One of the situational motor skills, which should be at a high level, is a strength of kicking the ball.

Most of the elements in football game, especially those with the ball, are very complex. For their improvement and impeccable application in the game, it is necessary first to have the whole motor preparations. The physical strength has a great importance in football (Gardasevic & Goranovic, 2011). A specific strength with football player is reflected by the strength reflection while jumping, the pushing strength with sprint, strength of stopping and pushing while changing the moving direction, strength of kicking by foot and with a head, strength of throwing the ball with a hand, stability on the ground and in the air, in duels (Gardasevic, 2010). One of the factors that affect the strength is the football players is their age. In child's development, the strength increases with increasing a muscle size. Psychomotor strength, primarily static and repetitive, according to some authors is 50% innate, and systematic training can have a significant effect on it (Gardasevic, Bjelica, Milasinovic, & Vasiljevic, 2016).

The main objective of this study was to determine the level of quantitative changes of strength of kicking the ball in football cadet level, under the influence of a programmed football training which included one preparatory period of forty-two days.

Methods

This was a longitudinal study with an aim that in the two time-varying points determine quantitative changes of strength of kicking the ball in football cadet level (15 year±6 months) under the influence of programmed training process, which included a summer preparation period for the competition season in a unique cadet league of Montenegro and the cadet league middle region of Montenegro. The training program lasted 42 days and was carried out on the auxiliary football field of FC Sutjeska Niksic. The training program included 44 training units, within which 8 friendly matches were played.

For data processing only the results of those respondents who have undergone a complete program of work and who have joined the initial and final measurement are taken. This study included a sample of 120 young cadet football players of 4 teams, all from Niksic. Before programmed work all respondents had passed medical check-ups to make sure they could access the training process. When selecting the instruments (tests) it was taken into account that they meet the basic metric characteristics, which means the appropriate age and objective material and spatial conditions. For the assessment of strength of kicking the ball the following tests were used (Gardasevic, 2010; Gardasevic & Bjelica, 2012): 1. The strength of kicking the ball with foot, ball on the ground (SKBG), 2. The strength

of kicking the ball with foot, ball in the air (SKBA), 3. the strength of kicking the ball with head (SKBH).

Considering that these are a cadet age players (15-year-olds $\pm$ 6 months), in a sensitive period of psychophysical development, program is tailored specifically to their age, taking into account the time spent in the previous training process. Time structure of the training ranged from 60 to 120 minutes, depending on the goals and objectives of the training unit and it was divided into 3 phases:

- Introductory-preparatory part (25-30% of the duration of training)
- The main part (60-65% of the duration of the training)
- The final part (up to 10% of the duration of training)

In the introductory-preparatory part of the training the emphasis was on raising the operating temperature in children. As a tools some various elementary games with a ball were used that enabled work on the elementary basics of technique and tactics, also the various polygons with exercises coordination were used. A variety of games and exercises to increase joint mobility and strengthen muscles also applied at this stage.

At the first stage of the main part of the training the intensity is slightly increased compared to the warm-up phase and the training program was implemented through a variety of ball games. With a game method, the respondents were taught and practiced football skills through a large number of repetitions. At the second stage of the main part of the training the players mostly had a free game on two goals that allowed them some creative activities and highlight of individual, imagination, independent thinking and hard work, applying the elements that teach by the method of the game from the first stage of the main part, and thus strengthening the willing quality. At this stage of the training the intensity was the greatest. At the final

part of the training the task was lowering the physiological curve to an optimum level, and low-intensity activities were used: stretching and relaxation exercises, competitive game of penalty kicks, free kicks.

Data obtained from the survey were analyzed using descriptive and comparative statistics. In the area of descriptive statistics for each variable both in the initial and the final state central and dispersion parameters were processed as well as measures of asymmetry and flatness. The hypothesis of normal distribution of results was tested on the basis of Kolmogorov and Smirnov test. In the area of comparative statistics, to determine differences in the variables used to estimate the strength of kicking the ball at the start (initial state) and at the end (final state) of the training program in the preparation period, we used the discriminative parametric procedure Student's t-test for large dependent samples.

Results

In Tables 1 and 2 are shown the basic descriptive statistical parameters of variables for estimations of the strength of kicking the ball in the initial and final measurement, where the values of central and dispersion tendency were calculated: arithmetic mean (Mean), standard deviation (Std. Dev.), standard error of arithmetic mean (Std. Error), the coefficient of variation (CV%), minimum (Minimum) and maximum (Maximum) values, the range of results (Range), the curvature coefficient (Skewness) and elongation (Kurtosis), as well as the values of Kolmogorov and Smirnov test (K-S test).

First the central and dispersion parameter of variables for assessing strength of kicking the ball in the initial state were analysed (Table 1).

Table 1. Central and depression parameter of variables for assessing strength of kicking the ball in the initial state

No.	Variables	Mean	Std. Dev.	Std. Error	CV%	Minimum	Maximum	Range	Skewness	Kurtosis	K-S test
1.	SKBGI	13.66	2.83	0.26	20.72	7	20	13	0.02	-0.42	0.08
2.	SKBAI	11.21	2.32	0.21	20.72	7	16	9	0.03	-0.96	0.02
3.	SKBHI	7.19	1.15	0.11	16.03	5.10	9.40	4.30	0.27	-0.85	0.32

Legend: SKBGI - The strength of kicking the ball with foot, ball on the ground initial state; SKBAI - The strength of kicking the ball with foot, ball in the air initial state; SKBHI - The strength of kicking the ball with head initial state

By analysing central and dispersion parameter of variables for assessing strength of kicking the ball in the initial state – values of Kolmogorov and Smirnov test shows that the results are normally distributed. The coefficient of variation and range have a little higher value, but still the results belong to homogenous sets. Slightly positive values of skewness in two variables, the strength of kicking the ball with foot, ball on the ground (SKBG) and the strength of kicking the ball with foot,

ball in the air (SKBA), are showing that the results have minimum lean to the side of the weak, it is almost perfect symmetry. The values of kurtosis indicate a slight curvature of the curve distribution of results and a slight scattering of results.

Central and dispersion parameters of variables for estimation of the strength of kicking the ball in the final measurement showed the following values (Table 2)

Table 2. Central and dispersive parameters of variables for estimation of the strength of kicking the ball in the final state

No.	Variables	Mean	Std. Dev.	Std. Error	CV%	Minimum	Maximum	Range	Skewness	Kurtosis	K-S test
1.	SKBGF	18.62	2.80	0.26	15.02	14	25	11	0.19	-0.83	0.07
2.	SKBAF	15.96	2.44	0.22	15.31	11	21	10	-0.14	-0.84	0.02
3.	SKBHF	8.02	1.12	0.10	13.96	6.10	10.10	4	0.31	-0.97	0.14

Legend: SKBGF - The strength of kicking the ball with foot, ball on the ground final state; SKBAF - The strength of kicking the ball with foot, ball in the air final state; SKBHF - The strength of kicking the ball with head final state

By analyzing the central and dispersive parameters of variables for estimation of the strength of kicking the ball in the final state – it is visible that the results are improved comparing to the initial state, that are quite homogeneous with respect to

the initial state even though the range of scores in the variables is still a quite large. Skewness and kurtosis values are in the range of -1 to +1, which means that there is no statistically significant tilt angle and elongation compared to the normal

distribution. The values of Kolmogorov and Smirnov test shows that the results are normally distributed in all three variables.

To determine the statistical significance (significance) of differences in arithmetic means (partial quantitative changes) of variables for estimation of the strength of kicking the ball, the t-

test was applied to for large dependent samples. The values of t-test were on the level of significance (Sig.) from 0.01 ($p \leq 0.01$) in all the variables for the evaluation of strength of kicking the ball. The differences of arithmetic means of the initial and the final measurement of variables for evaluating strength of kicking the ball are shown in Table 3.

Table 3. The values of t-test between the arithmetic means of the initial and the final measurement of variables for evaluating strength of kicking the ball

	Variables	Mean	Std.	Std.	Correlation	T-test	Sig.
			Deviation	Error			
Par 1	SKBGI	13.66	2.83	0.26	0.95	-60.23	0.00
	SKBGF	18.62	2.80	0.26			
Par 2	SKBAI	11.21	2.32	0.21	0.93	-58.39	0.00
	SKBAF	15.96	2.44	0.22			
Par 3	SKBHI	7.19	1.15	0.11	0.96	-27.93	0.00
	SKBHF	8.02	1.12	0.10			

Numerical value of t-test shows that also a statistically significant improvement occurred in tests for the evaluation of the strength of kicking the ball with foot, ball on the ground (SKBG) and the strength of kicking the ball with foot, ball in the air (SKBA), and by a numeric value smaller but still statistically significant improvements with respect to these two variables, with the variable the strength of kicking the ball with head (SKBH), as expected, as players of this age still have some latent fear of the hitting the ball with a head, which eventually disappears and only later show a significant improvement in this variable to estimate the strength of kicking the ball. Based on the results gained it can be noted that there are statistically significant differences in all variables for estimation of the strength of kicking the ball, and therefore can be said that there was a statistically significant positive partial effect of the training program in the preparation period, and the t-test values were significant at the reliability level $p < 0.01$ for all variables for estimation of the strength of kicking the ball.

Discussion

The aim of this study was to, based on the training work program of forty-two (42) days, determine the level of transformation of the strength of kicking the ball with cadet football players, under the influence of a scheduled football training that included one preparatory period. This study included a sample of 120 young cadet football players of 4 teams, all from Niksic, competing in a unique Montenegrin cadet league and in the middle region league of Montenegro. On the basis of the obtained parameters it can be concluded that the statistically sig-

nificant partial quantitative effects (changes) in all the variables for estimation of the strength of kicking the ball obtained as a result of the training program applied in the preparation period. The method of work that has been applied in this training program abounds with exercises dominated by powerful explosive movements, so that the positive transformations are not unexpected (Gardasevic, Bjelica, Vasiljevic, 2017). In this age, it comes to an increase in biological growth and development of muscles, increase of muscle cross-section, which can certainly contribute to positive results (Gardasevic, Bjelica & Vasiljevic, 2016).

Based on the results of t-test for large dependent samples, with the variables for estimation of the strength of kicking the ball the statistically significant differences were determined in all pairs of variables between the initial and final states, at the level of statistical significance (significance), $p < 0.01$. It can be concluded that the training program of work in preparation period has led to the positive transformation in all variables that were estimating, by the structure of a hypothetical setting of the models, the strength of kicking the ball. In this research, the authors were guided by the fact that such a training program of work in preparation period is a very efficient way of working in terms of raising the level of strength of kicking the ball with cadet football players. The authors conclude that the summer period of 42 days, at cadet football players, with such training work program, is optimal for lifting the strength of kicking the ball to the level required for the competition. The gained results can be directed towards innovation of plans and programs of work in the preparation period, and adjusting the same to the needs of the population concerned.

REFERENCES

- Bjelica, D. (2003). *Uticaj fudbalskog treninga na biomotorni status kadeta Crne Gore*. Doktorska disertacija. Beograd: Fakultet sporta i fizickog vaspitanja.
- Bjelica, D. (2004). Zavisnost tjelesnih sposobnosti od sportskog treninga kod populacije fudbalskih kadeta Crne Gore. *Sport Mont*, 4/II, 58-71.
- Bjelica, D. (2005). Sportski trening i njegov uticaj na antropomotoricke sposobnosti fudbalera cetnaestogodisnjaka mediteranske regije u Crnoj Gori. *Sport Mont*, 8,9/III, 26-41.
- Gardasevic, J. (2010). *Efekti programiranog rada u pripremnom periodu na transformaciju bazicno-motorickih i situaciono-motorickih sposobnosti kod fudbalera kadetskog uzrasta*. Magistarski rad. Niksic: Fakultet za sport i fizicko vaspitanje.
- Gardašević, J., & Goranović, K. (2011). Efekti programiranog rada u pripremnom periodu na transformaciju eksplozivne snage kod fudbalera kadeta. *Sport Mont*, 28,29,30/IX, 55-62.
- Gardašević, J., & Bjelica, D. (2012). Valjanost situacijsko-motoričkih testova kod fudbalera kadeta u dobi od 15 godina (U15). *Sport Mont*, 34,35,36/X, 488-493.
- Gardasevic, J., & Bjelica, D. (2013). Efekti programiranog trenaznog rada u trajanju od šest nedjelja na transformaciju fleksibilnosti kod fudbalera kadetskog uzrasta. *Sport Mont*, 37,38,39/XI, 212-217.

