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PERSONAL AND SYSTEM REQUIREMENTS OF A SUCCESSFUL RESEARCHING CAREER IN THE FIELD OF MULTIDISCIPLINARY BIOMEDICAL SCIENCES – PERSONAL REVIEW / OVERVIEW

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Abstract

A multidisciplinary approach to scientific research is necessary in order to find answers to complex questions in the field of medical and biomedical sciences. The author of this paper is a member of and coordinates the work of a multidisciplinary team composed of medical specialists, general practitioners, molecular biologists, biochemists, physiologists, psychologists, physiotherapists, bioinformaticians, physicists, statisticians and engineers. The team has been managed a research program over the previous several years in the following areas: cardiovascular ageing, heart failure and physical activity. The aim of this review article was to present the findings of several research projects and papers published in renowned international scientific journals in the areas of: I) studying the process of cardiovascular ageing, its impact of physiological processes and interaction with physical activity, and II) improving the diagnosis and treatment of heart failure in primary and secondary health care. Overall aim of the research programme has been twofold; I) to improve general health and functional capacity of older people and patients, and II) to improve health care system and clinical practice. In addition to a brief presentation of the scientific papers and their findings, this review article will also describe ways of securing research funding and grant application procedures required for the research within the higher education system in the United Kingdom.

Key words: MULTIDISCIPLINARY APPROACH / BIOMEDICAL SCIENCES / CARDIOVASCULAR DISEASES / HEART FAILURE / PHYSICAL EXERCISE / RESEARCH / UNITED KINGDOM

INTRODUCTION

A multidisciplinary approach is required in order to find the answers and solutions to complex research questions in the fields of medical and biomedical sciences. Multidisciplinarity implies the involvement (engagement) of several academic disciplines and professional specialties in addressing and solving a pre-defined problem (Youngblood, 2007). New, multidisciplinary approaches are necessary to meet many, if not all, scientific and research as well as economic and social challenges of today. It is obvious that only such an approach can contribute to the innovations promoting the economic development, psychophysical and social well-being of the citizens and systems of both developed and developing countries. There is an outstanding example of the Research Councils UK with the annual budget of more than £3 billion in research covering the full spectrum of academic disciplines from the medical and biological sciences to astronomy, physics, chemistry and engineering, social sciences, economics, environmental sciences and the arts and humanities. (Harper; Walport, 2016).

One of the greatest challenges facing mankind in the next 30-50 years will be a drastic change in the population demographic structure, predicting that by 2050, one in three people will be > 65 years old, and one in 10 people will be > 80 years old (Lakatta, Levy, 2003). These changes are of tremendous economic...
and social significance. Responding to the demographic changes will require the adaptation of many aspects of people’s lives, including the way we work, take care of, communicate and “interact” with others, adjust the immediate environment where we live and work, learn and use technology. In order to adapt to such conditions successfully, it is necessary to understand the nature and implications of the demographic changes as well as the details of the biological ageing process itself.

From the point of view of medical and biomedical sciences, it is necessary to understand the molecular, cellular and physiological changes which directly affect the ageing process of humans. These changes result in a decline in quality of life, functional capacity, and lowering the threshold for the occurrence of chronic diseases which contribute to an increased mortality and morbidity in the elderly. The author of this article is a member and leader of the multidisciplinary team composed of medical specialists, general practitioners, molecular biologists, biochemists, physiologists, psychologists, physiotherapists, bioinformaticians, physicists, statisticians and engineers.

The task of this multidisciplinary team is to enhance the understanding of the ageing process with a particular emphasis on cardiovascular and metabolic changes and to identify potential therapeutic pharmacological and physiological interventions which will improve the quality of life and function of the elderly. The author of this article is a member and leader of the multidisciplinary team composed of medical specialists, general practitioners, molecular biologists, biochemists, physiologists, psychologists, physiotherapists, bioinformaticians, physicists, statisticians and engineers.

The aim of this review article was to present the findings of several scientific and research papers of the specified multidisciplinary team in the fields of: I) studying the process of cardiovascular ageing and its interaction with physiological interventions, and II) improving the diagnosis and treatment of heart failure in primary and secondary health care.

**Cardiovascular system ageing and physical activity**

The age of an individual is a major risk factor for the occurrence of cardiovascular diseases, which are the leading cause of mortality and morbidity in the elderly in developed countries (Harper, Walport, 2016). In the absence of clinical hypertension or a diagnosed cardiovascular disease, structural and functional changes in the heart and blood vessels result from the ageing process (Lakatta, Levy, 2003). These changes lower the threshold of the occurrence of clinical symptoms and signs associated with cardiovascular diseases (Shih et al, 2011). Magnetic resonance imaging of the heart and blood vessels is one of the leading non-invasive methods of evaluating the structure and function of cardiovascular system (Hollingsworth, 2012).

Physical activity plays an important role in the prevention and management of cardiovascular diseases (Chodzko-Zajko et al, 2009; Berry, 2013). Regular physical activity reduces the rate of overall and cardiovascular mortality between 30-40% (Shiroma, Lee, 2010; Blair et al, 1995; Talbot et al, 2007). On the other hand, people who are physically inactive show a 63% greater risk of developing cardiovascular diseases (Chomistek, 2013). Despite the fact that physical activity plays a very important role in maintaining general health and cardiovascular function, the ageing process leads to a decline in physical activity and cardiovascular function (Talbot, Metter, Fleg, 2000; Wilson & Tanaka, 2000; Tanaka et al, 1997).

Although regular physical activity can attenuate physiological, molecular and cellular process associated with ageing, as indicated recently in a review article (Jakovljevic, 2017), further research is necessary to define the details of the interaction between the ageing process, physiological function and physical activity. In a previous study, we examined the correlation between cardiac function and vascular (arterial) function in relation to the age (Houghton et al, 2016). The results have shown that arterial stiffness is an excellent indicator of the cardiac function in the older, but not in younger age.

It is also necessary to determine molecular mechanisms as potential causes of heart function deterioration with ageing. A study we have recently published confirmed the role of cardiac energy metabolism (high-energy phosphate metabolism measured by magnetic resonance spectroscopy) in preserving the cardiac function in the elderly (Nathania et al, 2017). The results of these studies have influenced the development of new ideas and research projects aiming to identify new pharmacological and physiological interventions which will reduce arterial stiffness and/or enhance cardiac energy metabolism in order to improve the myocardial systolic and diastolic function.

Daily physical activity can be objectively measured...
using accelerometers and pedometers in research and clinical practice. According to the results of previous research, and based on an average number of steps taken by an individual, respondents can be categorized as ‘low physically active’ (<7,500 steps per day) or ‘very physically active’ (>12,500 steps per day) (Tudor-Locke, Bassett, 2004). Using this approach, we have quantified the effect of the objectively measured physical activity on the changes in cardiac function, structure and metabolism resulting in relation to physiological ageing (Jakovljevic et al, 2015). In a single-center cross-sectional study involving 63 participants (female), the results have shown that a high level of daily physical activity is required to preserve cardiac metabolism and functional capacity represented by cardiorespiratory fitness, i.e. maximum oxygen consumption. However, another study indicated that an increased level of physical activity actually has limited effect on the reduced cardiac autonomic function in the elderly (Njemanze et al, 2016).

In addition to the described clinical studies, we also lead the research program of basic sciences applying the experimental methods which involve mice. This program allows us to define the molecular and cellular mechanisms responsible for a reduction in physiological function due to the ageing process, using the heart muscle tissue (myocardium) itself, large arteries, the central nervous system, skeletal muscles, and other organs, thus enabling the identification of new goals for the development of pharmacological and physiological therapeutic strategies. We are especially focused on better understanding of the changes in and the role of mitochondria, as unique but very complex organelles responsible for a whole range of energy processes occurring at the cellular level as well as for the proper functioning of cells, organs and organisms themselves.

In order to unify and synchronize scientific research in the field of clinical and basic sciences regarding the study of the ageing process and the impact of physiological and pharmacological effects on it, in 2015 we created a project, applied for and received the funding from the UK Medical Research Council in the amount of £ 5.5 million for a period of 5 years (2016-2021), which enables the research and functioning of the Center for the Study of the Aging Process within which the author of this article leads the field of cardiovascular research.

HEART FAILURE – FROM DIAGNOSIS IMPROVEMENT, THE EFFECT OF PHYSICAL EXERCISE ON PATIENT OUTCOMES TO MECHANICAL CIRCULATORY SUPPORT AND COMPLETE RECOVERY

Early diagnosis of heart failure
Heart failure or cardiac insufficiency is a clinical syndrome accompanied by the symptoms and signs caused by structural and/or functional abnormalities of the heart which result in a decrease in cardiac output at rest or under stress (Ponikowski et al, 2016). The prevalence and incidence of heart failure increase linearly due to the changes in demographic structure and the improved outcome in coronary artery diseases. Over 2% of the population aged > 45 have heart failure, and the prevalence exceeds > 10% in the population over 70 (Ponikowski et al, 2016). Heart failure is associated with a very poor prognosis (5-year mortality rate is 42%), frequent hospitalization and high medical costs (Hobbs et al, 2007).

Early diagnosis of heart failure is crucial because it allows the implementation of a therapy which reduces mortality and morbidity, while improving the quality of life and functional capacity in patients (Ponikowski et al, 2016). However, the diagnosis is complicated and imprecise, especially in the early stages of the disease. Even though the patients seek medical help due to the symptoms they have, many of these symptoms and signs need not be associated only with the reduced cardiac function, but also with age, obesity or respiratory problems (Mant et al, 2009). General practitioners play a key role in the early detection of heart failure (Hobbs et al, 2010). However, the diagnosis is complicated and imprecise, especially in the early stages of the disease. Even though the patients seek medical help due to the symptoms they have, many of these symptoms and signs need not be associated only with the reduced cardiac function, but also with age, obesity or respiratory problems (Mant et al, 2009). General practitioners play a key role in the early detection of heart failure (Hobbs et al, 2010). However, medical research has shown that heart failure is difficult to identify in primary care, thus patients are not referred to specialists when this is optimal, but very often in later stages of the disease (Hobbs et al, 2010; Roberts et al, 2015). The main reason for such situation is that heart failure is recognized as a complex disease presented with cardiac dysfunction, and general practitioners do not have access to the simple, relatively inexpensive methods which they can apply in their practice to evaluate cardiac function which will help them diagnose and monitor heart failure (Fonseca 2006; Fuat, Hunigain, Murphy, 2003).

In addition to evaluating symptoms and signs, general practitioners currently have access to (use) an
electrocardiogram and analyze biomarkers, such as B-type natriuretic peptide. However, the diagnostic precision of both methods has been reduced (Roberts et al, 2015; Khunti et al, 2004). The reduced precision of these tests also affects late diagnosis as well as inaccurate referrals from primary to secondary care which are very expensive for the health care system (42 million pounds per year) and worrying for the patients.

Heart ultrasound (echocardiography), performed in secondary care, and specialist examination is a reference method applied to diagnose heart failure (Ponikowski et al, 2016). However, waiting times for echocardiographic examination may be up to 12 weeks (Commission, 2007), which results in late diagnosis. On the other hand, 2/3 of the patients referred from primary to secondary care on the basis of the biomarker results, symptoms and signs do not have a confirmed diagnosis of heart failure after the echocardiography and specialist examination performed. Therefore it may be observed that there is a strong need to identify new modern diagnostic methods which will lead to the improvement of clinical practice in primary care and the good patient outcomes in regard to the early detection (diagnosis) of heart failure.

Bearing in mind the aforementioned facts, we have developed a simple, non-invasive test which implies the continuous measurement of cardiac function (cardiac output) at rest and during a cardiac stress test (CORS, cardiac output response to stress test) using a method for estimating cardiac function based on electric signal processing (bioreactance). In our previous research we previously confirmed validity and reliability of bioreactance method for monitoring cardiac function at rest and during stress exercise (Jakovljevic et al, 2012; Jakovljevic, Trenell & MacGowan, 2014; Okwose et al, 2017; Perkins et al, 2016; Jones et al, 2015). The CORS test has been developed for the purposes of primary care and with the aim to enhance early diagnosis and improve the accuracy of referrals from primary to secondary care. The researchers engaged in the ongoing program focus on the diagnostic precision (sensitivity and specificity) of the CORS test, its acceptability by patients, general practitioners and medical technicians. The initial phase of this research program has been funded by the UK Medical Research Council (MRC) in the amount of £ 220,000 for the period 06/2016 - 03/2018. In cooperation with the Directors of the Departments of Public Health and Primary Care Research at the Universities of Oxford and Cambridge, the applications for the UK National Institute of Health Research (NIHR) worth £2.3 million are being prepared for a five-year research multi-center program aiming to confirm the diagnostic precision of the CORS test on a large sample size, its economic evaluation as well as the implementation of the CORS test and the clinical practice of primary care.

The role of physical activity in heart failure
Clinical guidelines suggest physical activity to be integrated into rehabilitation program as one of the main components of heart failure management (Ponikowski et al, 2016). Meta-analyses have shown that regular physical activity improves functional capacity and quality of life, at the same time affecting the reduction of symptoms and hospitalization in heart failure patients (Davies et al, 2010; Piepoli et al, 2011; Lewinter et al, 2015). Also, physical activity may, to some extent, affect the improvement of cardiac function itself when heart failure has been already diagnosed (Haykowsky et al, 2007; Mezzani, Corra & Gianuzzi, 2008).

Although the benefits of physical activity in heart failure have been clearly defined, it is known from clinical practice that most patients show a reduced level of regular physical activity (which is directly associated with morbidity and mortality rate) (Walsh et al, 1997; Sato et al, 2012; Jehn et al, 2009). Despite clear recommendations, very few patients with heart failure (<10%) participate in the rehabilitation programs organized by the health care system due to a lack of resources and the direct exclusion of heart failure rehabilitation programs from commissioning agreements (Dalal et al, 2012). Furthermore, patients do not participate in the physical activity programs that are implemented in health care institutions due to transport difficulties, home and work obligations, and, in some cases, due to their reluctance to attend group exercise programs (Beswiski et al, 2004; Dalal et al, 2010). For these reasons, the adapted physical activity programs that can be performed by a patient in the home environment have been designed, and they are as safe and efficient as the institutionalized programs, as demonstrated in patients with coronary artery diseases (Dalal et al, 2010; Taylor et al, 2010; Dalal et al, 2007).

On the other hand, there are no appropriate records regarding the efficiency and characteristics of
the physical activity programs performed in the home environment in patients with heart failure (Dalal et al., 2012). Also, there is a lack of research in regard to the optimal dosage and type of physical activity which will correspond to the aspects of safety and efficacy of such program performed in the home environment.

In 2010, we published the study aiming to define the effect of aerobic training compared to strength training in the patients with chronic heart failure (Jakovljevic et al., 2010). The results have shown that both interventions were safe and there were no negative consequences for patients. Nevertheless, the aerobic exercise program proved to be more efficient in regard to the improvement of functional capacity and cardiac function.

The previous studies evaluating the effects of physical activity have shown that the physical activity programs which are more frequent (≥5 times a week) and of longer duration (≥30 min per day) are more effective in regard to improving the quality of life and function in patients (Ress et al., Taylor et al., 2014). Walking programs performed in the home environment and using pedometers to monitor a number of steps are effective ways to increase physical activity (Harris et al., 2017). Regarding the volume of physical activity, a large population study published in the Lancet journal confirmed that an increase in physical activity by 2000 steps per day in relation to the baseline (pre-intervention) level is related to a 10% reduction in the risk of cardiovascular diseases (Yates et al., 2014). Based on these facts, we developed a home-based physical activity intervention for patients with chronic heart failure (ACTIVE-at-HOME-HF) and have recently confirmed its feasibility and acceptability. The major findings of the study were presented at the European Heart Failure Association Congress in Paris in 2017 (Okwose et al., 2017). The study has shown that such an intervention is possible, safe and acceptable to patients, and it can lead to the improvement of quality of life and functional capacity. This single-center feasibility study was funded by the UK Health Ministry, the National Institute of Health Research (NIHR), in the amount of £ 108,450. A multi-center project aimed at defining the clinical- and cost-effectiveness of ACTIVE-AT-HOME-HF intervention in patients with chronic heart failure is under preparation. The estimated value of the project will amount to 680,000 pounds.

Mechanic circulatory support in heart failure – Bridge-to-Recovery?

Left Ventricular Assist Device (LVAD) is applied very successfully in clinical practice for the treatment of advanced heart failure. Initially, LVAD was designed to be used to preserve the life of a patient until a donor’s heart becomes available for heart transplantation to be performed (“bridge-to-transplantation”). However, in the past several years, LVAD has been approved by the FDA to be used as a destination therapy (“bridge-to-destination”), which implies the fact that a patient with the implanted LVAD may be removed from a transplantation list since LVAD enables the patient to improve the quality of life and functional capacity (MacGowan et al., 2015; Laneman & Birks, 2014). In some cases, LVAD can lead to partial or complete cardiac recovery (“bridge-to-recovery”) (Lanneman & Birks, 2014). The LVAD implantation is associated with a whole range of histological, biochemical, anatomical, physiological, and haemodynamic changes observed in patients during a prolonged chronic left ventricular support using LVAD (Hall et al., 2011; Birks, 2013). In addition, a great number of clinical studies have confirmed that the LVAD implantation reduces mortality while improving the quality of life and functional capacity in patients (Laphor et al., 2010; Pagani et al., 2009). We have also shown that the use of LVAD can improve cardiac function (Jakovljevic et al., 2010a; Jakovljevic et al., 2010b). The cardiac function improvement can be achieved to the extent that it is possible to remove LVAD and avoid heart transplantation with a very good long-term outcome (Birks, 2010; Frazier et al., 2015). The recovery rate sufficient to remove LVAD has been observed in only 5-24% of patients (Birks, 2010). However, a special strategy including a combination of LVAD and medication using β2-receptor agonists can stimulate the myocardium recovery and allow the LVAD explantation (removal) in a larger number of respondents than previously shown (Birks et al., 2006).

Since 2006, the multidisciplinary team to which the author of this paper belongs has aimed to improve clinical practice, patient outcomes and enhance scientific knowledge in the field of heart failure, the application of LVAD and, most importantly, to identify the most effective strategy which will lead to the myocardium recovery. In previous studies, we have shown that a unique measure of the overall cardiac function, the so-called cardiac power output (CPO)
is the best indicator of heart failure severity and it is greatly differentiated between patient groups, such as advanced heart failure, LVAD patients, and those with the LVAD removed due to the recovery resulted in response to the chronic use of LVAD and the use of β2-receptor agonists (Jakovljevic et al, 2010a). Furthermore, we have been dealing with the problem of identifying the physiological variables which can be used as an indicator of cardiac function in patients with LVAD (Jakovljevic et al, 2011), as well as with the problem of a haemodynamic response to the acute interruption of LVAD support in order to find an optimal strategy for cardiac function recovery evaluation in LVAD patients (Jakovljevic et al, 2010b).

Also, within our research program, we have made a longitudinal comparison of the functional capacity recovery, quality of life and physical activity between the patients who underwent cardiac transplantation and those who underwent LVAD implantation (Jakovljevic et al, 2014). The results of this study confirmed the effectiveness of LVAD therapy, but we also presented a new finding indicating that 6 months following LVAD implantation, functional capacity improvement compared to the patients who underwent heart transplantation.

Recently (in April 2017) we published the paper on the topic of ‘LVAD - bridge to recovery’ where we have shown for the first time that 40% of the patients with previously implanted LVAD can fully recover after LVAD explantation, thus demonstrating cardiac function which is equivalent to the cardiac function of a healthy person of the same age, who never had a heart disease (Jakovljevic et al, 2017). The paper was published in the best scientific journal of cardiology (Journal of the American College of Cardiology), which is the top-rated among 137 world journals available in this field with its impact factor of 19.9. The results of this study made a ‘breakthrough’ and were referred to in the news both in the UK and around the world. The scientific paper itself has been classified into a category including 5% of the papers that have attracted the greatest attention of the readers worldwide. Several British media interviews, including the BBC, have been realized.

In order to pursue our research program in the field of mechanical circulatory support using LVAD, supported by the British Heart Foundation (BHF) and the European Research Council (ERC), we are preparing two research grant applications for a 5-year multidisciplinary research project in the total amount of £3.2 million in which the colleagues from Austria, Spain and Serbia will also participate in addition to those from the UK. The aim of this project is to develop a computer simulation model using clinical, molecular, histological, biochemical, physiological and genetic characteristics which will precisely identify the patients whose hearts will respond to LVAD implantation most adequately with the aim of complete recovery; II) define early recovery during LVAD therapy and help in deciding on the optimum time of LVAD explantation; and III) present a plan for optimal pharmacological therapy prior to, during and following LVAD therapy.

CONCLUSION

A multidisciplinary approach to scientific research is necessary in order to address the complex issues of today, including significant changes in the population demographic structure which represent one of the biggest challenges in the fields of the population’s health, health care systems, economic and social achievements. In this paper, the findings of the research conducted by the multidisciplinary team have been presented with an emphasis on understanding structural and functional changes in cardiovascular system and the role of physical activity in preserving function and mortality prevention. Additionally, a research program in the field of heart failure has been described, from the improvement of heart failure diagnosis, the role of physical activity in improving the function and quality of life in patients, to the effects of left ventricular assist devices on recovery in advanced heart failure. Among others, our most recent and most important studyfindings have been presented, which has indicated that a significant number of patients with progressive heart failure can be completely recovered by applying a combination of mechanical circulatory support and adequate medication therapy.
REFERENCES


PERSONAL- UND SYSTEMNOTWENDIGKEITEN EINER ERFOLGREICHEN FORSCHUNGSKARRIERE IM BEREICH DER MULTIDISZIPLINÄREN WISSENSCHAFTEN – PERSÖNLICHER ÜBERBLICK / RÜCKBLICK

Zusammenfassung

Schlüsselwörter: MULTIDISZIPLINÄRER ZUGANG / BIOMEDIZINISCHE WISSENSCHAFTEN / KARDIOVASKULÄRE KANNHEITEN / HERZINSUFFIZIENZ / KÖRPERLICHE ÜBUNGEN / FORSCHUNG / GROSSBRITANIEN

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TOP-DOWN OR SHARED LEADERSHIP?
EXAMINING DIFFERENCES IN ATHLETE LEADERSHIP BEHAVIOURS BASED ON LEADERSHIP STATUS IN SPORT

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Abstract

The purpose of this study was to examine differences in athlete leadership behaviours based on one’s athlete leader status. Intercollegiate athletes (N = 299) self-identified their leadership status (i.e., formal leader, informal leader, follower) and rated the frequency of their own leadership behaviours. Results revealed that formal athlete leaders engaged in Training and Instruction more often than informal athlete leaders; with informal athlete leaders reporting higher frequencies than followers. Further, formal and informal athlete leaders reported engaging in Social Support more often than followers. These findings provide preliminary evidence of a top-down approach to leadership among athletes. No differences were found for Democratic Behaviour and Positive Feedback, suggesting that athlete leadership also is distributed among teammates. Results highlight important practical implications for sport practitioners in regard to athlete leader development.

Keywords: SHARED LEADERSHIP / GROUP DYNAMICS / SPORTS TEAMS / STATUS / ATHLETE LEADER

INTRODUCE

There is an emerging consensus in the sport literature that athlete leadership is important for both individual and team outcomes. Specifically, the behaviour of athlete leaders positively contribute to player satisfaction/enjoyment (Eys, Loughead, & Hardy, 2007; Price & Weiss, 2013), confidence (Fransen, Coffee, et al., 2014; Price & Weiss, 2013), team cohesion (Callow, Smith, Hardy, Arthur, & Hardy, 2009; Vincer & Loughead, 2010), and performance (Callow et al., 2009). Given these positive benefits, it would appear worthwhile to examine factors which may impact the behaviour athlete leaders display. One such factor may be an athlete’s leadership status on the team, as researchers have identified multiple athlete leadership roles which exist in sport (Crozier, Loughead, & Munroe-Chandler, 2013; Fransen, Coffee, et al., 2014; Loughead, Hardy, & Eys, 2006).

In particular, status reflects the amount of importance or prestige an individual possesses or is accorded by virtue of their position in relation to others (Jacob & Carron, 1998). As such, individuals within a group setting can be categorized hierarchically according to their perceived status in comparison to others. In other words, those who have greater status would be positioned higher on the status hierarchy than someone with lower status. In sport, four major sources of status (Jacob Johnson, 2004) have been identified, which include an individual’s physical attributes (e.g., performance, experience, role as leader, playing position), psychological attributes (e.g., positive attitude, fostering team spirit), demographic attributes (e.g., age, in-
come), and relationships with external others (e.g., parental support). Although it can be argued that all four sources of status are important for sport teams, the present study focused on the physical attribute of an athlete’s role on the team, and in particular the role of being an athlete leader. In fact, the role as leader is one of the most important sources of status endorsed by team sport athletes (Jacob & Carron, 1998).

In their study, Jacob and Carron (1998) used captains or co-captains to define the role as leader. This frame of reference is of particular interest given that being an athlete leader can be more than simply being prescribed a leadership role such as being named as team captain. Rather, athlete leadership is a complex, dynamic process in which the leadership roles within teams is assumed by multiple athletes (Bucci, Bloom, Loughead, & Caron, 2012; Crozier et al., 2013; Fransen, Vanbeselaere, De Cuyper, Vande Broek, & Boen, 2014). The notion that leadership roles can be occupied by numerous individuals is rooted within the approach of leadership being shared or distributed (Pearce & Conger, 2003). The concept of shared leadership is in contrast to the traditional approach where one person is in charge with others following. This traditional top-down approach has dominated the research of leadership within sport which has examined the role of the coach as leader. Only in the past decade has research been paid to understanding shared leadership in sport, such that both coaches and athletes can provide leadership within the team (Loughead & Hardy, 2005).

In regard to athlete leadership specifically, the role of athlete leader is defined as an athlete occupying a formal or informal role within a team who influences other team members toward achieving a common goal (Loughead et al., 2006). This definition highlights that leadership roles can be shared or broadly distributed among members of the team, and that two types of athlete leader roles exist. Formal leaders are those individuals designated as leaders by the organization or team (e.g., captains), whereas informal leaders are those individuals who emerge as leaders through experience and interactions with other team members. Since this definition of athlete leader was proposed, a third role which has been acknowledged by researchers is the role of the athlete non-leader (i.e., the follower) (Crozier et al., 2013).

The present study was guided by Locke’s (2003) integrated model of leadership developed in organizational psychology, which proposes that shared leadership involves both upward or downward hierarchical influence and lateral influence. When applied to athlete leadership, the hierarchical influence would indicate that captains and assistant captains (formal types of leaders) are recognized as the highest source of athlete leadership status, followed by informal athlete leaders, and then by followers (i.e., hierarchical influence). As for the lateral influence of the model, team members are viewed as being equal and interdependent with each other (regardless of status). Several assumptions are associated with Locke’s model. The first is that all team members are not created equally based on their status—formal leaders have greater status than informal leaders, and both types of athlete leaders having greater status than followers. The second assumption is that both lateral and hierarchical influence contributes to team effectiveness and should not be considered mutually exclusive (Pearce & Sims, 2002).

While Locke’s (2003) integrated model of leadership has not been examined, to our knowledge, in relation to athlete leadership, research has indicated that a formal hierarchy does exist in sport, which provides structure regarding how individuals should enact their roles (Benson, Hardy, & Eys, 2016). Further, there is some evidence highlighting the model’s applicability, in that certain athlete leadership roles (i.e., formal and informal) may provide differing and/or similar types of leadership behaviours to their team. In a qualitative examination of the benefits associated with the presence of formal and informal athlete leaders, Crozier et al. (2013) reported that task leadership behaviours were cited as a benefit associated with formal leaders (e.g., captains) but not for informal leaders. In contrast, the results further identified the leadership behaviours of encouraging teammates and seeking input from teammates as important behaviours of both formal and informal leaders. While these findings...
suggest that formal and informal leaders are beneficial in that they provide different but also similar leadership behaviours to their team, it was not able to assess the relative frequency of behaviour that the different leadership roles exhibit.

Further, with some exceptions (e.g., Benson, Hardy, & Eys, 2016) there has been little research to date examining the role of followers in sport. From organizational psychology we know that followers are associated with having less responsibilities than leaders (Vanderslice, 1988) and that they are viewed and feel less important than those who occupy leadership roles (Hoption, Christie, & Barling, 2012). However, what the above results fail to indicate is whether athletes (leaders and followers) engage in similar or different amounts of leadership behaviours contingent on their leadership role (status). Determining which behaviours athletes in different leadership roles perceive themselves to display would provide practical knowledge for professionals working with athletes (i.e., coaches, sport psychologists). In particular, knowing which athletes (i.e., roles) are displaying specific leadership behaviours would allow practitioners to develop leadership training programs tailored specifically for an entire sport team. Currently, much of the leadership training athletes receive is catered toward the formal leader (Gould & Voelker, 2010). However, informal leaders also act as a primary source of leadership to many athletes (Fransen, Vanbeselaere, et al., 2014), and thus should be provided opportunities to enhance their leadership skills.

In terms of the leadership behaviours of interest to the current study, although a variety of measures have been used to assess athlete leadership, the Leadership Scale for Sports (LSS; Chelladurai & Saleh, 1980) has shown strong psychometric properties compared to other measures modified to assess athlete leader behaviours (Loughead, 2017). In particular, the LSS measures five dimensions of leadership behaviour: Training and Instruction (improve athletic performance); Positive Feedback (recognize and reward good performance); Social Support (show a concern for the welfare of team members); Democratic Behaviour (allow team members to participate in decision-making); and Autocratic Behaviour (make decisions independently of team members).

Therefore, the purpose of the current study was to examine whether there are differences between an individual’s leadership behaviours within team sports depending on one’s self-rated athlete leadership status. On the one hand, Locke’s (2003) integrated model of leadership would suggest differences in leadership behaviours based on an individual’s status (i.e., top-down approach). As research has indicated that formal leaders are cited more frequently than informal leaders as performing task-oriented functions (Fransen, Vanbeselaere, et al., 2014; Loughead et al., 2006), it was hypothesized that athlete leaders would differ in the frequency in which they reported engaging in Training and Instruction behaviours. Further, as captains have indicated they use autocratic techniques (as part of their role, see Dupuis, Bloom, & Loughead, 2006), it was hypothesized that formal athlete leaders would engage in more Autocratic Behaviour compared to informal leaders. On the other hand, the model also suggests there is the possibility that leadership is shared and there would be no differences based on status (i.e., shared approach). Given that research has reported athlete leaders, regardless of formal/informal status, are beneficial as they provide support to teammates as well as seek input from teammates (Crozier et al., 2013), it was hypothesized that frequency of Social Support, Positive Feedback, and Democratic Behaviour would not differ based on athlete leader status, such that these behaviours are shared similarly among athlete leaders. Last, as there is evidence in organizational literature that followers view themselves as having less responsibilities (Vanderslice, 1988) and are less important than leaders (Hoption et al., 2012) it was predicted that followers may engage in leadership behaviours to a lesser extent than athlete leaders. However, as there is a paucity of research in sport examining followers, no a priori hypotheses were advanced for which specific leadership behaviours would differ from those of the athlete leaders.
METHODS

Participants
A total of 299 intercollegiate athletes (90 male, 209 female) from both college and university intercollegiate teams participated in the study. All participants competed in either the Ontario University Athletics (OUA) Association or the Ontario Colleges Athletic Association (OCAA) and were members of interdependent sports teams that included basketball (n = 43), ice hockey (n = 122), and volleyball (n = 134). The mean age of the participants was 20.71 years (SD = 2.07). The participants had been involved with their current team for an average of 2.17 years (SD = 1.19).

Measures
Athlete leader status. Athlete leader status was determined by the participant self-identifying the leadership role they occupied on their current team. Participants were presented with a description of a formal athlete leader (i.e., an athlete that is selected by the team or coach to be in a leadership position, such as captain, co-captain or assistant captain) and an informal athlete leader (i.e., established through interactions with team members, not formally appointed by coach or team). The participants were asked to select one of these two athlete leadership roles as it applied to them. If a participant did not select either of these two options, they were classified as a follower. This method has been used in previous research in order to categorize athletes into the leadership role they perceived themselves as occupying (Crozier et al., 2013; Martin, Balderson, Hawkins, Wilson, & Bruner, 2016). Although we acknowledge the discrete nature of this categorization, this method was deemed appropriate for classifying athletes into their self-rated leadership status for this study. Similar categorization methods have been used in research examining starting status (i.e., whether they are a player who begins the competition on the playing surface and typically receives regular playing time; Eys, Carron, Bray, & Beauchamp, 2003) whereby self-rated starting status was a variable of interest (Jeffery-Tosoni, Eys, Schinke, & Lewko, 2011). In this study, results indicated that 67 (22.4%) participants identified themselves as a formal athlete leader, 135 (45.1%) as an informal athlete leader, and 98 (32.5%) were classified as an athlete non-leader. The leadership dispersion found in the current study using a self-selection method of leadership is similar to what research has found in previous studies (Crozier et al., 2013; Fransen, Coffee, et al., 2014; Fransen, Vanbeselaere, et al., 2014).