- Gardasevic, J., & Bjelica, D. (2014). Efekti rada u pripremnom periodu na brzinu vođenja lopte petnaestogodisnjih fudbalera. *Sport Mont*, 40,41,42/XII, 160-166.
- Gardasevic, J., Bjelica, D., & Popovic, S. (2015). Efekti programiranog rada tokom pripremnog perioda na transformaciju agilnosti kod fudbalera kadetskog uzrasta. *Sport Mont*, 43,44,45/XIII, 355-360.
- Gardasevic, J., Bjelica, D., & Vasiljevic, I. (2016). Six-Week Preparation Period and its Effects on Transformation Movement Speed with Football Players Under 16. *Sport Mont*, 14(1), 13-16.
- Gardašević, J., Bjelica, D., Milašinović, R., & Vasiljević, I. (2016). The Effects of the Training in the Preparation Period on the Repetitive Strength Transformation with Cadet Level Football Players. *Sport Mont*, 14(2), 31-33.
- Gardasevic, J., Bjelica, D., Vasiljevic, I. (2017). The strength of kicking the ball after preparation period with U15 football players. *Book of Abstracts of the 14th International Scientific Conference on Transformation Processes in Sport "Sport Performance"* (65-66), Podgorica: Montenegrin Sports Academy.

J. Gardasevic

University of Montenegro, Faculty for Sport and Physical Education, Narodne omladine bb, Niksic, Montenegro
e-mail: jovan@ac.me

Competition Efficiency Analysis of Croatian Junior Wrestlers in European Championship

Kristijan Slacanac, Mario Baic and Nikola Starcevic
University of Zagreb, Faculty of Kinesiology, Zagreb, Croatia

ABSTRACT

Croatian junior wrestler won a bronze medal at the European Championship 2016 year. Considering the potential of our wrestlers there is an obvious need of technical and tactical analysis so our juniors and seniors U23 wrestlers would be able to achieve even better results. Match analysis were conducted by LongoMatch 0.20.1. Seven matches of Croatian wrestlers were analysed. Time parameters, score efficiency, technical efficiency and tactical structure were observed and analysed from the aspect of attack and defence phase and successful/unsuccessful techniques. This paper shows descriptive parameters and competitor efficiency were calculated. The results show a great number of positive score in a standing position in relation to parterre position. The parameters of competitive efficiency (0.49 points per minute) show better attacking efficiency (1.32 points per minute) in relation to defence efficiency (0.83 points per minute). Croatian wrestlers achieve less score per minute in relation with elite wrestlers, but it is visible a significant progress in technical and tactical efficiency in relation in the past three year. According to place realization of technique, Croatian wrestlers realized more technique in the center, while opponents realized technique in the zone and moving to the zone. Further analysis of efficiency and individualisation training will improve efficiency of Croatian national wrestlers.

Key words: productivity, technical-tactical, Greco-Roman, standing position

Introduction

Junior European wrestling championships (JEWK) are maintained every year under the World wrestling federation (United World Wrestling – UWW) organisation. The UWW (2017) define junior age between 18-20 years and seniors U23 age between 19-23 years. On previous European championships, Croatian wrestling national team achieved significant results such as junior European champion Dominik Etlinger (2012), silver medallist (seniors U23 age) Antonio Kamenjasevic (2015) and bronze medallist Ivan Huklek (2016). Following the excellent results, it is evident that medal winning is constant in junior and seniors U23. Junior European Greco-Roman wrestling championship was held in Bucharest (Romania) from 20-22 June 2016. Croatian national wrestling team performed at this championship with three wrestlers, one of them is Ivan Huklek, a bronze medallist in up to 84 kg category. Considering the potential of Croatian national wrestlers (juniors and seniors U23), to improve technical-tactical efficiency at European and World championships and achieve a model technical-tactical values of top wrestlers, there is a need of technical-tactical analysis. Effectiveness is defined as obtaining certain technical points for making a technical-tactical combination (Lopez-Gonzalez, 2013). Modern and attractive wrestling consider a high level of technical-tactical efficiency in standing and parterre. Modern highly-qualified wrestler is characterised by aggressive attack tactics, tendency to technical, physical and psychological superiority over a rival, and the ability to make quick decisions in extreme conditions during the intensive fight (Grigoryan, Lavrichinko & Gomboev, 2011). Determination of technical-tactical parameters is possible with notational analysis. Notational Analysis (also called “Match

Analysis”) uses means to record critical events (movements, situations, interactions, techniques and tactics, even intervention of referees) in which performance can be quantified in a consistent and reliable manner (Lopez-Gonzalez, 2013).

The aim of this paper was to determine technical-tactical efficiency of Croatian national wrestlers at Junior European wrestling championship in 2016. Data analysis will determine score efficiency, technical (attack and defense) efficiency and tactical structure of Croatian national wrestlers.

Methods

Match analysis were conducted by LongoMatch 0.20.1. software package (Copyright ©2007-2010 Andoni Morales Alastruey). Seven matches of Croatian national wrestlers were analyzed. Time parameters, score efficiency, technical efficiency and tactical structure were observed by attack and defense aspect as well as successful and unsuccessful technique. This paper shows descriptive parameters and competitor efficiency was calculated.

Time parameters were obtained by calculating match time of each wrestler. Score efficiency was observed by summing achieved and loss points in all matches which represent wrestlers’ productivity. Some authors (Tünnemann, 2013; Lopez-Gonzalez, 2013) define productivity, quality of wrestlers (WQ) and attacking efficiency as a number of achieved points per minute. Negative quality of wrestlers (neg WQ) or defensive efficiency refers to the number of negative points per minute (Tünnemann, 2013). Total efficiency (WQ index) means the difference between attacking (WQ) and defensive efficiency (neg WQ) (Tünnemann, 2013).

Technical structure is established by recording successful and unsuccessful technique in standing and parterre, while tactical structure is identified according to the place of performing successful technique by Croatian national wrestlers and their opponents.

Results

Croatian national wrestlers achieved four wins and three loss matches with 32:56 minutes in combats.

Table 1. Descriptive parameters of Croatian national GR wrestlers at European Championship 2016.

	win	loss	summ. time	Point structure	posit. points	negat. points	successful/ unsuccessful technique
wrestler 1 (66 kg)	0	1	6:00	standing	0	2	0/2 (0%/100%)
				parterre	0	0	0/1 (0%/100%)
				passivity	1	1	
				out	0	0	
				summary	1	3	
wrestler 2 (74 kg)	1	1	9:35	standing	4	4	1/6 (14%/86%)
				parterre	6	2	3/1 (75%/25%)
				passivity	4	0	
				out	0	1	
				summary	14	7	
wrestler 3 (84 kg)	3	1	17:21	standing	26	10	9/2 (82%/18%)
				parterre	2	5	1/1 (50%/50%)
				passivity	0	1	
				out	0	1	
				summary	28	17	
CROATIA	4	3	32:56	standing	30	16	10/10 (50%/50%)
				parterre	8	7	4/3 (57%/43%)
				passivity	5	2	
				out	0	2	
				summary	43	27	14/13 (52%/48%)

As it is obvious from Table 1, Croatian national wrestlers realized more positive points than negative points (43 positive and 27 negative points). The proportion of all the achieved

points shows significantly more points in standing (81.40%) than parterre (18.60%). Technical efficiency is divided (52% successful and 48% unsuccessful technique).

Table 2. Productivity of Croatian national GR wrestlers at European Championship 2016.

		(tehn.pts/min)			(tehn.pts/bout)		
	productivity	WQ pts/min	neg WQ pts/min	WQ Index pts/min	WQ pts/bout	Neg WQ pts/bout	WQ Index pts/bout
wrestler (66 kg)	1 standing	0.17	-0.5	-0.33	1.00	3.00	-2.00
	parterre	0.00	0.00	0.00	0.00	0.00	0.00
	summary	0.17	-0.50	-0.33	1.00	3.00	-2.00
wrestler (74 kg)	2 standing	0.86	-0.54	0.32	5.00	2.50	2.50
	parterre	0.64	-0.21	0.43	2.00	1.00	1.00
	summary	1.50	-0.75	0.75	7.00	3.50	3.50
wrestler (84 kg)	3 standing	1.51	-0.70	0.81	6.50	3.00	3.50
	parterre	0.12	-0.29	-0.17	0.50	1.25	-0.75
	summary	1.63	-0.99	0.64	7.00	4.25	2.75
CROATIA	standing	1.07	-0.61	0.46	5.00	2.86	2.14
	parterre	0.25	-0.22	-0.03	1.14	1.00	0.14
	summary	1.32	-0.83	0.49	6.14	3.86	2.28

Table 2 presents efficiency (WQ index) parameters which is 0.49 points/min, while attacking efficiency is 1.32 points/min and defensive efficiency 0.83 points/min. Furthermore, Croatian national wrestlers achieve 6.14 points/match while opponents produce 3.86 points/match on them. Individual analysis of wrestlers shows greater efficiency of national wrestler 3 in standing position against national wrestler 2 who has a greater efficiency in parterre.

Figure 1 reveals similar number of successful and unsuc-

cessful technique in attack (10 successful and 10 unsuccessful). Standing attack structure indicates most successful combination, body drop throws and take downs. Successful combination includes take downs (first phase of technique) and backward throwing (execution phase).

Defensive technical structure (Figure 2) indicates that Croatian national wrestlers lose the highest number of points with take downs (3 take downs), counterattacks (2 counterattack) and outs (2 outs), while in parterre that is only 3 gut wrench.

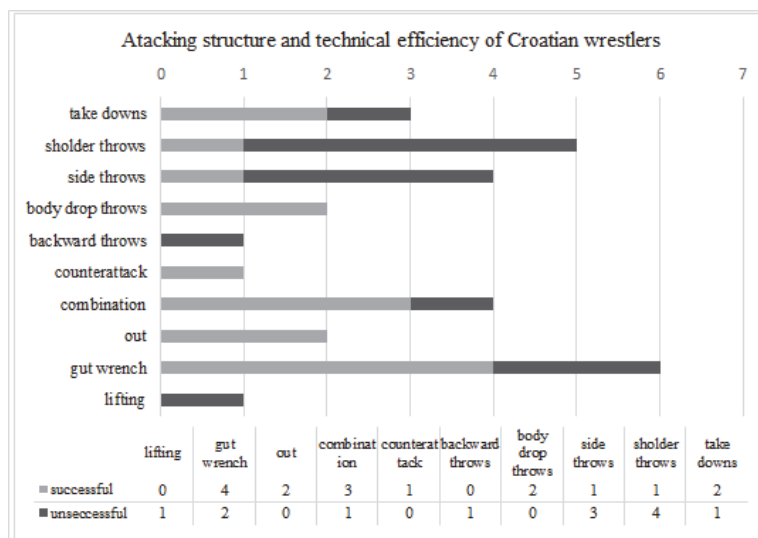


Figure 1. Attacking structure and technical efficiency of Croatian wrestlers at European championship

Figure 3 presents performance of Croatian national wrestlers mostly at the center, while their opponents do that in the

techniques in moving to the zone and an unsuccessful attempt of performing a technique on the zone. Their opponents have a

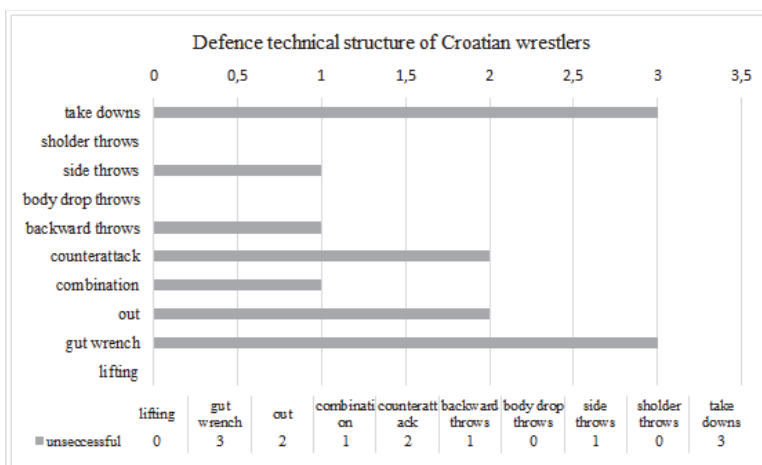


Figure 2. Technical structure of defence of Croatian wrestlers at European championship

zone and moving to the zone. Croatian national wrestlers have similar percentage of successful and unsuccessful technique at the center and a higher number of successfully performed tech-

higher number of successfully performed techniques in the zone and in moving to the zone.

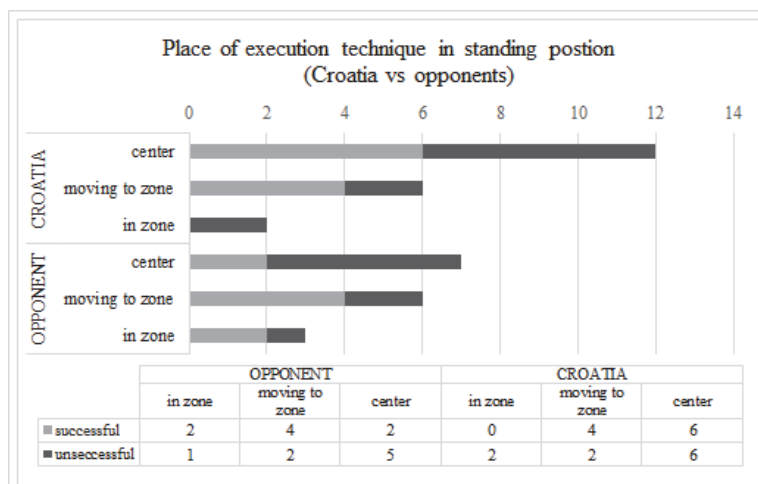


Figure 3. Difference between Croatian wrestlers and their opponents in attack place

Discussion

Results indicate that there is a large number of positive points in standing position and a smaller number of points in parterre. By changing rules these relations vary, so standing - parterre ratio in 2011 (Radchenko, 2012) was 26% standing, 74% parterre. According to 2013 rules, total number of points in parterre was 44.76% and 55.24% in standing (Lopez-Gonzalez, 2013; Tropin, 2013). The results of this study are in compliance with the existing wrestling rules (UWW, 2017). Actual wrestling rules indicate fight without ordered parterre, because of that ratio standing-parterre is greater for standing. It can be said that changing of the rules impacts mostly on match structure and technical-tactical technology preparation as well as condition preparation for important competition.

Points structure in standing position presents points of successful technique, but also judge warnings for insufficient wrestler activity. According to the actual wrestling rules (UWW, 2017), every second referee warning for insufficient activity in standing awards 1 point to the opponent. To increase the attractiveness of GR wrestling, it is necessary to explore ways to make larger strides in the variety of scoring, especially techniques from the standing position (Tünnemann, 2016). Out of all positive points, Croatian national wrestlers achieved 11.62% points by warnings, while opponents realized 8.33% points. That ratio is the result of greater activity in standing for Croatian national wrestlers. However, the activity itself is not enough for achieving victory. Comparing successful and unsuccessful technique, we can say that Croatian national wrestlers have “winning technique” in standing and parterre because their success rate is 75% (category 74 kg – parterre position) and 82 % (category 84 kg – standing position). The world leading wrestlers, as a rule, have several “winning move” techniques, and the “winning move” attack efficiency index is 80-100% (Grigoryan, et al., 2011).

Comparing data (Table 2) with previous research (Tropin, 2013) it is evident that Croatian wrestlers have great effectiveness then winners in final matches at European Championship with 5.6 points, and similar (6.8 pts/match) like wrestlers at World championship (Tünnemann, 2013). Croatian national wrestlers at category 66 kg, 74 kg and 84 kg have similar WQ as well as medal winners at World championship (World champion at 66 kg = 1.86 pts/min; 74 kg = 1.57 pts/min; 84 kg = 1.73 pts/min). NegWQ and WQ of Croatian national wrestlers is significantly lower then World champions at the same category. Croatian national wrestlers defence efficiency is of an individual character. The cause of significantly poorer defence efficiency can be insufficient mental preparation (increased anxiety and insufficient focus) and not knowing the situation for achieving advanced grips before the opponent. By prompt recognition and using of outside grip, it is possible to prevent opponents in tactical action and performing their winning techniques.

WQ ratio of the first 12 team is 0.47/1.18 pts/min, neg WQ is -0.82/-0.31 pts/min and WQ index ratio is 0.87/-0.26 pts/min (Tünnemann, 2013). Comparing these results and our results, we can say that Croatian national wrestling team have an average wrestling WQ index, poorer neg WQ, and also greater WQ then World wrestlers. The cause for that can be the change of scoring method (UWW, 2014) and better efficiency of Croatian national wrestlers at European and World championships comparing with previous research (Slacanac, Baic, Starcevic, Sun-

jerga & Penjak., 2016). Poorer defence efficiency can be the result of insufficient adaptation on fighting in standing position and inadequate moving toward to the zone in attacking phase.

Technical structure/attack efficiency of World champions at category 66, 74 and 84 kg (Tünnemann, 2013) indicates that the most common technique are take downs, throws and gut wrench. Technical structure of Croatian national wrestlers refers to combination (take down – backward throwing), take downs and side (head) throwing. Considering the differences compared to the World champions, we can say that Croatian national wrestlers have their “winning technique”. The “winning move” attack technique is the basis of individual style of the fight (Grigoryan et al., 2011). Methodology of the “winning move” technique formation in the individual mastership of beginners and experienced wrestlers is considered to be relevant (Grogoryan et al., 2011). Individual approach of specialization of “winning techniques”, by applying various tactical preparation and combining techniques can promote attacking efficiency of Croatian national wrestlers. Recent analyses, developed after 2013 rules modification, showed that the decisive offensive actions were applied in parterre situations – especially gut wrenches techniques and derivatives of suplex movements (Miarka, 2016). Technical structure of Croatian national wrestlers in parterre is in compliance with previous study (Miarka, 2016; Tünnemann, 2013; Lopez-Gonzalez, 2013).

No matter the level of technical preparedness, in order for effective technique to be at a wrestler’s disposal, its execution is impossible without appropriate tactic preparedness (Tropin, 2013). Tactical structure of Croatian wrestlers in standing position at European championship shows smaller number of successful technique in zone and moving to zone and greater number successful technique at the center. Comparing these results with their opponents’, it can be seen that opponents realized greater number of successfully performed technique in zone and moving to the zone. According to these differences it is necessary to pay more attention to coordination of arms and legs moving forward, achieving advanced grips and fighting on the zone with emphasis on specialization of technical-tactical elements.

In accordance with the aim of this paper, it was necessary to determine competitor efficiency (score, defence and attack efficiency) of Croatian national wrestlers at Junior European wrestling championship in 2016. It is found that Croatian national wrestlers generate more points in standing position then parterre. Higher number points was achieved by combining techniques (take downs – backward throws), take downs and side (head) throws, while gut wrench is the most common technique in parterre. Comparing obtaining results with the values of juniors at World wrestling championship (Tünnemann, 2013), it is visible that Croatian national wrestlers generate less points per minute (WQ index) and have poorer defence efficiency (negWQ), but it is visible a significant progress in technical-tactical efficiency in relation with previous research (Slacanac et al., 2016). The difference in technique execution place was visible. Croatian national wrestlers successfully performed more techniques in the center, while their opponents successfully performed techniques in the zone and moving to the zone. According to the results, it is necessary to have individualised training with emphasis on improving defence efficiency, aggressive fighting and increasing rhythm and tempo fighting in the zone and moving to the zone.

REFERENCES

- Grigoryan, A.R., Lavrichinko, K.S., & Gomboev, B.B. (2011). The winning move technique and it's formation in Greco-Roman wrestling. *Journal of Siberian Federal University. Humanities & Social Sciences*, 9(2011 4), 1260–1268.
- Lopez-Gonzalez, E.D. (2013). Wrestler's performance analysis through notational techniques. *International journal of wrestling science*, 2(3), 68-89.
- López - González, D. (2014). Technical - tactical performance in Greco - roman wrestling: analysis of 2013 Senior World Championships through mutivariate analysis. *International Journal of Wrestling Science*, 4(1), 95 - 110.
- Miarka, B. (2016). Demandas técnicotáticas e fisiológicas de combates da luta olímpica. *Revista de Artes Marciales Asiáticas*, 11(1), 18-31. DOI: 10.18002/rama.v11i1.3309
- Radchenko, Y.A. (2012). Analysis of competitive activities of Ukrainian champions with the strongest fighters of World (based on World championship in Greco-Roman wrestling 2011). *Pedagogics, Psychology, Medical-biological problems of Physical Training and Sport*, 5, 108-111.
- Slacanac, K., Baić, M., Karnincic, H., Sunjerga, R., & Penjak, A. (2016). *Effects of technical efficiency parameters on placing of Croatian wrestling national team members in World championships 2013*. Abstract presented at International scientific conference "Effects of physical activity application to anthropological status with children, youth and adults". Retrieved February 02, 2017, http://www.fsfvconference.rs/documents/book_of_abstracts_2016_12_12.pdf
- Tünnemann, H. (2016). Score analysis of the 2015 World wrestling championships. *International Journal of Wrestling Science*, 1(6), 39-52. doi: 10.1080/21615667.2016.1197028
- Tünnemann, H. (2013). *Analysis of the World championships 2013 in Greco-Roman Wrestling*. Almada: Fédération Internationale des Luttes Associées.
- Tropin, Y.M. (2013). Analysis of technical tactical training of highly skilled fighters of Greco-Roman wrestling. *Physical education of students*, 2, 59-62. doi: 10.6084/m9.figshare.156382
- United World Wrestling – UWW (2017). *International wrestling rules*. Retrieved February 02, 2017, from https://unitedworldwrestling.org/sites/default/files/media/document/wrestling_rules_ver_january_2017.pdf
- United World Wrestling – UWW (2014). *International wrestling rules*. Retrieved February 02, 2017, from https://unitedworldwrestling.org/sites/default/files/1-wrestling_rules_july_2014_eng.pdf

K. Slacanac

University of Zagreb, Faculty of Kinesiology, Horvaćanski zavoj 15, 10000 Zagreb, Croatia
e-mail: kristijan.slacanac@gmail.com

Application of Emotional Branding Strategy in the Model Development of Sports Brand of The Bottled Water Market

Marija Jankovic

University of Mediterranean, Faculty of Business Studies, Podgorica, Montenegro

ABSTRACT

The new economy has brought new meaning to the brand, which is characterized by a brand, but also has a human touch, turning into an emotional brand. Alternative branding strategies put emphasis on brand experience in terms of emotional, holistic and socially responsible. Bottled water has become the world's "liquid gold" in the last 40 years, because it is a natural product, which is made with minimal costs. The paper develops the idea to perform a kind of humanization and the introduction of a new emotional brand of bottled water on the market, which will bear the name "Aqua F.I.F.A" designed label of FIFA international organizations, as well as the roof of the organizers of the most important football events in the world and the label of the national team. This paper will analyze in detail the market opportunities and prospects of introducing a unique sports brand, on the emotional aspect, with the use of effective marketing communication strategy.

Key words: brand, strategy, sports brand, communication

Introduction

Brands provide complete sensory and emotional experience, and their strength is also reflected in the fact that consumers are sometimes so familiar with the brand that they are able to identify with it; sometimes they become 'obsessed' with their favourite brand, as well as the brand provides a feeling of more value. For this reason, the emotional branding, as a new approach, shifted the focus from the unique features of the product to a deeper understanding of the consumer. Today it is expected that brands have a proactive role, communicating with consumers from many different aspects (Gobe, 2006). Consumers' emotional attachments to a brand might predict their commitment to the brand (e.g., brand loyalty) and their willingness to make financial sacrifices in order to obtain it (Thomson, 2005). Sport marketing consists of all activities designed to meet the needs and wants of sport consumers through exchange processes (Mullin, Hardy, & Sutton, 2014). Some authors (Kahle & Riley, 2004) consider that sports marketing comprises three different sphere of activity as follows:

- Marketing watching sports as a leisure industry (constant aspiration for forming a wide audience, the sports and by increasing the level of interest in sports people);
- Marketing in sports aims to increase citizens' participation in sports activities (motivation of people to participate in sports, recreation, sports or volunteer engaged in different ways);
- Marketing seeks to connect with the sport, promote and selling products that have nothing to do with sports.