Athlete leader behaviours. The participants self-rated their own leadership behaviours using the Leadership Scale for Sports (LSS; Chelladurai & Saleh, 1980). The LSS has typically been used to measure transactional coaching behaviours but has been used effectively to assess athlete leadership behaviours (Loughead & Hardy, 2005; Vincer & Loughead, 2010). In addition, the LSS has shown strong psychometric properties compared to other measures that have been modified when assessing athlete leader behaviours (Loughead, 2017). The LSS is a 40-item inventory that measures five types of leadership behaviours. The Training and Instruction dimension consists of 13 items and assesses leadership behaviour aimed at improving athletic performance (e.g., “I explain to team members the techniques of the sport”). Positive Feedback contains five items and reflects the tendency to reinforce behaviour by recognizing and rewarding good performances (e.g., “I express appreciation when a team member performs well”). The dimension of Social Support consists of eight items and reflects the degree to which an individual shows concern for the welfare of his/her teammates (e.g., “I help team members with their personal problems”). The Democratic Behaviour dimension consists of nine items and reflects the extent an individual allows participation from teammates in decision-making (e.g., “I let fellow team members share in decision making”). Autocratic Behaviour includes five items and represents the tendency to make decisions independently from the team (e.g., “I work relatively independent of other team members”). All items were scored on a 5-point Likert type scale anchored by 1 (never) and 5 (always). The LSS has demonstrated convergent (Paradis & Loughead, 2012) and discriminant (Vincer & Loughead, 2010) validity, as well as acceptable internal reliability values when assessing
athlete leadership behaviours in athletes (Loughead & Hardy, 2005; Vincer & Loughead, 2010). Thus, this inventory is measuring its targeted constructs making it a viable tool for measuring leadership behaviours in athletes. For the current study, it should also be noted that the athlete leadership dimension of Autocratic Behaviour had an alpha coefficient of .61 and was removed from further analyses.

**Procedure**

Following university ethical approval, coaches were contacted via e-mail seeking permission to survey their athletes. After each coach had given permission, a convenient time was set to meet with the athletes prior to or after a practice session. At this meeting, the purpose of the study was explained to the athletes. Confidentiality of individual responses was assured with the primary researcher administering the questionnaires (i.e., demographic details, athlete leader status, and LSS) in separate unmarked envelopes. Completed questionnaires were placed back into the envelope to further ensure confidentiality. The return of the questionnaires signified consent to participate in the study and completion of the questionnaires took approximately 15 minutes. In addition, all participants were given the opportunity to fill out a ballot for a chance to win a $50 gift certificate to a sporting goods store as an incentive to participate in the study.

**Data Analysis**

In order to address the study's purpose, a MANOVA was conducted to examine if formal athlete leaders, informal athlete leaders, and athlete followers would differ in the frequency in which they displayed certain leadership behaviours. An athlete's self-rated leadership status served as the independent variable, with the four remaining dimensions of the LSS serving as dependent variables. As the distribution among leadership statuses were unequal, the Pillai's trace statistic was examined as it is considered the most robust statistic when data violates MANOVA assumptions (i.e., equal cell sizes; Olson, 1974).

If significant, to determine which specific athlete leadership behaviours differed in relation to athlete leader status, post-hoc analyses were conducted. Post-hoc univariate ANOVAs have typically been used to determine where the differences are found in a MANOVA (Huberty & Morris, 1989; Tonidandel & LeBreton, 2013), and are the dominant follow-up procedure in sport and exercise psychology research (e.g., Greenlees, Webb, Hall, & Manley, 2007; Landers, Arent, & Lutz, 2001; Loughead & Hardy, 2005; Weiss & Smith, 2002). However, there is one major shortcoming to using successive univariate ANOVAs to follow-up a significant MANOVA. By utilizing multiple ANOVAs, researchers are ignoring the correlations found between dependent variables (Bray & Maxwell, 1982; Dillon & Goldstein, 1984; Huberty & Morris, 1989). In order to account for correlated dependent variables in a MANOVA design, Tonidandel and LeBreton (2013) have applied the technique of relative weight analysis (Johnson, 2000) to the post-hoc assessment of significant MANOVAs. Relative weight analysis uses a variable transformation approach that creates a set of new variables that is maximally related to the original variables but are orthogonal (uncorrelated) to one another. Thus, relative weight analysis allows researchers to evaluate the relationship between the independent variable (i.e., athlete leader status) and the dependent variables (i.e., athlete leadership behaviours) while taking into account the intercorrelations among the dependent variables. Thus, relative weight analysis (Tonidandel & LeBreton, 2011) was conducted using the R statistical package (R Core Team, 2013) to control for potential intercorrelations between the four athlete leadership behaviours. The relative weights associated with each dependent variable (i.e., athlete leadership behaviours) represented a measure of relative effect size (i.e., the percentage of variance accounted for in each dependent variable by the independent variable; Tonidandel & LeBreton, 2013). Further, in order to account for family-wise error with four dependent variables, a Bonferroni adjustment was applied ($p = .05/4 < .0125$) to a Tukey post-hoc comparison with strict confidence intervals (99% confidence interval [CI]).
RESULTS

Descriptive Statistics

Table 1 contains the means, standard deviations, and alpha coefficients of the variables examined in the present study. In general, the means suggest that these athletes perceived themselves as providing medium to high frequencies of leadership behaviours (means ranged from 3.00 to 4.29, a 5-point scale). Table 2 contains the correlation coefficients between the four athlete leadership behaviours.

Table 1. Means and standard deviations for the leader behaviour dimensions distinguished by leadership status

<table>
<thead>
<tr>
<th>Variable</th>
<th>Formal</th>
<th>Informal</th>
<th>Non-Leader</th>
<th>α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training and Instruction</td>
<td>3.61</td>
<td>3.28</td>
<td>3.00</td>
<td>.90</td>
</tr>
<tr>
<td></td>
<td>(.65)</td>
<td>(.63)</td>
<td>(.67)</td>
<td></td>
</tr>
<tr>
<td>Democratic Behaviour</td>
<td>3.76</td>
<td>3.59</td>
<td>3.53</td>
<td>.70</td>
</tr>
<tr>
<td></td>
<td>(.53)</td>
<td>(.57)</td>
<td>(.54)</td>
<td></td>
</tr>
<tr>
<td>Social Support</td>
<td>4.13</td>
<td>3.97</td>
<td>3.72</td>
<td>.79</td>
</tr>
<tr>
<td></td>
<td>(.51)</td>
<td>(.59)</td>
<td>(.59)</td>
<td></td>
</tr>
<tr>
<td>Positive Feedback</td>
<td>4.27</td>
<td>4.29</td>
<td>4.16</td>
<td>.76</td>
</tr>
<tr>
<td></td>
<td>(.57)</td>
<td>(.49)</td>
<td>(.53)</td>
<td></td>
</tr>
<tr>
<td>Autocratic Behaviour</td>
<td>2.62</td>
<td>2.62</td>
<td>2.55</td>
<td>.61</td>
</tr>
<tr>
<td></td>
<td>(.67)</td>
<td>(.67)</td>
<td>(.66)</td>
<td></td>
</tr>
</tbody>
</table>

Note. aScores for the athlete leadership behaviours range from 1-5, with higher numbers representing a greater frequency
bDimension was deleted from further analyses due to low alpha value; Standard deviations are contained within the parentheses underneath their respective means.

Table 2. Bivariate correlations between athlete leadership behaviour dimensions

<table>
<thead>
<tr>
<th>Variable</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Training and Instruction</td>
<td>.496**</td>
<td>.452**</td>
<td>.314**</td>
</tr>
<tr>
<td>2. Democratic Behaviour</td>
<td>-</td>
<td>.423**</td>
<td>.406**</td>
</tr>
<tr>
<td>3. Social Support</td>
<td>-</td>
<td>-</td>
<td>.406**</td>
</tr>
<tr>
<td>4. Positive Feedback</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Note. ** p < .01

Main Findings

The overall MANOVA revealed a significant multivariate effect for leadership status, Pillai’s trace = .138, F(8, 588) = 5.447, p < .001, η² = .069, indicating that an athlete’s self-rated leadership status significantly differentiated the self-rated frequency of leadership behaviours. The results of the relative weight analysis are presented in Table 3, and show that the independent variable of athlete leader status was significantly different for the athlete leadership behaviours of Training and Instruction (e.g., providing instruction to teammates to help increase performance), and Social Support (e.g., helping a teammate through a difficult time).
Table 3. Relative weights and confidence intervals for each dependent variable

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Relative Weight</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training and Instruction</td>
<td>.076*</td>
<td>.028</td>
<td>.137</td>
</tr>
<tr>
<td>Democratic Behaviour</td>
<td>.007</td>
<td>-.016</td>
<td>.021</td>
</tr>
<tr>
<td>Social Support</td>
<td>.030*</td>
<td>.003</td>
<td>.068</td>
</tr>
<tr>
<td>Positive Feedback</td>
<td>.002</td>
<td>-.029</td>
<td>.009</td>
</tr>
</tbody>
</table>

Note. * indicates the relative weight significantly different from zero at $p < .05$; *If zero is not included, relative weight is significant.

Using the Tukey procedure for planned comparison post-hoc analysis, we found that athlete leaders who self-rated themselves as being a formal leader also perceived themselves as engaging in significantly more Training and Instruction than informal athlete leaders ($p < .01; CI = .04, .61$) and followers ($p < .001, CI = .29, .90$). Similarly, informal athlete leaders perceived themselves to use more Training and Instruction than followers ($p < .01, CI = .02, .52$). As for the athlete leadership behaviour of Social Support, it was found that self-rated formal athlete leaders ($p < .001, CI = .14, .67$) and informal athlete leaders ($p < .01, CI = .03, .47$) perceived themselves displaying this leadership behaviour to a greater extent than followers. No other differences were found (see Figure 1).

Figure 1. Frequency of self-rated leadership behaviours by athlete leader status
Note. * $p < .01$
DISCUSSION

In this research study, we examined whether an athlete's leadership status differentiated an individual's self-rated leadership behaviours in sport teams. A MANOVA, with relative weight analysis (Tonidandel & LeBreton, 2013) and planned comparison post-hoc tests were conducted to examine differences in behaviour based on athlete self-rated leadership status (i.e., formal, informal, and non-leader). Results will be discussed in relation to Locke’s (2003) integrated model of leadership.

First, results lend support to the top-down approach of leadership in Locke’s (2003) model, as athlete leadership status differentiated two dimensions of athlete leader behaviours. In support of our hypotheses, it was found that formal athlete leaders reported using Training and Instruction leadership behaviours more frequently than informal athlete leaders and followers, with informal athlete leaders displaying it more than athlete followers. In regard to formal athlete leaders, this may not be surprising, as captains and assistant captains are often selected based upon their skill level or sport-specific experience (Loughhead & Hardy, 2005; Moran & Weiss, 2006; Price & Weiss, 2011), suggesting they would have the knowledge to provide task instruction. Further, research has found that majority of athletes who perform task-oriented functions (e.g., provide tactical decision-making) occupy a formal leadership role (Loughhead et al., 2006). In relation to informal athlete leaders, results provide support for the task-oriented function in which emergent leaders may provide. While supporting previous work indicating that both formal and informal leaders provide task-oriented functions within teams (Fransen, Vanbeselaere, et al., 2014), the current study revealed that informal leaders do so to a lesser degree than formal leaders, but to a greater degree than followers.

Results also indicated that both formal and informal athlete leaders were found to provide more Social Support (i.e., concern for the welfare of others) compared to followers. While in contrast to our hypotheses, results do align with previous work which indicated that both designated leaders (i.e., formal) and emergent leaders (i.e., informal) provide social functions (e.g., promotes good relations among team members, deals with conflicts between teammates, is trusted by team members) within the team (Fransen, Vanbeselaere, et al., 2014; Loughhead et al., 2006). Results of the current study add to the extant literature by highlighting that formal and informal leaders reported using social support behaviours to a similar degree, yet to a greater degree than the athletes considered followers. This finding is novel when looking at the frequency of athlete leader behaviours.

While providing some evidence that leadership status can differentiate the behaviours of athlete leaders, the results also indicated that two of the athlete leader behaviours did not differ between statuses. As such, results also provide support for the shared leadership approach within Locke’s (2003) model. Specifically, results indicated that both Democratic Behaviour and Positive Feedback were displayed equally among athletes. In essence, all athletes reported consulting with their teammates before making a decision that affected the group, while also rewarding teammates for good performances. Although this finding may seem somewhat intuitive, as both democratic decision-making and positive feedback would be desirable among athletes regardless of status, this was the first study to our knowledge to statistically examine whether differences would emerge in leadership behaviours among athletes. As no differences emerged for these two behaviours, results provide additional insight into the shared nature of leadership in sport.

Most intriguingly, an examination of the means indicated that regardless of whether the participants self-identified as an athlete leader (formal/informal) or athlete non-leader (follower), all three groups rated the frequency of their leadership behaviours relatively high (i.e., above the mid-point on a five-point scale, see Table 1). Although we found significant differences for two of the leadership behaviours, the overall finding suggests that leadership is distributed equally among athletes. In essence, all athletes report themselves as engaging in leadership behaviours, regardless of if they are a leader or follower. In addition to research that has suggested every team member at some point occupies a role of followership (Benson et al., 2016), the current study adds to that knowledge by revealing that every team member, including followers, at some point perceives themselves as engaging in behaviours typically considered leadership behaviours.

Taken together, the results support Locke’s (2003) integrated model of leadership when applied to athlete leadership in sport. Specifically, Locke’s model indicates a top-down approach, whereby individuals
who have greater status (e.g., CEO or team captain) have the capacity to influence others who have lower status (e.g., employee or teammate). Further, the model also suggests that leadership can be distributed among individuals. That is, leadership can be "shared", and is a dynamic mutual process involving the emergence of both formal and informal leaders (Pearce, Manz, & Sims, 2009). Within the framework of shared leadership, all team members have the potential to be a leader contingent on the situation and the capacities of the individuals within that situation. Team members provide leadership when their background and strengths are required and will relinquish leadership to others when they are needed (Manz, Pearce, Mott, Henson, & Sims, 2013). Top-down or hierarchical leadership is still present with some individuals holding positions of responsibility (e.g., team captains) and making decisions when required, but the leadership process is fluid and can shift to other individuals (Locke, 2003; Manz et al., 2013). This aligns with research in organizational psychology, where group tasks were achieved through collective leadership (where a number of individuals emerged as leaders to guide a group through specific challenges; Friedrich et al., 2009). In sum, the findings from the present study indicate that both approaches to leadership (where a number of individuals emerged as leaders to guide a group through specific challenges; Friedrich et al., 2009). In sum, the findings from the present study indicate that both approaches to leadership (i.e., top-down, shared) are present within athlete leadership.

Given that all athletes engaged in leadership behaviours regardless of leadership status, the findings of this research have important implications for sport practitioners and researchers. More specifically, as athlete leadership behaviours have been positively related to perceptions of cohesion (Hardy, Eys, & Loughead, 2008; Price & Weiss, 2011, 2013; Vincer & Loughead, 2010), satisfaction (Eys et al., 2007), enjoyment (Price & Weiss, 2013), and collective efficacy (Price & Weiss, 2013), it would follow that leadership behaviours fostered in all athletes in order to influence individual and group outcomes. Therefore, coaches and sport psychology consultants should be aware of how athletes’ behaviours can influence aspects of the team environment and should provide opportunities for all athletes to develop their leadership abilities. For example, all athletes could be provided the opportunity to attend leadership development workshops to enhance their leadership skills. By allowing all athletes to develop leadership behaviours, athletes may begin to feel as though their leadership contributions to the team are benefiting the entire group. The results of this study further supports this idea by indicating that followers also viewed themselves as displaying leadership behaviours to a similar degree as their leader counterparts. In fact, recent research has found that athletes, regardless of leadership status, who attended leadership workshops over the course of a season, engaged in leadership behaviours more frequently and had greater perceptions of task motivational climate and athlete satisfaction at the end of the season (Duguay, Loughead, & Munroe-Chandler, 2016). Taken together, these findings suggest that followers may have the ability to influence the team environment, even if they do not regard themselves as a leader.

While the results of this research contribute to the athlete leadership literature, it is not without its limitations. The use of self-report measures may have resulted in response bias in terms of social desirability. In order to minimize this limitation, the questionnaires were distributed and returned to the investigator in unmarked envelopes and were completed independently by the athletes. Further, having self-rated measures for both predictor and criterion variables may have contributed to common method bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). While having coach- or peer-assessed leadership status/behaviours will avoid this issue in future work, results still provide an interesting insight into athletes' self-perceptions concerning leadership behaviours. Specifically, regardless of an individuals’ self-perceived leadership role (i.e., formal, informal, follower), all athletes’ perceived themselves as displaying leadership behaviours.

Further, as it is obvious within a team who is a formal leader (either they are a captain or they are not), individuals may have self-rated as an informal leader, so as not to be viewed as a follower (which may be associated with negative connotations). In order to circumvent this bias, participants were asked to read the definitions of the two leadership roles and then instructed to indicate whether they perceived themselves as being either a formal or informal leader. Individuals were also instructed to continue to the next section if they did not perceive themselves as occupying either of the leadership roles (i.e., leave the leadership role section blank). In this sense, participants were unaware that they would be categorized as a “follower" in this study if they opted to not choose one of the two options, as the follower was not a choice presented to the participants. This choice was
excluded in order to reduce the chance that participants would rate themselves as an informal leader to avoid being characterized as a “follower.”

Another limitation relates to the low internal consistency value found for the athlete leadership behaviour of Autocratic Behaviour. Thus, we were unable to examine whether this leadership behaviour might differ based on athlete leadership status. This low value has been reported in previous coaching leadership research (Murray, 2006; Westre & Weiss, 1991) and athlete leadership research (Paradis & Loughead, 2012). The low alpha value found may be the result of utilizing an inventory (i.e., LSS) that was originally designed to examine coaching leadership behaviours (Chelladurai & Saleh, 1980). Although responses to the athlete leader version of the LSS have supported its validity and reliability (Vincer & Loughead, 2010), previous studies examined athletes’ perceptions of their peers’ leader behaviours, whereas we measured athletes’ perceptions of their own leadership behaviours. Therefore, the items reflecting the dimension of Autocratic Behaviour may have been perceived as a negative behaviour and participants did not want to identify themselves as engaging in this type of behaviour. Conversely, the dimension of Autocratic Behaviour simply may not correctly reflect leadership behaviours displayed by athletes. Therefore, future research should examine whether the Autocratic Behaviour dimension of the LSS is relevant to athlete leaders.

Though the present study provides insight into leadership behaviours of athletes occupying different leadership roles, future directions can be suggested. This research was focused on examining the physical status attribute of leadership role (Jacob & Carron, 1996). Given that other attributes have been deemed to be important indicators of status, such as experience (Jacob & Carron, 1996), future research may wish to examine whether this variable distinguishes athlete leadership behaviours. For instance, Canadian intercollegiate sport is characterized by a five year eligibility rule for athletes. It would be interesting to determine which leadership behaviours are being used most frequently by athletes based on their eligibility at the intercollegiate level (1st year, 2nd year, 3rd year, and so on). This would help to determine which leadership behaviours should be targeted for intervention at different experience levels.

Although the purpose of the current study was to determine whether differences in leadership behaviour can be found based on leadership status, only four possible leadership behaviours were examined. As this study provides initial evidence that leadership occurs in both a hierarchical and lateral direction, future work may provide additional insight into this relationship by examining other athlete leader behaviours that have been identified (e.g., transformational leadership).

In summary, the results provided support for Locke’s (2003) integrated model of leadership as applied to athlete leadership. In particular, athlete leadership occurs in the traditional top-down approach, whereby those with greater status sometimes engaged in more leadership behaviours than those with lower status. However, the results also suggested that leadership is distributed among team members, such that individuals who did not identify themselves as a leader (i.e., followers) were providing similar levels of leadership behaviours. However, the mean ratings of leadership behaviour from all athletes were above the mid-point, suggesting that all athletes engage in leadership-type behaviours regardless of leadership status. As formal and informal athlete leader behaviours have been the focus of previous athlete leadership research, results indicate that followers’ behaviours should also be taken into consideration in future research.

Acknowledgments

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HIERARCHISCHES ODER GETEILTES LEADERSHIP? UNTERSUCHUNG DER UNTERSCHIEDE IN VERHALTENSWEISEN VON SPORT-LEADERN AUF GRUND DES LEADER-STATUS IM SPORT

Zusammenfassung


Schlüsselwörter: GETEILTES LEADERSHIP / GRUPPENDYNAMIK / SPORTTEAMS / STATUS / SPORTLEADER

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INTRA-SESSION AND INTER-SESSION RELIABILITY OF ELECTROMYOGRAPHY IN LEG EXTENSION DURING MAXIMUM VOLUNTARY ISOMETRIC CONTRACTIONS OF QUADRICEPS: THE EFFECT OF KNEE ANGLE

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Abstract
Numerous factors can influence the reliability of the signal obtained by electromyography EMG among which the type of contraction is practically fundamental. This study aimed to investigate intra- and inter-session reliability of EMG for maximal voluntary isometric contraction (MVIC) of the knee extensors at different joint angles. Nine healthy male students from the Faculty of Sport and Physical Education voluntarily joined the experiment. Main characteristics of the subjects were: age 23±1 years, body weight 80.8±7.8 kg and body height 182±7 cm. EMG signal from three surface heads of quadriceps femoris was recorded – vastus lateralis (VL), vastus medialis (VM), and rectus femoris (RF). Subjects had to perform 3 MVIC as fast as possible, as strong as possible at 6 different knee joint angles on 2 occasions separated by 7-8 days. The intra-class coefficient of correlation (ICC) was used to identify relative intra- and inter-session reliability, while standard error of measurement (SEM) was used to calculate the absolute reliability of each tested muscle. All muscles showed high intra-session reliability (ICC=0.488-0.988 and SEM=1.38-11.35). VL showed good inter-session reliability for most of the conditions (ICC=0.603-0.948), VM for two knee angles (ICC120°=0.764 and ICC130°=0.788), RF was not reliable for any knee angle. This study indicates that RF does not need to be used in EMG testing in leg extension MVIC due to lack of reliability between two sessions, and If EMG RMS from VL and VM will be tested, knee angle of 120° should be used for the testing.

Keywords: TESTING / BETWEEN-DAY / WITHIN-DAY / REPEATABILITY

INTRODUCTION
The surface electromyography (EMG) signal represents motor unit's neural activity recorded on the muscle's surface. Activation of the motor unit leads to contraction of every muscle fibre innervated by that motor unit which brings the production of the muscle force. Furthermore, the force produced by muscle partially is a result of the amount and timing of the motor unit activity (Wang and Butchman, 2002; Farina et al., 2014; Enoka and Duchateau, 2015). Numerous extrinsic and intrinsic factors can influence the quality of the signal obtained by the EMG: technical error, equipment error, learning effects, biological variance (Ball and Scurr, 2010; Burden, 2010; De Luca, 1997; Larsson, 2003). To overcome some of the factors and to make EMG signal comparable between the muscles and between tests, the signal should be normalized (Mirka, 1991; Burnett et al., 2007; Dankaerts et al., 2005). Because muscle activation varies with a change in joint angle, comparison of the EMG signal in different muscle lengths should be done with a normalized signal as a relativized level of muscle activity (Mirka, 1991; Merletti et al., 1999). Regarding practical applicability, the use of normalization method is needed for the reliability evaluation of the EMG signal.

In recent history, different approaches to reliability were reported. Mostly, reliability was investigated for different intensities (Campy et al., 2009; Larsson
et al., 2003; Mathur et al., 2005; Rainoldi et al., 2001; Smith et al., 2012). Campy et al (2009) examined the hamstring muscles at different contraction intensities and found high test-retest reliability coefficients (ICC=0.70-0.92 and SEM=9.72-24.94%) only for the medial hamstring across low to moderately high isometric contraction intensities, 10-60% of maximal voluntary contraction (MVC). In the same study, lateral hamstring muscle showed moderate reliability coefficient (ICC=0.57-0.68 and SEM=13.12-21.35%) only at low contraction intensities, 10-30% of MVC (Campy et al., 2009). Another study demonstrated high reliability (ICC=0.80-0.95 and SEM=9-69) for knee extensor muscles for two sets of 100 dynamic maximum concentric right knee extensions separated by 7-8 days (Larsson et al., 2003). Mathur et al (2005) investigated the reliability of median frequency and amplitude of EMG at 80% and 20% of maximal voluntary contraction held to exhaustion. For both, median frequency and amplitude, the initial, final and normalized EMG showed moderate to high reliability for vastus lateralis (VL), vastus medialis (VM) and rectus femoris (RF) at both contraction levels: ICC = 0.59–0.88 for MDF; ICC = 0.58–0.99 for amplitude (Mathur et al., 2005). Similarly, Rainoldi et al (2001) showed a high level of reliability (ICC>70%) for 50 seconds sustained contraction at 50% MVC. In the weight-bearing control study, Smith et al (2012) reported high inter-session reliability of the quadriceps muscles in most of the tested conditions, ICC=0.60-0.94. In the same study authors found similar results for the intra-session reliability because ICC was from 0.63-0.95.

When it comes to intra-session reliability, many studies showed moderate to high level of reliability, depending on the task used (Larsson et al., 1999; Fauth et al., 2010, Smoliga et al., 2010; Smith; 2012; Worrel et al., 1998). Larsson et al (1999) aimed to investigate the during-the-day reproducibility by using the protocol that involves 10 maximal dynamic extensions with a one-hour rest. They followed the EMG signal of VL, RF and VM and the results showed a high level of reliability for all muscles, ICC=0.83-0.98 but VL was the most reliable (Larsson et al., 1999). Another study of reliability included 3 different tasks maximal voluntary isometric contraction (MVIC), jump from the height and cutting and the reliability of EMG was very high with all ICC values greater than 0.80 (Fauth et al., 2005). Smoliga et al (2010) investigated the reliability of the EMG in competitive runners. They calculated ICC for 25 consecutive strides and found ICC>0.80 for 7 out of 13 tested muscles where VL and RF had ICC<0.80 with RF more reliable than VL, ICC for RF=0.794 and ICC for VL=0.394 (Smoliga et al., 2010). In the study with lateral step-up conditions, Worrel et al (1998) found high intra-session reliability with ICC ranging from 0.89-0.98 for VM and VL and 0.67-0.99 for hamstring and gluteus maximus. On the other side in the same study was reported that inter-session reliability ranged from poor to moderate with ICC ranging from 0.06-0.67 and 0.34-83 for the same muscle groups (Worrel et al., 1998).

Only 2 out of 9 above mentioned studies dealt with both, the inter- and intra-session reliability (Worrel et al., 1998; Smith et al., 2012) and they had different results. Both studies reported good EMG reliability for the intra-session repetitions, but one study reported poor to moderate reliability EMG for inter-session (Worrel et al., 1998) while another study reported moderate to high reliability of the EMG for inter-session design (Smith et al., 2012). It seems that there is a certain amount of the studies that explained reliability of the EMG in various study designs with different tasks. However, to our knowledge, there is a lack of the evidence exist regarding the reliability for the basic relationship muscle activity – muscle length (EMG – L), during MVIC. Also, not many studies dealt with both intra- and inter-session reliability, and there is an existing inconsistency with the results. Thus, more data regarding that matter is needed. Therefore, the purpose of this study was to investigate the effect of knee angle on intra-session and inter-session reliability of the EMG for MVIC. Four hypotheses will be tested: 1) intra-session will show high reliability across all knee angles and muscles; 2) inter-session reliability will have moderate to high level of reliability depending on the knee joint angle, and the muscle followed among which VL will be the most reliable.

**METHODS**

Since this study included 9 participants and two testing session, this study could be classified as a pilot study conducted by the laboratory principles using cluster sample (Hopkins, 2000).

**Participants**

Nine healthy male students from the Faculty of...
Sport and Physical Education voluntarily joined the experiment. Main characteristics of the subjects were: age 23±1 years, body weight 80.8±7.8 kg and body height 182±7 cm. All subjects were involved in physical activity minimum 3 times a week for last 3 years. There was no evidence of any knee injury or neurological disorders in their medical history. All participants were informed about the purpose of the study, and they could leave the study at any moment. The study was approved by the ethical committee of the Faculty of Sport and Physical Education following the Declaration of Helsinki regarding human experimentation.

**Equipment**

**Electrode placement**

EMG signal from three surface heads of the quadriceps femoris were recorded: VL, VM, and RF using surface Delsys Single differential Surface EMG sensors (Delsys Inc., Boston, MA). Electrodes were placed by Delsys manual guide (Delsys technical note 101: EMG sensor placement). A ground electrode was placed on the hip joint of the opposite leg. The skin was shaved at the location of the electrode placement, cleaned with alcohol, and lubricated with ultrasound gel for better electrical conductivity. The electrodes were placed on the most prominent point of the muscle belly following Delsys manual guide (De Luca, 2002). Electrode positions were marked on the skin by the waterproof marker so the day to day position can be controlled. To avoid cross-talk, electrodes were placed at the minimum of 3 cm from each other and tightly fixed with medical tape around the leg and over the electrodes, so there is no movement of the electrodes. Additional tapes were used to fix the cables.

**EMG signal acquisition and processing**

Single differential multichannel EMG amplifier of 1000Hz was used to register EMG signal. Sampling frequency was 2000Hz, and A/D converter with 12-bit precision in the voltage range of ±0.002V. Original Delsys software (Delsys EMG works 4.1) was used for signal processing. To estimate muscle activity level, root mean square (RMS) calculation was used. According to the De Luca (1997), RMS is a measure of the power of the EMG signal. Window length was 100ms with 80ms of overlapping. For further statistical analysis, first 2 seconds of each contraction were normalized relative to highest maximal voluntary contraction (MVC). The beginning of the contraction was followed by the fourth channel where foot switcher was connected. Foot switcher was positioned on the front edge of the tibia where the lower leg was in contact with the lever arm. The change in voltage caused by the pressure of the tibia on the lever arm was recorded, and it presented the beginning of the contraction.

**Familiarization and settings**

Subjects came to the laboratory on 2 occasions: one week before the first testing day and then 3 days before the first testing day to get familiar with the testing procedures. First familiarization session was used for the setting of the isokinetic chair (Kin-Com, Chattanooga Group, Inc. Chattanooga TN) according to subject’s anthropometry and to get familiar with the contraction mode. The horizontal position of the thigh was fixed for all participants, while the back support and whole chair were adjusted to fix the hip joint position in 90°. The axis of rotation of the dynamometer and the axis of the rotation of the knee joint were aligned by moving the head of the dynamometer. The same principle was used to parallelly align dynamometer lever arm and tibia. Two separate crossbelts were used to fix upper body to the armchair, one belt fixed hips to the chair, and one belt was used to fix the thigh to the chair. Force detection system was positioned 1cm above the lateral malleolus. The chair positions for every knee joint angle were marked and written down. Keeping the same position of the chair for both testing days kept technical error of the measurement at the minimum. Second familiarization session was used for getting more familiar with the contraction mode and for marking the places for electrodes placement.

**Testing procedure**

Before the testing, all participants did warm up protocol of 10 minutes cycling on the bicycle ergometer, followed by 3-5 minutes dynamic stretching. After stretching, electrodes were positioned and with fixed electrodes participants were positioned in already individually prepared Kin-Com dynamometer chair. Subjects had to perform 3 maximal voluntary isometric contractions (MVIC) as fast as possible, as strong as possible in 6 different, randomly selected, knee joint angles. Tested angles were 80°, 90°, 100°, 110°, 120°, and 130° of knee extension (angle between femur and tibia). Duration of each contraction was
3 seconds. Rest period between contractions was 45-60s. After the testing in one joint angle was finished, participants had 3-5 minutes of rest, and during that time, the next joint angle was set. Contraction correctness was controlled by the force output. Every contraction that contained stretch-shortening cycle or lasted less than 3s was repeated until 3 successful contractions were recorded. Subjects could see the force output so they can give their best in every contraction. Also, for better motivation, they were highly supported by the testing team. The identical protocol with the same order of knee angles has been conducted in both testing sessions.

**Statistical analysis**

All RMS values were written in Microsoft Excel for further analysis. The descriptive statistics for mean and standard deviation was conducted in Microsoft Excel. For reliability analysis software SPSS Statistics 17 was used. Intraclass Coefficient of Correlation with 95% confidence interval (ICC2,1 two-way random effect) was used to identify within and between-day reliability (Larsson et al., 2003), using p<0.05 level of significance. ICC has been chosen as a measure of relative reliability because it considers between and within-subject variance (Larsson et al., 2003; Mathur et al., 2005; Wier, 2005). ICC values of more than 0.75 represent high reliability, values of 0.60-0.74 represents medium reliability, and low or lack of the reliability would be for all values below 0.60 (Smith et al., 2012). For acceptable reliability level, the value of 0.75 was taken as per previous study (Dankaerts et al., 2004). Sometimes a negative ICC can occur which means that the within-subject variance exceeds the between-subject variance (Larsson et al., 2003; Rainoldi et al., 2001). Variability among subjects must be significant. If that is not the case, limits of the ICC do not match the theoretical limits of 0.0–1.0, and it cannot be considered valid. Practically, it is possible for ratios to range from negative to positive infinity. In that case, the alternative measure of reliability - standard error of measurement (SEM) was used to express the absolute reliability of the measure (Smith et al., 2012). Since there were two testing sessions and three trails for each knee angle, additionally paired-sample T-test was used to determine if differences in normalized EMG magnitudes occurred between testing sessions (Smith et al., 2012). One-way ANOVA was used to test if differences existed between three trails (Larsson et al., 1999). In both statistical analyses, the level of significance was set at α<0.05. The standard error of measurement (SEM) was used to calculate the absolute reliability between two testing sessions and is determined from the standard deviation of the scores. The smaller the SEM, the better result is (Wier, 2005; Mathur et al., 2005).