Essentially, the idea is to make a kind of "humanization" and to introduce a new emotional brand in the market of water, which will be called "Aqua F.I.F.A", designed by FIFA label, an international organization that is the roof of the organizers of the most important football events in the world and the label of

the national teams. The bottled water market in the last five years has increased by about 35% at the global level, dictated by young consumers, who are becoming increasingly aware of the importance of proper nutrition in maintaining health; however, water with additives, they say, is not healthy to the extent that it is advertised for it is low in vitamins. The European Commission in the document "The EU & Sports Matching Expectations" notes that about 60% of the citizens of the European Union deal with some type of sport or recreation. The approximately 700.000 sports clubs of Europe engage around 70 million athletes and around 10 million volunteers. On the economic front, the European Commission estimated that in Europe sport generates a turnover of about 400 billion euro or 3.7% of EU GDP and employs 4.5% of the workforce.

The primary strategic objective that we set refers to the creation of a new and unique brand before the start of the biggest events of the World Cup - "World Cup 2018- Russia", which will have a vision to be a leader in the field of non-carbonated bottled water on the sport and the broader market.

Methods

The mission of the brand would be the production of high quality water with the brand name "Aqua F.I.F.A.", which will be, with quality and design, able to enter the hearts of consumers, to achieve trust and loyalty. Collection of relevant data was performed from written sources and personal testing. We used the methods of collecting and analyzing primary and secondary data, available in electronic and printed sources. Pest analysis was performed on competitive environment, with the aim of testing the significance of introducing new sports brand on the market, before a major sporting event starts. Marketing mix and communications plan are proposed as well.

Results

The competitive advantage of our products is reflected in the fact that there is no brand in the bottled water that bears the symbols of the national team and is directly related to football. The new water plant, which will cost about 30 million euro, with operating costs 0.34 euro per cubic meter, is a profitable investment. We have to set time goals: short-term (up to one year) - take the leading position in the production and sale of water; medium-term objectives (an interval of one to five years) - a strong penetration in the world market; - Long-term goals (a period longer than five years) - leadership in the penetration of the global market. It should be noted that the non-carbonated bottled water is, because of the nature of the product and the most reasonable prices, one of the few categories of products that are almost entirely consistent in ranking of the most used and favorite brands.

The attractiveness of the introduction of the product before the World Cup is high, considering that it is a highly profitable and glamorous event, appealing to sponsors and advertisers, and as such attracts audience of millions. By Pest analysis, we analyzed the geographic, demographic and behavioral factors and come to the following conclusions:

Geographical factors:

Direct geographical area of sales: Europe, Asia; The total population is: Europe (740 million) and Asia (4.000.000.000); Demographic factors: Consumption of non-carbonated water in the last 50 years has tripled; The main customers are the fans, athletes, supporters as the primary group, then: women (about 51% of women in the total population), men who lead a healthy life; This attitude is changing over time (current ratio of men compared to women in the world is 100:101.8); Target customers are fans, as the primary group and the general population, as secondary as well; Priority target in the secondary group are married women with a high level of education, with children. The most frequent populations of women who consumed water is from 20 to 70 years; Number of stadiums in Europe 58, the capacity of: 3.541.870; Number of teams at the World Cup: 208+1; The number of teams in the finals: 40; Number of stadiums at the World Cup - "World Cup 2018 - Russia": 3 ready, 12 under construction. Capacity place: 666.269; World Cup 2018 matches will be played in Russia on 12 stadiums, of which two are located in Moscow, at a stadium in St. Petersburg, Samara, Saransk, Rostov-on-Don, Sochi, Kazan, Kaliningrad, Volgograd, Nizhny Novgorod and Yekaterinburg; 64 matches will be held and the finals will be at Luzhniki Stadium; Research shows that one third of Russians plan to watch live WC 2018 matches, 50% of them think the championship is an unique event in the history of the country, and 79% have already noticed positive changes in Russia, related to the championship; Final World Cup 2014 in Brazil was watched by over a billion people worldwide, which is about the size of this event; The organizers have created 600.000 accreditation for fans (primary target group); The expected number of tourists: 2.000.000; Special level benefits by the organizers are the provision of fans: bought ticket for the match will have a visa function for fans that come from countries that have a visa regime with Russia; Convenience for sale; Organized free transport for fans to the stadium; Fun-Zone for fans who will not be able to watch matches in stadiums. Such places will appear in many cities of the country, from the western borders of Russia to Siberia and the Far East.

Behavior factors:

The average salary in the world is \$ 1.480. The highest

minimum wage in Europe is 1.923 euro in Luxembourg and the lowest in Bulgaria 184 euro; The average cost of packaging water is € 0.35 (0.33 l PET); Revenue growth of manufacturer of water from year to year (the world's largest manufacturers of water are: Veolia Environment (France), with revenues of \$ 49.519 million, followed by Suez Environment (France), with revenues of \$ 17.623 million, followed by ITT Corporation (USA) with revenues of \$ 10.900 million, etc.; The cost of living of the population increases significantly.

Product designs (Kotler, 2006), represents an element of differentiation in relation to competing products, and thus becomes a source for gaining and maintaining a competitive advantage in the market. Sports products can be tangible and intangible (material or immaterial, consistent or lacking substance). In practice wrongly equate a sports product and services (or between them do not make differences relating to: understanding of the element to be, the core, and the core functional usefulness sports products, term expectations of the audience in the form of sports results) with a single sports event; talk about image sports brand (Dugalić, 2008).

The bottle design is modern, with a series of different patterns, suitable for holding in the hand, transparent packaging and stable bottom, which is characterized by the so-called brands "Quiet waters". In the colors of the national team over the green background, which resembles a grassy bottom and football sports brand, the brand Aqua F.I.F.A. tends that the national character enters the hearts of consumers. The green color of the brand gives tranquility, reminiscent of the grassy surface and much differentiated element in the competition (Figure 1).



Figure 1. Proposed look of bottle water PET 0.33l

The visible elements of the brand "Aqua F.I.F.A. " includes:

- 1) Name - Aqua F.I.F.A. (Water points to forceful name F.I.F.A.);
- 2) Slogan (during the campaign for the World Cup the slogan "To score more" is suggested);
- 3) Logo stylizes force, security, competence, through the gray and blue and integrity through white;

The invisible elements include:

- 1) value that promotes the brand: healthy living, sports, quality;
- 2) Basically, a brand should be in the minds of consumers when buying products emphasizing that consumers are making healthy and good choice.

Discussion

We investigated which features our new brand would have and we defined its portfolio, designed for specific target groups. The organization of the world's biggest event in football, "the World Cup 2018 - Russia" will allow popularizing the brand Aqua F.I.F.A. as excellent circuit of water, healthy living and sport, oriented to a broad market segment. (Categories of people: from the youngest to the oldest age). Product portfolio that meets the needs of consumers of different affinities would include the following products:

- 1) Aqua F.I.F.A. -For General consumption 0.3 l PET, 0.5 l, PET 1.5 l, Water cooler program 19 l;
- 2) Aqua F.I.F.A. - For HoReCa system: Glass 0.25 l, 0.75 l Glass,
- 3) Aqua F.I.F.A Life - For the older population, 0.3 PET 0.5 l PET 1.5 l,
- 4) Aqua F.I.F.A Kids - For children and youth 0.3 PET 0.5 l, 1.5 l PET.

Marketing orientation of our brand would refer to the categories and subcategories of products (water - categories, with subcategories - water for children, water for athletes, and water for the older population). Proper targeting of target groups and sub-groups should comprise strategic planning and co-ordination and implementation of quarterly and monthly plans, with the introduction of differentiation in product mix in terms of categories and subcategories of the product water. Part of the investment should be focused on non-sporting brands under the name "Aqua F.I.F.A" (T-shirts, caps, hats, transparent scarves, umbrellas, lighters, flags, etc.).

Our primary target groups are: fans, supporters, sports clubs, and secondary: women, men, children, athletes, the elderly, hotel and catering chains, retail, wholesale. Much of the investment is necessary to direct to large customers, retail and HoReCa sector. Target groups, with a new product (e.g. Aqua FIFA Kids, without and with different flavors), may be the children from primary and secondary schools. Target groups of the product Aqua Detox FIFA, may also athletes, while Aqua FIFA Life could be offered to elder individuals that take care of health. In terms of hyper competition, it is necessary to introduce differentiation of marketing activities on and off on the premises with a focus on emotional branding its own brand.

Product Aqua F.I.F.A, in terms of quality, would be low-mineralized water, which is characterized by the following features: temperature at the source, the microbiological quality, low mineralization, low in sodium, potassium, magnesium, nitrate, chloride and sulphate, with about 30 mg/l of calcium and 100 mg/l bicarbonate. In addition to fulfilling the conditions required by the Directive 777 of the EU, the product would have a low mineral content, in which the concentration of certain ions would be below the value determined by the Directive and, to Aqua F.I.F.A. water, would be virtually impossible to fit into a group, which is dominated by one or more ions, or the presence of heavy metals and organic matter of artificial origin (pesticides, oils, phenols, etc.) could not be proved. We should also emphasize that cardiologists very openly recommend the use of water as Aqua F.I.F.A., due to its extremely low sodium content. Aqua F.I.F.A. would be low - mineral water, to the extent that it practically can not be classified in any group of water, which is dominated by one or more ions - and as such is a rare and there is no serious competitor in global terms.

Of particular importance is a very low content of iron and manganese (<0.01 mg/l). It should be emphasized the fact that the low-mineral water with nitrate content below 3 mg/l is very

rare in the world. Aqua F.I.F.A. would contain nitrates in concentrations lower than even 0.65 mg/l. With very low sodium content Aqua F.I.F.A. is eminently suitable for everyday use. When it comes to pricing, the Aqua F.I.F.A. it is recommended using a combination of three methods (integrated approach), including: pricing based on costs, competition and market-based. (The cost price per liter of carbonated water ranges from 0.28 to 0.33 €.) The quality and chemical composition has been one of the main competitive advantages of Aqua F.I.F.A. water and the advantage of being very beginning to be exploited. Therefore, the general recommendation is that in all modes of communication should emphasize content and quality of water Aqua F.I.F.A.

As G.E. Belch and M.A Belch (2004) asserted that several organizations are more towards sponsoring events so focusing mass target market consists of national and international markets. Leading FIFA sponsors are: Coca-Cola, McDonald's, Visa card, beer Budweiser. World football federation said that it has made an agreement with the Qatar television Al Jazeera to sell the rights for television broadcasts of matches World Championships in 2018 and 2022. It is necessary to start from an integrated approach to communications, in order to transmit a clear, coherent and consistent message. Also, one of the main recommendations is that, particularly, it must be directed to the final customer - pull strategy, and those that apply to communications with intermediaries (wholesale, retail, distributors,) - push strategies. In communication with customers, Name of TV Campaigns' Let's be healthy in a healthy environment ", which will announce the brand under the slogan" Toward the World Cup ".

Public relations represent a long-term effort of organizations focused on creating and maintaining good relationships and mutual understanding and communication with all important stakeholders, which significantly contributes to its acceptance in the environment (Verčič, Zavrl, Rijavec, Tkalc & Laco, 2004). The objectives of the promotional campaign would be: - through the mass media to provide true and timely information on the new product; - to implement educational and information campaigns in order to provide full and timely information to various target groups of healthy and create a unique brand (especially for fans and tourists, then for secondary target groups); - -mobile and Internet marketing (scratch and bet "live"); - to establish a body for monitoring and coordinating communication activities; -to strengthen dialogue with all segments of the target group (advertisements, magazines about healthy lifestyle, merchandising, contests for children, etc.); - deployment of advertising in stadiums, halls, ethnically representations, video screens, subway, outdoor advertising, outdoor, web site, social network - advertising of audio and visual ways of advertising messages in stadiums - "Minutes for Aqua FIFA" - players at half-time with reference to the video wall drinking water Aqua FIFA; symbols brand on their jerseys and equipment players, as well as the medical stretcher; -sales rights to use the names, character, characters and other symbols of sponsorship rights of representation in order to achieve advertising effects; -leader brand sports water should be represented on the Internet pages: Facebook, Twitter, Google, Delicious, Strumble, My Space, etc.. (agreement on the release of banners on social networks); - messages must to be highlighted in all places, auxiliary facilities, stadiums, grandstands, tickets, equipment, team, office; etc.

Marketing communication able to efficiently support the company in drawing out the favorable consumers feedback (Duncan & Moriarty, 1998). The IMC strategically started appreciable when organizations considered IMC as a set of

implementations which involve planning, developing, effective execution, and evaluation of measurable, coordinated, effective brand communications programs interacting over time with stakeholders.

Research persuasive power of the media would not be complete, unless you knew the characteristics of the media audience, its beliefs, attitudes, interests and lifestyles (Kvejl, 1994). Advertising would be passed on to all known international broadcasters which have purchased the right to broadcast the World Cup in Russia in 2018. Also, in the period before playing the final match in sales would be even bottles which are numbered 2022 under the cap, and it would mean that the per-

son who finds it receives free tickets for the finals of the World Cup 2022 in Qatar. With the arrival of new products on the market, for example, Aqua Kids, Aqua Detox, then 0.75 packing glass, with better promotion and a competitive price would require new commercials, music videos, which would require the provision of a product on an annual basis at the local level. Advertising on sports channels: ESPN, Fox Sports, Sports Club, Sky TV Programmes, Eurosport program, Arena Sport, GT Sport and significantly provide space for better promotion Aqua F.I.F.A. By strategic planning and implementation of the proposed measures, built brand identity of Aqua F.I.F.A. will be obtained.

REFERENCES

- Belch, G.E., & Belch, M.A. (2004). *Advertising and promotion: an Integrated Marketing Communications perspective*. 6th edition. New York: Tata McGraw-Hill.
- Dugalić, S. (2008). Definition and conception of sports products. *New sports practice*, 3(2), 56-71.
- Duncan, T., & Moriarty, S.E. (1998). A Communication-based marketing model for managing customer relationships. *Journal of Marketing*, 62, 1-14.
- Gobe, M. (2006). *Emotional branding- new paradigm connecting brands with people*⁴. Mass Media International, Belgrade.
- Kahle, R.L., Riley, K. (2004). *Sports Marketing and the Psychology of Marketing Communication*, Mahwah, New Jersey.
- Kotler, P. (2006). *Marketing Management*, 12th Edition, Data Status, Beograd.
- Kvejl, M. (1994). *The old continent, new media*, Belgrade, Nova Holding, p. 196.
- Mullin, B., Hardy, S., & Sutton, W. (2014). *Sport Marketing, IV Edition*, Sheridan Books, USA.
- Thomson, M., MacInnis, D., & Whan Park, C. (2005). The ties that bind: Measuring the strength of the consumers' emotional attachments to brands. *Journal of consumer psychology*, 15(1), 77-91.
- Verčič, D., Zavrl, F., Rijavec, P., Tkalac V.A., & Laco, K. (2004). *Relations with media*. Masmedia, Zagreb.

M. Jankovic

University of Mediterranean, Faculty of Business Studies, Josipa Broza Tita bb, Podgorica, Montenegro
e-mail: marija.jankovic.mbs@gmail.com

Guidelines for Authors

Revised March 2016

*** Please use the bookmark function to navigate within the guidelines. ***

When preparing the final version of the manuscripts, either NEW or REVISED authors should strictly follow the guidelines. Manuscripts departing substantially from the guidelines will be returned to the authors for revision or, rejected.

1. UNIFORM REQUIREMENTS

1.1. Overview

The *Sport Mont Journal* (SMJ) reserves copyright of the materials published.

The submission with SMJ is free of charge but author(s) has to pay additional 250 euros per accepted manuscript to cover publication costs. This costs is decreased for the delegates at the MSA Annual Conference (these author(s) has to pay additional 50 euros per accepted manuscript). If the manuscript contains graphics in color, note that printing in color is charged additionally.

SMJ adopts a double-blind approach for peer reviewing in which the reviewer's name is always concealed from the submitting authors as well as the author(s)'s name from the selected reviewers.

SMJ honors six-weeks for an initial decision of manuscript submission.

Authors should submit the manuscripts as one Microsoft Word (.doc) file.

Manuscripts must be provided either in standard UK or US English language. English standards should be consistent throughout the manuscripts accordingly.

Format the manuscript in A4 paper size; margins are 1 inch or 2.5 cm all around.

Type the whole manuscript double-spaced, justified alignment.

Use Times New Roman font, size eleven (11) point.

Number (Arabic numerals) the pages consecutively (centering at the bottom of each page), beginning with the title page as page 1 and ending with the Figure legend page.

Include line numbers (continuous) for the convenience of the reviewers.

Apart from chapter headings and sub-headings avoid any kind of formatting in the main text of the manuscripts.

1.2. Type & Length

SMJ publishes following types of papers:

Original scientific papers are the results of empirically- or theoretically-based scientific research, which employ scientific methods, and which report experimental or observational aspects of sports science and medicine, such as all clinical aspects of exercise, health, and sport; exercise physiology and biophysical investigation of sports performance; sport biomechanics; sports nutrition; rehabilitation, physiotherapy; sports psychology; sport pedagogy, sport history, sport philosophy, sport sociology, sport management; and all aspects of scientific support of the sports coaches from the natural, social and humanistic side. Descriptive analyses or data inferences should include rigorous methodological structure as well as sound theory. Your manuscript should include the following sections: Introduction, Methods, Results, and Discussion.

☒Open Submissions

☒Indexed

☒Peer Reviewed

Original scientific papers should be:

- Up to 3000 words (excluding title, abstract, tables/figures, figure legends, Acknowledgements, Conflict of Interest, and References);
- A structured abstract of less than 250 words;
- Maximum number of references is 30;
- Maximum combined total of 6 Tables/Figures.

Review papers should provide concise in-depth reviews of both established and new areas, based on a critical examination of the literature, analyzing the various approaches to a specific topic in all aspects of sports science and medicine, such as all clinical aspects of exercise, health, and sport; exercise physiology and biophysical investigation of sports performance; sport biomechanics; sports nutrition; rehabilitation, physiotherapy; sports psychology; sport pedagogy, sport history, sport philosophy, sport sociology, sport management; and all aspects of scientific support of the sports coaches from the natural, social and humanistic side.

☒Open Submissions

☒Indexed

☒Peer Reviewed

Review papers should be:

- Up to 6000 words (excluding title, abstract, tables/figures, figure legends, Acknowledgements, Conflict of Interest, and References);
- A structured abstract of less than 250 words;
- Maximum number of references is 100.

Editorials are written or commissioned by the editors, but suggestions for possible topics and authors are welcome. It could be peer reviewed by two reviewers who may be external or by the Editorial Board.

☐Open Submissions

☒Indexed

☒Peer Reviewed

Editorials should be:

- Up to 1000 words (excluding title, abstract, tables/figures, figure legends, Acknowledgements, Conflict of Interest, and References);
- A structured abstract of less than 250 words;
- Maximum number of references is 10.

Short reports of experimental work, new methods, or a preliminary report can be accepted as two page papers. Your manuscript should include the following sections: Introduction, Methods, Results, and Discussion.

☒Open Submissions

☒Indexed

☒Peer Reviewed

Short reports should be:

- Up to 1500 words (excluding title, abstract, tables/figures, figure legends, Acknowledgements, Conflict of Interest, and References);
- A structured abstract of less than 250 words;
- Maximum number of references is 15.

Peer review - fair review provides authors who feel their paper has been unfairly rejected (at any journal) the opportunity to share reviewer comments, explain their concerns, and have their paper reviewed for possible publication in SMJ.

☒Open Submissions

☒Indexed

☐Peer Reviewed

Peer review - fair review should be:

- Up to 1500 words (excluding title, abstract, tables/figures, figure legends, Acknowledgements, Conflict of Interest, and References);
- A structured abstract of less than 250 words;
- Maximum number of references is 15.

Invited papers and award papers include invited papers from authors with outstanding scientific credentials. Nomination of invited authors is at the discretion of the SMJ editorial board. SMJ also publishes award papers selected by the scientific committee of the International Scientific Conference on Transformation Processes in Sport.

☐ Open Submissions

☒ Indexed

☐ Peer Reviewed

Invited papers and award papers should be:

- Up to 3000 words (excluding title, abstract, tables/figures, figure legends, Acknowledgements, Conflict of Interest, and References);
- A structured abstract of less than 250 words;
- Maximum number of references is 30;
- Maximum combined total of 6 Tables/Figures.

1.3. Submission

SMJ only accepts electronic submission to the e-mail of the Journal Office: **sportmont@ac.me**.

Submitted material includes:

- A manuscript prepared according to the Guidelines for the Authors;
- A signed form that states the study was not previously published, nor has been submitted simultaneously for consideration of publication elsewhere, that states that all of the authors are in agreement with submission of the manuscript to SMJ, and that, for studies that use animal or human individuals, authors must include information regarding their institution's ethics committee, and which identifies the official approval number;
- A signed form that there is no conflict of interest.

Name the files according to the family name of the first author. Authors submitting revised versions of the manuscript can use the identification number of their manuscript as provided by the Journal Office. *See example:*

- ✓ FAMILY NAME-manuscript.doc – (main manuscript file)
- ✓ FAMILY NAME-statement.PDF – (authorship statement)
- ✓ FAMILY NAME-declaration.PDF – (declaration of potential conflict of interest)
- ✓ FAMILY NAME-fig1.tiff – (Figure 1)

1.4. Peer Review Process

A manuscript submitted for publication will be submitted to the review process as long as it fits the following criteria:

- The study was not previously published, nor has been submitted simultaneously for consideration of publication elsewhere;
- All persons listed as authors approved its submission to SMJ;
- Any person cited as a source of personal communication has approved the quote;
- The opinions expressed by the authors are their exclusive responsibility;
- The author signs a formal statement that the submitted manuscript complies with the directions and guidelines of SMJ.

The editors-in-chief and associate editors will make a preliminary analysis regarding the appropriateness, quality, originality and written style/grammar of the submitted manuscript. The editors reserve the right to request additional information, corrections, and guideline compliance before they submit the manuscript to the ad-hoc review process.

SMJ uses ad-hoc reviewers, who volunteer to analyze the merit of the study. Typically, one or two expert reviewers are consulted in a double-blind process. Authors are notified by e-mail when their submission has been accepted (or rejected). Minor changes in the text may be made at the discretion of the editors-in-chief and/or associate editors. Changes can include spelling and grammar in the chosen language, written style, journal citations, and reference guidelines. The author is notified of changes via email. The final version is available to the author for his or her approval before it is published.

1.5. Publisher Copyright Policies

Copyright of published articles are the property of SMJ, and under no circumstance will the Journal transfer rights of published work. Reproduction of portions of published articles in other publications, or for any other use, is subject to written permission by the editors-in-chief. Reproductions of published work by SMJ, under a maximum of 500 words, are allowed with proper citation references and quotations.

Authors partially reproducing others' published work-whether by a different author or his or her own-exceeding 500 words, or that includes tables, figures, and other illustrations, must have written permission from the author and/or journal holding copyrights of such work. We strongly discourage authors who include multiple reproductions of published work in order to avoid perceptions of plagiarism or self-plagiarism by reviewers and the editorial board.

Upon acceptance of an article, authors will be asked to complete a "Journal Publishing Agreement". Acceptance of the agreement will ensure the widest possible dissemination of information. An email will be sent to the corresponding author confirming receipt of the manuscript together with a "Journal Publishing Agreement" form or a link to the online version of this agreement.

The editors of SMJ consider plagiarism and self-plagiarism to be a serious breach of academic ethics. Any author who practices plagiarism and/or self-plagiarism (in part or totality) will be suspended for six years from submitting new submissions to SMJ. If such a manuscript is approved and published, public exposure of the article with a printed mark ("plagiarized" or "retracted") on each page of the published file, as well as suspension for future publication for at least six years, or a period determined by the editorial board. Third party plagiarized authors or institutions will be notified, informing them about the faulty authors. Plagiarism and self-plagiarism will result in immediate rejection of the manuscript.

SMJ only publishes studies that have been approved by an institutional ethics committee (when a study involves humans or animals). Fail to provide such information prevent its publication. To ensure these requirements, it is essential that submission documentation is complete. If you have not completed this step yet, go to SMJ website and fill out the two required documents: Declaration of Potential Conflict of Interest and Authorship Statement. Whether or not your study uses humans or animals, these documents must be completed and signed by all authors and attached as supplementary files in the originally submitted manuscript.

- ☒ Authors can archive pre-print (i.e., pre-refereeing)
- ☒ Authors can archive post-print (i.e., final draft post-refereeing)
- ☒ Authors can archive publisher's version/PDF

1.6. After Acceptance

After the manuscript has been accepted, authors will receive a PDF version of the manuscripts for authorization, as it should look in printed version of SMJ. Authors should carefully check for omissions. Reporting errors after this point will not be possible and the Editorial Board will not be eligible for them.

Should there be any errors, authors should report them to the Office e-mail address **sportmont@ac.me**. If there are not any errors authors should also write a short e-mail stating that they agree with the received version.