**RESULTS**

Simple descriptive statistics shows the differences between test-retest means and standard deviations of normalized EMG signal for each tested muscle. Figures 1-3 show that VL has the smallest differences between two testing sessions comparing to other two tested muscles. The smallest differences in VM occurred at the knee angle of 120° and 130° (Figure 2). In RF only knee angle of 110° seem to have a small difference between means (Figure 3).
Figure 1. Descriptive statistics for mean and standard deviation for both testing days in VL.

Figure 2. Descriptive statistics for mean and standard deviation for both testing days in VM.

Figure 3. Descriptive statistics for mean and standard deviation for both testing days in RF.
**Intra-session reliability**

Table 1 shows the results of absolute and relative intra-session reliability among 3 consecutive trials. ANOVA detected significant differences between means only in VL and VM at the knee angle of 110° (Sig=0.021 for VL and 0.011 for VM). Results for all other tested angles for each muscle did not show any significant difference in trail-trail means.

<table>
<thead>
<tr>
<th>Muscle</th>
<th>Knee angle</th>
<th>ANOVA Sig</th>
<th>ICC</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>VL</td>
<td>80</td>
<td>0.546</td>
<td>0.975</td>
<td>5.32</td>
</tr>
<tr>
<td>VM</td>
<td>80</td>
<td>0.898</td>
<td>0.976</td>
<td>1.85</td>
</tr>
<tr>
<td>RF</td>
<td>80</td>
<td>0.253</td>
<td>0.956</td>
<td>5.26</td>
</tr>
<tr>
<td>VL</td>
<td>90</td>
<td>0.684</td>
<td>0.979</td>
<td>6.64</td>
</tr>
<tr>
<td>VM</td>
<td>90</td>
<td>0.546</td>
<td>0.970</td>
<td>2.20</td>
</tr>
<tr>
<td>RF</td>
<td>90</td>
<td>0.793</td>
<td>0.962</td>
<td>2.99</td>
</tr>
<tr>
<td>VL</td>
<td>100</td>
<td>0.348</td>
<td>0.956</td>
<td>3.63</td>
</tr>
<tr>
<td>VM</td>
<td>100</td>
<td>0.590</td>
<td>0.966</td>
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</tr>
<tr>
<td>RF</td>
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<td>0.079</td>
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</tr>
<tr>
<td>VL</td>
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<td>0.021</td>
<td>0.988</td>
<td>3.60</td>
</tr>
<tr>
<td>VM</td>
<td>110</td>
<td>0.011</td>
<td>0.985</td>
<td>1.38</td>
</tr>
<tr>
<td>RF</td>
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<td>0.602</td>
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</tr>
<tr>
<td>VL</td>
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<td>0.600</td>
<td>0.982</td>
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</tr>
<tr>
<td>VM</td>
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<td>0.250</td>
<td>0.922</td>
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</tr>
<tr>
<td>RF</td>
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<td>0.448</td>
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</tr>
<tr>
<td>VL</td>
<td>130</td>
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</tr>
<tr>
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<td>0.955</td>
<td>3.61</td>
</tr>
<tr>
<td>RF</td>
<td>130</td>
<td>0.315</td>
<td>0.939</td>
<td>4.90</td>
</tr>
</tbody>
</table>

ICC results from table 1 indicate moderate to high reliability for all muscles across all joint except RF at 120° which is the only non-reliable trail-trail result in this study. ANOVA results for VL and VM from the angle of 110° are shown to be highly reliable according to ICC results (0.988 and 0.985 VL for VM). Furthermore, SEM values for these two muscles are smallest at the same angle (3.60 and 1.38, respectively). All SEM values were relatively low which makes that absolute intra-session reliability relatively high (Table 1). Almost all SEM results were in range of 1.38-7.28, except VL at 130° which was slightly higher (11.73). In other words, 95% confidence interval in which the true results of 3 consecutive trails are likely to fall is relatively narrow, which could also be an indicator of the good validity of EMG. Practically, when it comes to trail-trail analysis, use of EMG is a very precise method.

**Inter-session reliability**

Table 2 shows the results of absolute and relative inter-session reliability. According to T-test statistical analysis, VL mean values from 2 testing sessions are not significantly different for all tested knee joint angles with the highest \( p \)-value at 110° (\( p = 0.853 \)) and smallest at 100° (\( p = 0.163 \)). VM and RF also did not show a significant difference between means from two testing session except RF at the angle of 80° (\( p = 0.006 \)). The smallest difference for VM was found at the knee angle of 120°, and for RF at 110° (\( p = 0.869 \)). In terms of consistency, VL showed the most consistent reliability relative to knee joint angles, while in terms of the best reliability with the smallest difference between means VM showed the highest \( p \)-value at 120° of knee angle. Overall, T-test showed that VM had the lowest \( p \) values among 3 followed muscles except at the 120° of knee angle where VM was the most reliable muscle.
Comparing to T-test, ICC results showed similar results for VL muscle (Table 2). The only joint angle of 80° and 130° were slightly below the criterion value of 0.75 which was chosen as the lowest acceptable level of reliability for this study. In other words, VL showed very consistent reliability across the tested range of muscle length. On the other side, VM and RF differences between two sessions were insignificant in most of the angles in T-test which is not the case with ICC. According to ICC results, VM showed sufficient reliability only at the knee angles of 120° and 130° (ICC=0.788 and 0.764, respectively), while RF did not show reliability at all in any of tested knee angles. Additionally, results from SEM showed the lowest values right on the knee angles which were reliable either for VL or VM. The highest reliable SEM value found for VL at the angle of 110° (ICC=0.867, SEM=12.08) and the lowest was at 130° for VM (ICC=0.764, SEM=7.14) (Table 2). In other words, all reliable ICCs were in range of SEM from 7.14-12.08. Comparing to intra-session 95% confidence interval for inter-session is slightly but acceptably wider. However, it should be considered when using EMG analysis in testing sessions divided by one week.

**DISCUSSION**

**Intra-session reliability**

The results of this study showed that intra-session reliability is high for all tested muscles across all joint angles (ICC=0.795-0.988 and SEM=1.38-11.71), except RF at 120° (ICC=0.448). Similar results for ICC were reported in study that tested within-day reliability in voluntary isometric contraction (ICC=0.95 for VL, 0.97 for VM and 0.96 for RF), jump landings (ICC=0.90 for VL and VM, and 0.93 for RF) and cuttings with ICC=0.94 for VL, 0.88 for VM, and 0.78
for RF (Fauth et al., 2010). Additionally, Larsson et al (1999) investigated intra-session reliability on 3 sets of 10 dynamic contractions and found high reliability for VL, VM and RF with ICC=0.89-0.96 for the mean of ten contractions, and ICC=0.83-0.97 for the contractions with the highest peak torque. Moreover, their ANOVA results showed no difference among the sets in both cases, which goes in line with our results that showed insignificant differences between means in 3 consecutive trials in most of the cases. Only two p values in our study (VL and VM at 110°) showed significant differences but followed with high ICC which could be due to small sample size and corresponding big standard deviation. Smith et al (2012) found that intra-session reliability is moderate to high for most of the weight bearing force control conditions that were used. The lowest ICC was 0.34 and highest 0.94, but the majority of the results was above ICC of 0.75 with corresponding SEMS of not more than 0.20. Intra-session reliability in running for EMG RMS of VL and RF showed good reliability for RF but insufficient for VL with ICC=0.394 and 0.794, followed with SEM of 0.126 and 0.075 or normalized SEM=34.77 and 30.18 (Smoliga et al., 2012). It could be due to large standard deviations of the mean which reflects inter-subject variations due to differences in body composition or differences in motor patterns among individuals. (Smoliga et al., 2010). Furthermore, dynamic activity depends on variations in muscle length and shape, and therefore this affects EMG throughout soft tissue filtering since the distance between electrode placement and the active motor unit is cyclically changing (Smoliga et al., 2010).

Even though there are some variations in absolute and relative intra-session reliability results, our and other studies conducted in dynamic and isometric conditions showed high reliability of EMG for RMS between consecutive trails, when the electrodes once positioned had not been moved. When comparing isometric to dynamic contractions of leg extensor muscles, isometric conditions undoubtedly showed high reliability for all three surface heads. In that regard, the first hypothesis of this study has been shown to be true.

### Inter-session reliability

Inter-session reliability is shown to be moderate to high for VL at 90°, 100°, 110°, 120° (ICC=0.872-0.948 with SEM=7.30-9.09, respectively), and moderate for VM at 120° and 130° (ICC=0.764 and 0.788 with SEM=7.14 and 10.01). It was also observed that T-test generally indicated the smallest differences between means of VL comparing to VL and RF, which is additional evidence of EMG signal from VL being the most consistent among three tested muscles. The problem with T-test was that it showed non-significant differences between two testing sessions for most of the conditions. More precisely, only RF muscle at one knee angle was shown to have significant differences in means. This could be due to the nature of T-test which measures the straight-line association and not agreement between two measures which is not the appropriate way of estimating reliability (Larsson et al., 2001). That is why this study additionally employed ICC analysis that considers between and within-subject variance for relative reliability, and SEM for the absolute reliability which is determined from standard deviation of the scores from all subjects and ICC reliability coefficient (Larsson et al., 2003; Mathur et al., 2005; Wier, 2005).

Knee angle of 120° of showed highest reliability values for VL and VM while lengthening the muscle further resulted in lowered reliability levels for VM and lack of reliability for VL. Rectus femoris did not show reliable activation on any of tested angles. Mathur et al. (2005) reported day to day reliability to be low to very high (ICC=0.68 for VL, 0.88 for VM, and 0.91 for RF) during sustained contraction of 20% of MVC. They also reported a decreased level of reliability for RF and increased for VL, when the contraction intensity was set to 80% of MVC (ICC=0.66 for RF, 0.83 for VM, and 0.84 for VL). This was explained by the inverse correlation between force production and force variability - higher force shows higher within-subject variability which may affect day to day reliability (Mathur et al., 2005). In the study of Larsson et al. (2003), the results showed lack of reliability of three surface quadriceps heads when the RMS signal was normalized (ICC=-0.02 for VM, 0.43 for RF and 0.52 for VL). Even it was very low, normalized EMG reliability for VL in this study was higher than for VM and RF (Larsson et al., 2003). However, protocol in this study consisted of 100 dynamic movements where electrode position could be compromised, and it cannot be certain if the activation from the same motor units were recorded in every consecutive contraction. Also, authors used different normalization method which, as they said, should be further investigated (Larsson et al., 2003). Rainoldi et al (2001) reported similar results as ours. They used knee angle of
130° for isometric contraction and for amplitude variable only VL showed reliable activation. The probable cause for lack of repeatability of the activation pattern in VM could lie in the muscle fibre length, in the portion of VM where the electrode should be placed. Vastus medialis oblique is a small part of the VM close to the knee, and those fibres are short. Thus, day to day placement could influence the signal obtained (Rainoldi et al., 2001). The overlapping of the actin and myosin filaments seem to be the most optimal on these muscle lengths as well as the angle of the muscle attachment to the bone. Thus, Golgi tendon organ will not be neither excited nor inhibited. Furthermore, joint surfaces are in such position, so there is no high intra-articular pressure and anterior cruciate ligament is relatively relaxed which again removes excitation and inhibition reflexes that could influence the muscle activation (Gandevia & McKenzie, 1998; McGinty et al., 2000). It could be concluded that these knee joint angles might be the best positions for the acquisition of the EMG signal in quadriceps testing when the leg extension is planned to be used. These muscle lengths allow maximal muscle activation while other factors are minimalized.

Standard Error of Measurement has frequently been used as a measure of absolute reliability (Larsson et al., 2003; Campy et al., 2009; Mathur et al., 2005; Smith et al., 2012). Results of Larsson et al. (2003) were very different after they normalized EMG signal. When RMS was expressed in µV, RF, VM and VL showed high reliability (ICC=0.89 for RF, 0.88 for VM and 0.83 for VL) but the SEM values were very high (SEM=49, 49, 63). In other words, relative reliability was high but absolute was low. On the other side, when RMS was normalized, ICC showed lack of reliability with VL having the highest ICC, but the SEM values were much lower (SEM=17 for RF, 19 for VM, and 16 for VL). Campy et al. (2009) conducted the inter-session reliability for medial and lateral hamstring muscles at different contraction intensities. For every intensity that showed reliable results (ICC=0.77-0.92), SEM values were below 14 (SEM=9.72-13.57). Comparing to mentioned study, our results showed better relative reliability followed with the low corresponding absolute measure of reliability as well. Furthermore, results of Mathur et al. (2005) suggest that 80% MVC contraction intensity could be a better choice than 20% MVC for EMG investigations because relative reliability was similar for both intensities, but SEM showed better absolute reliability at 80% MVC. Even though ICC for RF at 20% MVC was higher, its SEM was lower as well as VM's and VL's SEM values (9.8-17.2 for 80% MVC vs 14.8-22 for 20% VMC) (Mathur et al., 2005). Note that most of the moderate to high ICC values were followed by SEM values less than 15, which is also the case in our study. Thus, this might be the evidence of the good validity of the approach and precision of the electrode placement.

It cannot be assumed that two muscles within a region or similar function will be equally reliable. The same holds true for the knee extensor muscles, namely with the VL being more reliable in RMS than other two tested muscles. However, VM also showed good reliability on 120° and 130° of knee joint angle. The discrepancy between reliable and non-reliable muscles could be due to consistency of muscle activation patterns between muscles crossing one joint versus the one crossing two joints. Comparing to the VL and VM, RF is a two-joint muscle which could cause the redundancy of the muscle activation in non-specific contraction conditions, and increased redundancy lowers the reliability. Contrary, natural pattern of the RF requires the adjustment of its activation in accordance with the hip-knee relation, and RF has been shown to doing it very reliably (Mathur et al., 2005; Stensdotter et al., 2003; Larsson et al., 2003; Smoliga et al., 2010). According to mentioned above, the conclusion could be made that inter-session reliability of normalized EMG RMS from MVIC is subject to various factors such as sample size, type of contraction, number of joints included, statistics used, and muscle length.

CONCLUSION

Our study dealt with the effect of muscle length on reliability, and the conclusion could be made that reliability between consecutive trials is not affected by the change of muscle length in any tested muscle. On the other side, when the testing sessions are divided by 7-8 days, change in muscle length does affect the reliability of both, single-joint and multi-joint muscles of quadriceps femoris during leg extension. Furthermore, the most reliable surface head of quadriceps femoris is shown to be vastus lateralis followed by vastus medialis, while rectus femoris did not show any reliability in activation. Thus, the second hypothesis of this study is also proved to be true because the
reliability of all tested muscles was affected by knee angle and VL was the most reliable among the tested muscles. Additionally, the angle of 120° of knee extension is shown to be the only angle reliable for both VL and VM which suggests that this angle might be a good choice for the leg extension testing if it includes MVIC and EMG.

This study was a short experimental investigation of possible methodological issues when electromyography is used in leg extension MVIC at different knee angles, and 2 practical advices could be made: 1) RF can be excluded due to lack of reliability; 2) If EMG RMS from VL and VM will be tested, knee angle of 120° should be used for the testing.

**LIMITATIONS**

Certain methodological limitations could influence the applicability of the results. The sample of the subjects was clustered which means participants were chosen by their physical ability to do the test. The age range of participants was very small, and the sample included only male participants, so the application of the results to older population or female population is not possible. All participants of this study were very fit with very low amount fat tissue, so application to more fatty or obese participants is questionable. This test with MVIC could not be conducted with the population that has any medical condition of the knee joint.

**ACKNOWLEDGEMENTS**

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ZUVERLÄSSIGKEIT DER ELEKTROMYOGRAFIE WÄHREND UND ZWISCHEN SETS BEI MAXIMALEN ISOMETRISCHEN KONTRAKTIONEN DES QUADRIZEPS: EINFLUSS DES GELENKWINKELS

Zusammenfassung:

Schlüsselwörter: TEST / ZUVERLÄSSIGKEIT / SET ZWISCHEN 7-8 TAGEN / SET IM LAUNE VON EINEM TAG

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THE CONNECTION OF PERFECTIONISM AND FLOW WITH ATHLETES OF A DIFFERENT PERFORMANCE LEVEL

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Abstract
Athletes often report on the experiences of absolute dedication and flow that represent an extraordinary experience and act motivatively. Motivation is a natural product of our essential desires and needs, and the flow as a mental state relieves us of fears of judgment, which can be a motivational component of the flow model. The aim of this research was to find out to what extent perfectionism and flow are present in a group of athletes, whether perfectionism and the flow experience are linked, and which socio-demographic variables they correlate with. The research involved 50 professional athletes with participation at all competitive levels, from local level competitions to world level competitions. The instruments applied are the Multidimensional scale of perfectionism, the Questionnaire of Flow, the Semi-Structured Interview and the Questionnaire on Socio-demographic Characteristics. Through interviews, we received data on situations and emotions during the flow experience, where close to 98% of the athletes stated that they were not aware of the flow experience during its occurrence, but they could retrospectively invoke that feeling which remained the greatest and lasting trophy of their success. Almost on all sub-scales of Multidimensional scale of perfectionism, athletes achieve higher results compared to the general population. The results of the research have shown that there is no correlation between the flow experience and perfectionism, except when it comes to the connection of the flow experience with concern due to errors and this relationship is negative.

Key words: PERFECTIONISM / FLOW / ATHLETES

INTRODUCTION

Perfectionism is usually defined as a tendency for infallibility in all aspects of life (Flett, Hewitt, 2002). Some authors consider that the perfectionism is a relationship that an individual makes with his environment, and the nature of that relationship depends on the type of support that serves to maintain a certain kind of perfectionist behavior. That's why they consider that perfectionism should be viewed more like a term that describes patterns of behaviour than as an immutable personality trait (Slade, Owens, 1998).

Not so long ago, in psychology, perfectionism was seen as a one-dimensional construct which could be a disturbing factor in all human functioning and achievement, but also a disturbing factor in the aspect of satisfaction with life and overall health (Beck et al., 1979; Accordino et al., 2000 Ashby, Rice, 2002). However, with recent research, many concepts of perfectionism have been developed which have multi-dimensionality as a common thread (Frost et al., 1990; Flett and Hewitt, 2002; Bieling, Israeli, Antony, 2004). However, results of the research which studied perfectionism as a multi-dimensional concept have shown that perfectionism does not bring a priori to negative outcomes, but can also have a positive impact on human functioning and achievement. Accordingly, the so-called positive and negative perfectionism are distinguished (Hamachek, 1978; Stoebcr, Otto, 2006; Fedewa, Burns, Gomez, 2005). Terry-Short, Owens, Slade and Dewey (1995), among others, suggest the theoretical basis for the difference between positive and negative perfectionism, the so-called a dual process model of perfectionism. According to these authors, the difference can be explained in accordance with Skiner's behavioral perspective that emphasizes the function of a certain behavior. Accordingly, the differences between the positive and the negative aspects of perfectionism are not in the behavior itself,
but rather result from different motivations in their basis. Positive perfectionism refers to cognitions and behaviors aimed at achieving high goals, in order to achieve positive consequences, and it is encouraged by positive support and the desire for success. Negative perfectionism refers to cognitions and behaviors aimed at achieving high goals in order to avoid negative consequences, and is encouraged by negative support and fear of failure, therefore is often accompanied by fear, too high standards and frustrations.

Frost et al. (1990) distinguishes the following dimensions of perfectionism: excessively high personal standards, concern about performance errors, the suspicion of the quality of personal performance, the perception of parental expectations and parental criticality, and the excessive need for precision, organization and order, resulting in the construction of Multidimensional Perfectionism Scale (Multidimensional Perfectionism Scale, MPS-F) (Frost et al., 1990).

The author Csikszentmihalyi describes flow as a complete commitment to one activity. The state of the flow is accompanied by an extraordinary concentration, the focus of attention is only on a given activity, and the person experiences a feeling of happiness and pleasure at the same time (Csikszentmihalyi, 2006). There are several factors that stimulate the state of flow: clear goals of unambiguous feedback and the balance between capabilities and tasks. Ceja and Navaro (Ceja, Navaro, 2009) argue that there are other factors that can influence the occurrence of flow: the greater possibility that requests are experienced as challenges, and not as a threat, and a feeling of coherence and meaning. According to Baumann and Scheffer (Baumann, Scheffer, 2010), the predictive circumstance of experiencing flow is given to individuals with a motive for achieving the flow. The motive for achieving flow is derived from various actions that individuals have learned to apply in specific situations, and are made up of two motives: a motive to look for challenges and a motive to solve problems.

In flow, there are several dimensions that characterize or contribute to this feeling (Nakamura and Csikszentmihalyi, 2002). These factors are as follows: 1) A challenging activity that requires skills or a balance between opportunities and challenges; 2) State of mind and activity; 3) Loss of self awareness - the flow requires maximum concentration and focus on a particular activity; 4) Clear Goals - help to complete commitment to particular activity; 5) Concentration and focusing - it involves dealing with certain activities that at the given moments require complete commitment, which at the same time does not allow the thinking about anything else; 6) A sense of control over the situation - people do not enjoy being in control, but in the sense of achieving control in difficult situations. A feeling of flow is also the feeling that a certain skill is completely ruled. 7) A changed sense of time - the subjective sense of time during the flow does not look like a real, objectively measured time; 8) Feedback, a direct and immediate reaction to stimulation - success and failure are obvious in the activity, so that behavior can be adapted to the new situation in time; 9) Activity itself is rewarding - satisfaction arises from performing certain activities. It is about intrinsic motivation, which does not require any external rewards.

On the basis of everything that has been said about perfectionism and the flow experience, it is clear why these concepts are closely related to sports. Sports activities, especially those related to professional sports which involve competitive activities, at the same time involve high abilities, a tendency to be the best and an attempt to outperform any established personal or external standard. On the other hand, well trained, high intrinsic motivation and complete dedication are often the correlates of the flow experience and often present in sports.

Therefore athletes are constantly facing dilemmas because: (according to Bajraktarević, 2008):

• an athlete can (and should) be unique and unrepeatable, but at the same time he is expected and asked to be like everyone else;
• an athlete needs to prove as much as possible superiority over his opponent, but to respect him at the same time;
• an athlete should set his competitive aspirations very high and very real at the same time.

It is exactly internal conflicts that athletes have in trying to respond to demands during the achievement of competitive results that causes greater anxiety and the need for constant growth and development of cognitive, emotional and personality traits that can contribute to success in sports. Therefore, the aim of this paper is to examine whether perfectionism is present through its multidimensional constructs in athletes, whether the flow is related to sporting situations and in what connection the flow experience and perfectionism defined as a multi-dimensional construct are.
THE METHOD

Respondents
The research involved 50 athletes of different performance categories. The sample consisted of 38 (76%) male respondents and 12 (24%) female respondents, the average age of 23 (M=22.80, 16-41; N=50).

The average length of the sports service is 12 years (M = 11.68, N = 50). The largest number of respondents, 100% of them, participated in local level competitions, 98% participated in national level competitions, 94% of respondents participated in international level competitions, while 38% participated in the world level competitions (N = 50). The survey was conducted in November and December 2013, on a sample from the South-West Serbia. The data were collected during home visits or visiting clubs of respondents.

Instruments

Multidimensional Perfectionism Scale
The multidimensional perfectionism scale (MPS-F; Frost et. 1995) consists of 35 claims that measure perfectionism through six dimensions. Dimension Personal Standards is conceived as very high personal standards and the overriding importance attached to these high standards in self-evaluation. Dimension Concerns about errors is conceived as negative reactions to errors, the tendency to interpret the error as equal to failures, and the tendency to believe that a person will lose respect of others after the failure. A tendency towards the belief that parents of some athletes set high goals and that they are overly critical comprise the dimension Parental Expectations, or Parental Objections. Dimension Suspicion in personal performances is described as a feeling of insecurity in personal actions or thinking, and as a tendency to feel that tasks are not satisfactorily completed. Emphasis on importance and preference of order and organization constitutes the last component of perfectionism, called Organization. The scale has satisfactory reliability, and the coefficient of internal coincidence ranges from 0.77 to 0.93 in our study α = 0.81. According to the obtained results, the subscales show satisfactory reliability: Concerns about errors - 0.85; Organization - 0.87; Parental expectations - 0.79; Personal standards - 0.79; Suspicion in personal performances - 0.77; Parental objections - 0.60. The respondent responds by evaluating the degree of agreement with individual items on the 5-degree Likert's type scale (from 1 – I completely agree to 5 – I completely disagree). The total score is calculated as the sum of the matching points with individual items on all subscales except for the subscale Organization. Items related to Organization are not taken into account when calculating the overall scale result due to the low correlations of that subscale with other subscales, as well as with the sum of all the items of perfectionism scale.

The flow experience questionnaire
Flow experience questionnaire authors Csikszentmihaly & Csikszentmihaly, 1988, consists of 11 claims, but due to the specificity of the sample, we selected the six items we used in this study. In order to leave the space for supplementing the state of flow through a semi-structured interview, by adjusting the questionnaire we tended to increase the objectivity of the results. The reliability of the flow questionnaire restructured for this study was checked by the coefficient of internal coexistence, and the custom questionnaire has satisfactory reliability with α = 0.891. The respondent responds by evaluating the degree of agreement with individual items on the 5-degree Likert's type scale (from 1 - does not look like me to at all to 5 - very similar to me). The total result is equal to the sum of the values given by the respondent.

Semi-structured interview
In order to get a fuller picture of the respondents and their ability to reach the state of flow, we used a semi-structured interview. During the research, respondents reported on their own experiences, feelings and activities when performing.

Questionnaire on sociodemographic features
The questionnaire was designed for the research purposes. Through this questionnaire, we tried to get basic information about athletes such as the category of sport (individual or group), the number of participations in the competitions, the motives for dealing with sports and the years spent in sports.
RESULTS AND DISCUSSION

Qualitative processing of results

The athletes who took part in this research show a certain tendency to achieve the flow experience through a total score on the scale of 22,54 (M = 22.54, SD = 3.42). Starting from the assumption that the theoretical range of results on a scale is from 0 to 30, the achieved result observed through the average value can indicate the inclination of athletes to experience the state of flow. We tested the results on the scale with a semi-structured interview.

During the interview, we tried to find out from the respondents whether they had experienced a state of flow. Since the flow is a state an individual is not aware of in the moment of experiencing, this experience can only be discussed when it is over and when we look at it from a certain time distance. Therefore, during the interview, we tried to find out how individuals describe this experience. Almost all of the interviewed athletes reported on the same feelings, thoughts, the conditions through which they passed and which they experienced during the flow. Furthermore, the flow is characterized by the state of focus and concentration. During the interview, most athletes reported on the visualization of winning, medals, goals scored as motivation factors to persevere in their efforts and achieve a sense of euphoria over the victory. Internal control locus and intrinsic motivation help when attaining a state of flow.

However, for the success achieved, besides the athlete, its environment and the support it has from others is significant. Table 1 gives a percentage view of social support, significance of others, which athletes evaluated in relation to their importance.

Table 1. Support sources for athletes

<table>
<thead>
<tr>
<th>Support</th>
<th>Involvement (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parents</td>
<td>55</td>
</tr>
<tr>
<td>Coach</td>
<td>37</td>
</tr>
<tr>
<td>Friends</td>
<td>5</td>
</tr>
<tr>
<td>Audience</td>
<td>3</td>
</tr>
</tbody>
</table>

During the interview, athletes reported that their success was the result of persistent and hard work, and that only genuine love for sports was a supporting factor and a condition for achieving a state of flow. Table 2 shows the factors of motivation for dealing with sports.

Table 2. Factors that affect motivation expressed in percentages

| Factors of motivation * ( * Answers to the question: "I'm dealing with sports due to.."
<table>
<thead>
<tr>
<th>Part (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
</tr>
<tr>
<td>Awards</td>
</tr>
<tr>
<td>Friendships</td>
</tr>
<tr>
<td>True love for sports</td>
</tr>
</tbody>
</table>

Perfectionism and the flow experience

We used descriptive statistics and correlation to examine the relationship between perfectionism and the state of flow. The results were processed in the SPSS 18.0 statistic program.

Table 3 shows the descriptive values of the results obtained on Perfectionism scale's subscales. According to our results, the total values of all subscales are increased relative to the standard values.

Table 3. Arithmetic mean of achieved results on sub-scales of Multidimensional Perfectionism Scale

<table>
<thead>
<tr>
<th>Sub-scales</th>
<th>Arithmetic mean of the author of the scale</th>
<th>Arithmetic mean on a sample of athletes</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concern for error</td>
<td>18,52</td>
<td>22,36</td>
<td>8,09</td>
</tr>
<tr>
<td>Organization</td>
<td>21,97</td>
<td>27,12</td>
<td>2,88</td>
</tr>
<tr>
<td>Parental expectations</td>
<td>11,71</td>
<td>15,64</td>
<td>4,35</td>
</tr>
<tr>
<td>Personal standards</td>
<td>20,77</td>
<td>27,96</td>
<td>3,70</td>
</tr>
<tr>
<td>Suspicion in personal ability</td>
<td>10,08</td>
<td>10,00</td>
<td>3,54</td>
</tr>
<tr>
<td>Parental objections</td>
<td>7,34</td>
<td>10,48</td>
<td>2,76</td>
</tr>
</tbody>
</table>
The results of our research have shown that in almost all subscales of the MPS-F scale, our respondents have increased scores in relation to the arithmetic mean obtained by validating the scale.

On the scale Concerns for errors where concern due to errors is defined as negative reactions to errors, the tendency to interpret the error as equal to failures, and the tendency to believe that a person will lose respect of others after the failure, respondents have achieved a high score. Since the interpretation of the failure is equal to failure, athletes obviously have difficulty to accept the failure and mistakes they make.

On the subscale Parental expectations athletes also showed significantly higher scores than on the standard test results. A tendency towards the belief that parents of individuals set high goals and that they are overly critical comprise the dimension of Parental Expectations or Parental Objections. The literature often states that three elements are responsible for the success of an athlete: the abilities of the athlete, parents and the coach (Barjaktarević, 2008) but the personal capacity of an individual, investing in physical and tactical preparation, as well as developing motivation for achieving are also additional elements of success. According to the results of our research, a qualitative analysis showed that most athletes indicated that their parents and coach were their biggest support. However, we are often the witnesses of the indirect role of parents, namely, their overwhelming desire for success, possible dreams that did not come true or that they still have, lack of cooperation with the coach and, most importantly, the constant expectations for the best results from the athlete, they create pressure with the athlete (Rice, Ashby, Preusser; 1996). In the process of growing an athlete, the need for parents to be with him and to understand him is one of the basic needs that provides the child with security and stability, where every decision of the child is created in cooperation with parents who are sufficiently involved in the situation. The involvement of parents in the training process is a crucial component that reduces the discrepancy between athletes, parents and coach, which reduces objections, and therefore expectations (Barjaktarević, 2008).

One of the most sensitive subscales for testing perfectionism is the subscale Personal Standards. According to Greblo (Greblo, 2012), advocating the idea that a multi-dimensional approach to the study of perfectionism is necessary (Hewitt et al 2003) he refers to early theorists who reported on the importance of the interpersonal aspect of perfectionism (Hamachek, 1978), and emphasizes that self-evaluation of perfectionists, above all, depends on the perception of the level of acceptance by significant others, and not exclusively about (un)achievement of high standards of achievement. In addition to this, perfectionists often require others to achieve high goals, which can also determine the characteristics of their psychosocial adaptation (Habke, Flynn, 2002). Generally speaking, athletes with high personal standards tend to re-evaluate the goals achieved they often declare as insufficient and easily achievable goals, which increases the risk of developing various difficulties.

However, what is particularly relevant to our sample is that there is no doubt in personal ability. Dimension Suspicion in personal performances is described as a feeling of insecurity in personal actions or thinking, as well as a tendency to feel that tasks are not satisfactorily completed. Obviously, engaging in sports activities contributes to self-confidence (Barjaktarević, 2008).

The correlation between perfectionism and the state of flow was also examined. The results are shown in Table 4.

Table 4. Correlation of the subscales of multi-dimensional perfectionism scale with a flow experience

<table>
<thead>
<tr>
<th>Sub-scale</th>
<th>Flow experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Concern for errors</td>
<td>-0.152**</td>
</tr>
<tr>
<td>2. Organization</td>
<td>0.108*</td>
</tr>
<tr>
<td>3. Parental expectations</td>
<td>0.096</td>
</tr>
<tr>
<td>4. Personal standards</td>
<td>0.059</td>
</tr>
<tr>
<td>5. Suspicion in personal performance</td>
<td>0.013</td>
</tr>
<tr>
<td>6. Parental objections</td>
<td>0.013</td>
</tr>
</tbody>
</table>

*p<0.05 ; **p <0.01

Generally, the results indicate a very weak linkage of the flow experience with perfectionism. When it comes to certain subscales, statistically significant correlations are missing. Statistically significant, but low, negative correlation of the Flow experience with the Concern about errors subscale was obtained. The flow experience implies a certain spontaneity, seizing the moment (to which the etymological significance of the word implies as well) (Nakamura and Csikszentmihalyi, 2002), while Concern about errors implies a desire for perfection filled with fear of possible
mistakes, which leaves no space to any kind of relaxation. The flow experience is in a positive statistically significant connection with Organization. The correlation obtained is low, but it suggests that a certain measure of order, work and control over oneself and their own time is probably one of the correlates of a superior experience.