1.7. Code of Conduct Ethics Committee of Publications



SMJ is hosting the Code of Conduct Ethics Committee of Publications of the **COPE** (the Committee on Publication Ethics), which provides a forum for publishers and Editors of scientific journals to discuss issues relating to the integrity of the work submitted to or published in their journals.

2. MANUSCRIPT STRUCTURE

2.1. Title Page

The first page of the manuscripts should be the title page, containing: title, type of publication, running head, authors, affiliations, corresponding author, and manuscript information. *See example:*

Transfer of Learning on a Spatial Memory Task between the Blind and Sighted People Spatial Memory among Blind and Sighted

Original Scientific Paper

Transfer of learning on a spatial memory task

Selcuk Akpınar¹, Stevo Popović^{1,2}, Sadettin Kirazci¹

¹Middle East Technical University, Physical Education and Sports Department, Ankara, Turkey

²University of Montenegro, Faculty for Sport and Physical Education, Niksic, Montenegro

Corresponding author:

S. Popovic

University of Montenegro

Faculty for Sport and Physical Education

Narodne omladine bb, 84000 Niksic, Montenegro

*E-mail: **stevop@ac.me***

Word count: 2,980

Abstract word count: 236

Number of Tables: 3

Number of Figures: 3

2.1.1. Title

Title should be short and informative and the recommended length is no more than 20 words. The title should be in Title Case, written in uppercase and lowercase letters (initial uppercase for all words except articles, conjunctions, short prepositions no longer than four letters etc.) so that first letters of the words in the title are capitalized. Exceptions are words like: “and”, “or”, “between” etc. The word following a colon (:) or a hyphen (-) in the title is always capitalized.

2.1.2. Type of publication

Authors should suggest the type of their submission.

2.1.3. Running head

Short running title should not exceed 50 characters including spaces.

2.1.4. Authors

The form of an author's name is first name, middle initial(s), and last name. In one line list all authors with full names separated by a comma (and space). Avoid any abbreviations of academic or professional titles. If authors belong to different institutions, following a family name of the author there should be a number in superscript designating affiliation.

2.1.5. Affiliations

Affiliation consists of the name of an institution, department, city, country/territory (in this order) to which the author(s) belong and to which the presented / submitted work should be attributed. List all affiliations (each in a separate line) in the order corresponding to the list of authors. Affiliations must be written in English, so carefully check the official English translation of the names of institutions and departments.

Only if there is more than one affiliation, should a number be given to each affiliation in order of appearance. This number should be written in superscript at the beginning of the line, separated from corresponding affiliation with a space. This number should also be put after corresponding name of the author, in superscript with no space in between.

If an author belongs to more than one institution, all corresponding superscript digits, separated with a comma with no space in between, should be present behind the family name of this author.

In case all authors belong to the same institution affiliation numbering is not needed.

Whenever possible expand your authors' affiliations with departments, or some other, specific and lower levels of organization.

2.1.6. Corresponding author

Corresponding author's name with full postal address in English and e-mail address should appear, after the affiliations. It is preferred that submitted address is institutional and not private. Corresponding author's name should include only initials of the first and middle names separated by a full stop (and a space) and the last name. Postal address should be written in the following line in sentence case. Parts of the address should be separated by a comma instead of a line break. E-mail (if possible) should be placed in the line following the postal address. Author should clearly state whether or not the e-mail should be published.

2.1.7. Manuscript information

All authors are required to provide word count (excluding title page, abstract, tables/figures, figure legends, Acknowledgements, Conflict of Interest, and References), the Abstract word count, the number of Tables, and the number of Figures.

2.2. Abstract

The second page of the manuscripts should be the abstract and key words. It should be placed on second page of the manuscripts after the standard title written in upper and lower case letters, bold.

Since abstract is independent part of your paper, all abbreviations used in the abstract should also be explained in it. If an abbreviation is used, the term should always be first written in full with the abbreviation in parentheses immediately after it. Abstract should not have any special headings (e.g., Aim, Results...).

Authors should provide up to six key words that capture the main topics of the article. Terms from the Medical Subject Headings (MeSH) list of Index Medicus are recommended to be used.

Key words should be placed on the second page of the manuscript right below the abstract, written in italic. Separate each key word by a comma (and a space). Do not put a full stop after the last key word. *See example:*

Abstract

Results of the analysis of

Key words: spatial memory, blind, transfer of learning, feedback

2.3. Main Chapters

Starting from the third page of the manuscripts, it should be the main chapters. Depending on the type of publication main manuscript chapters may vary. The general outline is: Introduction, Methods, Results, Discussion, Acknowledgements (optional), Conflict of Interest (optional). However, this scheme may not be suitable for reviews or publications from some areas and authors should then adjust their chapters accordingly but use the general outline as much as possible.

2.3.1. Headings

Main chapter headings: written in bold and in Title Case. *See example:*

✓ **Methods**

Sub-headings: written in italic and in normal sentence case. Do not put a full stop or any other sign at the end of the title. Do not create more than one level of sub-heading. *See example:*

✓ *Table position of the research football team*

2.3.2 Ethics

When reporting experiments on human subjects, there must be a declaration of Ethics compliance. Inclusion of a statement such as follow in Methods section will be understood by the Editor as authors' affirmation of compliance: "This study was approved in advance by [name of committee and/or its institutional sponsor]. Each participant voluntarily provided written informed consent before participating." Authors that fail to submit an Ethics statement will be asked to resubmit the manuscripts, which may delay publication.

2.3.3 Statistics reporting

SMJ encourages authors to report precise p-values. When possible, quantify findings and present them with appropriate indicators of measurement error or uncertainty (such as confidence intervals). Use normal text (i.e., non-capitalized, non-italic) for statistical term "p".

2.3.4. 'Acknowledgements' and 'Conflict of Interest' (optional)

All contributors who do not meet the criteria for authorship should be listed in the 'Acknowledgements' section. If applicable, in 'Conflict of Interest' section, authors must clearly disclose any grants, financial or material supports, or any sort of technical assistances from an institution, organization, group or an individual that might be perceived as leading to a conflict of interest.

2.4. References

References should be placed on a new page after the standard title written in upper and lower case letters, bold.

All information needed for each type of must be present as specified in guidelines. Authors are solely responsible for accuracy of each reference. Use authoritative source for information such as Web of Science, Medline, or PubMed to check the validity of citations.

2.4.1. References style

SMJ adheres to the American Psychological Association 6th Edition reference style. Check "American Psychological Association. (2009). Concise rules of APA style. American Psychological Association." to ensure the manuscripts conform to this reference style. Authors using EndNote® to organize the references must convert the citations and bibliography to plain text before submission.

2.4.2. Examples for Reference citations

One work by one author

- ✓ In one study (Reilly, 1997), soccer players
- ✓ In the study by Reilly (1997), soccer players
- ✓ In 1997, Reilly's study of soccer players

Works by two authors

- ✓ Duffield and Marino (2007) studied
- ✓ In one study (Duffield & Marino, 2007), soccer players
- ✓ In 2007, Duffield and Marino's study of soccer players

Works by three to five authors: cite all the author names the first time the reference occurs and then subsequently include only the first author followed by et al.

- ✓ First citation: Bangsbo, Iaia, and Krstrup (2008) stated that
- ✓ Subsequent citation: Bangsbo et al. (2008) stated that

Works by six or more authors: cite only the name of the first author followed by et al. and the year

- ✓ Krstrup et al. (2003) studied
- ✓ In one study (Krstrup et al., 2003), soccer players

Two or more works in the same parenthetical citation: Citation of two or more works in the same parentheses should be listed in the order they appear in the reference list (i.e., alphabetically, then chronologically)

- ✓ Several studies (Bangsbo et al., 2008; Duffield & Marino, 2007; Reilly, 1997) suggest that

2.4.3. Examples for Reference list

Journal article (print):

- Bangsbo, J., Iaia, F. M., & Krstrup, P. (2008). The Yo-Yo intermittent recovery test: a useful tool for evaluation of physical performance in intermittent sports. *Sports Medicine*, 38(1), 37-51.
- Duffield, R., & Marino, F. E. (2007). Effects of pre-cooling procedures on intermittent-sprint exercise performance in warm conditions. *European Journal of Applied Physiology*, 100(6), 727-735.
- Krstrup, P., Mohr, M., Amstrup, T., Rysgaard, T., Johansen, J., Steensberg, A., Bangsbo, J. (2003). The yo-yo intermittent recovery test: physiological response, reliability, and validity. *Medicine and Science in Sports and Exercise*, 35(4), 697-705.

Journal article (online; electronic version of print source):

- Shaw, A. (1999). The planning and development of New Bombay [Electronic version]. *Modern Asian Studies*, 33(4), 951-988.

Journal article (online; electronic only):

- Chantavanich, S. (2003, October). Recent research on human trafficking. *Kyoto Review of Southeast Asia*, 4. Retrieved November 15, 2005, from <http://kyotoreview.cseas.kyoto-u.ac.jp/issue/issue3/index.html>

Conference paper:

- Pasadilla, G. O., & Milo, M. (2005, June 27). *Effect of liberalization on banking competition*. Paper presented at the conference on Policies to Strengthen Productivity in the Philippines, Manila, Philippines. Retrieved August 23, 2006, from <http://siteresources.worldbank.org/INTPHILIPPINES/Resources/Pasadilla.pdf>

Encyclopedia entry (print, with author):

- Pittau, J. (1983). Meiji constitution. In *Kodansha encyclopedia of Japan* (Vol. 2, pp. 1-3). Tokyo: Kodansha.

Encyclopedia entry (online, no author):

- Ethnology. (2005, July). In *The Columbia encyclopedia* (6th ed.). New York: Columbia University Press. Retrieved November 21, 2005, from <http://www.bartleby.com/65/et/ethnolog.html>

Thesis and dissertation:

- Pyun, D. Y. (2006). *The proposed model of attitude toward advertising through sport*. Unpublished Doctoral Dissertation. Tallahassee, FL: The Florida State University.

Book:

Borg, G. (1998). *Borg's perceived exertion and pain scales*: Human kinetics.

Chapter of a book:

Kellmann, M. (2012). Chapter 31-Overtraining and recovery: Chapter taken from Routledge Handbook of Applied Sport Psychology ISBN: 978-0-203-85104-3 *Routledge Online Studies on the Olympic and Paralympic Games* (Vol. 1, pp. 292-302).

Reference to an internet source:

Agency. (2007). Water for Health: Hydration Best Practice Toolkit for Hospitals and Healthcare. Retrieved 10/29, 2013, from www.rcn.org.uk/newsevents/hydration

2.5. Tables

All tables should be included in the main manuscript file, each on a separate page right after the Reference section.

Tables should be presented as standard MS Word tables.

Number (Arabic) tables consecutively in the order of their first citation in the text.

Tables and table headings should be completely intelligible without reference to the text. Give each column a short or abbreviated heading. Authors should place explanatory matter in footnotes, not in the heading. All abbreviations appearing in a table and not considered standard must be explained in a footnote of that table. Avoid any shading or coloring in your tables and be sure that each table is cited in the text.

If you use data from another published or unpublished source, it is the authors' responsibility to obtain permission and acknowledge them fully.

2.5.1. Table heading

Table heading should be written above the table, in Title Case, and without a full stop at the end of the heading. Do not use suffix letters (e.g., Table 1a, 1b, 1c); instead, combine the related tables. *See example:*

✓ **Table 1.** Repeated Sprint Time Following Ingestion of Carbohydrate-Electrolyte Beverage

2.5.2. Table sub-heading

All text appearing in tables should be written beginning only with first letter of the first word in all capitals, i.e., all words for variable names, column headings etc. in tables should start with the first letter in all capitals. Avoid any formatting (e.g., bold, italic, underline) in tables.

2.5.3. Table footnotes

Table footnotes should be written below the table.

General notes explain, qualify or provide information about the table as a whole. Put explanations of abbreviations, symbols, etc. here. General notes are designated by the word *Note* (italicized) followed by a period.

✓ *Note.* CI: confidence interval; Con: control group; CE: carbohydrate-electrolyte group.

Specific notes explain, qualify or provide information about a particular column, row, or individual entry. To indicate specific notes, use superscript lowercase letters (e.g. ^a, ^b, ^c), and order the superscripts from left to right, top to bottom. Each table's first footnote must be the superscript ^a.

✓ ^aOne participant was diagnosed with heat illness and n = 19. ^bn = 20.