The flow experience of the athlete can act motivating and therefore needs to be nurtured and encouraged. It would be important to suggest coaches and sports workers that the excitement of the flow experience through frequent praise, patience, meeting the needs of athletes, is important for the formation of intricative motivation. Intricative motivation has long-term effects on the formation of an athlete’s personality, and spontaneously on the success of the athlete himself as well.

CONCLUSION

Although there is a tendency to observe perfectionism as an aggravating factor for athletes, we must accept that the inclination to perfectionism has good sides, especially if we take into account its adaptive forms. The possibility to develop adaptive perfectionism is characteristic for athletes who strive for perfection, but only for personal reasons and intrinsic motives. Our sample showed that the true motive that drives them in sports is true love for sports. However, it is obvious that we must consider the pressure of parents and significant others as a significant factor. Striving for infallibility contributes to achieving top results, but does not provide a supreme experiences that are invaluable prize and motivating factor by themselves.

Notes:
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Zusammenfassung:

Schlüsselwörter: PERFEKTIONISMUS / ERGRIFENHEIT / SPORTLER

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STEVAN TODOROVIĆ, LIFE AND WORK OF A PERFORMER, ARTIST, EDUCATOR AND FOUNDER OF ORGANIZED SPORT IN SERBIA

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Abstract
In 2017, 160 years were marked since the beginning of the organized physical exercise (1857) and 126 years since the emergence of Sokol movement in Serbia (1891). The great contribution of Academics Steva Todorovic, Dr. Vladan Djordjevic and Dr. Vojislav Rasic to the beginning and development of physical culture in the Principality and the Kingdom of Serbia, was evoked. 160 years since the arrival of Academic Stevan Todorovic in the capital of Belgrade, in which he started his cultural and enlightenment work in 1857, was also denoted. At the „School of Painting” which he opened, „Group for Gymnastics and Fighting” was also founded, as the first organized association for physical exercise. This Group preceded the idea of acceptance of „Sokolstvo”, the development of modern sport and the affirmation of physical culture in Serbia. The aim of this paper is to highlight the contribution of academic Steva Todorovic to the overall cultural and educational progress of Serbia, including physical culture. The historical method was compiled of authentic documents from 1899, 1908, 1912, 1927, 1938 which were not available and known to the wider and professional public, gymnastic and Sokol membership.

Key Words: STEVAN TODOROVIC / PHYSICAL CULTURE / EDUCATION / CULTURE / ART / SERBIA

INTRODUCTION
Among the prominent promoters of physical exercising in Serbia, who are even today, after more than a century, considered charismatic visionaries of gymnastic and Sokol exercising, we include Vladan Đorđević, Vojislav Rašić, Laza Popović, Miroslav Vojinović... However, among these famous beginnings of the physical exercising movement, we must add one more great man of Serbian gymnastics and Sokol movement, as their true founder – Stevan “Steva” Todorović (Vukašinović, 2016). He was the first to leave and impress an undeniable and strong mark, in his own manner, on the emergence of organised physical exercising and founding and development of civilian gymnastic and cultural societies in the framework of socio-cultural changes in Serbia from the middle of the 19th and until the beginning of the 20th century.
Stevan was born in Novi Sad, in a family with seven children – four sons and three daughters. The tobacco trade brought to the family a significant income until 1937, when their shop and house burnt in a great fire. Stevan enrolled at a Novi Sad elementary school, but when he was seven, he moved with his parents to Szeged, where his parents bought a warm and a cold public bath by the Tisa river. Between 1839 and 1846 he finished elementary school in Szeged and five years of high school. At the Serbian Elementary School, supported by the Serbian Orthodox Church, Steva learned to write according to the orthography of Vuk Karadžić from the deacon Dimitrije Popović. The educational influence of this teacher, who was famous for being a cousin of Đura Daničić and Karadžić’s supporter in the reform of the Serbian language and orthography, was enormous during the school years of the gifted and erudite Todorović (Simić, 1951). The famous gymnastics and martial arts teacher at the Szeged High School, Đorđe Marković Koder, also had a huge influence on Stevan’s life (Todorović, 1968). The young high school student was impressed by gymnastics and fencing and this would be important for the building of Todorović’s personality, which the future would confirm.

In the middle of 1846 his father took him to Vienna for further education and there he finished the sixth and seventh year of high school. After the graduation he enrolled at the Vienna Lyceum, where he studied philosophy. When the 1848 Revolution erupted, he was recruited into the student regiment, which allowed him to support himself, since his contact with his family was interrupted by the war, and because his father had died some time earlier that same year, without him knowing.

After the defeat of the revolution in 1849 Steva returned from Vienna and went to Belgrade to his uncle who took care of his further education. In his brewery he learned how to produce beer, but every free moment he used “to draw and paint with watercolours, every wall was covered with his works”. The uncle, recognising Steva’s talent and his, since childhood, only desire – to become a painter, took him to Vienna in 1850 and enrolled him at the second semester of the Academy of Fine Arts.

The life circumstances in his youth were not inclined towards Todorović, but he made his path on his own during his school years, without a scholarship. Six weeks after the enrolment at the Academy his uncle died and Steva lost a monthly income of 150 forints. He returned to Belgrade to inherit his uncle’s property, only to find his uncle’s house robbed. Soon after, both the house and the brewery were taken from him by a banker and a pasha, and the entire scheme was devised by Steva’s lawyer. After his return to Vienna, Steva enrolled at Professor Waldmüller’s private school. The assistance from his mother was not enough to pay for his education and he was forced to support himself until the end of 1852 by giving private drawing and singing lessons. His inseparable friend Kornelije Stanković with whom he shared a flat, taught him to sing, because he was a wonderful baritone, and while he studied in Vienna some suggested that he should study opera singing (Simić, 1951).

This was a difficult period for Steva. Without any income he returned to his mother in Szeged, and then went to Vienna, after which he enrolled at the Munich Academy of Fine Arts (at the end of 1853), but after nine months, because of lack of money, he returned to study in Vienna (1854) with the famous professor Carl Rahl. In the meantime, he spent his money once more and returned to Szeged to visit his mother and earn more for his studies. He painted portraits in several places in Vojvodina and went to Novi Sad (in the fall of 1855) where he spent ten months. With the teachers of the Serbian High School Đorđe Natošević, Jovan Gavrilović and Jovan Đorđević he practiced gymnastics and fencing in the High School gymnastics department and there he discussed the importance of exercising. In the spring of 1856 he joined Kornelije Stanković as a “sonorous” baritone at his concerts in larger towns and he got a third of their earnings to continue his studies. Steva became a fa-
mous baritone who "always left a great impression at concerts", and in the fall of 1856 he had a very successful concert in Belgrade, "when all the cultured Belgrade met him for the first time". He went to Vienna once again and stayed in Carl Rahl's school until April 1857, where he was remembered as the most successful among the first Serbian painters (Todorović, 1899; Jeftimijades, 1938; Simić, 1951).

STEVAN TODOROVIĆ, PERFORMER AND GYMNASICS, MARTIAL ARTS, SINGING TEACHER

During his stay in Munich Steva practiced gymnastics and fencing. That was a good opportunity for him to get directly introduced to the system of German tournament gymnastics, as well as to the organisation and methodology of private institutes for exercising. It was probably there that he got the idea to establish a similar association upon his return to Serbia. Destined for wider vocations, Todorović had other interests also. While studying in Vienna, in the circles of the progressive Serbian youth he talked about "the culture which our people are in need of", the educational importance of art, physical exercising, music, singing, and theatre” as national tasks of the young Serbian intelligentsia "which will make sacrifices for the sake of future generations" (Simić, 1951), so as to catch up with the advanced European nations.

Next year Steva permanently settled in Belgrade (May 1857), and since he was tireless and entrepreneurial he immediately opened the Painting School in Kosančićev venac St., in the house of the iconographer Milija Marković Raspop. In his private "institute" he taught the Lyceum students to draw, paint, sing, he told and interpreted the Iliad for them, reciting Shakespeare's tragedies, and as a great aficionado of physical exercising, he taught them gymnastics and fencing, all for free. On his enthusiasm Steva wrote the following in his Autobiography:

"I immediately set down to expand my work beside painting to all other necessities, and especially to introduce harmonic singing and physical exercising as the basis for a healthy body and spirit. But much needed to be done to improve the neglected home education" […] "The physical exercising proceeded difficult in the beginning, because Belgrade populace did not understand the benefits of this, and there was even disapproval."

He grouped Lyceum students according to their talents and interests, and soon the Company for Gymnastics and Martial Arts was formed, later renamed the First Serbian Association for Gymnastics and Martial Arts (1857). Practising gymnastics and fencing, the Company quickly gained favour and great popularity among the students, and it even received support from Prince Mihailo Obrenović. Young intellectuals who would later hold important positions in Serbian politics, science and education – Vladan Đorđević, Miloš S. Milojević, Milan Kujundžić, Čedomir „Čeda” Mijatović, Ljubomir Kaljević, Steva Popović „Crni”, Andra Nikolić, and others – also practised gymnastics there (Đorđević, 1927; Petrović, 1983).

"Šćeva", as he was nicknamed by his students, endeavoured to diversely educate the youth in a patriotic spirit. He devoted a lot of time to them, beside his painting, seeing in them the bearers of future changes in Serbia. Šćeva's former student, the writer Čeda Mijatović, later wrote how it had all begun in New Spark in 1900 (Jeftimijades, 1938):

"He taught us to swim in the waves of music, to emerge from them rejuvenated, with our souls cleaner and nobler. However, his workshop soon became to us a true academy for skills, literature, aesthetics and morality. We visited him at any time of day, early in the morning and late in the evening. We stood around him, observing him while he worked and listening to him." […] "He was jovial, always jocund, witty, spirited..." […] “One merciful and fortunate thought en-
sured that this self-sown academy develop and take us to higher planes.” [...] “That was when Steva started organising music and aesthetics nights where there would be singing and an issue from literature and aesthetics would be discussed. Practically unintentionally he became our dear and great teacher. When he had realised this himself, then, to make a full circle of our education, he began teaching us drawing and gymnastics. That was how we were fortunate to, from 1857, go for free to a school, which was as priceless as gold, and which had no peer before and after. When Steva had gathered around himself and impressed a significant number of young men, in the autumn of 1857, in conjunction with them, he established a association for physical exercising named The First Serbian Association for Gymnastics and Martial Arts.

THE FIRST SERBIAN GYMNASTICS ASSOCIATION AND GYM

That 1857 Belgraders were proud that their town was among the first Slavic cities to have its own gymnastic association, and their thanks went to the young academic painter Stevan Todorović, who stood in the first ranks of the young Serbian bourgeoisie when cultural societies started being established (Jovanović, 1957). He taught in his workshop, and when the number of students had grown he addressed Belgraders in the press to help him with that useful endeavour. That was how exercising continued in Sava Spahija’s warehouse near St. Michael’s Cathedral. That was how the first gym in Belgrade came to be.

In spite of objections to these activities from the public, such as a parent report to the police that “such games are being played that children could break arms and legs”, Steva managed to deal with these difficulties relying on his connections, since among his students there were also children of important figures. When it came to a one-day ban, the Minister of Education Kosta Nikolajević intervened (Simić, 1951).

Encouraged by this success Steva asked the Prince to help him by sending him on a study and professional development trip to Rome, for a year or two. The Prince granted this wish and advised him to wait further instruction in Vienna, but, because of a scheme of a palace administrator Steva did not receive this help, and because he was already in Vienna he spent his savings while waiting for the promised help. He did not lose the desire to learn more even on this occasion, and so he spent time visiting Professor Rahl’s school. He lived with “his good friend” Kornelije Stanković1 until the middle of the 1861 summer, while Jovan Bošković2 helped him to find money to return to Belgrade. In Belgrade, he settled in the “Kruna” inn, and after two months he found himself in even greater debt. Since he could not pay the expenses, the innkeeper sold his paintings and equipment in the market.

Photo 3. The building of Turkish han (Belgrade)

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1 Kornelije Stanković, the first Serbian educated composer, conductor, pianist, music writer.
2 Jovan Bošković, at the time professor of Grammar School, linguist, educator at the court of Obrenovic, theater critic, professor of the High School, member of the Serbian Royal Academy, Minister of Education.
Gaining the Obrenović favour, at the beginning of November 1861 Todorović became the tutor to Prince Mihailo’s ten-year-old illegitimate son, Velimir Todorović. That was probably one more reason why Steva got a good pay and a large apartment with a balcony and two chambers, for his studio and gym, in the “Staro zdanje” hotel (in the 7. juli St. at the modern day location of the National Bank of Serbia) where he could also place modern gymnastics equipment even in winter. In the summer of 1862, at his own expense, the Prince also built the summer exercising grounds near the Kalemegdan Fortress – across Realka school, at the modern day location of the Serbian Academy of Sciences and Arts – with the most modern exercising equipment (Trujić, 1976). Steva’s gymnastics association operated until 1864. Intensive work in the well-equipped gym and in the exercising grounds in the open continually attracted new members, middle school students, and so the number of students in his School grew to 80.

At the beginning of 1861 Steva started teaching, beside Velimir, other students chosen by the Prince, and his contract stipulated that this work should last for six years. In his “Staro zdanje” apartment, he taught drawing, singing, gymnastics and fencing, while for other subjects – foreign languages, piano and others – he hired “particular” teachers. In these groups there were even girls. The Prince allowed that Todorović's students could be joined in their exercises in the gym and on the summer exercising grounds by high school students. During the summer break, he took the students on study trips to Italy, France and Switzerland, and they kept journals, which would be handed to the Prince upon their return to Serbia. This is what Steva wrote about that:

“The first thing I would do was examine my students’ home education and knowledge acquired at school” […] “It required a great effort on my part to tame these little savages, to form in them the sense for noble deeds, and particularly the love for Serbia and the fatherland.”

Steva marked the beginning of this pedagogical work as a turning point in his life, remembering “the miserable past” and difficult moments from his youth. This all happened at the moment of great dejection due to penilessness, when he was dependent upon the help of his friend Jovan Bošković, for his life to suddenly become more carefree, filled with acquaintances and recommendations: “And only now did I see what this world is like: now when I had everything in abundance, offers came from all sides even for my dear painting” (Simić, 1951).

Steva also considered a turning point in his life, his marriage to Poleksija Ban, the daughter of the poet and dramatist Matija Ban. Poleksija was one of Steva’s students, who charmed him with her talent for painting and her pleasant spirit, though he was also flattered that she was the daughter of a famous poet, writer and politician. Their joint and extensive work would bring him the realisation of great ambitions in painting. The Prince allowed him to stop teaching and unexpectedly rewarded him with a wedding gift of two thousand ducats, and thus helped him to go to a honeymoon. This trip served Steva and Poleksija’s further professional development in Florence and Rome, where they copied the works of classical artists – Raphael, Titian, Rubens, Leonardo da Vinci, Michelangelo, Giorgione and others (1864-1865) (Simić, 1951).

In the spring of 1865 Steva accepted the position of the assistant professor for free-hand drawing at the newly founded Technical Faculty of the Belgrade Higher School. In September he was already appointed as the drawing teacher in a Belgrade high school, and after two months he received a permanent employment in Realka (Todorović, 1899). That was how, in spite of considering painting his life’s call, Steva would spend his life working as a teacher, from 1865, until 1894, when he was let into retirement at his own request.
EXERCISING, PATRIOTISM AND “NATURAL KNOWLEDGE” OF STEVAN TODOROVIĆ FROM CULTURE, SCIENCE AND ART

One hundred and sixty years have passed since Stevan Todorović, a visionary and father of cultural and artistic life of the backward Principality of Serbia, arrived from progressive Vojvodina to Belgrade. He immediately shook the languid spirits of the apathetic provincial milieu and continued working passionately on the cultural-educational growth of his fellow Belgraders. He worked tirelessly with his heart full of endless love, with inexhaustible strength of his spirit and body and the faith in the better life and people, giving all of himself so that the values of a better cultural life may take roots among the Serbian people and in their state. He left important, deep and undeniable marks on the social, cultural, artistic and sport life.

Diversely educated, refined, talented, noble, tireless, a patriot, intolerant towards foreigners in the singing societies and theatre, sensitive to the poverty among the people and in the association, generous to his friends, always caring for his “dear” mother… An academic painter, and the teacher of drawing, painting and other skills, the author of critiques and polemics, an actor in his youth, a theatre decorator, a baritone singer, gymnast and fencer. The greatness of his diverse work and contribution to the cultural development of Serbia from the middle of the 19th century, was characterised by rich painting opus, pedagogical work with children and the youth, as well as activities in the founding and development of numerous cultural-artistic and sport institutions and societies.

From this time distance Steva's mental strength and endurance are awe-inspiring. He served diligently in the education system, where he held between 18 and 22 classes a week, always a number of different subjects: free-hand drawing, geometry, Serbian history, the history of trade and crafts, geography, descriptive geometry, ornamnatics, architecture and topography, German language, and on his own accord gymnastics and fencing. He left behind a considerable opus in historical and church painting, portraiture and landscape painting, and also managed a painting, sculpting and gymnastics school, and a fencing department, participating in all cultural-artistic events in Belgrade, travelling abroad on state missions and was quite active in theatre and singing companies.

He participated in politics and was loyal to the Liberal Party. Despite his high social standing, fruitful work and favour of the Obrenović dynasty, due to the rivalry between the Liberal and Progressive parties he felt on his own skin the degradation of the teaching profession. In just a few months of the same year at the “recommendation” of the Minister of Education Kosta Cukić, he was transferred from the Technical Faculty to Realka. In his advanced years he belonged to the higher stratum of the Serbian bourgeoisie, but at the end of the 19th century his work developed outside the ruling circles. In the war with the Ottomans (1876) he stoically shared the fate of Serbian soldiers, as a father and grandfather. In a letter from the front he wrote to his Polekssija that he “was lamenting that he had not arrived to the site of a fierce battle a day earlier” and that “it didn’t trouble him that he was sleeping on the ground and that he had felt the blessing of all manner of insects, when he marched with such a brave army” (Simić, 1951). From the front he sent, relying on stagecoaches, drawings for the foreign newspapers and salary paycheques, so that Poleksija and their four children, Zorica, Ljubica, Miloš and Milan, would not be without money.

Serbian art critics consider him one of the most famous and most revered painters of that period and the leading representative of Romanticism in Serbian painting. He held his first exhibition, the first one in Serbia in general, in Belgrade in 1859, and it received the highest praises and excellent criticism. He made around a thousand drawings, genre paintings, portraits, aquarelles, twenty iconostases and historical compositions, and in this he had a great help in his wife Poleksija. He made some 300 representative portraits of his contemporaries, members of the Obrenović dynasty, and a number of writers, scientists, well-known merchants, chroniclers. In his most fruitful phase (1850-1880), he created famous works, among them a group portrait of Belgrade gymnasts and a self-portrait from 1854 which is one of the most valuable works of Serbian Romanticism (Kusovac et al., 2002). A huge number of Todorović’s works have not been preserved, drawings from the 1876-1878 wars with the Ottomans and from his journeys were stolen in 1918, along with great historical compositions, works from international exhibitions were either ruined or stolen by the enemy during the Great War.
Steva was a tireless cultural worker, significant in the development of music and theatre life of Belgrade which was unparalleled in the Serbian culture of the second half of the 19th century. In 1857 Steva became a member of a Belgrade amateur theatre troupe. He was the manager of the amateur theatre in “Kneževapivara” inn, and in it he acted, directed, made backdrops and decorations, and in various manners participated in 53 plays, until the establishment of the National Theatre where he assisted as a scenographer. Until deep old age he worked on the improvement of vocal music and acting. He was the founder and from 1865 member of the First Belgrade Singing Association for 33 years, a long-time president, and that was why he was elected as the permanent president of this association. In his Autobiography Steva remembers how he diligently worked to remove German, and other foreign actors and singers, from the performance of Serbian songs (Todorović, 1899).

**STEVAN TODOROVIĆ – PHYSICAL CULTURE AND ORGANIZED EXERCISING IN SERBIA**

The Autobiography that Steva Todorović wrote in his late years in exile (in 1915 in the town of Vranje, and 1917 in Rome), also encompasses a part of his total engagement in the development of physical culture, and those were activities in the establishment of physical exercising in *the Painting School*, i.e. in *the Company for Gymnastics and Martial Arts*, and to a lesser extent, the functions in gymnastics and the Sokol movement. However, enough of relevant source data not included in the Autobiography on Steva’s contribution to the development of physical culture in the Kingdom of Serbia has been preserved.

Steva’s work in education, which started in 1857, is considered the beginning of the first emergence of organised physical exercising (gymnastics) in Serbia, from which the Sokol movement and modern sports would spring out. From then on, during the coming decades, Steva would be in the centre of all important events in the physical culture of Serbia, almost until the end of his 93-year long and fruitful life. His initial experiences in the development of physical exercising were precious for the further advance of gymnastics and Sokol movement. His students from *the Company* established and helped, twenty years later, other similar societies in the Kingdom of Serbia. And Steva was, as one of the founders and a functionary in *the Belgrade Association for Gymnastics and Martial Arts* (1882) – on many occasions the vice president of this association (1882-1884 and 1889-1891); the president (1884-1886 and 1888-1889); and a member of the Managing Board (1882-1891). When Belgrade gymnasts accepted the Czech Sokol System, Steva was still active and performed a number of highest functions: he was the president of *the Belgrade Gymnastic Association “Soko”* (1906-1909); the president of the unified *Association of Sokol Association “Dušan
the Mighty” (from 1910); the president of the Association of Serbian Sokols (from 1908 until the beginning of the First World War, the so called All-Serbian Sokol Association); a representative of the Serbian Sokol movement in the All-Slavic Sokol Association (from 1910). He was a member of the Committee for the Establishment of the Belgrade Gymnastics School and the Committee for the Gymnastics Exams; he continued helping the founding of gymnastic and Sokol societies throughout Serbia; at his own request he taught gymnastics in Belgrade Realka (1874-1881).

Beside these managerial activities Todorović participated in the slets of Bulgarian “Junak” in Sofia (1910), Sokols in Zagreb (1911) and Prague at the First All-Slavic Sokol Slet (1912) as a representative of the above mentioned associations. During his war exile in Italy he participated in the founding of the Serbian Football Club “Soko”. After the end of the Great War, even though quite old, Todorović was elected to the lifetime positions of honorary president of the Belgrade Sokol Department upon its founding (1920) and honorary head of the Sokol Association of Belgrade-Matica. With these acts Steva received a deserved recognition for the pioneer steps he had undertaken in the organising of physical exercising, and for his long work on the development of gymnastics and Sokol movement in Belgrade, Serbia and farther. “Uncle Steva”, as the Sokols later called him, in the sport expert community is mostly known as the founder, and to some, the father of sport in Serbia (Rašić, 1908; Todorović, 1899. and 1912; Jefitimijades, 1938; Simić, 1951; Jovanović, 1957; Todorović, 1968; Trujić, 1976; Ilić i Mijatović, 2006; Vukašinović, 2016).

THE BIOGRAPHY OF STEVAN TODOROVIĆ – ETERNITY OF SERBIAN EXERCISING AND SPORT MOVEMENT

The enormous and tireless work brought to Steva recognition and material security for a comfortable life in his late years. For everything he had done during his life Steva Todorović was honoured and rewarded. In the Serbian-Ottoman Wars (1876-1878) he was decorated with the Order of the Cross of Takovo of the fourth and third class, as a war painter and newspaper reporter. For his artistic work he was decorated with the Order of Saint Sava of the third and second class, the Order of the White Eagle of the fifth class, and Karadorde’s Star of the fourth class, the Order of Prince Danilo of the fourth class, Order of the Crown of Italy of the second class… He was chosen as an honorary, and not long after, a regular member of the Serbian Royal Academy (1902), the honorary member of the Saint Petersburg Academy of Arts and the Italian Catania Academy. For his contributions to the sport, he also received numerous recognitions. Togymnasts and Sokols, once, and now, Steva has been a pioneer, father, a great man of physical exercising.

Stevan Todorović died on 22 May 1925 and was buried in the Belgrade New Cemetery. For this last farewell to Uncle Steva many people gathered – the common citizenry, official representatives of numerous institutions, artists, actors, singers, and gymnasts, Sokols and sportsmen.

Notes

At the Faculty of Sport and Physical Education - University of Belgrade, on November 3 and 4, 2017, the Scientific Meeting was held „160 years since the beginning of organized physical exercise (1857) and 126 years since the emergence of Sokol movement in Serbia (1891)” Within the program, representatives of the Faculty, members of the Sokol Association of Serbia and Belgrade, Sokol Association Belgrade Matica and participants of the scientific gathering, honored in the gardens of the great ones at the New Cemetery, laid wreaths on the graves to academics Steva Todorović, Dr. Vladan Đorđević and Dr. Vojislav Rasic. At the scientific conference were presented the results of the research on this work, about the life and impressive works of Steve Todorovic.
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ETHICS EDUCATION IN APPLIED SPORT PSYCHOLOGY

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Abstract

In applied sport psychology psychologists are often required to provide their services outside of the framework of traditional clinical practice, which has its advantages and limitations. Practitioners often face specific dilemmas and cannot find guidelines in the ethics code. Education in the field of ethics has been empirically proven as a powerful factor in the prevention of ethics violations. This issue becomes more important as there has been a growing number of psychologists in this field in recent years. That is why the focus of this paper is describing the specificity of ethics in applied sport psychology. Based on the review of the relevant literature, three most common issues have been identified: setting boundaries, confidentiality and competence. In the second, lesser, empirical part of the paper, the results of a pilot study on ethical beliefs related to the behavior of sports psychologists are presented. Data were collected on a sample of students of psychology (N = 92), some of which might become sport psychologists. Some of the behaviors that are necessary for effective practice but are atypical for traditional clinical practice (for example, the presence of psychologists in competitions) are seen as unethical by almost half of the respondents. Most of the respondents have similar beliefs regarding the disclosure of confidential information to trainers. Recommendations which refer to the need to develop specific training programs in applied sport psychology ethics are also presented.

Keywords: CLINICAL SPORT PSYCHOLOGY / ETHICAL DILEMMAS / BOUNDARIES / CONFIDENTIALITY / COMPETENCE

INTRODUCTION

Sport psychology is a relatively young discipline that left the broader frames of psychology, sport sciences and medicine during 1960s (Stapleton, Hanks, Hayes & Parham, 2010). Two sub-disciplines differentiated themselves within sport psychology (Wylleman, Harwood, Elbe, & Caluwé, 2009): academic sport psychology and applied sport psychology (ASP). Sport psychology intertwines with clinical psychology within ASP. Besides the practice of providing clinical services (e.g. work with athletes that have mood disorder and eating disorders), the interventions that are, by their nature, educational, also apply within ASP, including training of mental skills required for top sport achievements (skills of relaxation, setting of goals, imagination, and other), learning communication skills with co-players and trainer and many others (Stapleton, et al., 2010; Weinberg, & Gould, 2011). In accordance with the specificities of ASP appear characteristic ethical questions and possible ethical dilemmas that the practitioners meet. Beside the ones characteristic for clinical psychology, they include the ones characteristic for sport psychology and sport culture in general (Brown, & Cogan, 1994; Moore, 2003). ASP belongs to the interdisciplinary areas where ethical questions are extremely important (Petipas, Brewer, Rivera, & Van Raalte, 1994).

ETHICAL CODE AND ETHICS EDUCATION

With a view to regulating the practice of this applied discipline, various professional associations have developed ethical codes, establishing the rules of (un)desired behaviour and acting in certain situations. Thus, for example, the National Association for Sport and Physical Education published “Ethical...
standards in providing services of NASPE members". The Association for the Advancement of Applied Sport Psychology accepted, in principle, the guidelines of the Ethical Code published by the American Psychological Association. In our environment, ethics of psychologists has been regulated by the ethical code of the Serbian Association of Psychologists (DPS, 2000), within which the specificities of ethics of sport psychologists have not been explicitly provided. Often and unfortunately, sport psychologists meet various ethical dilemmas for which there are not prescribed clear rules of behaviour (Lavallee, Kremer, Moran, & Williams, 2004; Weinberg, & Gould, 2011). This is precisely why the education of students and experts in ethics represent the strongest weapon in fighting against the violation of ethical rules (Vasquez, 1992). Its basic goal is adoption of a certain way of thinking in meeting with ethical dilemmas in practice and their solving (Pack-Brown & Williams, 2003). The Association of Applied Sport Psychology (AASP) has prescribed minimal standards for obtaining the sport psychologist certificate. According to these standards, which are the only ones recognised by the American Olympic Committee, the post-graduate studies of sport psychology should also contain the ethics module (Wylleman, Harwood, Elbe, & Caluwè, 2009). Adoption and respect of professional ethics is connected to the professional identity of the practitioners in this area (Haberl, & Peterson, 2006). It is determined by education, training, and qualifications (Wylleman, & Lavallee, 2004). Most practitioners are graduated students of psychology specialised in sport psychology through additional trainings. On the other hand, many modern educational programmes in sport sciences include counselling and trainings in clinical psychology. Their different professional identity leads to their not abiding by the same ethical code (Brown, & Cogan, 1994). The ability of recognising and development of special sensitivity for ethical questions and possible ethical dilemmas is crucial for ethical behaviour that influences competency (Brown, & Cogan, 1994).

The subject of this paper are ethical beliefs and behaviours of sport psychologists. The paper presents some ethical questions which are most frequently mentioned as characteristic for ASP in the literature by foreign authors (Brown, & Cogan, 1994; Huang, & Hung, 2008; Moore, 2003; Stapleton et al., 2010): setting of boundaries, confidentiality and competency. As sensitivity for these questions is considered to be crucial for the efficient sport psychologist practice, and there are no published papers with this topic in our environment, the first objective of the paper is their presentation. In the recent years, more and more our local psychologists have dealt with ASP, and only three out of seven accredited faculties of psychology have subjects that are related to some area of professional ethics (non-specific, for psychology in general). In addition, the courses regarding professional ethics are an exception, rather than a rule (Petrović, 2016). The research shows that the beliefs are important because the psychologists’ behaviour is mostly in accordance with beliefs (Pope, Tabachnik, & Keith-Spiegel, 1987; Rubin & Dror, 1996) and because they can largely influence the psychologists to respect or violate professional ethics (Petrović, 2016). In our environment, in most cases, the practitioners of ASP are psychologists, often without an additional formal education and training. The second objective hereof is to present the results of the explorative research - a pilot study - in which we have examined the beliefs of psychology students (future psychologists) regarding behavioural ethics of sport psychologists.

**MOST COMMON ETHICAL QUESTIONS IN APPLIED SPORT PSYCHOLOGY**

Setting of boundaries. Clear boundaries are set within the counselling and psychotherapeutic relationship with a goal to define the roles of each side in the relationship and to protect clients’ welfare (Speight, 2012). In the last two decades, the literature has considered that not every crossing of the boundaries represents their violation and is not necessarily detrimental to the client (Barnett, Lazarus, Vasquez, Moorehead-Slaughter, & Johnson, 2007). Consultations held by sport psychologists can, by their nature, represent crossing of the boundaries (Moles, Petrie, & Watkins, 2016). Actually, when sport psychologists consider appropriateness of their behaviour, they should see it through the prism of the sport environment (Speight, 2012). Besides performing their practice in traditional places, in consulting rooms within the private practice or the university, it is usual that the sport psychologist holds the consultations with athletes and trainers outside...
the classical psychotherapeutic setting, for example, in the room for prepreations before the competition, in the locker room, during a trip (on the bus, plane), in the hotel (Andersen, Van Raatle, & Brewer, 2001; Brown, & Cogan, 1994; Etzel & Watson 2007; Moore, 2003; Stapleton, et al., 2010; Haberl, & Peterson, 2006). This particularly regards the psychologists that work with sport teams or within sport organisations (Moore, 2003). More often than not, the schedules of the athletes are already planned in advance and they keep the athlete occupied throughout the day, and it does not leave room for the sessions to last the usual 45-60 minutes, but there is time only for short interventions that are sometimes performed during meals (Stapleton, et al., 2010). Such practice enables the psychologist to help the athlete function as optimally as possible, in order to realise his/her personal goals and the goal of the team and/or sports organisation (Moore, 2003). Athletes can feel more at ease when the psychologist is with them and when they can have consultations when they need them (for example, right after the competition, or upon defeat). The next advantage of such manner of work is in existence of more possibilities for the psychologist to know better both the trainer and the athlete, as well as to see their reactions in the critical situations. It is clear that in the described environment the boundaries are less rigid than in clinical practice. In addition, ethical dilemmas may appear in those situations when there is more social interaction (APA, 2002). For example, the psychologist can be invited to attend the celebration after the team victory or the trainers can invite him/her to have a drink in the bar. How should the psychologist act if he/she gets in such situation? If he/she refuses to come, it might create a distance in the relationship (and closeness in the psychologist-athlete relationship is crucial). Usually it takes longer for the psychologist to develop a good working alliance and closeness with athletes and other officials (if he/she works within a certain sports organisation), and to still be respected and trustworthy person (Moore, 2003). On the other hand, one should not neglect the second possible scenario: athletes that have come to the psychologist to solve specific problems and that have built a good working alliance with the psychologist can seek help in the future after the initial treatment is over. If the psychologist accepts the invitation to such events, it is necessary to be always aware of his/her professional boundaries, to “beware” of close interactions, and to have superficial conversations. The literature mentions the experience of the psychologist that was often invited to attend such social events. He imposed himself in the role of driver in the situations when alcohol was consumed, which enabled him to be involved in the event, but also to keep a professional relationship and to preserve the boundaries (Brown, & Cogan, 1994). Another characteristic situation that can be ethically questionable regards the venue of holding consultations with athletes during trips. Let us imagine a frequent situation when there is no available separate room for holding consultations in the hotel. Holding consultations with athletes in the hotel lobby can lead to violation of the confidentiality principle. Also, the psychologist can hold the consultations with individual athletes or a group of athletes in the hotel room (Moore, 2003) which may open a question of potential sexual intentions (some psychologists solve this situation by working with the door open). Finally, the psychologist does not have to avoid such situations at any cost, but represents himself/herself in a professional manner in these situations, making his/her role and manner of his/her involvement clear for everybody (Moore, 2003).

Confidentiality. A good relationship between a professional, whether he/she is a psychologist, psychotherapist, consultant, supervisor, sport psychologist, and a client (that can be an individual athlete, sports team, a trainer and other club officials, parents of the athlete) represents a key component for the successful outcome (Stapleton, et al., 2010). Trust makes a basis of this relationship. Even the slightest violation of the confidentiality principle can reflect negatively on their relationship. Most often the third party - parents of the athlete, the trainer or other club officials can direct the athlete to the psychologist and realise the first contact with him/her. It is not rare that the third party presumes that he/she is automatically entitled to the information regarding the sensitive data on the treatment and progress (Moore 2003). The additional complication can develop if the third party finances the treatment. This is a frequent situation with the parents that are highly involved in the sports activity of their children. It might happen that the psychologist works in parallel with the athlete and his/her parents. It is extremely important to develop a special sensitivity for additional questions and for keeping confidentiality...
ty. In such cases the confidentiality issues are much more complex and require a special caution and balancing. One of the most delicate issues is to what extent every family member counts on confidentiality within the family, which is especially emphasized if the family members come individually as well. The two-way errors are possible. If the psychologist gives plenty of information (without violating a confidentiality principle), it may look as if the confidentiality principle was violated. Contrary to that, if the psychologist offers too few information, it can create a suspicion regarding the process itself. In such situations, the psychologist will act best if he/she encourages the family members to exchange the information when they consider it appropriate. When there is a doubt of such possibility, the psychologist can ask each family member which part of the information would be appropriate for sharing with other family members.

When the sports psychologist works with professional sports organisations, he/she cannot assume the same confidentiality boundaries as when he/she works with an individual athlete (Gardner, 2001). In that process one should bear in mind the objectives of the athlete and the objectives of the sports organisation if it has hired the psychologist (in such case the organisation is a client as well). Trainers, club officials, even the media can consider themselves entitled to this privileged information. For example, let us imagine that the sports club (the third party in the relationship) hires the psychologist to evaluate the characteristics of the athletes’ personalities and that the psychologist’s task is to draft the reports to the sports club. It is necessary to inform the athletes thereof. That is why during the very first contact with the third party the psychologist should set clear boundaries of confidentiality of information in the relationship with the athlete (Moore, 2003). If, for example, the third party asks the psychologist for the information on the athlete, he/she should direct it to the athlete. As the relationship between the psychologist and the third party may influence the quality and duration of the psychologist-athlete relationship, a relationship of trust should be developed between them. One of the first steps is to encourage the third party to support the athlete’s treatment which implies respecting of confidentiality. If the consultant is a psychologist, he or she might happen to work with the athlete on the issues that go beyond the sport progress, even with the ones in the field of clinical psychology (eating disorders, anxiety, depression, etc.). In some cases the trainer can actively participate in the treatment. In such case it is necessary to ask the athlete for the written consent on the possibilities of disclosure of the information (and to what extent it can be given to the third party). More often than not, the trainers informed on the confidentiality boundaries ask the consultant the questions regarding the athlete’s progress. For example, if the athlete has made a progress, the trainer wants to know the topics of the psychologist’s conversation with the athlete, most probably in order to know how to support the athlete in future situations. These situations are more frequent if the trainer and the psychologist know each other personally. Then the psychologist can ask the athlete what and how much information he/she can disclose to the trainer. This situation is awkward for all parties involved, and it can be prevented by setting the agreement in advance, and the consultant’s communication with the third party should be planned in advance as well. The APA code envisages that the psychologist can give the information to the third party, but only such that directly regards the achieving of a certain objective (professional or scientific) and only to a certain person. Other information that is not directly connected to the goal of the treatment must not be disclosed (APA, 2002).

Holding consultations in public places, during the training or during the competition is another important aspect of the practice for which the psychologist should develop a special sensitivity (Huang, & Hung, 2008). Athletes should pay attention to the people around them, but the psychologist has to converse carefully on the confidential information that other persons can overhear. Andersen et al. (2001) give two suggestions regarding such situations. One of them is that the psychologist and the athlete try to find a sound proof room, and the other is to schedule the consultation regarding the sensitive matters for another time.

**Competency.** Sport psychology is a specialised domain and it requires a specialised competency (Brown, & Cogan, 1994). It is wrong to believe that competency for sport psychology can be acquired by developing a huge interest in sport psychology topics, by reading the literature, or that former athletes or trainers possess such competency. Psychologists can be competent for counselling or psychotherapy, but in order to become competent for sport psychol-
ogy, it is necessary to acquire a specific knowledge from sport sciences, as well as to continuously improve themselves (Stapleton et al., 2010). It is also important to possess certain competencies within the sub-specialty. So, for example, practitioners notice significant differences in working with the athletes of different competitive ranking (Stapleton et al., 2010). It is equally important to take into account specific aspects when working with young athletes, with university athletes, within sports organisations or with professional and top athletes, as well as specificities of each sports branch. Upon the completed formal programmes which include sport psychology courses, with a view to protecting the client’s welfare, it is important for the psychologist to go to supervision, that may vary from frequent to annual, to a supervisor - field expert and to a peer supervisor (Barney, Andersen, & Riggs, 1996). The relevant literature (Brown, & Cogan, 1994; Moore, 2003; Stapleton et al., 2010) shows a consensus that psychologists can cross the borders of their competency in two manners. One of them is that the psychologist is hired to work with the athlete with a view to improving the competition performance, and he/she discovers a psychopathological problem (e.g. eating disorder, mood disorder) during work. If he/she is not trained for application of the treatment of such problem, and if he/she fails to refer the athlete to the colleague that is a specialist in this field, he/she performs the practice outside his/her competency. The other reflects in that the psychologist builds a counselling/psychotherapeutic relationship with the athlete that wishes to improve his/her competition performance, without being competent for working on improvement of the sports performance – has not mastered the mental training for athletes. Also, the application of measuring instruments which the psychologist is not qualified for, represents crossing of the competency boundaries (Moore, 2003).

BELIEFS OF PSYCHOLOGY STUDENTS REGARDING THE BEHAVIOURAL ETHICS OF SPORT PSYCHOLOGISTS

Sample and procedure
Psychology students of the Faculty of Philosophy of the University of Belgrade took part in the research (N=92), out of which 75 (81,52%) girls and 17 (18,48%) boys. The average age of the participants is 22.08 years (SD=1.59). A majority of students is on the third year of studies, 79 (85.87%), and the rest is on the fourth year, 13 (14.13%). The percentage of students that declined to participate in the research was insignificant (10.6%) and non-systemic. The research was anonymous, and the questionnaires were applied via the platform SurveyMonkey.

Instrument
The questionnaire contains 9 items which describe hypothetical behaviours of sport psychologists, and the participants should estimate ethicality of these behaviours on the five-point Likert scale (from 1 = undoubtedly unethical to 5 = undoubtedly ethical), by indicating to what extent they agree that certain actions are not ethical. The statements in the items are in the third person, e.g. "Disclosing confidential data on the athlete to the trainer". The author’s theoretical knowledge and practical experiences served as the sources used for determining the content of the test items.

RESULTS
Most items in the questionnaire describe complex ethical issues. The results obtained (f and %) are presented in Table 1. The psychologist’s behaviours regarding accepting the invitations for going to the match, to the celebration, romantic or sexual involvement with the client, regard the principle of respecting boundaries. The results of this research show that two thirds of participants consider the romantic involvement with a former client undoubtedly unethical, or ethical in rare situations. Even bigger level of agreement exists (almost all participants) regarding the sexual involvement with a current client, which is strictly forbidden by the ethical code. This behaviour is estimated as undoubtedly unethical by the students. However, some 70% of the students think that attending the team celebration after the victory is undoubtedly unethical or ethical in rare situations. If one bears in mind that sport psychologists frequently hold their consultations in non-traditional places, including competitions, the concerning data is that almost half of the students (47%) considers accepting the invitation to the competition to be unethical. Only less than 10% of the participants opine that such behaviour, characteristic for sport psychologists, is
undoubtedly ethical. Interesting data were obtained regarding the confidentiality principle – disclosure of the data to the parents, trainer and owner of the club, as well as including testimonials of athletes regarding the psychologist’s work as advertisement. More than a half of the participants think that including of testimonials of athletes regarding the psychologist’s work in advertisements is undoubtedly unethical. Approximately one fifth of the participants think that disclosing the data on the underage client to their parents is undoubtedly unethical. A significantly higher percentage of them, close to 60%, think that disclosing of the data to the team owner is undoubtedly unethical, and the biggest consensus (91%) was achieved regarding the belief that disclosing of the data on the athlete to his/her trainer is undoubtedly unethical. No participant opted for the answer that disclosing of the data to the trainer is ethical in most situations or undoubtedly ethical. When it comes to competency, a relatively high percentage of examined students (85%) think that counselling related to the problem which the psychologist is not competent for falls under the category of unethical behaviour.

Table 1. Frequency and percentage of answers of the participants for each category of questions in the questionnaire

<table>
<thead>
<tr>
<th>Questionnaire items</th>
<th>Undoubtedly unethical behaviour</th>
<th>Ethical behaviour in rare situations</th>
<th>Behaviour that is sometimes ethical</th>
<th>Ethical behaviour in most situations</th>
<th>Undoubtedly ethical behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Celebrating with the team in the bar after the victory</td>
<td>35 (46,1)</td>
<td>18 (23,7)</td>
<td>13 (17,1)</td>
<td>7 (9,2)</td>
<td>3 (3,9)</td>
</tr>
<tr>
<td>Accepting the client’s invitation to the match or competition</td>
<td>15 (19,7)</td>
<td>21 (27,6)</td>
<td>16 (21,1)</td>
<td>17 (22,4)</td>
<td>7 (9,2)</td>
</tr>
<tr>
<td>Romantic involvement with the former client</td>
<td>38 (50,0)</td>
<td>14 (18,4)</td>
<td>14 (18,4)</td>
<td>4 (5,3)</td>
<td>6 (7,9)</td>
</tr>
<tr>
<td>Sexual involvement with the client</td>
<td>74 (97,4)</td>
<td>1 (1,3)</td>
<td>1 (1,3)</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Including of athletes’ “testimonials” of the successful work of a sport psychologist in advertisement</td>
<td>39 (51,3)</td>
<td>26 (34,2)</td>
<td>7 (9,2)</td>
<td>4 (5,3)</td>
<td>/</td>
</tr>
<tr>
<td>Disclosing confidential data on the underage client to his/her parents</td>
<td>16 (21,1)</td>
<td>33 (43,4)</td>
<td>15 (19,7)</td>
<td>8 (10,5)</td>
<td>4 (5,3)</td>
</tr>
<tr>
<td>Disclosing confidential data on the athlete to the trainer</td>
<td>69 (90,8)</td>
<td>5 (6,6)</td>
<td>2 (2,6)</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Disclosing the data on the progress in working with the client to the team owner</td>
<td>45 (59,2)</td>
<td>15 (19,7)</td>
<td>10 (13,2)</td>
<td>4 (5,3)</td>
<td>2 (2,6)</td>
</tr>
<tr>
<td>Counselling the client regarding the problem which the psychologist is not competent to solve</td>
<td>34 (44,7)</td>
<td>31 (40,8)</td>
<td>7 (9,2)</td>
<td>2 (2,6)</td>
<td>2 (2,6)</td>
</tr>
</tbody>
</table>

**DISCUSSION**

For achieving professional objectives within ASP, it is important for the psychologists to integrate into the sports environment and to adapt their practice to the requirements of sport culture. Such environment requires the psychologist to be spontaneous, flexible and able to respond to the clients’ changing needs. They meet ethical dilemmas atypical for the standard psychotherapeutic practice, that most frequently regard the questions of preserving the boundaries in the environment that is not considered traditional for the psychologist’s practice, the questions of confidentiality and the questions of competency (Brown,
& Cogan, 1994; Moore, 2003). On the other hand, it goes without saying that psychologists should abide by the ethical code, and that they should acquire a specific ethical knowledge that influences the manner of their behaving with ethical challenges. The development of a specific sensitivity for ethical questions is especially important for the psychologists that work within sports organisations (Gardner 2001). Bearing in mind that, in the recent years, there have been increasingly more psychologists engaged in this field in our environment, and that we do not have a formal ethical education in this area nor the Serbian Association of Psychologists’ code emphasizes the specificities of ethics of sport psychologists, the first objective hereof has been to present characteristic ethical dilemmas and possible situations in which they may be generated. The second objective has been to examine empirically how the psychology students – future experts of which some may prefer working within ASP – estimate ethicality of the sport psychologists’ behaviour in certain situations.

In the context of performing ASP, the boundaries are less rigid comparing with the classical psychotherapeutic practice (Andersen et al., 2001; Brown, & Cogan, 1994; Etzel & Watson 2007; Haberl, & Peterson, 2003; Moore, 2003; Stapleton et al., 2010). Unlike numerous researches related to the boundaries in the psychotherapeutic and counselling relationship, there is almost no research dedicated to the same questions in the sport psychologist/athlete relationship with which we can compare the results of our research. Almost half the participants thinks that going of the psychologist to the sports competition is unethical, and even more of them, some 70%, shares the opinion on attending social events by the psychologist. Our results are endorsed by the research of Petitpas et al. (1994), according to which more than 40% of the participants - ASP practitioners registered with the AAASP in USA considers attending social events to be undoubtedly unethical, and slightly less than 25% considers it to be ethical in rare situations. However, the results of the research of Moles et al. (2016) do not endorse the results of our research. According to the results of that research, over 90% of the participants thinks that attending competitions and special events and small social gatherings belong to the category of behaviours that are mostly professional. When we compare the differences in the results obtained, we should bear in mind that the participants in our research were students of final years of studies, and that they have not attended specific courses in sport psychology ethics, while in the research of Moles et al. the participants were certified ASP practitioners (including psychologists or experts in sports sciences). Actually, these behaviours can be necessary for efficient and professional performing of sport psychologists’ practice (Haberl, & Peterson, 2006) and it is obvious that the beliefs of American psychologists have changed over time. The participants in this research think that sexual involvement with the former client is undoubtedly unethical, which corresponds to the results of Petitpas et al. (1994). These researchers reported that more than 92.7% participants does not consider this behaviour to be ethical in any situation.

Confidentiality in the psychologist-athlete relationship is deemed a foundation stone of the efficient practice (Moore, 2003). Usually it takes longer for the psychologist to realise a good working alliance, closeness and trust relationship with the clients. This is precisely why it is recommended to the psychologist to accept to perform a part of his/her practice “in the field”, when the athletes need it most. The literature emphasises that attending various social events does not have to be detrimental to the client’s progress or to their relationship. In such circumstances it is essential that the psychologist is aware of his/her behaviour at all times and to preserve professional boundaries in the relationship (Brown, & Cogan, 1994). In fulfilling the needs of the team, as of the individual athletes in the team, the psychologists faces the requirements related to respecting the confidentiality principle (Stapleton et al., 2010). If the psychologist works with underage athletes whose parents are interested in the details of the progress and course of the treatment, the psychologist has to protect the entrusted information. One of the key steps in this process is for the psychologist to support the third party in the relationship (parent, trainer, club official) to respect the confidentiality principle and to inform them thereof during the very first contact (Moore 2003). Somewhat unexpected results were obtained in our research. Namely, there is a relatively high consensus of the participants regarding that disclosing the confidential data on the athlete to the third party is an unethical behaviour. The answers obtained are in accordance with the code which envisages that the psychologist may disclose to the third party only the information regarding the achieving of a certain professional goal (APA, 2002; DPS, 2000). However, while almost 80% of the participants estimates that
disclosing the data to the athletes’ parents is sometimes ethical and around 40% believes the same about disclosing information to the team owner, it represents a paradox that less than 10% of respondents thinks that disclosing the data to the trainer (who is the only one in the role of instructor, mentor, demonstrator, professional adviser) falls under the category of ethical behaviour in certain situations. In the lack of empirical data for the interpretation of the results obtained, we can express the assumption that precisely the specific role and responsibility of the trainer is something that causes our participants to doubt and fear the possible unintentional abuse of the data.

Working with the problems which the psychologist is not qualified for is opposite to the principle of competency. Achieving of competency within ASP requires possession of specialised knowledge and skills (Brown, & Cogan, 1994) that represent an integration of various fields of psychology, sport medicine and sport sciences. For the efficient practice, it is necessary that the psychologist knows the specificities of each sports branch, level of competition and characteristics of each athlete. The variety of questions and issues which the practitioners meet has led to the development of certain sub-specialties (Stapleton, Hanks, Hayes & Parham, 2010). Upon the completion of the formal education, a continuous improvement and various form of supervision can significantly contribute to the further development and maintaining the competency (Barney et al., 1996). In our research, some 85% of the participants estimated that counselling the clients for the problem which the psychologist is not competent for falls under the categories of unethical behaviour (undoubtedly and in rare situations). The corresponding research findings were obtained in the research of Petitpas et al. (1994) according to which some 87% of the participants considered working with the problems for which the psychologist does not have a formal training to be unethical behaviour, and at the same time some 73% of the participants considered counselling the athlete without the training in the area of counselling and/or psychotherapy to be unethical (or in rare situations ethical) behaviour.

In practice, sports coaches, whether they are more or less actively involved with a sports psychologist, may influence the frequency of ethical dilemmas by engaging them and with their demands to athletes and psychologists. Viewed from that angle, it would be important to examine the views of physical education and sport students about how much the behaviour of sports psychologists is ethical or unethical. The obtained results would be the starting point for creating ethical education programs for future sports coaches (and not just psychologists), and the results of this research would gain more ecological validity.

**CONCLUSION**

For professional and efficient performing of the complex ASP practice, it is necessary that the psychologist fully understands his/her professional role and that he/she assimilates his/her practice in the sport culture in accordance with specific requirements and needs of a unique clientele. In parallel with the ever growing interest and the increasing popularity of this interdisciplinary field, appear numerous questions related to the manner of providing the best services possible, respecting ethics. One of the newest is working with athletes via internet (e.g. through Skype), because they often travel abroad and psychologists can’t always travel with them. As in our environment ASP is still gaining its reputation, it may happen that the inefficient practice discredits not only the psychologist, but the profession as well. Besides, this first empirical data on ethical beliefs regarding behaviours of sport psychologists indicates the need for development of specific training programmes in ASP ethics in our environment. The starting point and the role model for developing such programmes can be training programmes and experiences of the sport psychologists from the countries in which such programmes have already been developed.

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ETHISCHE BILDUNG IN ANGEWANDTER SPORTPSYCHOLOGIE

Zusammenfassung

Schlüsselwörter: KLINISCHE SPORTPSYCHOLOGIE / ETHISCHE DILEMMAS / GRENZEN / VETRAULICHKEIT / KOMPETENZ

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TACTICS OF ATTACK OF FOOTBALL TEAMS IN THE CHAMPIONS LEAGUE KNOCKOUT PHASE IN SEASONS OF 2015/2016 AND 2016/2017

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Abstract
The aim of this study is to find out characteristics of tactics of attack of teams which play in the finals of the Champions League by analyzing competition activities and also to use comparative analysis for the same competition in two competition seasons and point to the potential tendencies in tactical preparation of teams for the very end of the competition. The analysis involved quarter-finals, semi-finals and finals in seasons 2015/2016 and 2016/2017, i.e. 13 matches in each season. The tactical action was analyzed by monitoring variables that describe the ways of beginning, realization and completion of successful attacks, but also the overall characteristics of play when a team was in ball possession (scope, success and speed of passing the ball). Results of this study showed that there are no significant differences in tactical demonstration of teams that play the final round of the competition in two competition seasons. The application of continuous attacks is dominant, beginning by cutting a pass and winning “the second ball” on the opponent’s half, while the final pass is in most cases the centre and back lateral passing. However, significand difference was discovered only in efficiency during the passing game, which was significantly greater in the 2016/2017 season (p=0.013) and partially in the longer ball possession also in the 2016/2017 season. The kind of analysis in the field of football tactics is valuable because it provides a possibility to define the criteria for achieving results on the highest level, but to predict potential tendencies in developing offensive football tactics.

Key words: FOOTBALL / COMPETITION ACTIVITY / GAME ANALYSIS / SUCCESSFUL ATTACKS / PASSING GAME

INTRODUCTION
Moments of the game that more or less influence the final result can be identified by analyzing competition activities in football on the individual or the team level (Castelano et al., 2012; Liu & Gomez., 2014; Liu et al., 2015a). Studies that deal with this kind of analyses in a longer period of time aim at discovering these technical and tactical parameters of the game correlated with success, and, on the other hand, serve to envisage new trends, and above all, football game tactics (McGarry et al., 2002). Results of these studies and their explanation function to define theoretical procedures in evolutive development of football, but they also have a significant role in technological process and preparation for certain football competitions.

A high level of technical, tactical, physical and psychological preparation is a necessary prerequisite for competition on the highest level. The training process for each of the types of preparation, through evolution of the football game has been changing and adapting according to demands and characteristics of the same game. Evolution of the football game is moving towards the intensified activities of players with and without the ball that directly influence the group and team actions in certain standard situations of the game (Wallace & Norton, 2014). Significantly higher scope and intensity of movement of players during the game, and on the other hand, reduction of time of the active play are indicators of changes in demands of players necessary for competition on the elite level. Besides, significantly greater closeness of players on the area but also the speed of movement of the ball on the pitch point to changes in organization of the game on the group and the team level (Wallace & Norton, 2014).
One of the most systematic overviews of methods of football game analysis was presented by Sarmiento et al. (2014), who divided the research activity in football into descriptive, comparative and predictive analysis. The space of description is related to the description of technical, tactical and physical performances of a football player; the comparative analysis mostly take into consideration the level/type of the competition and position of a player in a team, while the prediction of actions based on the already seen is a space in which standard protocols are defined. For all types of analyses, towards determining characteristics of offensive tactics, the structure of attack actions that ended with the shot on the opponent's goal was observed (Lago – Penas et al., 2010; Castellano et al., 2012; Mitrotasios & Armatas, 2014; Liu et al., 2015b) but also the quality of the passing game and the way of realization of some standard situations like breaks of the game, offensive transitions and the like (Janković et al., 2009; Almeida et al., 2014; Liu et al., 2015b; Janković et al., 2016).

Based on the current directions in the football game analysis, a need arose to continuously monitor tactical manifestation at the highest quality competitions of modern football in order to accurately define directions of the game development from the tactical prospective, but also to identify those technical and tactical elements of the game that can be characterized as the coach's surprise for a certain match.

Therefore, the object of this research was the highest quality club competition in football, the Champions League, in two successive seasons of competition, that is, the tactics of attack of teams which played in the finals. The specificity is the fact that the FC Real Madrid was the winner of the competition in both seasons, so it was interesting to see whether and to what extent Real and other teams changed their tactical plan of the game.

Thus, the aim of this paper was to determine characteristics, as well as to define modern tendencies in relation to the tactics of the attack of teams that compete on the highest level, in this case in the Champions League. Based on the results of studies completed so far, it was expected that certain characteristics of the offensive tactics specific for the competition itself would be sorted out, but also that parameters of the game related to individual preparation, the idea of the coach, specificity of teams that have qualified for the finals of the competition etc. would be discovered.

**METHOD**

**Research sample**

The sample of matches that were analyzed for needs of this study included the final matches of the Champions League (CL) in seasons 2015/16 and 2016/17. Matches played in quarter-finals, semi-finals and finals were observed, i.e. 13 matches of this competition for each season, therefore the total of 26 matches were analyzed.

**Sample of variables and ways of data collection**

Since the result represents the basic measure of success in football, which is the consequence of successfully completed attack actions of a team, to describe the tactics of attack, variables that point to the structure of successful attacks were observed (all offensive actions were finished by the shoot on the opponent's goal):

- Number of shots on the goal (successful attacks);
- Accuracy of successful attacks – inaccurate, accurate and efficient;
- Time interval of realization: 0 – 15 minutes, 15 – 30 min., 30 – 45 min., 45 – 60 min., 60 – 75 min., 75 – 90 min. and 90 – 120 min.;
- Zone of initiation of successful attacks – attacks started from the defence, middle or attack zone;
- The way the successful attacks started – “cutting the ball”, winning the tackle, throw-in (the attack that started by throwing the ball in), free kick play (the attack started after the free kick, and the ball was not directed to the opponent's penalty area), “the second ball” (coming into possession after “winning” the ball that had never been in control by either team), offensive stoppage and attacks started by the goalkeeper's pass;
- Types of successful attacks – continuous, counter-attacks and set pieces attacks;
- Structure of successful attacks – number of participant players, number of passes, duration of an attack;
- The way of coming into position for the shot on the goal (assistance) – individual attack, “the second ball”, centre, back pass, long pass;
- Zones from which shots on the goal were directed – 0 - 5 m, 5 - 11 m, 11 - 16 m and >16 m;
- The segment with which the shot was made – head, left leg, right leg;
Together with successful attacks, towards defining the attacking tactics, variables that point to the orientation of the game in situations when the team was in ball possession were monitored:

- Total duration of the ball possession during the match, number of ball possession situations, duration of ball possession;
- Number of successful passes, percentage of successful passes, the speed of passes (number of precise passes in the unit of time by the achieved possession of the ball).

The analysis of previously recorded matches started with creation of the observing protocol (Carling et al., 2005). That protocol was used for each match and each team separately. While observing matches, each successful attack and action that ended with the shot on the goal was recorded in the observation sheet. Video materials were taken from the TV channels Premium sport - HD, Bein sports – HD, Sky sports – HD, and Premium Calco – HD.

**Data processing**

Each variable was processed by standard descriptive statistics (total and mean value, as well as standard deviation). Differences in distribution of certain tactical indicators within one group between competition seasons 2015/2016 and 2016/2017 were assessed by nonparametric chi-square test, while for examining differences between two independent competitions the Mann–Whitney U test was used in certain variables. The level of statistical significance was \( p<0.05 \). All statistical tests were processed using SPSS 17.0 program (SPSS INC Chicago, IL).

**RESULTS**

Results of this study have shown that teams that appeared in the finals of the competition in the 2016/2017 season were slightly more offensive, which was confirmed by the data according to which the average number of successful attacks was 11.5 compared to the previous season - 9.5. The ratio of inaccurate, accurate and efficient shoots towards the goal was 48% - 41% - 11% in the 2015/2016 season, and 49% - 38% - 13% in the 2016/2017 season.

Observing successful attacks realized in certain time intervals, it can be noted that the number of such attacks in seasons 2015/16 and 2016/17 was equal, however, in the 2016/2017 season more attacks were realized in the introductory parts of the first and the second halftime (Figure 1).

![Figure 1. Number of successful attacks in relation to time intervals of the duration of the game in the competition of the Champions League (seasons 2015/16 and 2016/17)](image.png)

When the type of the attack is in question, the analysis showed that the application of continuous attacks, counter attacks and successful actions after the break of the game is proportionally represented in both seasons (Table 1). Somewhat smaller percentage of shots to the goal after the break in the season
2016/17 was manifested through the increase in the number of successful attacks from the game (continuous attacks and counter attacks). The largest number of shots on the goal occurred after organization of continuous attacks, and the fact in connection with this data is the average duration of successful attacks that was 13.9 seconds in the 2015/16 season, and 13.57 seconds in the second competition season (Table 2).

The teams most often started successful attacks in both competition seasons from the attacking third of the pitch, then from the middle zone, and the least number of successful actions started from the defence zone (Table 1). Besides, the analysis shows that in the second season (2016/2017) the number of attacks started from the attacking third is slightly larger compared to the first season (46% - 49%) while on the other hand fewer attacks started from the middle zone (36% - 32%).

<table>
<thead>
<tr>
<th>Zone of initiation</th>
<th>2015/2016 Total</th>
<th>%</th>
<th>2016/2017 Total</th>
<th>%</th>
<th>Chi Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defense zone</td>
<td>45</td>
<td>18</td>
<td>56</td>
<td>19</td>
<td>c² = 0.996</td>
</tr>
<tr>
<td>Middle zone</td>
<td>89</td>
<td>36</td>
<td>95</td>
<td>32</td>
<td>p = 608</td>
</tr>
<tr>
<td>Attack zone</td>
<td>114</td>
<td>46</td>
<td>147</td>
<td>49</td>
<td>Cramer’s V = 0.43</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Types of attack</th>
<th>2015/2016 Total</th>
<th>%</th>
<th>2016/2017 Total</th>
<th>%</th>
<th>Chi Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous</td>
<td>138</td>
<td>56</td>
<td>173</td>
<td>58</td>
<td>c² = 1.320</td>
</tr>
<tr>
<td>Counter attack</td>
<td>58</td>
<td>23</td>
<td>74</td>
<td>25</td>
<td>p = 0.517</td>
</tr>
<tr>
<td>Set play</td>
<td>52</td>
<td>21</td>
<td>51</td>
<td>17</td>
<td>Cramer’s V = 0.049</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Attempts zone (m)</th>
<th>2015/2016</th>
<th>2016/2017</th>
<th>Chi Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 5</td>
<td>18</td>
<td>18</td>
<td>c² = 1.711</td>
</tr>
<tr>
<td>5 - 11</td>
<td>87</td>
<td>119</td>
<td>p = 635</td>
</tr>
<tr>
<td>11 - 16</td>
<td>39</td>
<td>48</td>
<td>Cramer’s V = 0.056</td>
</tr>
<tr>
<td>16+</td>
<td>103</td>
<td>113</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Goal attempts</th>
<th>2015/2016</th>
<th>2016/2017</th>
<th>Chi Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head</td>
<td>50</td>
<td>58</td>
<td>c² = 0.101</td>
</tr>
<tr>
<td>Left leg</td>
<td>84</td>
<td>98</td>
<td>p = 0.96</td>
</tr>
<tr>
<td>Right leg</td>
<td>114</td>
<td>142</td>
<td>Cramer’s V = 0.014</td>
</tr>
</tbody>
</table>

Results show that shots on goal in both seasons most rarely came from zones 0 – 5m and 11 – 16m, as well as that players in the observed matches most often shot from the 5 – 11m zone and the area >16m (Table 1). However, in the 2015/16 season, the percentage of realized shots from the 5 – 11m zone was smaller than from the area >16m, while in the season of 2016/17 the number of shots from the 5 – 11m zone was larger compared to shots outside the 16-meter area. Shots performed with a leg were dominant, in most cases the shot was realized using right leg (46% - 48%), then left leg (34% - 33%) and finally using head (20% - 19%) (Table 1).

Winning “the second ball” and cutting the ball are the most often used forms to start a successful attack, and the significant number of actions that ended with a shot towards the goal started after organizing an offensive break (Figure 2).

The analysis of the attack structure, observed according to the number of players who participated and the number of passes during a successful action showed that in both seasons teams performed successful attacks with 3 – 5 players, at which most often there were 4 passes before a shot on the goal (Table 2).

The total duration of possession of the ball in one game was slightly longer in the 2016/17 season and the difference is 45 seconds per a match, besides, the teams were in ball possession slightly longer in the second season, in average 16.8 seconds (Table 2).

The dynamics of the play in both seasons was equal, which was confirmed by the results of the speed of passes, but the teams in the second season were more successful in passing the ball from one player to another (Table 2).