Probability notes provide the reader with the results of the tests for statistical significance. Probability notes must be indicated with consecutive use of the following symbols: * † ‡ § ¶ || etc.

✓ *P<0.05, †p<0.01.

2.5.4. Table citation

In the text, tables should be cited as full words. *See* example:

- ✓ Table 1 (first letter in all capitals and no full stop)
- ✓ ...as shown in Tables 1 and 3. (citing more tables at once)
- ✓ ...result has shown (Tables 1-3) that... (citing more tables at once)
- ✓in our results (Tables 1, 2 and 5)... (citing more tables at once)

2.6. Figures

On the last separate page of the main manuscript file, authors should place the legends of all the figures submitted separately.

All graphic materials should be of sufficient quality for print with a minimum resolution of 600 dpi. SMJ prefers TIFF, EPS and PNG formats.

If a figure has been published previously, acknowledge the original source and submit a written permission from the copyright holder to reproduce the material. Permission is required irrespective of authorship or publisher except for documents in the public domain. If photographs of people are used, either the subjects must not be identifiable or their pictures must be accompanied by written permission to use the photograph whenever possible permission for publication should be obtained.

Figures and figure legends should be completely intelligible without reference to the text.

The price of printing in color is 50 EUR per page as printed in an issue of SMJ.

2.6.1. Figure legends

Figures should not contain footnotes. All information, including explanations of abbreviations must be present in figure legends. Figure legends should be written bellow the figure, in sentence case. *See* example:

- ✓ **Figure 1.** Changes in accuracy of instep football kick measured before and after fatigued. SR – resting state, SF – state of fatigue, * $p > 0.01$, † $p > 0.05$.

2.6.2. Figure citation

All graphic materials should be referred to as Figures in the text. Figures are cited in the text as full words. *See* example:

- ✓ Figure 1
- × figure 1
- × Figure 1.
- ✓exhibit greater variance than the year before (Figure 2). Therefore...
- ✓as shown in Figures 1 and 3. (citing more figures at once)
- ✓result has shown (Figures 1-3) that... (citing more figures at once)
- ✓in our results (Figures 1, 2 and 5)... (citing more figures at once)

2.6.3. Sub-figures

If there is a figure divided in several sub-figures, each sub-figure should be marked with a small letter, starting with a, b, c etc. The letter should be marked for each subfigure in a logical and consistent way. *See* example:

- ✓ Figure 1a
- ✓ ...in Figures 1a and b we can...
- ✓ ...data represent (Figures 1a-d)...

2.7. Scientific Terminology

All units of measures should conform to the International System of Units (SI).

Measurements of length, height, weight, and volume should be reported in metric units (meter, kilogram, or liter) or their decimal multiples.

Decimal places in English language are separated with a full stop and not with a comma. Thousands are separated with a comma.

Percentage	Degrees	All other units of measure	Ratios	Decimal numbers
✓ 10%	✓ 10°	✓ 10 kg	✓ 12:2	✓ 0.056
× 10 %	× 10 °	× 10kg	× 12 : 2	× .056

Signs should be placed immediately preceding the relevant number.

✓ 45±3.4	✓ p<0.01	✓ males >30 years of age
× 45 ± 3.4	× p < 0.01	× males > 30 years of age

2.8. Latin Names

Latin names of species, families etc. should be written in italics (even in titles). If you mention Latin names in your abstract they should be written in non-italic since the rest of the text in abstract is in italic. The first time the name of a species appears in the text both genus and species must be present; later on in the text it is possible to use genus abbreviations. *See example:*

✓ First time appearing: *musculus biceps brachii*

Abbreviated: *m. biceps brachii*

Authorship Statement

(Fill out the blank fields, in print and send on email: sportmont@ac.me)

1. Manuscript title:

--

2. List all authors in order of appearance on the title page:

--

(Family name, initials)

3. Publication type:

--

(Please suggest the type of your publication: **original scientific papers, review articles, editorials, short reports, peer review - fair review, or invited papers and award papers**)

4. Numbers:

Number of authors :	
Number of tables :	
Number of figures :	
Number of figures submitted separately :	
Total number of FILES submitted (including manuscript):	

5. Statement:

The authors herein signed, state that:

- This manuscript is an original work, has not been previously published nor is being simultaneously submitted elsewhere;
- The authors agree that the manuscript will be under review for publication in the Sport Mont Journal;
- If the study includes participation of human beings or animals, please fill out the compliance/assessment by an ethics committee:

This study complies with the ethics committee of (state the name of the institution):	
Approval date:	
Approval number:	

6. Authors' confirmation:

By signing, all authors confirm the agreement with the contents of the statement in the previous chapter and that the information they provided on these pages is true.

(Authors should be listed in the exact order as appearing on the title page of the manuscript. Feel free to copy and add more tables for additional authors if needed, likewise delete the excess if not used. ALL AUTHORS MUST SIGN THIS FORM).

No.	Name		Date and signature:
1	Institutional address		
	Email		
	Corresponding author (YES/NO)		

No.	Name		Date and signature:
2	Institutional address		
	Email		
	Corresponding author (YES/NO)		

No.	Name		Date and signature:
3	Institutional address		
	Email		
	Corresponding author (YES/NO)		

No.	Name		Date and signature:
4	Institutional address		
	Email		
	Corresponding author (YES/NO)		

Declaration of Potential Conflict of Interest

(Fill out the blank fields, in print and send on email: sportmont@ac.me)

Manuscript title:		
Authors (last name, initials):		
Number of authors		

ALL AUTHORS MUST SIGN THIS FORM and it must be uploaded as a supplementary document of the submitted manuscript in the Journal database.

When potential conflict of interest exists, descriptions of type of conflict must be stated for each of the listed authors.

The items listed below are some of the examples of conflict of interest that can be inserted in the form:

- Author participates in clinical and/or experimental study subsidized by an industry or business;
- Author is a speaker at events sponsored by an industry or business;
- Author is a member of a board or directors of an industry or business;
- Author participates in regulatory committees of scientific studies sponsored by an industry or business;
- Author receives institutional financial support of an industry or business;
- Author shares stocks in an industry or business;
- Author prepares/develops scientific papers for journals sponsored by industries or business.

Note:

All authors must sign this document disclosing potential conflict of interest.

Form must be scanned and converted to a PDF file.

The document must be uploaded as supplementary file of the submitted manuscript.

[] No potential conflict of interest exists for this study.

[] Yes, there is a potential conflict of interest relative to this study as detailed above (please explain):

--

AUTHORS

By signing, all authors confirm the agreement with the contents of the previous (first) page of the Conflict of Interest statement (of the Sport Mont Journal) and that the information they provided on these pages is true.

(Authors should be listed in the exact order as appearing on the title page of the manuscript. Feel free to copy and add more tables for additional authors if needed, likewise delete the excess if not used. ALL AUTHORS MUST SIGN THIS FORM).

No.	Name		Date and signature:
1	Institutional address		
	Email		
	Corresponding author (YES/NO)		

No.	Name		Date and signature:
2	Institutional address		
	Email		
	Corresponding author (YES/NO)		

No.	Name		Date and signature:
3	Institutional address		
	Email		
	Corresponding author (YES/NO)		

No.	Name		Date and signature:
4	Institutional address		
	Email		
	Corresponding author (YES/NO)		

No.	Name		Date and signature:
5	Institutional address		
	Email		
	Corresponding author (YES/NO)		

Journal Publishing Agreement

(Fill out the blank fields, in print and send on email: sportmont@ac.me)

Contributor name:.....

Contributor address:.....

Re: Manuscript entitled:.....
(the "Contribution")

for publication in the Sport Mont Journal (the "Journal").

Dear Contributor(s):

Thank you for submitting your Contribution for publication. In order to expedite the editing and publishing process and enable the Sport Mont Journal to disseminate your Contribution, we need to have this Journal Publishing Agreement signed and returned as soon as possible. Publication cannot proceed without a signed copy of this Agreement.

A. GENERAL TERMS AND CONDITIONS

I hereby assign that:

- The article I have submitted to the journal for review is original, has been written by the stated authors and has not been published elsewhere;
- The article is not currently being considered for publication by any other journal and will not be submitted for such review while under review by this journal;
- The article contains no libelous or other unlawful statements and does not contain any materials that violate any personal or proprietary rights of any other person or entity;
- I have obtained written permission from copyright owners for any excerpts from copyrighted works that are included and have credited the sources in my article;
- If I am using any personal details or images of a third person, I have obtained written permission or consent from this person; AND
- If the article was prepared jointly with other authors, I have informed the co-author(s) of the terms of this publishing agreement and that I am signing on their behalf as their agent, and I am authorized to do so.

B. PUBLISHING AND DISTRIBUTION

1. The Contributor assigns to the Sport Mont Journal the right to publish, republish, transmit, sell, distribute and otherwise use the Contribution in whole or in part in electronic and print editions of the Journal throughout the world, in all languages and in all media of expression now known or later developed.

2. Reproduction, posting, transmission or other distribution or use of the final Contribution in whole or in part in any medium by the Contributor as permitted by this Agreement requires a citation to the Journal and an appropriate credit to the Sport Mont Journal, as Publisher, suitable in form and content as follows: (Title of Article, Author, Journal Title and Volume/Issue, [year]). Links to the final article on the Sport Mont Journal's website are encouraged where appropriate.

C. RETAINED RIGHTS

Notwithstanding the above, the Contributor or, if applicable, the Contributor's Employer, retains all proprietary rights.

D. PERMITTED USES BY CONTRIBUTOR

As a journal author, you retain rights for a large number of author uses, including use by your employing institute or company. These rights are retained and permitted without the need to obtain specific permission from the Sport Mont Journal. These include:

- the right to make copies (print or electric) of the journal article for their own personal use, including for their own classroom teaching use;
- the right to make copies and distribute copies (including via e-mail) of the journal article to research colleagues, for personal use by such colleagues;
- the right to present the journal article at a meeting or conference and to distribute copies of such paper or article to the delegates attending the meeting;
- patent and trademark rights and rights to any process or procedure described in the journal article;
- the right to include the journal article, in full or in part, in a thesis or dissertation;
- the right to use the journal article or any part thereof in a printed compilation of works of the author, such as collected writings or lecture notes (subsequent to publication of the article in the journal); AND
- the right to prepare other derivative works, to extend the journal article into book-length form, or to otherwise re-use portions or excerpts in other works, with full acknowledgement of its original publication in the journal.

Singnature of Contributor:.....

Date of Signature (mm/dd/yyyy):.....

Please return the completed and signed original of this form by e-mailing a scanned copy of the signed original to Journal Office (sportmont@ac.me).

Note: *If you do not fully complete this form or fail to submit this form to the Journal Office, a final decision on your manuscript may be delayed or the manuscript may be denied.*

Reviewers Form

(Fill out the blank fields and send back on email: sportmont@ac.me)

1. General information:

Reviewer's name	
E-mail	
Manuscript number	
Date sent to reviewer	
Date expected from reviewer	

2. Comments per each section:

General comment:	
Introduction:	
Methodology:	
Results:	
Discussion:	
Bibliography/references:	
Others:	
Decision:	

3. Evaluation:

(Please rate the following: 1 = Excellent; 2 = Good; 3 = Fair; 4 = poor)

Originality	
Contribution to the field	
Technical quality	
Clarity of presentation	
Depth of research	

4. Recommendation:

(Kindly mark with an X)

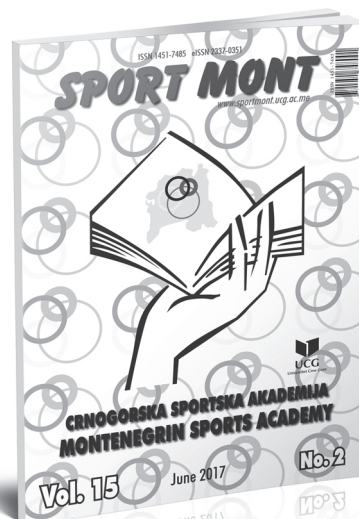
Accept as is	
Requires minor corrections	
Requires moderate revision	
Requires major revision	
Submit to another publication such as	
Reject on grounds of (please be specific)	

5. Additional Comments:

(Please add any additional comments, including comments/suggestions regarding online supplementary materials, if any)

--

SPORT MONT



ISSN 1451-7485

Sport Mont Journal (SMJ) is a print (ISSN 1451-7485) and electronic scientific journal (eISSN 2337-0351) aims to present easy access to the scientific knowledge for sport-conscious individuals using contemporary methods. The purpose is to minimize the problems like the delays in publishing process of the articles or to acquire previous issues by drawing advantage from electronic medium. Hence, it provides:

- Open-access and freely accessible online;
- Fast publication time;
- Peer review by expert, practicing researchers;
- Post-publication tools to indicate quality and impact;
- Community-based dialogue on articles;
- Worldwide media coverage.