Results further show that the end of successful attacks was mostly different after assistences of centre shots, then after individual actions, long passes, back passes and finally after “the second ball” won. Together with the listed, a significant increase in the case of assistences with centre shots and back passes in the second season is also interested (Figure 3).
Figure 2. Ways to initiate successful attacks in the Champions League (seasons 2015/16 and 2016/17)

Table 2. Structure of successful attacks, ball possession and passing game in the Champions League seasons 2015/16 and 2016/17

<table>
<thead>
<tr>
<th></th>
<th>2015/2016</th>
<th>2016/2017</th>
<th>U test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Stdev</td>
<td>Mean</td>
</tr>
<tr>
<td>Number of players</td>
<td>4.22</td>
<td>1.14</td>
<td>4.01</td>
</tr>
<tr>
<td>Number of passes</td>
<td>4.62</td>
<td>2.15</td>
<td>4.23</td>
</tr>
<tr>
<td>Duration of attack</td>
<td>13.9</td>
<td>5.89</td>
<td>13.57</td>
</tr>
<tr>
<td><strong>Ball possession</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total duration of possession (min)</td>
<td>29.47</td>
<td>0.18</td>
<td>30.32</td>
</tr>
<tr>
<td>Number of possessions</td>
<td>109</td>
<td>6.34</td>
<td>109.8</td>
</tr>
<tr>
<td>Possession duration (sec)</td>
<td>16.5</td>
<td>2.57</td>
<td>16.8</td>
</tr>
<tr>
<td><strong>Passes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Successful passes</td>
<td>471</td>
<td>92.5</td>
<td>479</td>
</tr>
<tr>
<td>Successful passes (%)</td>
<td>84</td>
<td>2.8</td>
<td>86</td>
</tr>
<tr>
<td>Speed of passes</td>
<td>16</td>
<td>1.02</td>
<td>16</td>
</tr>
</tbody>
</table>

Figure 3. The number of successful actions in relation to the way of coming into the position to shoot on the goal in the Champions League (seasons 2015/16 and 2016/17)
DISCUSSION

Results of this study showed that the finals of the Champions League demand a certain level of technical and tactical manifestation, taking into account the fact that there are no significant differences in the structure of successful attacks of teams that ranked into the quarter-finals of this competition in two competition seasons. However, certain technical and tactical elements of play sorted out which are different to a certain extent and in that way they point to certain innovations in preparations of teams for the finals of the competition.

Realization of successful attacks in relation to time intervals of duration showed that there are no differences in the dynamics of the play between two competition seasons, however, it is noted that in the first 15 minutes of both half terms there were more active periods in the 2016/2017 season. Both seasons are characterized by a larger number of shots on goal in the second half-time, which is generally the case in other competitions (Sgro et al., 2015; Liu et al., 2016), but it is interesting that in the second season there was the largest number of shots on goal exactly in the introductory part of the game, which can be linked to the data according to which in 70.9% of cases the first team that scored the goal won the match (Michailidis et al., 2013).

According to some analyses, getting in possession of the ball way deep on the opponent’s half of the pitch is one of the factors that directly affects the success in modern football (Mackenzie & Cushion, 2013; Almeida et al., 2014; Janković et al., 2016). The results of this study showed that the teams which differentiated by their quality and ranked in the finals of this competition tend to apply pressing in order to take possession of the ball from the opponent as close to the opponent’s goal as possible and thus attack the distraught defense of the opponent. A slightly higher percentage of attacks started from the attacking third of the pitch in the 2016/2017 season which, among other things, influenced greater efficiency of successful attacks compared to the 2015/2016 season.

Application of continuous attack, according to results of this study, represents a dominant form of offensive action organization. If we take into account the data according to which is directly linked with the positive result (Leontijević et al., 2015), it can be said that for ranking in the finals of the competition a tactical commitment in the play according to which passing game and ball possession resulted in the shot on the opponent’s goal. For such a tactical plan it is necessary to have players who are firstly technically skilled for such way of playing a game. Thus, teams that base their offensive actions exclusively on a direct play (counter attack) or rely on a break cannot achieve good results continuously. However, such a statement can be further examined in some future studies if we take into account the fact that these matches are eliminatory, and, at the same time, their importance is significantly greater, the play itself is more cautious, teams tend to risk less, primarily trying to score a goal, they lose ball possession less frequently in the phase of the initiation of the attack, etc.

The quality in the game by applying the continuous attack, among other things, can be analyzed by efficiency in the ball possession manifested through the success in passing the ball. The 2016/2017 competition season was more efficient in relation to the previous one (a larger number of goals), probably contributed by the data according to which the teams were in ball possession for 45 seconds longer during the match. Besides, the second season is characterized by significantly greater success in passing game (p=0.013), while the speed of the ball during passing was equal. Thus, the conclusion is imposed that it is necessary to technically prepare a player for a game as for the successful passing the ball and for playing under pressure in order to achieve results in football at the highest level. Results of the study that analyzed competitions on the different level (national leagues) also showed that the duration of ball possession, successfullness in passing game and the speed of the ball during passes are the basic indicators of success (Bekris & Gioldasis, 2014; Leontijević et al., 2015; Barreira et al., 2016).

Ball possession nearer to the opponent’s goal, application of cutting the ball and winning “the second ball” during the start of actions that end in shot on the goal, suggest the application of pressing at the very beginning of the opponent’s attack which was slightly more often applied in 2016/2017 competition season. Moreover, the distance of the shot is a data which is correlated with the positive result and the efficiency of the shot itself (Michailidis et al., 2013; Liu et al., 2015b), so that a slightly larger number of shots from the 5 – 11-meter zone in the 2016/2017 season resulted in larger number of scored goals. However, there is an interesting data according to which there are more and more shots on the goal after lateral passes (centre) and back passes, having in mind the data ac-
according to which the number of centre shots during a match negatively correlate with the success in the game (Liu et al., 2015b; Liu et al., 2016).

CONCLUSION

The analysis of the finals of the Champions League in seasons 2015/2016 and 2016/2017 showed that there is no clearly defined structure of attacking actions that end with a shot on goal for this level of competition. The application of continuous attacks, a high percentage of success in the passing game with the distribution of the ball, especially in the attacking third of the pitch represent dominant forms of realization of successful attacks. Also, it can be concluded, based on some differences, that there is an increasing tendency in the offensive tactics to play through the wing positions, to employ the players of impeccable technical skill which increases accuracy in ball passing, and affects efficiency of the final pass and the shot on goal. Besides, there is an increase in number of attacks initiated in the attacking third of the pitch, that is, the application of high-pressing at the beginning of the opponent’s attack which has become more frequent choice in the defensive organization.

To provide a more detailed analysis and more precise discovering of the game mechanisms, it is necessary to examine the structure of continuous attacks, counter attacks and set pieces in the future studies. Also, using comparative analysis, elimination matches and the group phase of the competition, it is necessary to examine whether and to which extent the importance of the game affects the tactical plan of the game. Of course, the analysis of each subsequent competition season will only determine certain standards in the offensive tactics of football on the highest level, but also point to the actual tendencies of development and improvement.

The value of this kind of analysis in the field of football tactics is reflected in clear directions when it comes to preparation of a football team which tends to be highly ranked in the Champions League. Therefore, necessary parameters of the game have been defined precisely, i.e. criterion of demands for the highest level of competition have been determined. On the other hand, theoretical value of such an approach in analysing competitive activity in football is the definition of current demands in the football tactics on the highest level and prediction of potential tendencies of development in the forthcoming period.

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ANGRIFFSTAKTIK VON FUßBALLMANNSCHAFTEN IN DER ENDPHASE DER CHAMPIONS-LEAGUE IN DEN SAISONS 2015/2016 UND 2016/2017

Zusammenfassung

Schlüsselwörter: FUßBALL / WETTBEWERBSAKTIVITÄT / SPIELANALYSE / ERFOLGREICHE ANGRIFFE / PASSSPIEL

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RELATIONSHIP BETWEEN LIFESTYLE AND NUTRITIONAL STATUS AMONG ADOLESCENT

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Abstract
To prevent excess weight, the eating habits and lifestyle among adolescence arouse great interest in public health. The aim of this study is to analyze the lifestyle and nutritional status of this age, also to determine the difference between the habits of the students that attend the Medical and Technical school and to find out that knowing about the importance of a healthy lifestyle would have an effect on everyday habits.

The research was conducted as a cross-sectional study in a Medical school and a Technical school in Vojvodina. The research instrument was a questionnaire, which is anonymous and voluntary, filled out by 209 students, aged 14-18 years. Analysis of the data was analyzed by the statistical package SPSS. We used descriptive statistics and statistical significance between the two schools was tested using the Pearson χ² test. Students of the technical school don’t think about health, but they are physically more active. They have a higher percentage of overweight students (18%). The students of the Medical school are thinking about health, physically less active, and have a higher percentage of underweight students (10%). With appearance is satisfied with 44% of respondents. One-third believes that they have overweight and should lose weight. The knowledge about the importance a healthy lifestyle in students of medical school affect consciousness in selecting foods, the desire to control their own weight, but does not influence to the regular physical activity.

Key words: EXERCISE / DIET / HEALTH / FOOD

INTRODUCTION

In the world and also here the problems of improper diet and physical inactivity in high school are present. Inadequate nutrition of young people seriously compromises their physical and mental development, reduces learning capacity and worsens eating habits that affect the prevalence of disease. As a result of inadequate nutrition, being overweight and obesity can be found in 20-30% of children and adolescents in Europe (WHO, 2004). Most worrying is the fact that obese children remain obese in adulthood, and are prone to and often suffer from non-contagious chronic diseases (cardiovascular disease, cancer, diabetes) these are responsible for 86% of deaths and 77% of diseases in Europe (Ilić, 2010). Certain dietary changes and physical activity can prevent the cases of cardiovascular diseases and diabetes up to 60% (Despotović, Ilić, Irgutinović & Marković, 2013).

A healthy lifestyle is most commonly defined as engaging in physical exercise, sports and recreation, and active lifestyle defined by the quantity of exercise. However, lifestyle is a multidimensional measures of behavior, and can not be defined only by physical activity, because it was determined by other behaviors that are associated with health, especially healthy diet (Markus, 2012). Proper diet and regular physical activity are the basis of a healthy lifestyle, these are behaviors that improve health, and as such should be adopted at a young age (World Health Organization, 2005).

However, the entire system of nourishment in schools are not based on the principles of proper nutrition, instead it is left to the economic interests of individuals. Everything that is offered to young...
people in the immediate vicinity of the school is far from what would be a healthy meal at school (Bogar & Kosić-Bibić, 2013). It is in adolescence, that young people consume more food outside the home, usually irregularly, they tend to skip meals, usually breakfast. “Fast food” meals are frequent outside the home, a lot of snacking between meals, drinking sweetened drinks, eating sandwiches as alternatives for school lunches. Such a diet is poor in fruits and vegetables, as well as high quality sources of protein which leads to deficiencies such as diseases or excessive energy intake. Many adolescents are unhappy with their appearance, and adolescence is also a period when young people begin to go on diets (Ilić, 2010; Cvijović, 2011).

Cultural influences on physical activity are great. Time for rest and work is increasingly carried out in inactivity, because children while watching television, playing video games, spending time on the computer, using means of transport only moving from one sitting position to another (Lešović, 2014).

The importance of health education and learning about proper nutrition and the positive effects of physical activity have been recognized by the education system. Although it has not been integrated into the educational plan of every elementary and high school, in medical schools thanks to the specificity of subject (such as Hygiene with health upbringing during the 2nd year, Health Care internal and surgical patients during the 3rd and 4th year and Medical biochemistry during the 4th year of schooling) it is mostly learned, so the students of the medical are better informed in comparison to other schools (The curriculum for the field work: Health and social services).

The goal of this paper is to examine the lifestyle among adolescents, to examine the difference in lifestyles of students attending the medical and technical school, to discover the extent to which knowledge about the importance of proper nutrition and physical activity affects the way of life.

The specific objectives of the research was to determine the nutritional status by using body mass index, and to discover what is the opinion of high school students on their own weight and whether they think about their health when choosing a diet.

The main hypothesis is that a larger number of students feed incorrectly, which results in increased body weight and dissatisfaction with their own body weight. The specific hypothesis is that students at medical schools pay more attention to choosing healthy foods and to regularly engage in physical activity as a result of a specific curriculum, as well as detailed knowledge about certain diseases and thereof their prevention.

METHODS

The sample of respondents
The survey was conducted as a cross-sectional study in which 119 (56.9%) students participated from the Medical high school “7 April” in Novi Sad (nursing course), 44 male (37.0%) and 75 female (63.0%), and 90 (43.1%) students from the Technical high school “Ivan Sarić” in Subotica (electric technician courses), 63 male (70.0%) and 27 female (30.0%), students aged 14-18 years.

This study included 107 (51.2%) male, and 102 (48.8%) female subjects, of the total 209. The respondents were from different parts of Vojvodina (Serbia), the larger percentages were from Novi Sad (30%) and Subotica (20%), and the surrounding villages (4%).

The sample of variables and instruments
Data was obtained by interviewing. The survey was conducted during the school year of 2015/16., with the participation of. The survey was completely anonymous, the students filled it out voluntarily. To share the survey, the written consent of the school directors was obtained.

For research was used a questionnaire (Ilić, 2010; Despotović, Ilić, Irgutinović & Marković, 2013), which in addition to general demographic data, contains questions about the anthropometric parameters, the frequency of physical activity (1. Once a day 2. Two or three times a week, 3. Once a week, 4. Less than once a week 5. Never), the thinking about health and holding diet (1. No, 2. No, but I should , 3. No, because I need to gain weight, 4. Yes), and the attitude towards own body (1. Extremely too thin, 2. Too thin, 3. Good body weight 4. A little fat, 5. Extremely overweight).

Data processing
The analysis was done in SPSS 20.0 software package. For statistical analysis of the data descriptive methods and non-parametric analysis, statistical significance between the two schools and gender were tested using the method of cross tables and Pearson’s χ² test (Chi-square test).
RESULTS

In Table 1, 2 and 3 are shown, the basic descriptive parameters age, body weight, body height, and body mass index (BMI) of respondent by sex and age. In Figure 1 is shown the structure by sex and age.

Table 1. Anthropometric characteristics of the study participants

<table>
<thead>
<tr>
<th>Parameters</th>
<th>̅x± SD</th>
<th>Std. Error</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>16.22±1,11</td>
<td>0,074</td>
<td>14-18</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>65,49±11,80</td>
<td>0,816</td>
<td>43-100</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>179,60±110,53</td>
<td>0,600</td>
<td>154-197</td>
</tr>
<tr>
<td>Body mass index (kg/m²)</td>
<td>22,02±3,017</td>
<td>0,2087</td>
<td>14,5-32,7</td>
</tr>
</tbody>
</table>

Table 2. The descriptive parameters of the subjects according to sex

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Boys</th>
<th>Range</th>
<th>Girls</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>16.11±1.20</td>
<td>14-19</td>
<td>16.32±1.10</td>
<td>14-19</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>71.18±11.33</td>
<td>45-100</td>
<td>59.53±9.05</td>
<td>43-90</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>177.56±7.18</td>
<td>160-197</td>
<td>166.17±5.81</td>
<td>154-180</td>
</tr>
<tr>
<td>Body mass index (kg/m²)</td>
<td>22.47±3.02</td>
<td>16.9-30.9</td>
<td>21.54±2.95</td>
<td>14.5-32.7</td>
</tr>
</tbody>
</table>

Table 3. The descriptive parameters of the subjects according to the age

<table>
<thead>
<tr>
<th>Parameters</th>
<th>14 год.</th>
<th>15 год.</th>
<th>16 год.</th>
<th>17 год.</th>
<th>18 год.</th>
<th>19 год.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>16.11±1.20</td>
<td>16.32±1.10</td>
<td>16.88±1.08</td>
<td>16.32±1.10</td>
<td>16.32±1.10</td>
<td>16.32±1.10</td>
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<tr>
<td>Range</td>
<td>50-68</td>
<td>50-68</td>
<td>50-68</td>
<td>50-68</td>
<td>50-68</td>
<td>50-68</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>170.67±11.08</td>
<td>170.67±11.08</td>
<td>170.67±11.08</td>
<td>170.67±11.08</td>
<td>170.67±11.08</td>
<td>170.67±11.08</td>
</tr>
<tr>
<td>Range</td>
<td>159-188</td>
<td>159-188</td>
<td>159-188</td>
<td>159-188</td>
<td>159-188</td>
<td>159-188</td>
</tr>
<tr>
<td>Body mass index (kg/m²)</td>
<td>19.47±1.15</td>
<td>19.47±1.15</td>
<td>19.47±1.15</td>
<td>19.47±1.15</td>
<td>19.47±1.15</td>
<td>19.47±1.15</td>
</tr>
<tr>
<td>Range</td>
<td>17.4-20.7</td>
<td>17.4-20.7</td>
<td>17.4-20.7</td>
<td>17.4-20.7</td>
<td>17.4-20.7</td>
<td>17.4-20.7</td>
</tr>
</tbody>
</table>

Fig. 1. Structure of respondents by sex and age
According to this research results of our students are 8.6% underweight (BMI 18.5), 7.5% of men and 9.8% of women, 10% of medical students and 6% of technical school students.

Normal weight (BMI 18.5-24.9) had 74.6% of students, 71% of men and 78.4% of girls. In the higher percentage of technical school students (75.5%).

Overweight (BMI 25-29.9) was 15.3% of students, 20.5% of men and 9.8% of girls (p=0.024). There is no difference in the incidence of overweight and schools. Obese (BMI 30 and over) was 1.4% of the students, 0.9% of men and 1.9% women, who were identified as students of technical school. Distribution of BMI by age is shown in Figure 2.

When choosing food for breakfast healthiness is still considered by 30.1% of students. More frequently by medical students (32.8%) than technical school (26.7%) students. Sometimes does it 49.3% of the respondents, more women (51%). While 20% of the respondents never thinks about healthiness at breakfast, more men and students of technical schools (41%).

At lunch 48.3% of the children are considering healthiness, more students of medicine (53.8%) than technical school (41%). More girls (52%), than boys (45%).

When choosing foods for dinner healthiness is still considered by 40% of the students, more often by girls, and by students of the medical school (47%) than the technical school students (31%), with statistically correlation p=0.039. On average 40% of respondents occasionally thinks about healthiness and their choice of food for lunch and dinner.

Physical activity daily is done by 32.5% of children, 45% of boys and 20% girls (p=0.001). This includes 39% of students from the technical school (p=0.038). Exercise 2-3 times a week is done by 40% of them, mainly girls (44.9%). Almost 15.3% exercises less than once a week or never trains (Figure 3).
With their appearance 44% of respondents was satisfied, 57% of boys and 30% girls, with statistical significant correlation $p=0.001$. One-third believes that is overweight (50% of girls and 19.6% of boys), and that they should lose weight (Figure 4). While 12.4% of respondents (19.6% girls) already hold a diet, 15% of medical school students and 9% of technical school students. Students that are overweight engage in physical activity 2-3 times a week (43.8%) and daily (40.6%), they are aware that they have excess weight, and that they should lose weight, and 28% are on a diet. It is positive that they recognize the importance of daily or at least regular physical activity, and thus attempt to reduce or maintain weight. Obese children are less physically active and exercise only once a week (66.7%). Some of them they think should lose weight, while there are those who are satisfied with their current weight, however none of the obese children are holding a diet. There is a correlation between the position of one's own body weight and body mass index ($p=0.000$), and also with dieting ($p=0.032$) (Table 4).

![Fig. 4. The attitude towards one's own body, by school and sex](image-url)
Table 4. Relations between body mass index and physical activity, dieting and attitude towards their own body

<table>
<thead>
<tr>
<th>Body Mass Index</th>
<th>Underweight n (%)</th>
<th>Normal n (%)</th>
<th>Overweight n (%)</th>
<th>Obese n (%)</th>
<th>Total n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Once a day</td>
<td>3(16.7)</td>
<td>51(32.7)</td>
<td>13(40.6)</td>
<td>1(33.3)</td>
<td>68(32.5)</td>
</tr>
<tr>
<td>2-3 times a week</td>
<td>9(50.0)</td>
<td>60(38.5)</td>
<td>14(43.8)</td>
<td>0(0.0)</td>
<td>83(39.7)</td>
</tr>
<tr>
<td>At least once a week</td>
<td>3(16.7)</td>
<td>19(12.2)</td>
<td>2(6.2)</td>
<td>2(66.7)</td>
<td>26(112.4)</td>
</tr>
<tr>
<td>Least once a week</td>
<td>2(11.1)</td>
<td>19(12.2)</td>
<td>1(3.1)</td>
<td>0(0.0)</td>
<td>22(10.5)</td>
</tr>
<tr>
<td>Never</td>
<td>1(5.6)</td>
<td>7(4.5)</td>
<td>2(6.2)</td>
<td>0(0.0)</td>
<td>10(4.8)</td>
</tr>
<tr>
<td><strong>Diet</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No, I am satisfied with my weight</td>
<td>11(61.1)</td>
<td>74(47.4)</td>
<td>6(18.8)</td>
<td>1(33.3)</td>
<td>92(44.0)</td>
</tr>
<tr>
<td>No, but I should to lose weight</td>
<td>1(5.6)</td>
<td>44(28.2)</td>
<td>16(50.0)</td>
<td>2(66.7)</td>
<td>63(30.1)</td>
</tr>
<tr>
<td>No, because I need to gain weight</td>
<td>6(33.3)</td>
<td>21(13.5)</td>
<td>1(3.1)</td>
<td>0(0.0)</td>
<td>28(13.4)</td>
</tr>
<tr>
<td>Yes</td>
<td>0(0.0)</td>
<td>17(10.9)</td>
<td>9(28.1)</td>
<td>0(0.0)</td>
<td>26(12.4)</td>
</tr>
<tr>
<td><strong>Attitude towards one’s own body</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extremely thin</td>
<td>2(11.1)</td>
<td>3(1.9)</td>
<td>1(3.1)</td>
<td>0(0.0)</td>
<td>6(2.9)</td>
</tr>
<tr>
<td>Something too thin</td>
<td>6(33.3)</td>
<td>27(17.3)</td>
<td>1(3.1)</td>
<td>0(0.0)</td>
<td>34(16.3)</td>
</tr>
<tr>
<td>Pretty good weight</td>
<td>9(50.0)</td>
<td>75(48.1)</td>
<td>7(21.9)</td>
<td>1(33.3)</td>
<td>92(44.0)</td>
</tr>
<tr>
<td>Slightly thick</td>
<td>1(5.6)</td>
<td>49(31.4)</td>
<td>21(65.6)</td>
<td>1(33.3)</td>
<td>7234.4</td>
</tr>
<tr>
<td>Extremely overweight</td>
<td>0(0.0)</td>
<td>2(1.3)</td>
<td>2(6.2)</td>
<td>1(33.3)</td>
<td>5(2.4)</td>
</tr>
</tbody>
</table>

**Statistical correlation is significant at the level p≤0.01; * Statistical correlation is significant at the level p≤0.05

**DISCUSSION**

According to the results of studies on the health of the population in Serbia in 2013, they registered an increase in the percentage of obese children (4.9%) compared to 2006 (2.6%). Also a significantly higher percentage of moderately obese (13.2%) and obese (7.5%) children were recorded among children aged 11-14 years (Boričić, et al., 2014).

According to our results, in the sample we are identified 16.7% overweight and obese children, who are a warning about the low quality of their diets and physical inactivity. However, as we don’t found an extremely large number of excess weights, we reject the basic hypothesis.

The status of nourishment in our study is somewhat more favorable in comparison to the survey conducted in Bor (central Serbia) among primary school pupils in 2011 (Stanković & Mihajlović, 2011), when they found that normal body weight had 81% of the girls and 3% were underweight, and 16% had excess weight (in our study, we found 9.8% underweight and 11.76% of girls are overweight). 68% of boys had normal weight, 7% was underweight and 25% were overweight (in our study we found 7.48% malnourished boys and 21.49% with excess weight).

Observing the schools, we found that students of technical school have a larger percentage of daily physical activity. Here we identified 17.8% overweight and 6.6% underweight students. While, students of the Medical school have a lower percentage and rarely engage in physical activity. Here we identified 15.9% of overweight and 10% of malnourished students.

As for the differences between men and women, we noticed that men are physically more active, mainly satisfied with their weight, only 5% hold a diet. Girls, however, are less frequently (2-3 times per week) engaged in physical activity. Almost 50%
of girls considered themselves overweight, and 20% already hold a diet.

Broken down by age, we identified among 15 year olds 21%, among 16 year olds 20.7%, among 17 year olds 12.5% and among 18 year olds 11.1% of respondents with excessive weight. Obviously, the percentage of excessive weight respondents declines with age.

Nutritional status of adolescents is of great interest to public health, in terms of prevention of diseases associated with obesity. The effects of obesity in young people can lead to long-term health problems. It is important to emphasize that physical activity in childhood and adolescence should be constantly stimulated, in which the biggest role has physical education teachers.

The teacher of physical education, through its activities in the school and outside the school, in sports clubs, performs an important role in physical and mental development of children with effect on the personality of young people, directly assisting its formation and development. The teacher makes the students develop skills in accordance with the talent, potential predisposition, influence at the same time educational and of their personality (Krasniqi, et al., 2008).

Several studies confirm this fact. Thus, for example, in India examined the effect of daily physical activity besides of regular school hours on body composition in obese men aged 9-15 years (Apte & Rao, 2013). The intervention involved the 5 sessions per week, beside school hours for a period of 50 minutes. After one year, assessed the impact of physical activity on reducing obesity. They found that participants show a significant reduction in body fat (1.0%), reduction of skinfold thickness, too, there was a significant reduction in indicators of central obesity - waist circumference (from 1.8 to 1.1 cm) with respect to their original measurement. This indicates that the potential benefits of 50 minutes daily physical activity justify the introduction in the curriculum of schools, for better health adolescence.

However, the benefits of regular physical activity could be reach up within the current school program, modification of content. It's been proven in Brazil, where nearly 400 subjects aged 15-17 years involved in research on the impact of physical activity on body composition (Farias, Gonçalves, Morcillo, Guerra-Júnior, & Amancio 2015). The study group is subjected to a specific program of physical activity during the regular physical education classes (aerobic activity, muscle strength exercises, running, jump-

ing, sports games and stretching) while the control group attended a conventional program of physical education (sports games through exercise, gymnastics, base of sports). Both groups had a regular two hours of physical education per week, during the school year. The results are reported positive effects of programmed physical activity in the control group (p 0.001) in both sexes, reducing the percentage of fat (mean difference = -5.58%) and waist circumference (-2.33 cm), and an increase in clean weight (+2.05 kg), while the opposite was observed in the control group. This points to the role of physical education teachers, as the just choice of physical activity can achieve reduction of body weight and contribute to the health of adolescents in the context of regular teaching physical education classes.

Also examined was the impact of programmed and self-selected physical activity on physical fitness of adolescents (Neto et al., 2014). One group of students performed physical activity according to their own rhythm in the following sports: basketball, volleyball, handball, football and swimming. While another group of programmed physical activity is performed specific conditional exercise. Training for both groups lasted 60 minutes. Intervention with programmed physical activity showed more changes in physical abilities, the cardiorespiratory state and strength of the lower and upper extremities.

According to previously analyzed, the greatest potential is found in the decision that the state recognizes the importance of prevention chronical noncommunicable diseases through adequate nutrition and regular physical activity from an early age. School sport should contribute to improving public health, but in the analysis of this problem is usually stated that there are a small number of sports sections, which operate non-systematic. Today the little number of school has a regularly organized sport sections, so sport in schools regularly engaged in only 3-5% of the students, and one of the main problems is the existence only 2 hours of physical education per week (Provincial Secretariat for Sports, Vojvodina, Serbia, 2007).

However, as it was submitted in the “Strategies for the development of sport school in Vojvodina for the period 2013-2017” highlights, daily physical activity should be incorporated into the curriculum, while this is not achieved, the emphasis should be put to sport in schools should is available as an optional subject, or by providing a variety of free sections of sport within the the school.
Also, more emphasis should be placed on school meals. The good and bad habits acquired in childhood remain until the end of life, and improper diet can have significant consequences. The development of eating habits of school children most affected by the parents, but we must point out the impact of the school on the formation of the child’s personality and adopting healthy eating habits and behavior.

Special significance have a school meal, because children six or more hours spend in school, and during that time consumed largely unhealthy meals, snacks, fast food and soft drinks, with high fat and concentrated carbohydrates, which can cause overweight (Janković, 2003). Legal provision of adequate, healthy food in the school cafeteria, student dormitories could significantly reduce diseases associated with inadequate nutrition.

CONCLUSION
Only a third of respondents are engaged daily physical activity. Differences in lifestyle among students of medical and technical schools, are reflected primarily in the frequency of physical activity, which is present in higher percentage among students of technical schools and boys. In assessing the nutritional status we found more malnourished students between medical school, while in technical school more obese student. Mostly women believe that they have an excess weight, and the large number from the medical school is already hold uncontrolled diet. Mainly students from medical school think about their health when choosing food. Knowledge about the importance of proper nutrition and physical activity among medical school students affect consciousness in selecting foods, but does not affect regular physical activity. Apparently, the knowledge that nursing students receive in medical schools without practical advice and motivation is not enough to change lifestyle. This is a long process that needs to start at a young age. In addition to families, schools and teachers have a crucial role, promoting healthy lifestyles, the importance of regular activity and the possible consequences of obesity.

REFERENCES


VERHÄLTNIS ZWISCHEN LEBENSTIL UND ERHÄHRUNGSZUSTAND BEI ADOLEZENTEN

\textbf{Zusammenfassung}\n

\textbf{Schlüsselwörter:} KÖRPERLICHE AKTIVITÄT / DIÄT / GESUNDHEIT / LEBENSMITTEL

\textbf{Received: 05.02. 2017}\n\textbf{Accepted: 17.11.2017}
INTRODUCTION

There are two primary reasons for me to call to your attention. The first reason is the 70th anniversary of the journal PHYSICAL CULTURE in 2016. It is a date to be proud of and celebrate; to continue to exist for as long as seven decades. Published regularly during tumultuous social changes and events, the journal has matured and developed. In this progress it has received indirect world recognition together with its publisher, the Faculty of Sport and Physical Education of the University of Belgrade by entering the prestigious Shanghai list. This is the second reason why I call to your attention. But let us start from the beginning. We should remind ourselves about the genesis of maturing of the journal PHYSICAL CULTURE.

GENESIS AND DEVELOPMENT OF THE JOURNAL PHYSICAL CULTURE

Among many scientific and professional sources in physical culture, we may be proud of our oldest journal PHYSICAL CULTURE. For as long as 70 years of continuous existence, it has witnessed everything that has happened in the profession and science. The journal has followed and shared the fate since the time of our oldest educational institution “DIF” (the State Institute of Physical Education) to the Faculty of sport and physical education of today.

The date of “birth” of our oldest professional (and later even scientific) journal is April 1947 in 27, Deligradska Street, at the place of “Old DIF”! Although its first name was “Physiculture” (1947-1949) and the imprint of the first issue showed that the publisher was the Committee of the Government of the Federal People’s Republic of Yugoslavia (FPRY), and for a time it was the Association of Pedagogues of Physical Culture and the Republican Association of Physical Culture, the journal PHYSICAL CULTURE has been edited mostly by teachers from the DIF and it was always “located” at the Faculty (Table 1).

That is how the Journal changed its first name: “Physiculture – the journal for theory and practice of physical culture” (1947-1949) grew into “Physical Culture – the journal for theory and practice” (1950-1960), then has had the name “Physical Culture – the journal that publishes papers from all domains of
physical culture (physical education, sport and related biological, humanistic, social and natural sciences) - (1961-2005) for 45 years. Although the managing editor in that time in the volume number 2 (1994) in his introductory text advocated that the journal should become the profession scientific herald (Justification for the Journal PHYSICAL CULTURE as the profession scientific herald”), the new editorial board of the Journal with the editor in chief Irina Ju has boldly emphasized their SCIENTIFIC orientation in the impressum of the Journal in 2006: “Physical Culture” – Scientific journal publishing papers from the field of physical education and sport and related bio-medical, humanistic, social, and natural sciences (2006-2010). In the period form 2010-2016, the Journal gets a new editorial board with the managing editor Saša Jakovljević and a new impressum: “Physical Culture” – Scientific journal publishing papers from the field of sports sciences and physical education as well as from related bio-medical, humanistic, social, and natural sciences (Table 1).

Table 1 The overview of names, scientific field and publishers of the journal PHYSICAL CULTURE (1947 – 2016)

<table>
<thead>
<tr>
<th>Year(s)</th>
<th>Description</th>
</tr>
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<tr>
<td>1947/1</td>
<td>“PHYSICULTURE” – the journal for theory and practice of physical culture</td>
</tr>
<tr>
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<td>(publication of the Committee for physical education of the government of FPRY)</td>
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<tr>
<td>1950/1-2</td>
<td>“PHYSICAL CULTURE” – the journal for theory and practice</td>
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<tr>
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<td>(Committee for Physical Education of the Government of FPRY)</td>
</tr>
<tr>
<td>1951/1-2</td>
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</tr>
<tr>
<td></td>
<td>(State Institute for Physical Education)</td>
</tr>
<tr>
<td>1954/1-2</td>
<td>“PHYSICAL CULTURE” – the journal for theory and practice</td>
</tr>
<tr>
<td></td>
<td>(The Institute for Physical Culture)</td>
</tr>
<tr>
<td>1957/1-2</td>
<td>“PHYSICAL CULTURE” – the journal for theory and practice</td>
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<tr>
<td></td>
<td>(High school for Physical Education)</td>
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<tr>
<td>1960/1-2</td>
<td>“PHYSICAL CULTURE” – the journal for theory and practice</td>
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<tr>
<td></td>
<td>(Association of Societies of Physical Education Teachers of Yugoslavia)</td>
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<tr>
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<td>(journal of the Association of Societies of Physical Education Teachers of Yugoslavia)</td>
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<td>(journal of the Association for Physical Culture of the Social Republic of Serbia)</td>
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<td>1975/1</td>
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<td></td>
<td>(publisher: the Republican Association of Physical Culture)</td>
</tr>
<tr>
<td>1990/91/1-2</td>
<td>“PHYSICAL CULTURE” – The journal publishes papers from all domains of physical culture</td>
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<tr>
<td></td>
<td>(publisher: the Faculty of Physical Culture of the University in Belgrade)</td>
</tr>
<tr>
<td>1992/2</td>
<td>“PHYSICAL CULTURE”</td>
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<tr>
<td></td>
<td>The journal publishes papers from the field of physical culture (physical education, sports recreation, sport and related biological, humanistic, social and natural sciences)</td>
</tr>
<tr>
<td></td>
<td>(publisher: the Faculty of Physical Culture of the University in Belgrade)</td>
</tr>
<tr>
<td>2006/1</td>
<td>“PHYSICAL CULTURE”</td>
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<tr>
<td></td>
<td>Scientific journal publishes papers from the field of physical education and sport and related bio-medicine, humanistic, social and natural sciences</td>
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<td>(publisher: The Faculty of Sport and Physical Education of the University in Belgrade)</td>
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<tr>
<td>2010/1</td>
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</tr>
<tr>
<td></td>
<td>Scientific journal publishes papers from the field of sports sciences and physical education, as well as from related bio-medicine, humanistic, social and natural sciences</td>
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</tbody>
</table>
The Journal Editors in chief were university professors: Branko Polič (1947-1953), Borivoje Jovanović (1954-1956), Miloš Nišavić (1956-1973), Miladin Ilić (1974-1989), Božo Bokan (1990-2005), Irina Juhas (2006-2009) and Saša Jakovljević (2010-2016). All professors were from the University of Belgrade – the Faculty of Sport and Physical Education, except the professor Miladin Ilić, who was from the University of Niš – the Faculty of Sport and Physical Education (Table 2). If we take into account that the largest number of author’s texts in the Journal were written by teachers and associates whose work as pedagogues is connected to this institution of higher education (from DIF to the Faculty of Sport and Physical Education), it is therefore clear why the Faculty has been the publisher of our oldest journal for a long period of time.

Table 2 Basic indicators of the journal PHYSICAL CULTURE by periods in 70 years of existence

<table>
<thead>
<tr>
<th>Period</th>
<th>Span</th>
<th>Number of volumes</th>
<th>Number of pages</th>
<th>Number of texts</th>
<th>Publisher</th>
<th>Editor in chief</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1947/1950</td>
<td>20</td>
<td>2193</td>
<td>276</td>
<td>The Committee of the Government of FPRY</td>
<td>Branko Polič</td>
</tr>
<tr>
<td>2</td>
<td>1951/1959</td>
<td>43</td>
<td>4222</td>
<td>699</td>
<td>DIF, Belgrade CoPE, Belgrade</td>
<td>Branko Polič Bora Jovanović Miloš Nišavić</td>
</tr>
<tr>
<td>3</td>
<td>1960/1973</td>
<td>70</td>
<td>5593</td>
<td>1075</td>
<td>Association of societies of PET / PC</td>
<td>Miloš Nišavić</td>
</tr>
<tr>
<td>4</td>
<td>1974/1989</td>
<td>76</td>
<td>6565</td>
<td>1880</td>
<td>Republican Self-management Community for PC</td>
<td>Miladin Ilić</td>
</tr>
<tr>
<td>5</td>
<td>1990/2005</td>
<td>30</td>
<td>3874</td>
<td>780</td>
<td>FPC, Belgrade FSPE, Belgrade</td>
<td>Božo Bokan</td>
</tr>
<tr>
<td>6</td>
<td>2006/2009</td>
<td>6</td>
<td>815</td>
<td>47</td>
<td>FSPE, Belgrade</td>
<td>Irina Juhas</td>
</tr>
<tr>
<td>7</td>
<td>2010/2016</td>
<td>14</td>
<td>3120</td>
<td>108</td>
<td>FSPE, Belgrade</td>
<td>Saša Jakovljević</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1947-2016</td>
<td>259</td>
<td>26382</td>
<td>4865</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Presented in numbers, seventy years of existence of the Journal would look like this: 76 members of editorial board, 7 managing editors, 8 different publishers (out of which the Faculty of sport and physical education of today was the publisher for 4 times under different names), 70 volumes, 259 issues, 26,382 pages of text, about 1,600 authors and 4,865 different professional and scientific texts (Table 2).

In the overall period from 1947-2016, the Journal with its topics was oriented towards the whole area of physical culture, slightly directed towards school education in the first three periods, and significantly directed towards sport in the last two periods.

The journal PHYSICAL CULTURE had the Yugoslav orientation in the first three periods of development, and according to the status of the publisher, it was the federal journal in the First and the Third period, and in the following periods it started to gain features of a national journal concerning editors and authors of papers, which was the reflection of social and political developments on the territory of former common state.

The most significant changes in editorial form of the Journal occurred happened in 1974 (the Fourth period), when the format B was replaced by larger format A4, documentation elements (abstracts of papers in Serbian and English languages in a separate card) were integrated, and then other standards (addresses of authors and other things) were applied.

A new change, i.e. printing of the Journal on B format happened in 1994, when the abstract of the paper is placed in the header of the article; the table of contents is given in Serbian, English and Russian, and some other details are harmonized with the current – actual demands of the Ministry of Science and Technology of the Republic of Serbia.

The Journal published original articles and contributions, and occasionally even translations. The most remarkable changes during seventy years happened in the category of articles. In the First, Second, Third and mostly in the Fourth period, articles were not categorized individually (division on scientific and professional ones). However, as early as in the Third period, since 1970, the column “Scientific paper” was
established (for which the member of the editorial board, prof. Nikola Kurelić, PhD, was in charge) where such papers were published. The same form was kept in the Fourth period up to 1986. In 1987 the permanent individual categorization of articles started. At the same time, review of articles by selected reviewers outside the editorial board was introduced, and that good practice continued in the Fifth, Sixth, and Seventh period of the development of the Journal.

The Journal uses blind peer review and the list of reviewers is published every year in the last issue of the Journal. The papers are categorized in the following categories:

- original scientific article,
- review article,
- previous announcement,
- lecture at a scientific / professional meeting,
- call lecture and an announcement,
- scientific criticism, argument, review,
- professional article.

The share of scientific articles per year ranged from 14.0% to 33.6% of texts from 1987 to 1996, and that trend, with a slight decline, lasted till 2005, which meant the Journal had scientific direction together with the professional one. Finally, from 1995 onwards, the Ministry of science and technology of the Republic of Serbia co-funded publication of PHYSICAL CULTURE as “A PUBLICATION OF A SPECIAL INTEREST FOR SCIENCE” and thus it was acknowledged that the journal belonged to the scientific category.

There is the exchange between the Journal and two dozens of leading journals in the world. It is regularly distributed to our major libraries (the National Library, the University Library), as well as to faculties of physical culture in Serbia.

The Academic Council of the Faculty of Sport and Physical Education concluded in 2006 that the Journal should be transformed into the Journal of international importance, i.e. to become “A publication of the special importance for world science in the field of physical culture”.

In the Sixth period of the Journal development, it was published in the A4 format again, the Editorial board got several new members from abroad and for the first time, all texts were fully translated from Serbian language (Cyrillic letters) into English. This tendency of “two journals in one” was continued by the Editorial board in the Seventh period of the development of the Journal, together with establishing the Publishing board comprised of a large number of respected professors of the University and researchers from various fields of physical culture from the whole world. Without going into deeper analysis of texts published in the Sixth and the Seventh period of development, it can be concluded that the English version of the journal has made a significant role in the development of the Journal from the angle of its Internet presentation and dissemination of texts all over the world (Picture 1).

![Picture 1](https://example.com/PhysicalCulture.png)

The good practice, of publishing papers in Serbian language (Cyrillic), as well as their translation into English, together with internet presentation, should continue in the following period. Preservation of the traditional Cyrillic letters in Serbian and the English version of texts are the publishing enterprise of the editorial board of the Journal which deserves a visual presentation as a protective paradigm of the present and future editorial boards (Picture 1).

The contribution to the development of the Journal is given by the members of the library of the Faculty of Sport and Physical Education, Sida Bogosavljević as a proofreading editor and Saša Golub as a librarian and a technical editor, who ensured that library sources together with the texts from the Journal, via SClindex – Serbian Citation Index, become available to world university community of researchers. Since 1991 the journal PHYSICAL CULTURE has become available in electronic form to the level of abstracts, key words and references, and since 2002 full texts of all volumes of the Journal have become available.

In mentioning significant persons for appearance and quality of the Journal, we should not forget permanent translators Gordana Vekarić (for English language) and Bojana Sabo (for Russian language).
HOW THE FACULTY MATURMED
AS THE PUBLISHER OF THE
JOURNAL AND AS A SCIENTIFIC
INSTITUTION

Another reason for discussion is the appearance
of the Faculty of Sport and Physical Education of
the University of Belgrade in the prestigious Shang-
hai Ranking of faculties for PURPOSEFUL MOVE-
MENT CULTURE OF A MAN. We deliberately used
the ontological expression ("purposeful movement
culture of a man") that should "cover" different names
of faculties that are on the list of 300 best faculties of
the world that deal with education of different pro-
files of experts whose main activity is – body move-
ment – exercising.

At first glance, it may seem that there was a switch
of argument: the Journal – the Faculty, but, as previ-
ously mentioned, the Faculty of Sport and Physical
Exercise was, during its history, the publisher of the
Journal in most occasions, and the largest number of
teachers from the Faculty were editors and wrote pro-
fessional and scientific texts for it.

The forerunner of the Journal of today was “Physi-
culture” (1947/1) – the journal for theory and practice
of physical culture”, the publisher of which was the
Committee for Physical Education of the Govern-
ment of the FPRY. As early as in 1951, the Journal
got the name it has today „Physical culture” (1951/1-
2) – the journal for theory and practice, the publisher
was the State Institute for Physical Education (DIF),
the forerunner of the current name of the Faculty of
Sport and Physical Education (1). The Journal and the
Faculty have grown and matured together! This is the
main reason why we discuss the Faculty while analys-
ing the Journal and vice versa (Picture 2).

From the moment when abstracts and texts in the
Journal were printed in English and especially when
the texts from the Journal became available to read-
ers all over the world via the Internet, it was not only
that the authors became "visible", but the University
and the Faculty became even more "visible". Besides,
authors from the Faculty, in the process of election to
titles, had to publish papers in international indexed
journals, which contributed to the rating of authors
themselves, but also of the University and the Faculty.
That was the symbiosis and the mutual influence that
happened to the Journal and the Faculty. The increase
in number of papers and authors who worked at the
Belgrade Faculty of Sport and Physical Education re-
sulted in higher Faculty ranking in the world.

The University of Belgrade is ranked in the
prestigious Shanghai list (the basic criterion is the
number of published papers in international journals
and number of quotations) among 20,000 universities
in 2012 – firstly between 400-500 top positions, and
in 2016 it was rated between the positions 200-300
(Table 3), while the Faculty of Sport and Physical Ed-
ucation reached the same position in 2016 (Table 4).
It should be said that the Faculty of Sport and Physical
Education from Niš found its place in the Shanghai
list of best faculties in teaching staff for physical edu-
cation, sport and recreation. Although this ranking
is informal, it is a matter of prestige to be published
in the list that presents only two percent of the world
universities each year.

Picture 2 Publisher of the Journal PHYSICAL CULTURE –
from DIF to FSPE
Table 3  Academic ranking of prestigious world universities – Shanghai list 2016

<table>
<thead>
<tr>
<th>Rank</th>
<th>The name of the university</th>
<th>Country</th>
<th>Year of establishment</th>
<th>National rank</th>
<th>Total score</th>
<th>Score on special criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Harvard University</td>
<td>USA</td>
<td>1636</td>
<td>1</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>4</td>
<td>University of Cambridge</td>
<td>Great Britain</td>
<td>1318</td>
<td>1</td>
<td>69.6</td>
<td>78.3</td>
</tr>
<tr>
<td>19</td>
<td>Swiss Federal Institute of Technology Zurich</td>
<td>Switzerland</td>
<td>1855</td>
<td>1</td>
<td>43.8</td>
<td>29.5</td>
</tr>
<tr>
<td>20</td>
<td>University of Tokyo</td>
<td>Japan</td>
<td>1977</td>
<td>1</td>
<td>42.2</td>
<td>36.3</td>
</tr>
<tr>
<td>27</td>
<td>University of Toronto</td>
<td>Canada</td>
<td>1827</td>
<td>1</td>
<td>39.4</td>
<td>19.9</td>
</tr>
<tr>
<td>30</td>
<td>University of Copenhagen</td>
<td>Denmark</td>
<td>1479</td>
<td>1</td>
<td>37.7</td>
<td>21.8</td>
</tr>
<tr>
<td>39</td>
<td>Pierre and Marie Curie University – Paris</td>
<td>France</td>
<td>1971</td>
<td>1</td>
<td>34.5</td>
<td>33.6</td>
</tr>
<tr>
<td>40</td>
<td>The University of Melbourne</td>
<td>Australia</td>
<td>1853</td>
<td>1</td>
<td>33.9</td>
<td>17.0</td>
</tr>
<tr>
<td>44</td>
<td>Karolinska Institute</td>
<td>Sweden</td>
<td>1810</td>
<td>1</td>
<td>32.7</td>
<td>25.6</td>
</tr>
<tr>
<td>47</td>
<td>Heidelberg University</td>
<td>Germany</td>
<td>1386</td>
<td>1</td>
<td>32.3</td>
<td>19.9</td>
</tr>
<tr>
<td>56</td>
<td>University of Helsinki</td>
<td>Finland</td>
<td>1640</td>
<td>1</td>
<td>29.9</td>
<td>12.6</td>
</tr>
<tr>
<td>58</td>
<td>Tsinghua University</td>
<td>China</td>
<td>1911</td>
<td>1</td>
<td>29.6</td>
<td>10.3</td>
</tr>
<tr>
<td>201-300</td>
<td>University of Belgrade</td>
<td>Serbia</td>
<td>1808</td>
<td>1</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>401-500</td>
<td>University of Ljubljana</td>
<td>Slovenia</td>
<td>1595</td>
<td>1</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>401-500</td>
<td>University of Zagreb</td>
<td>Croatia</td>
<td>1669</td>
<td>1</td>
<td>0.0</td>
<td></td>
</tr>
</tbody>
</table>

Comment on the Table 3 Ranking of Universities in the Shanghai list in 2016 by countries

1. The most quality universities have been from the United States of America for a long time. Out of the first 20 universities from the Shanghai list, 17 are from the USA, and one is from Great Britain, Switzerland and Japan each.

2. The most quality universities are from 20 most developed countries of the world: USA, Great Britain, Switzerland, Japan, Canada, Denmark, France, Australia, Sweden, Germany, Finland, and China.

3. “Age” of the university influences the quality of rank, so that the oldest universities are the most quality ones at the same time. It specially pertains to universities from the USA and European states.

4. The number of universities from medium developed and undeveloped countries is smaller, so that their appearance in the Shanghai list is considered exceptionally significant.

5. The University of Belgrade appeared in the Shanghai list in 2012 for the first time, it was positioned between 401-500 and since then it has constantly made progress. Since 2016, the University of Belgrade has been ranked between 201-300 top positions, and it is the only university from Serbia ranked according to criteria of the Shanghai list - (the Shanghai list published every year by the Shanghai Jiao Tong University and it is one of the most influential in the world. The key criteria for ranking a university are: the number of published scientific papers in international journals, number of quotes, number of Nobel Prize winners and Fields medals of those who used to attend the University or work there. Although the “Shanghai list” is informal, it is the matter of prestige to be include, because it encompasses only two percent of the world universities).

6. If compared to the Universities from the region (Ljubljana and Zagreb), it is much better ranked, although in the beginning these universities were ranked better.
Table 4 Global rank of faculties of physical culture – Shanghai list 2016 (Selection of prestigious faculties presented by country)

<table>
<thead>
<tr>
<th>World Rank</th>
<th>The name of the faculty</th>
<th>Country</th>
<th>Total Score</th>
<th>Score on special criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Deakin University – School of Exercise and Nutrition Sciences</td>
<td>Australia</td>
<td>100</td>
<td>98.9</td>
</tr>
<tr>
<td>2</td>
<td>Loughborough University – School of Sport, Exercise and Health Sciences</td>
<td>Great Britain</td>
<td>95.7</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>University of South Carolina – Columbia Department of Exercise Science / Department of Hospitality, Retail and Sport Management / Department of Physical Education and Athletic Training</td>
<td>USA</td>
<td>89.5</td>
<td>88.6</td>
</tr>
<tr>
<td>4</td>
<td>Norwegian School of Sport Sciences – Norwegian School of Sports Sciences</td>
<td>Norway</td>
<td>84.4</td>
<td>73</td>
</tr>
<tr>
<td>7</td>
<td>University of Southern Denmark – Department of Sports Science and Clinical Biomechanics</td>
<td>Denmark</td>
<td>78.4</td>
<td>68.5</td>
</tr>
<tr>
<td>8</td>
<td>University of Leuven – Faculty of Kinesiology and Rehabilitation Sciences</td>
<td>Belgium</td>
<td>75.4</td>
<td>66.9</td>
</tr>
<tr>
<td>10</td>
<td>University of Cologne – German Sport University Cologne</td>
<td>Germany</td>
<td>73</td>
<td>87.1</td>
</tr>
<tr>
<td>11</td>
<td>Vrije University of Amsterdam – Department of Human Movement Sciences</td>
<td>The Netherlands</td>
<td>72.2</td>
<td>79.9</td>
</tr>
<tr>
<td>16</td>
<td>University of British Columbia – Allan McGavin Sports Medical Center, School of Health and Exercise Science, School of Kinesiology</td>
<td>Canada</td>
<td>64.1</td>
<td>64.8</td>
</tr>
<tr>
<td>19</td>
<td>Verona University – Faculty of Exercise and Sport Science, Sport, Mountains, and Health Research Center</td>
<td>Italy</td>
<td>58.6</td>
<td>63.3</td>
</tr>
<tr>
<td>101-150</td>
<td>University of Ljubljana – Faculty of Sport</td>
<td>Slovenia</td>
<td>17.2</td>
<td></td>
</tr>
<tr>
<td>101-150</td>
<td>University of Zagreb – Faculty of Kinesiology</td>
<td>Croatia</td>
<td>19.8</td>
<td></td>
</tr>
<tr>
<td>201-300</td>
<td>University of Belgrade – Faculty of Sport and Physical Education</td>
<td>Serbia</td>
<td>9.9</td>
<td></td>
</tr>
<tr>
<td>201-300</td>
<td>University of Niš – Faculty of Sport and Physical Education</td>
<td>Serbia</td>
<td>7.9</td>
<td></td>
</tr>
</tbody>
</table>

Comment on Table 4 Ranking of faculties of physical culture according to Shanghai list 2016

1. Among the best faculties in the field of physical culture, faculties from the USA are not dominant any more. Although among the first 20 faculties there are the ones from the USA, now the dominant faculties are from Australia, Great Britain, Norway, Denmark, Belgium, Germany, the Netherlands, Canada, Italy.
2. The best faculties for physical culture are again those from the 20 most developed countries of the world.

3. Faculties from the region (Ljubljana, Zagreb) with their placement between 101-150 position are ranked better than their universities (401-500), while the Faculty of Sport and Physical Education from Belgrade follows its University (201-300).

4. The Faculty of Sport and Physical Education appeared in the Shanghai list for the first time in 2016 which is considered to be a great achievement of the Faculty.

5. The Faculty of Sport and Physical Education from Niš appeared in the Shanghai list in 2016, although the University of Niš is not in the Shanghai list.

By reviewing and analysing different names of faculties from the Shanghai list in 2016, different names as a consequence of cultural, traditional, economic and other qualities of countries are noticed: "Universities of physical education" – Poland (Table 5), "Universities of sport" – Germany, China, Lithuania, Japan (Table 6), "Faculties of physical education" – the Czech Republic, Poland (Table 7). The most frequent names of faculties are presented in Table 8. Here we should emphasize once more that faculties of physical culture from Russia are not in the Shanghai list, and they have the name "Faculty of Physical Culture" in most cases.

Table 5. Universities of PHYSICAL EDUCATION – Shanghai list 2016

<table>
<thead>
<tr>
<th>Number</th>
<th>The name of the university</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gdansk University of PE and Sport</td>
<td>Poland</td>
</tr>
<tr>
<td>2</td>
<td>Jozef Pilsudski University of PE in Warsaw</td>
<td>Poland</td>
</tr>
<tr>
<td>3</td>
<td>The Jerzy Kukuczka Academy of PE in Katowice</td>
<td>Poland</td>
</tr>
</tbody>
</table>

Table 6 Universities of Sport – Shanghai list 2016

<table>
<thead>
<tr>
<th>Number</th>
<th>The name of the university</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>German Sport University Cologne</td>
<td>Germany</td>
</tr>
<tr>
<td>2</td>
<td>National Taiwan Sport University</td>
<td>Taiwan / China</td>
</tr>
<tr>
<td>3</td>
<td>Shanghai University of Sport</td>
<td>China</td>
</tr>
<tr>
<td>4</td>
<td>Tianjin University of Sport</td>
<td>China</td>
</tr>
<tr>
<td>5</td>
<td>Beijing Sport University</td>
<td>China</td>
</tr>
<tr>
<td>6</td>
<td>Lithuanian Sports University</td>
<td>Lithuania</td>
</tr>
<tr>
<td>7</td>
<td>Nippon Sport Science University</td>
<td>Japan</td>
</tr>
<tr>
<td>8</td>
<td>Osaka University of Health and Sport Sciences</td>
<td>Japan</td>
</tr>
</tbody>
</table>

Table 7 Faculties of PHYSICAL CULTURE – Shanghai list 2016

<table>
<thead>
<tr>
<th>Number</th>
<th>The name of the faculty</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Faculty of Physical Culture</td>
<td>Czech Republic</td>
</tr>
<tr>
<td>2</td>
<td>Department of Physical Culture and Health Promotion</td>
<td>Poland</td>
</tr>
</tbody>
</table>
As a final consideration, the distribution of physical culture faculties by continents should also be mentioned (Table 9). This table clearly shows that Europe is dominant with its faculties for the movement culture of a man (about 50%), with names: “physical culture”, “physical education”, “sport” and “sports sciences” and various combinations of mentioned names. Faculties from North America are on the second place (29%), with the dominant names: “kinesiology”, “sport”, “sports science”, “physical education” and various combinations of mentioned names, with a large number of these faculties focusing on biomedical sciences. Faculties from Europe and North America have about 80% of the faculties of physical culture in the world and they are the most developed, with a long tradition and the best results achieved in the field of physical culture. If one needs to take the name of the faculty of physical culture as an example, then it is definitely Europe, with its long tradition and results in the field of the movement culture of a man.

Table 8. Most frequent names of faculties for movement culture of a man on the Shanghai list in 2016

<table>
<thead>
<tr>
<th>Rank</th>
<th>The name of the faculty (department, school, institute)</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Department of Kinesiology</td>
<td>26</td>
</tr>
<tr>
<td>2</td>
<td>Department of Sport and Exercise Science</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>Faculty of Physical Education and Sport Science</td>
<td>7</td>
</tr>
<tr>
<td>4-5</td>
<td>Department of Physical Education</td>
<td>6</td>
</tr>
<tr>
<td>4-5</td>
<td>Faculty of Sport Science</td>
<td>6</td>
</tr>
<tr>
<td>6-8</td>
<td>School of Physical Education</td>
<td>4</td>
</tr>
<tr>
<td>6-8</td>
<td>School of Kinesiology</td>
<td>4</td>
</tr>
<tr>
<td>6-8</td>
<td>Institute of Sport Science</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>65 (30.52%)</td>
</tr>
</tbody>
</table>

Conclusions for the Shanghai list of faculties for the movement culture of a man

1. Out of 300 faculties for the movement culture of a man that are in the Shanghai list of 2016, there are 213 faculties under different names.
2. The most often used name is the Department of Kinesiology, but these are mostly faculties from the USA. Only three faculties from Europe (two from Croatia and one from Belgium) have that name.
3. Departments of Kinesiology in the USA have majors in biomedical sciences.
4. Most frequently used name for faculties in Europe are: School / Department of Physical Education, Faculty of Sport Science and combination of these two names Faculty of Physical Education and Sport Science, or Faculty of Sport and Physical Education.
5. Most frequently used prefixes for the denotation of the faculty for the movement culture of a man according to the frequency of appearance of the name are as follows: sport (88), kinesiology (54), and physical education (38).
PERSPECTIVES OF DEVELOPMENT OF THE JOURNAL AND THE FACULTY IN THE 21ST CENTURY

On the basis of presented data on the development of the Journal and the Faculty, it can be concluded that these are two different concepts that make ONE. That ONE should be developed TOGETHER (AS ONE), as a unique process for the benefit of BOTH – as the UNITY “of one and all” according to the model of philosophical argument by M. Cekić (1989). Transferred from the area of philosophy to the field of physical culture, it was the Promethean attitude brought by M. Matić when speaking about the Journal and the Faculty (1995:181), that highlighted: “We are creating the Journal – but nonetheless it is creating us, both in social and in expert and professional, even personal sense”.

From the facts about the genesis of the journal “Physical culture”, it can be concluded that in the last 70 years the Journal has advanced from the practice, via theory to science. That was the development of the Faculty as well – as an educational and a scientific institution, we can assume that both entities are open for further upgrade, because it is the only way for practice, theory and science to be developed further – otherwise it would be the end of development of both the Journal and the Faculty. If the associates and teachers of the Faculty, by publishing their papers in prestigious journals in the world managed to bring the Faculty of sport and physical education among 300 best faculties in the world with their work, could they do the same with their Journal?

Do all members of scientific community who publish texts in the journal Physical Culture and who work at higher education and other institutions have strength and quality to raise towards a benchmark - which has not been reached yet? Respecting the knowledge and belief that to reach the new level means to invest new efforts and values that have not been exhibited yet, the whole scientific community in PHYSICAL CULTURE stands before a significant challenge – to conquer what is inscrutable and unknown.

One of the prerequisites for further development of both the Journal and the Faculty is their material basis, without which there is no spiritual upgrade. The material basis of the Journal are human resources that have to be adequately valued for their work, both the Editorial board that edits the Journal, and associates who write contributions. It would be ideal if the Journal were edited by the professional Editorial board, and texts of associates and the work of reviewers were adequately rewarded. Another possibility is that the work of all members of the Editorial board, authors of texts and reviewers from the Faculty of Sport and Physical Education are adequately valued and stimulated. That would create healthy competition and motivation for quality texts. Otherwise, we shall remain in the field of voluntary work as it is now, which is fading in the world of explicit material values, the basis on which liberal capitalism is created.

The Faculty assets, although constantly upgraded and modernised, have to be invested in even more, especially with the help of the Ministry of Education, Science and Technological Development of the Republic of Serbia, for the teaching process to be raised on a higher level, and to enable new and modern equipment for the study of movement culture in the research process.

In the methodological sense, all phenomena in both social and natural sciences (and phenomena in the process of body movement – exercises as well) should be studied by applying different research approaches: quantitative, qualitative and mixed (Ristić, 2016). In particular, there is an urgent need to change the current method of research because of the fact

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that the previous research approaches in physical culture were predominantly based on quantitative research work and inductive conclusion, and biological field of man in the exercise process was predominantly investigated, as shown in the analysis of works in journals published in the Republic of Serbia (Bokan, 2013). The recent study has only confirmed the previous finding on the sample of 80 relevant world journals “of the science of exercise”, pointing out that in theoretical and philosophical sense, positivism is the dominant research paradigm (Petrovic, Koprivica & Bokan, 2017).

In methodological and philosophical sense, physical culture needs structural revolution and a new research paradigm, modelled on ideas and works of T. Kuhn (1974), K. Popper (1973), I. Lakatos and A. Musgrave (2003). In studying of physical activity of a man, negative practice of deranged understanding of collective research has prevailed, as evidenced by the famous British philosopher Mike McNamee (2005:2): “The idea of a lonely scientist who performs experiments can sound romantic in Galileo’s Tower, but it is barely near the modern reality of scientific research in the field of exercise, health and sports, as elsewhere. Researchers usually “hunt” in packs.”

The message to be understood from this British philosopher’s critical attitude is that knowledge in the logical sense is the process of concluding primarily carried out in minds of individual researchers and not in ones of collective investigators where “no trees can be seen from the forest.” In philosophical sense, facts that come with investigative procedures are dead material, and human interpretation is giving meaning and value to them. Therefore, phenomena in physical culture should be extended to the area of qualitative and mixed research approaches, which has been less common in previous works in the journal Physical culture. Similar phenomenon is manifested in works of university associates and teachers in meeting criteria for their promotions. It has become normal that in the study of “the man who exercises” quantitative research methods are predominately applied, and “the man who exercises” is first and foremost a human and a social being, and his gender essence is his ontological feature that has been rarely explored so far.

Regarding basic field of study and the scientific field both in the Journal and in the Faculty, if we, as a Slavic nation, increasingly flee and shy away from “physical culture” as the most comprehensive expression for the BEING of a man’s moving culture, we return to its constituent entities: physical education, sport and recreation (as we defined the scientific field in the Statute of the Faculty of Sport and Physical Education of the University of Belgrade: PHYSICAL EDUCATION AND SPORT, or as a narrow scientific field: SCIENCE OF PHYSICAL EDUCATION, SPORT AND RECREATION). Instead of one, we use several names, instead of simpler, we use more complex, but the one which is the being of our profession and science and the ontology of our existence, no matter how we are defined – it is PHYSICAL (human) ACTIVITY and GOODS created as purposeful categories. In the same relationship, the appointment of an institution that educates staff to work in all domains of a man’s moving culture appears in the same way, which has undoubtedly been shown in the analysis of 300 prestigious faculties for physical culture according to the Shanghai list for 2016. We, as an institution, should retain the Slavic name of the FACULTY OF PHYSICAL CULTURE, or to understand it as its integral entity the FACULTY OF PHYSICAL EDUCATION, SPORTS AND RECREATION. The history of our Faculty’s development has already been confirmed, and examples of faculties around the world show DIFFERENT VARIATIONS OF THE SAME. It is important that others do not take our basic field of study, and that we do not flee from educating experts in various fields of specialty, from teachers of physical education in schools, sports coaches in clubs and organizers of physical recreation in voluntarily organized associations of citizens.
REFERENCES


PHYSICAL CULTURE – A FRAMEWORK FOR THE MEDIA
CLARIFICATION OF MAN’S CULTURAL BEING

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Abstract
Culture, and its related syntagm of physical culture, especially in its most narrow of meanings which refers to spiritual creation, is the foundation of every nation. As a result the term physical culture, which we have for a long time now wanted to unburden ourselves of and leave it in our past, should be rehabilitated, like our colleagues from the Scandinavian countries have done, and it should be given back its (necessary) cultural dimension. Since, as we ourselves know, in the very focus of our profession, physical culture, we find man who is his own biggest mystery. And this man accepts physical movement – exercise, like nourishing food, necessary not only for his body but for his soul. Precisely in that, in this emergence of physical exercise from man’s body do we find the entire phenomenology of physical culture. Man experiences “thirst” for various types of satisfaction of his own cultural needs. And just like he has the need to read a good book, hear a good piece of music, look at a beautiful picture, … he also has the need to add to physical exercise, in a dietary or agonistic sense, everything that has already been mentioned. These expectations of a man desiring spiritual and physical food must be satisfied. The printed and electronic media are a good opportunity to meet this need. After all, these media are at every moment available to man who has increasingly less free time. This is the opportunity to “ad hoc” inform man and encourage him to turn to this aspect of his cultural needs – physical culture.

Key words: MAN’S CULTURAL BEING/ PHYSICAL CULTURE / MEDIA

INTRODUCTION

Culture – as our mirror, in which we can see, if we want to, all that we have endured and all of our ups and downs, just like our conscience has been imprinted into our being by the seal of our elders like our first gospel – it is the foundation of our existence. It is the foundation into which the written word has been embedded, like the cornerstone of our civilization.

It is true, in the beginning there was the Word, Logos. And that Word was God’s which he spread everywhere and built into everything visible and invisible. Thanks to that, we have grown from that Word, become a people with our own words and alphabet, this civilizational watershed in the history of human kind. They, this Word and our words, are (also) the foundation of our people.

If we were to look at it from an Orthodox point of view, the forefather of the Nemanjić dynasty of Serbia, Stefan Nemanja, who was later St. Simeon, told everyone who looked around more and admired everyone else’s home than their own:

“If you take another’s word, know that you have not won it, you have subjugated yourself. It is better to lose the biggest and most fortified city in your country than even the smallest and least known word of your language. Know that the extent to which your enemy has won and conquered you is the number of words of your language he has destroyed and introduced his own in their stead.”

Like in the past, today as well, in the second decade of the 21st century, we should listen for the echo of these words and remind ourselves what the Word means, and what our words mean.