SMJ is published three times a year, in February, June and October of each year. SMJ publishes original scientific papers, review papers, editorials, short reports, peer review - fair review, as well as invited papers and award papers in the fields of Sports Science and Medicine, as well as it can function as an open discussion forum on significant issues of current interest.

SMJ covers all aspects of sports science and medicine; all clinical aspects of exercise, health, and sport; exercise physiology and biophysical investigation of sports performance; sport biomechanics; sports nutrition; rehabilitation, physiotherapy; sports psychology; sport pedagogy, sport history, sport philosophy, sport sociology, sport management; and all aspects of scientific support of the sports coaches from the natural, social and humanistic side.

Prospective authors should submit manuscripts for consideration in Microsoft Word-compatible format. For more complete descriptions and submission instructions, please access the Guidelines for Authors pages at the SM website: <http://www.sportmont.ucg.ac.me/?sekcija=page&p=51>. Contributors are urged to read SM's guidelines for the authors carefully before submitting manuscripts. Manuscripts submissions should be sent in electronic format to sportmont@ac.me or contact following Editors:

Dusko BJELICA, *Editor-in Chief* – dbjelica@ac.me
Jovan GARDASEVIC, *Managing Editor* – jovan@ac.me

Publication date: Winter issue – February 2017
Summer issue – June 2017
Autumn issue – October 2017



Univerzitet Crne Gore

UNIVERZITET CRNE GORE FAKULTET ZA POMORSTVO – KOTOR

UNIVERSITY OF MONTENEGRO MARITIME FACULTY - KOTOR



In addition to maritime education in navigation and marine engineering, University of Montenegro - Maritime Faculty in Kotor also provides additional training for professional seafarers in:

- Different IMO model courses
- DP - Dynamic positioning courses
- Offshore courses

From 2015 runs the newly established joint training center with partners from NTNU - Aalesund in Norway, being one of the most experienced and most successful in providing offshore and DP training courses worldwide. The up-to-date bridge simulator, ac-

companied by AB simulations and instructor station, enables the organization of all the courses held as in the Norwegian training centers, with the same team of instructors and certificates. So far, a series of courses have been organized related to the operation of complex offshore equipment and team work in these demanding operations, both for students and international crews. In addition, the Kotor/Aalesund training center has recently been awarded with the Nautical Institute accreditation for holding DP (Induction and Simulator) trainings and so far has successfully launched several groups of DP operators.



OSC offshore simulator at Maritime Faculty Kotor, Montenegro



**BUREAU
VERITAS**

Dobrota 36, 85330 Kotor
Tel/Fax ++382(0)32 - 303 - 184
Centrala ++382(0)32 - 303 - 188
fzp@ac.me, www.fzp.ucg.ac.me

Ž.R. 510-227-38
PIB 02016702
PDV 30/31-03951-6



University of Montenegro

Cetinjska br.2
81 000 Podgorica
Montenegro

E-mail:
rektor@ac.me
rektorat@ac.me

Phone: + 382 20 414 255
Fax: + 382 20 414 230

Web:
www.ucg.ac.me



The University of Montenegro is the leading higher education and research institution in Montenegro. It is a public institution, established by the state, operating as a unique legal entity represented by the Rector. It is an integrated university organized on the model of the most European universities. Organizational units are competent for provision of study programmes, scientific-research and artistic work, use of allocated funds and membership in professional associations.

Since its foundation, the University of Montenegro has continuously been conducting reforms in the area of education and research, while since 2003 in line with the trends in EHEA. After adoption of the Bologna Declaration, University of Montenegro organized systematic preparation of documents aligned with it. Already in 2003, the experimental teaching programme started and today, all studies are organised in line with the Bologna principles. During the last two years systematic reforms of the University's study programmes have been conducted in order to harmonize domestic higher education system with European standards and market needs to highest extent.

The University of Montenegro has unique academic, business and development objectives. It comprises 19 faculties and two research institutes. The seat of the UoM is in Podgorica, the capital city, while university units are located in eight Montenegrin towns. The University support services and centers (advisory services, accounting department, international cooperation, career orientation) are located in the Rectorate.

Academic community of University of Montenegro is aware of the importance of its functioning for further development of the state and wider region. It has been so far, and will be in the future, the leader in processes of social and cultural changes, along with the economic development.

In the aspect of attaining its mission, University of Montenegro is oriented towards the priority social needs of the time in which it accomplishes its mission; open for all the students and staff exclusively based on their knowledge and abilities; dedicated to preservation of multicultural and multi-ethnic society in Montenegro; entrepreneurial in stimulating social and economic application of supreme achievements within the scope of its activities.

In 2015/16 there were a total of 1.192 employees at UoM, 845 of which were engaged in teaching. In the same year there were 20.236 students registered at all three cycles of studies.

Internationalization is high on the agenda of UoM priorities, thus it has participated in a number of international projects – over 50 projects funded under the Tempus programme, over 15 Erasmus Mundus Action 2 projects for student mobility, a number of projects under FP7 funding scheme or IPA supported projects, Erasmus + capacity building and International credit mobility projects and other.

For more information about University of Montenegro, please visit our website www.ucg.ac.me or send e-mail to pr.centar@ac.me.





**Faculty for sport
and physical education
NIKŠIĆ**



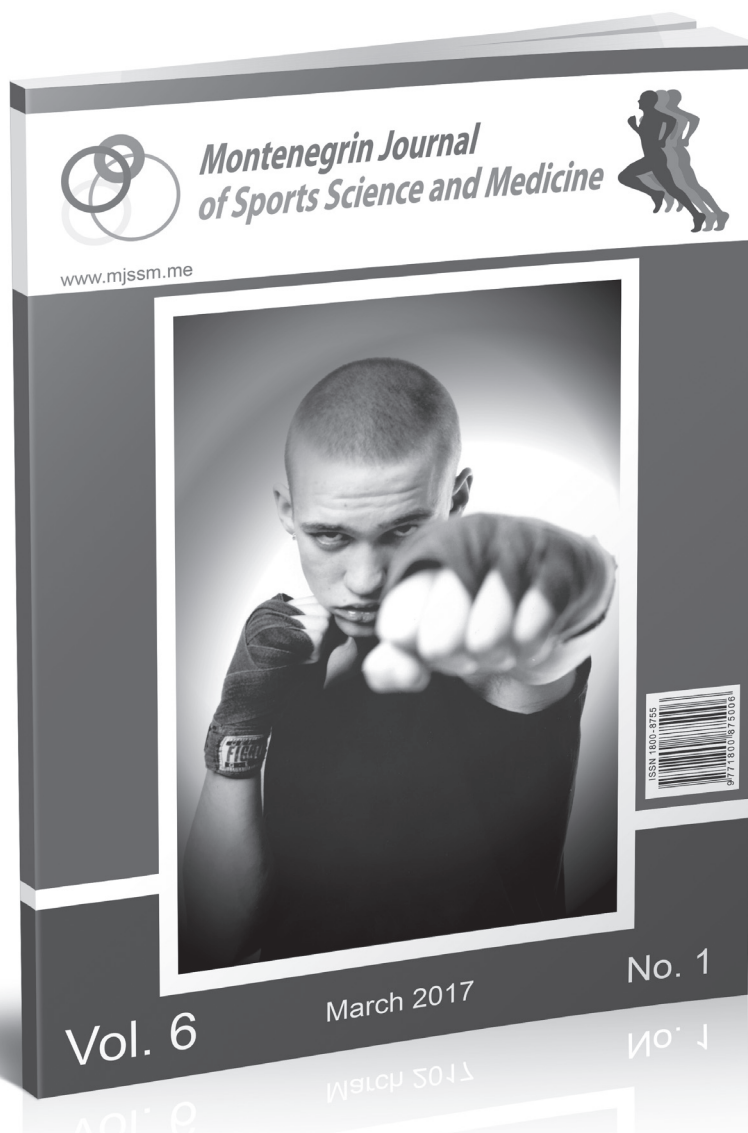
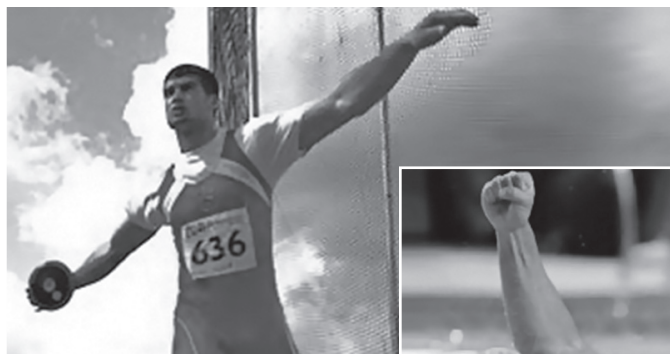
Phone: + 382 40 235 204; Fax: + 382 40 235 207, +382 40 235 200
E-mail: fakultetzasportnk@t-com.me; Web: www.fsnk.ucg.ac.me

Znanje i zdravlje!



CRNOGORSKI OLIMPIJSKI KOMITET
MONTENEGRIN OLYMPIC COMMITTEE

BE PART OF OUR TEAM





USEFUL CONTACTS

Editorial enquiries and journal proposals:

Dusko Bjelica

Editor-in-Chief

Email: sportmont@ac.me

Stevo Popovic

Executive Editor

Email: office@mjssm.me

Marketing enquiries:

Rajko Milasinovic

Marketing Manager

Email: administration@mjssm.me

Sports Science and Medicine Journals from Montenegrin Sports Academy

We have expanded the quality of our journals considerably over the past years and can now claim to be the market leader in terms of breadth of coverage.

As we continue to increase the quality of our publications across the field, we hope that you will continue to regard MSA journals as authoritative and stimulating sources for your research. We would be delighted to receive your comments and suggestions, mostly due to the reason your proposals are always welcome.

Look Inside!



Sport Mont Journal

Editor-in-Chief: **Dusko Bjelica**, Montenegro

Director: **Batric Markovic**, Montenegro

Managing Editor: **Jovan Gardasevic**, Montenegro

Volume 15, 2017, 3 issues per year; Print ISSN: 1451-7485, Online ISSN: 2337-0351

Sport Mont is a scientific journal that provides: Open-access and freely accessible online, authors retain copyright; Fast publication times; Peer review by expert, practicing researchers; Post-publication tools to indicate quality and impact; Community-based dialogue on articles; and Worldwide media coverage. Sport Mont is published once a year and publishes original scientific papers, notes, preliminary communications, reviews and conference papers in the fields of Sports Science and Medicine, as well as editorials, a "letter to the editor" section, abstracts from international and national congresses, panel meetings, conferences and symposia, and can function as an open discussion forum on significant issues of current interest.

www.sportmont.ucg.ac.me



Montenegrin Journal of Sports Science and Medicine

Editor-in-Chief: **Dusko Bjelica**, Montenegro

Executive Editor: **Stevo Popovic**, Montenegro

Associate Editors: **Selçuk Akpınar**, Turkey; **Mehmet Uygur**, USA; and **Yang Zhang**, China

Volume 6, 2017, 2 issues per year; Print ISSN: 1800-8755, Online ISSN: 1800-8763

Montenegrin Journal of Sports Science and Medicine (MJSSM) is published biannually, in September and March of each year. MJSSM publishes original scientific papers, review papers, editorials, short reports, peer review - fair review, as well as invited papers and award papers in the fields of Sports Science and Medicine, as well as it can function as an open discussion forum on significant issues of current interest. MJSSM covers all aspects of sports science and medicine; all clinical aspects of exercise, health, and sport; exercise physiology and biophysical investigation of sports performance; sport biomechanics; sports nutrition; rehabilitation, physiotherapy; sports psychology; sport pedagogy, sport history, sport philosophy, sport sociology, sport management; and all aspects of scientific support of the sports coaches from the natural, social and humanistic side.

www.mjssm.me

MSA Conference 2018

15th International Scientific Conference on Transformation Processes in Sport



UCG

Univerzitet Crne Gore



<http://www.csakademija.me/conference/>



SPORT PERFORMANCE

12th - 15th April 2018,
Budva - Montenegro