Culture as a word and its syntagmatic derivation physical culture, especially in its more narrow sense which refers to spiritual creation, is the foundation of every nation. This is why the term physical culture which we have tried for so long to rid ourselves of and leave behind us in the past should be rehabilitated, as
our colleagues in Scandinavian countries have done, and once again be reinstated (as a much needed) cultural dimension. Since, as we know, at the heart of our profession of physical culture we find man – his own biggest mystery. And this man accepts physical movement – exercise as nourishment, not only for his body, but for his soul. And precisely there, in this emergence of physical exercise from the body of man, lies all the phenomenology of physical culture.

Let us, after all, remember the words of Milivoje Matić, spoken and recorded a long time ago:

"In the beginning there was movement and it remained… primarily… as exercise" (Matić, M. 1978).

And truly, the ever-increasing technological development, through an excellently designed marketing of hedonism, caters to man’s weakness which emerges from a sedentary culture, confirms these words. This conclusion is not just a mere pun, an afterthought, it is in fact our reality permeated with man’s physical inactivity. And the increasingly more pronounced (not only?) physical inactivity must lead to: either man’s transformation when he will no longer be able to even walk, or to his “awakening” and gaining insight into the necessity of physical movement – exercise.

And that is how we come to the phenomenological breadth of physical culture. Since, as a phenomenon, uniting phenomenologically relevant terms: physical education, sport and physical recreation, it offers answers to many important questions. And to one of these questions, in short: what is the goal of all this physical exercise?, it offers a brief response – that we could remain humans even in our duality, which through the act of baptism is expanded into a trinity, that we equally care both for our body and for our soul. Which is why physical exercise which stems from man, and returns to him, is that deciding factor which enables us to speak of physical culture as a phenomenon.

The general image of man’s inactivity, not only physical but also intellectual, even though projected by those who manage this world order still can and must change. Which is why we single out physical culture and its phenomenological breadth. Using all these phenomenological possibilities, man can significantly change his inactive reality. Tethered by the inertia of the social reality programmed to offer man what is useful. And without outside help it is very difficult for him to change the state he finds himself in.

The media, both printed and electronic, hold an increasingly significant place in the altered awareness of individuals, groups of individuals, as well as nations as a whole. They, using academic patterns of writing, are an important lever in the formation of a new perspective on the position of an individual in society.

This opportunity should be taken advantage of even through the media, primarily through the written word, since it becomes permanently available to everyone and anyone, to fight for a change in our physical and intellectual inactivity. This is both our duty and our commitment.

PHYSICAL CULTURE AND MEDIA

Irrespective of how we define physical culture, it always emerges from culture and returns to its fold. At the same time, it removes from the framework of culture what it needs to perform its mission in the time and space which have been assigned to it, but on its return to the fold of culture it always brings with it a pebble which it builds into the mosaic of its being. This seemingly metaphysical conclusion is actually a normal course of physical culture in the given social circumstances.

Just like culture is the mirror of a nation, with many different stamps of a particular time, so is physical culture. It too is a mirror and stamp of a time and a people. The forms of physical exercise, dietary and agonistic in character, viewed in various periods of time and the social circumstances characteristic of them, indicate that they have changed over time. Their goals changed and were in accordance with the requirements of individual epochs, so that we today can recognize five theories of the development of physical culture, that is, physical education and sport (Živanović, N. 2015).

1 The media use academic patterns of writing to promote an idea: the introduction, body and conclusion. These simple rules, whose values we have gotten know through the 1990s when the preparations to break up the Serbian state were well under way, and the bombing of the country as well, in addition to these guidelines, refer to each individual text as well. Quite often, photography is a powerful tool which through its visual nature promotes an idea – general and/or individual. Due to its value, photography has gradually taken on a leading role in the media.

2 Recently, the Anthology of contemporary Serbian prose on sport by the authors Saša Hadži Tančić and Jugoslav Hadži Tančić has been published. In it we find some of the most beautiful stories of our fiction writers, starting from Ivo Andrić, who found sport to be an inspiration for their writing.
These five theories are actually five of its mirrors and five stamps of the time which we received as a gift from these epochs. These are the values of our profession which encourage the constant work of those who believe that man is important, as a personality and not an individual, and physical movement – exercise.

And just like man experiences a “thirst” for various types of culture and has a need to read a good book, hear a nice piece of music, see a beautiful painting, … he also has the need to add physical exercise, in a dietary and agonistic sense, to everything previously mentioned. And if all of this moves him to help himself to the splendor of the rich cultural feast and create his own involvement in physical culture, then it is a sign that all of this was done for the benefit of the human being himself. And that he, this man – personality, unique and singular, will select nourishment which his body needs, as does his soul. This is an important step towards the dissolution of the inert state of inactivity of man’s body and his intellect.

And it is precisely this awakening and the severing of this thread of that hedonistic trap which is the cause of his physical and intellectual inactivity that is the challenge facing every physical education professional. These experts also need to be personalities which have not only knowledge but the means to transfer that knowledge. And precisely in that knowledge of how to pass knowledge on, personality gets its own value since, unlike the individual, that small atomized individual, he sees further and sees more; sees that longing of man and his desire to break the chains which his physical and intellectual inactivity is bound by, sees that he cannot succeed in this intent alone – and jumps to his aid.

This help from the experts is not only equal to a lighthouse – which lights the way to those who need it – but also shows that without personality there is no progress, even though many have tried during the course of history (and not just history) to expel personalities who have left a mark in time and space and through its objectivization show that there are objective processes which people adapt to, and that some of them have even proclaimed the very end of history, marking the idea of the fossilization of existing relations in the world.

Fortunately for all of us, this world, and in it culture and our physical culture, still cannot do without man – a personality. This is pointed out by the times and the people living in these times. They are the décor of every culture, and our physical culture as well. And the volatile and turbulent social changes, on the global and local level, only confirm the conclusion that man in each attempt at the creation of social reality is an important and irreplaceable factor. Even the upcoming heralded cyberization of man, we hope, will not succeed.

The desire that man displays to reduce and completely sever all ties with his physical and intellectual inactivity is a good signal for those who are ready to help. Even this “thirst” which his being feels for cultural values, like the values of physical culture, should be reduced by the spreading of a wealthy cultural feast. And man will, based on all his fine cultural feelings, select from that feast what suits and benefits him.

The media today are an important leverage which can move a man to action so that he could completely forget about his physical and intellectual inactivity and return to his own being. They are an opportunity to use fine texts, as well as beautiful photographs, to begin with the changes to man’s awareness and his turn towards cultural values which are needed both by his soul, and by his body. And that should be used, for the benefit of all of us.

A framework for media clarification of physical culture

The media, not without reason, carry the epithet of a force the seventh force to be exact. And we can see this force all around us. With the power to directly, but also indirectly, influence the changes in the awareness of individuals, but also of nations, it creates social reality. It was not by accident that the conclusion what was not in the media actually never even happened emerged.

Of course, this literary device which has been known for quite some time, and which at the beginning was merely a joke, today represents a harsh reality. And this reality indicates that even information of the greatest importance in the media only “lives” for a few days. This is, quite certainly, a consequence of several reasons, which might be boiled down to two of the most important ones: (a) the ever more rapid internet enables the quicker transfer of information and (b) it is necessary for the users of this information (the readers) not to think about this information. This is perhaps the most important part of the story of the strategist who is in possession of this information – in small doses, as if it were a cure, it should perform previously set tasks.
The rapid succession of information is characteristic for these areas of social life which the media follow. From politics and economy, to entertainment and sport they abide by the same rules. Academic patterns: introduction, body, conclusion, especially when something needs to start living: an idea, a program, a decision. Certainly, this type of approach to the media creating social reality also has positive aspects – when they fight for the values which are in favor of the well-being of man, as well as the nation as a whole. And this should be used, this positive side of the media.

The media which promote shorter (or longer) analytical texts are very suitable for professionals in the field of physical culture. And they should be used to represent physical culture in all its cultural breadth. By means of texts which are based on its philosophy at whose center is man, a secret even unto himself and physical exercise, as the nourishing food for his body and to his soul it is possible to gradually spread the idea of the benefits of physical exercise and physical movement. That is the basic and most important idea. But along with it, texts should be focused on the fields of physical culture: physical education, sport and physical recreation. Relying on their philosophy it is possible to represent the cultural wealth of these fields, with all their advantages and shortcomings. And in all of that one should see man.

Man, of course, feels and has a need for the satisfaction of that aspect of his personality which he refers to as his being spiritual. Beautiful texts, often at the level of short essays, can satisfy even that frail side of his personality and to lift him to the level when he begins to think, not only about who he is and what he is but to also think about how and which road to take. In that line of thinking, which is actually a privilege in this fast-paced world in which sedentary culture is increasingly more dominant, man should be motivated to think about physical culture as something that he needs and lacks. And a fine word, written or spoken, which brings back beautiful memories, just like a photograph, helps to refresh man's knowledge about something interesting and current, and all this together might encourage to satisfy both his physical and spiritual need for physical movement – exercise.

In that attempt to help man in his search for himself lies the beauty of our physical culture and of each individual effort. The reward for effort and for each of its followers is the smile on the face of the people around them, healthy and happy adults and children. The reward is the feeling that we have done something good, within our profession, for the well-being of the people around us. That this is the case has been proven by the epochs which are behind us and the people, experts, which adorned them.

A reward, truly great and worthy!

**Media rules**

A text prepared for the media (printed and electronic) must respect its rules. The most important among them, certainly, are the rules which refer to the extent of the text and it current status.

The extent of the text, depending on the media and the column for which it is being written is determined beforehand. This is especially relevant for the printed media and is measured usually by the number of “characters”, and less frequently by the number of words or the number of rows. Modern technology, with the constant pressure and insistence on the speed and rationalization of the employed, turns editors of certain columns into technical advisors. They have at their disposal several broken (modified) models of their pages, and their task is also to adapt the texts they select into previously formatted windows (spaces). In the given space we must include each text. And that is why we must bear this in mind while writing.

The current nature of the text is one of the more important assumptions for publication in the media. The more dense sequence of current events today, both in the country and in the world at large, must be followed by the media. What depends on this is the size of their readership, the number of visits to their websites, and all this leads to the number and quality (expressed financially) of advertisements and advertisement messages which are being published. Even in this game with time and the current status of information we must find texts from within the domain our profession. They must be up-to-date to fit into the sequence of events which these media follow.

In addition to these two of the most important media rules, a few other things need to be taken into consideration:

- A text based on correct facts, which are made public, since there remains a historical trace available in the media archives, but also in the archives of public samples of these media.3 As a result it is necessary to

3 We are witnesses of half-truths and falsehoods which are being promoted not only in the world media, but the local media as well. With their publication, at the expense of someone or of some idea (material in most cases), the formation of
check every piece of data which is being used, especially if a person writes for a particular media type over longer periods of time, because of the confidence the readers have in the published texts of a single author. This confidence is difficult to achieve, as we know, and is very easy to lose. As a result, but also for the benefit of our profession, the texts must be based on verified data.

The language and style of writing, of course depend on the author himself. But, it is necessary to bear in mind the overwhelming number of those following this medium (or media). And depending on the population group the author is addressing, it is necessary for him to use the language (terminology) and the style of writing suited to that particular group. And if it is impossible to omit any sample of professional jargon, understandable to the professionals involved in that particular field, then it is desirable to use an explanation of this term in brackets. After all, the purpose of the texts in the media is not to “impress” the reader with the language they do not understand, but to inform them of something.

The educational aspect, or the opportunity to expand the reader’s knowledge should be nurtured in each text. The fast pace of our time and of ourselves in that time leads not only to the expansion of fast food but also of information in the form of quick reminders and knowledge. That is why in short texts, of approximately 60 lines, finely molded, the reader should find out something new or to remind himself of what he has forgotten. And when he comes across something interesting in the text, if he also writes this information down so as not to forget it or to use it in his own writing, then that is a sign of a very good text. And of course, efforts should be made to have as many of these texts as possible which the readers will read with a pencil in their hands.

These few rules that we have mentioned are merely reference points which should be used when one writes for the media. And each author and each medium in particular will find the best formula to approach the reader. It is important to encourage the desire among the readers to turn to the values of physical culture and their physical movement – exercise - like a nourishing food for their physical, but also their spiritual being. Everything else will come in its own time – the fine texts, and the beautiful photographs, and the fine walks, and the basketball shots, maybe made in the company of one’s own grandson. This is truly useful and nice.

CONCLUSION

Rapid technological development, urbanization with the tendency towards megalopolises and new smart cities, limited living and working space, are only some of the characteristics of the world and time we live in. And it is quite understandable that even the cultural needs of man would be adapted to the given conditions.

But even in addition to this cruel reality, man in his being has, and attempts to maintain, his roots preserved in his memory. This memory, which is written in the genetic code which he was handed down from his ancestors, helps him to survive (even) in this day and age. And this memory is actually hope that, as the poet would say, not everything is lost when everything is (R. P. Nogo). That is why there is hope that culture, and physical culture that has emerged from it, will help man to remain a personality – unique and singular, which will enable him to preserve the duality of body and soul, through baptism brought to the level of the trinity, even in the given social circumstances.

The media, both the printed and electronic, can be of great use in this respect. And that should be used in the careful approach to each of them. Through different forms of texts we can satisfy the needs of all their readers for the fine word, photograph, information, piece of advice. And all with the aim of creating in their minds the thought of beauty and the necessity of physical movement – exercise. This is the exalted mission of every professional in the field of physical culture which also leaves (even) our seal in the time and space we live in.

opinion and a change in awareness is being influenced. In the 1990s, and even today, we are exposed to such efforts, all in the desire to present us as the bad guys or the bad nation.

4 Milan Vujaklija, at the end of his Preface to the second edition of his Lexicon included a quote in Latin: Indocti discant et ament meminisse periti (Let the unlearned learn and the learned take pleasure in refreshing their memories.). These words were not written in vain, and are especially current at a time when we are struggling for education during the course of our entire lives.
KÖRPERKULTUR - RAHMEN FÜR DIE MEDIENBEGRÜNDUNG DES MENSCHLICHEN KULTURWESENS

Zusammenfassung

Schlüsselwörter: DER MENSCH ALS KULTURWESEN / KÖRPERKULTUR / MEDIEN

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A DIALOGUE ON THE SPORTS TRAINING THEORIES IN PROFESSIONAL AND SCIENTIFIC PERIODICALS

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Abstract
The purpose of a scientific dialogue is to overcome existing problems, participate responsibly, and find out the real nature of an issue, rather than to „be enclosed within a room” with one theory - studying one theory until its ultimate purpose is revealed. The dialogue preceded by a problem presented in a sincere and „risky” way and followed by a responsible attempt to solve the presented problem can be considered the true scientific dialogue. Establishing the criteria for conducting a dialogue may be relevant for discovering the reality in a scientific discipline. The dialogue on the sports training theories has been ongoing and the main aim of this paper was to overcome the problems related to the „rival theories” - the traditional theory of sports training versus the theory of the sports training block periodization. A weakness of the current dialogue on the sports training theories is a small number of the criteria on which the discussion on the „rival theories” is based. The dialogue should be conducted repeatedly in order to find a more tolerant attitude towards the other/different or in order to strengthen the already existing opinion.

Key words: SPORTS TRAINING THEORY / DIALOGUE / TRADITIONAL THEORY / BLOCK PERIODIZATION / SCIENTIFIC JOURNALS

INTRODUCTION

The importance of a scientific dialogue
The basic motive for conducting a scientific dialogue can be knowledge expansion, scientific advancement, the maturing of science and dialogue participants as well as overcoming the problems that have been observed so far. The dialogue can define the value and significance of a particular problem, which indicates that not all of the scientific problems are significant and not all of the dialogues are relevant either. It is not easy to participate in a scientific dialogue, but it is worth to be tormented by this „exalted torment”. This has been confirmed by the so-far history of conducting dialogues, not only on the sports training theories, but also on the theories in other scientific disciplines.

The purpose of a scientific dialogue is to overcome existing problems, participate responsibly, and find out the real nature of an issue, rather than to „be enclosed within a room” with one theory - studying one theory until its ultimate purpose is revealed. Any dialogue can be considered fruitful if the hierarchy of the values of the dialogue subject matter is not violated, and if the answers to relevant questions are searched for in a variety of different ways. In a dialogue, the „little things” should not replace the „big ones.” A dialogue participant should have such a determination and be ready to defend his attitudes, but also to correct them if the requirements for doing so are met. This suggests that the purpose of a dialogue is not „a mental spectacle”, but a sincere intention to improve oneself through knowledge, the maturing of science (although science never matures completely!), the designing of science or a scientific discipline.

The dialogue preceded by a problem presented in a sincere and “risky” way and followed by a responsible attempt to solve the presented problem can be considered the true scientific dialogue. It is hard to imagine that something can be found out without internal struggle, without the dialogue which includes opposing opinions as well as without the di-
dialogue which contains the opposite within itself. No scientific dialogue is truly set up if it is not done in a “risky” manner, i.e. if it does not include the creativity in its interpretation or the uncertainty in its findings. The dialogue may result in new knowledge, i.e. new interpretation of the existing postulates within scientific theories. The results of a scientific dialogue can be a larger amount of knowledge which may direct the course of the scientific discipline development in further research. Additionally, it should be understood that new research directions are established only after a good dialogue. This suggests that not all of new scientific findings are significant, therefore not all of the previous knowledge should be rejected and vice versa. A good dialogue is distinguished by accepting “new” and “old” findings and a theory is more valuable if it is “more permanent” rather than “more modern”. The permanence, understanding and interpretation of a theory represent the main values and novelties of scientific knowledge.

According to Jerotić (Јеротић, 2013) a dialogue is “A conversation conducted with a man of the opposing opinion in relation to ours (it does not matter if this opposing opinion is of religious, philosophical, scientific or political nature); the conversation should be repeated several times and, importantly, it should be devoid of the presence of affections. The result of the dialogue conducted in this manner is also known: the enrichment of the personalities of both conversation participants, either in terms of a partial or a complete change of the previous opinion (our thought often becomes our faith, either positive or negative, tolerant or intolerant) or in respect of the fruitful strengthening and consolidation of the previous opinion “.

THE BASICS OF THE DIALOGUE ON THE SPORTS TRAINING THEORIES – TRADITIONAL THEORY VS BLOCK PERIODIZATION

Two “rival” sports training meta-theories will be presented herein as well as a brief introduction to the overall discussion and dialogue and the issues of the sports training theory. In the literature, the first theory is recognized and known as “the traditional theory of sports training (TTST)”; but other terms, such as “anecdotal” or “Matveyev’s theory”, are also used in regard to it. On the other hand, there is a new approach, i.e. the theory that has been accepted and titled the “theory of the sports training block periodization (TSTBP)” or shorter the “block system” or “block periodization” of sports training.

The supporters of the theory of the sports training block periodization have confronted the traditional theory of sports training enthusiastically. However, we should bear in mind that in the overall theoretical discussion there are some authors who wrote about the issues of the sports training theory but without entering into the said dialogue. On the basis of their works it may be observed to which side their theory with all its particularities belongs, i.e. on which theoretical assumptions their scientific thought has been based upon. This suggests the understanding of two “research programmes” as the foundations of scientific knowledge in the field of sports training science as well as many other (not less important!) sports training theories which have a sort of unifying character.

Matveyev (Матвеев, 1964) first presented the theory of sports training as an organized scientific and logical whole, which was later recognized as the „traditional theory of sports training” in the literature. The aforementioned theory represented a need to regulate a large amount of practical knowledge that existed during that period. In 1950s, it was possible to predict how the sports training theory would develop and to define its problems (Озолин, 1951, 1959). In his later studies, Matveyev (Матвеев, 1977) attempted to complete his previous work based on the theory of sports training. In a simplified sense, all the works were aimed at answering the question of how the best sports results should be achieved in the important competitions, such as the Olympic Games, World Cup or European Championship. Later, Matveyev (Матвеев, 1998b) gradually switched from the theory of sports training to the general theory of sports. In his latest studies, Matveyev (Матвеев, 2010) supplemented and formulated his own general theory of sports, which was published as a book in several editions. By attempting to solve the problem of the general theory of sports, the sports training theory has practically started to gain its significance.

From the aspect of the development of the science of sports and sports training, a paradoxical fact has emerged. Namely, as Matveyev was designing his general theory of sports, as well as the theory of
sports training therein, the criticism of such considerations was strengthened, particularly by Verkhoshansky - one of the greatest critics of the traditional theory of sports training. The criticism has been expanded by Issurin and Shklyr (Issurin, 2010; Иссурин, 2010; Иссурин & Шкляр, 2002) who have supported the theory of sports training block periodization and elaborated the initiated idea of the sports training block system.

On the other hand, Platonov (Платонов, 1998), Kiely (Kiely, 2010) and Koprivica (Koprivica, 2012) have opposed the sports training block system pointing out numerous problems and failures that the supporters of the block system failed to present. Generally speaking, in physical culture, there is practically none or a small number of areas where a dialogue has been started on a theoretical level between the authors of different opinions. However, in the field of the sports training theory, the dialogue has been conducted and but also avoided between the authorities who have made a major contribution to the development of the above mentioned science. In this sense, if the science is observed from the viewpoint of the “criticism” by Popper (1973), it may be easily noticed that in physical culture the discussion about the sports training theory is a rather developed part of the science. Although physical culture “craves” theoretical discussions and criticism in any of its fields of study, the great theoretical discussions have been started and are ongoing in the field of the sports training theory. In this respect, all the participants in the dialogue - now on a global scale - should be acknowledged. Such dialogues, in fact, lead to scientific independence as well as to the formation of scientific disciplines and the transition to a higher level of understanding and interpretation of a certain scientific discipline.

The aforementioned critic Verkhoshansky (Верхошанский, 1998а, 1998b) boldly started a dialogue in the field of the sports training theory. In his articles, Verkhoshansky has launched a very severe criticism of Matveyev's theory. Verkhoshansky (Верхошанский, 2005) has elaborated the original hypothesis of the new sports training theory, which has been given its full name of the sports training block system.

What has Verkhoshansky actually criticized Matveyev for? The criticism has started with stating that the traditional approach “lost its battle” with time since it has not been based on the recent biological findings which, according to the critics, play a key role in understanding the process of controlling sports form. This fact has been confirmed by many experts around the world in the field of sports training. Furthermore, Verkhoshansky has not denied the importance of the philosophy of science, methodology or pedagogy, but he has given priority to the objective knowledge that is acquired through experiments and practice. This primarily implies the findings in the field of philosophy, biochemistry or biomechanics. On the basis of these findings, he has developed his own theoretical system with its terminology and regulation methods. Verkhoshansky has criticized the traditional approach to the sports training theory on several occasions, but it seems that he presented it in the most comprehensive manner in his work “On the way of the scientific theory and methodology of sports training” (rus. На пути к научной теории и методологии спортивной тренировки containing seven items, where he stated the following) (Верхошанский, 1998b):

- the cardinal error of the CSTP (the concept of sports training periodization) which deprives it of both theoretical and practical relevance is the disregard of biological findings and scientific achievements in the field of sports;
- the consequence of the methodological and scientific inadequateness of the CSTP is an obvious conceptual mess of „laws“, „principles“, „basic starting points“, „principle starting point“, „characteristics / features of laws“, and this mess has been caused by a strange and hopeless attempt to find regularities in the experience of sports training development;
- the speculative and logical basis of the CSTP was derived from the so-called phases of the sports form;
- “the general pedagogical approach” has not been based on: a serious natural scientific basis, objective and quantitative criteria of its subject matter or a strict scientific method, therefore there is no theoretical and methodological basis of the sports training theory;
- serious criticism by the experts-practitioners is related to the very essence of the CSTP - a formal and mechanical classification of the training process into subjectively formed parts (cycles, phases, periods), which represented the main idea as well as the purpose of the CSTP;
the technology of the training process development is a part of the CSTP which is least developed and based on the principle „it can be done either way";

one of the most important shortcomings of the CSTP is that it allows only two regulation methods / ways (volume and load intensity) of the impacts of training on an athlete.

The criticism started by Verkhoshansky was expanded by Issurin (Иссурин, 2010, p. 101-106), who stated the following TTST contradictions:

- traditional planning is suitable for the athletes of low and middle qualifications. However, it does not function well with top-level athletes;
- parallel application of different loads contributes to the adequate provision of energy;
- due to the heterochrony of physiological systems’ recovery, athletes are not recovered adequately;
- the exercises used in the application of different training methods often have adverse reciprocal effects due to energy deficits, technical complexity and/or nervous and muscle fatigue;
- the application of high loads during a training session requires a high degree of psychological concentration which cannot be directed towards multiple objectives at the same time;
- the specific progression of top-level athletes requires the application of large-scale training effects which cannot be organized during a training session due to a large number of objectives.

On the other hand, Matveyev (Матвеев, 1998a) has reminded Verkhoshansky of his neglect of the recent research on the sports training theory and a comprehensive approach to the study of sports training as well. In fact, these recent studies have been practically tested and confirmed by many scientific and sports professionals worldwide. Matveyev has reminded that therefore it remained unclear why Verkhoshansky did not appreciate the opinions of other authors and experts who made a great contribution to the dynamics of the traditional sports training theory development. However, according to Matveyev, it seems that the key problem in the overall discussion is the understanding of the unity of competition dynamics and training process and athletes as its participants. Matveyev is a supporter of a holistic approach including creative processes and outcomes, and he considers it inadmissible to partially examine only one of numerous issues of the now general theory of sports. This attitude may be best observed in his statement: „To initiate a severe standardization means to enter into irreconcilable contradictions of the live training process variation."

In addition to Matveyev, other authors also remarked on the block system of the sports training, among which Platonov (Платонов, 1998) can be singled out by expressing his disagreement with Verkhoshansky's theory in the following way:

- the criticism has been reduced to the analysis of only one of the numerous components of the sports training system - the concept of periodization published by Matveyev in 1964 and 1977. Thus, the crisis of not only domestic but also the Eastern European sports training theory has been introduced;
- Verkhoshansky criticized Matveyev for disregarding biological findings and Matveyev’s thesis where sport pedagogical and biological knowledge interweave has been widely known. This is confirmed in the literature referred to by Matveyev – more than a half of the references belong to the fields of physiology, biochemistry and sports medicine;
- bibliographical indicators about the most important articles have been excluded;
- criticizing Matveyev, Verkhoshansky has referred to the fact that Matveyev’s theory cannot be understood in the West. This statement has been questioned since the experience gained in the dialogue with the experts from Japan, China, America and Canada has confirmed the opposite - the theory of sports preparation periodization as well as different variants of its practical implementation were developed by the experts of the USSR and the GDR during 1970s and 1980s, representing one of the few fields of study where experts from all around the world have given unconditional priority to the Eastern European scientific school. Like it or not, they have been treating this contribution with respect and it is known that Matveyev has contributed most to the development of the aforementioned Eastern European school;
- Platonov believes that Verkhoshansky’s theory does not differ substantially from Matveyev’s theory regarding the principles, stating
that the difference can only be noticed in that Verkhoshansky has introduced some new terms, previously unknown to both the experts from the Russian speaking countries (rus. отечественных) as well as to the foreign ones - this has resulted in nothing but confusion;

- the issues discussed cannot be reduced to only one problem consistently emphasized by Verkhoshansky;

- at this point, it should be added here that Platonov has also fiercely confronted the views expressed in Verkhoshansky’s work titled “Horizons of the studied theory and methodology of sports training” (Russian: Горизонты научной теории и методологии спортивной тренировки).

Platonov (Платонов, 2008, p. 17-20) has severely opposed Verkhoshansky’s theory in his recent works as well:

- many elements of the criticism are „absurd", ambitious and based on a tendentious and sometimes rough presentation of the basic postulates of the periodization theory. All of this is aimed at creating an own, alternative theory of the training process programming and organization;

- Verkhoshansky has expressed his emotional criticism, but not the scientific and practical one;

- if this issue is approached objectively, it is very difficult to notice what new concepts have been introduced by Verkhoshansky to the knowledge system, relating to the development of the elite athletes' preparatory process throughout a year and macrocycles. His claim to the discovery of a unique and previously unknown phenomenon is vague and unclear;

- the proposed principle, regarding goal-oriented loads (the loads that develop only one ability) and including a great intensity-recovery-delayed adaptation effect had been thoroughly considered by many authors, such as Consilman, Ozoline, Harre, Matveyev and others, much before Verkhoshansky wrote about it;

- unidirectional concentration of loads with a high volume of work, which is characteristic of modern sports, also includes other risks: 1) a possibility of functional uptake (pre-adaptation), 2) a reduction in structural and functional reserves of other systems (de-adaptation), which are not engaged to the extent necessary when performing the work.

Kiely (Kiely, 2010, p. 803) has also joined the existing criticism of the theory of block periodization, reminding that Issurin prematurely and unsustainably talked about the „new horizons” of the training periodization. There are two main reasons for this: a) anecdotal – it includes the selected cases/examples of the athletes and coaches who have achieved high levels of success using a block-training design; 2) „two modern scientific concepts” related to the cumulative and residual effect of training, in fact, do not represent anything new. Indeed, Matveyev is the most famous author of the traditional periodization model and he has also taken into account the cumulative effect of training and the concepts that correspond with the residual training effect in his influential work “The Basics of Sports Training”. Eventually, Kiely (Kiely, 2010, p. 804) has concluded that a more appropriate description of the block periodization should be a „new variant” rather than a „new horizon” in the sports training planning.

The criticism put forth by Kiely was followed by Issurin’s reply. Given that Issurin’s criticism of the traditional theory of sports training has been already presented in this paper, his response to Kiely will be omitted.

Recently, the discussion has been taking place in a way of outvoting character which is, it may be said, insufficiently justified in scientific terms. Namely, in the study of García-Pallarés et al. (García-Pallarés, García-Fernández, Sánchez-Medina, and Izquierdo, 2010) the effects of two training models (traditional periodization and block periodization) on the change in competitive abilities in top-level kayakers have been compared. “The design of the study” is shown in the Figure 1 and it briefly summarizes the training plan, the main training objectives and the testing calendar for both cycles.
Based on such a “design of the study”, it may be concluded that the block periodization is a better means of planning compared to the traditional periodization and it greatly improves the skills that are important for kayakers (García-Pallarés et al., 2010). However, if the proposed “design of the study” is closely observed, it may be also concluded that these authors have differentiated the block periodization and the traditional periodization only by the volume of the loads, disregarding that the model of a volume and intensity ratio is analogous - almost the same in TTST and TSTBP. Additionally, the criticism of the traditional periodization has been expressed without any reference to the traditional periodization of sports training included in the references. Such a dialogue is not simply methodologically justified because it does not show the maturity required for the highest level of discussion about the theory of sports training. García-Pallarés et al. (2010) have not considered the classical concepts of the traditional and block periodization in detail, but interpreted them freely in a speculative way.

A similar principle has been presented in other studies (Carazo-Vargas, González-Ravé, Newton, and Moncada-Jiménez, 2015; Rønnestad, Ellefsen, et al, 2014; Rønnestad, Hansen, and Ellefsen, 2014), which have also criticized the traditional model of sports training periodization out of context and in a completely loose and, in some cases, even chimeric way. The aforementioned authors have entered into the criticism of the partial elements of the traditional theory reducing it to what it is not, without referring to a single quote of the authors who have designed the traditional model.

The research problem discussed and presented above is primarily of a scientific significance, the purpose of which has emerged in the dialogue. However, it is not about any kind of dialogue, but the dialogue that will have clear postulates as well as its beginning and its ending. The scientific dialogue with its beginning and ending should also deal with a wider sense of human existence and understanding. Although this is not usually associated with the scientific necessity, suggesting that it is also possible to conduct research in other ways, without taking into account a broader context of understanding certain issues – the holistic understanding versus the particularistic one. In addition, the understanding of man through science should be developed in two directions: in breadth and in depth. Otherwise, the man whom the science has been trying to define and understand could be easily simplified without such a consideration. Therefore, it is necessary to examine the way in which the problem of the overall theory of sports training has been presented as well as how the conclusions regarding the theory of sports training have been drawn. In other words, can the purpose and aim of the sports training theory be beyond the purpose of man?

It should be added here that the dialogue conducted within the sports training theory is of a “purely scientific character” which includes a shortcoming. Namely, if we consider how these two theories / concepts are constituted, and how the dialogue has been conducted, then it can be easily noticed that the dialogue is based on factual knowledge. However, such factual knowledge in the sports training theory imposes an important question: according to which norms / criteria are the facts attributed to one theory more valuable in content than the facts attributed...
to another theory? The authors have often referred to their own studies, but also to the ones which have actually proven the basic postulates of one theory or the other. The dialogue based on such tendencies seemed justified in the previous discussions; however, after a lot of criticism expressed repeatedly by both sides, the circumstances that have occurred within this scientific community have started to resemble “outvoting” rather than a valid scientific dialogue within the sports training theory. Simply, the leading scholars have not reached the consensus on the most important issues of the sports training theory yet.

A possible solution to the problems relating to the sports practice, i.e. the practical problems of “lower class” but of equal importance, arises out of the aforementioned. In fact, these are the problems of selecting and approaching one of the proposed systems and its application in practice.

THE CRITERIA FOR CONDUCTING A DIALOGUE ON THE THEORIES OF SPORTS TRAINING

A scientific dialogue in the function of assessing and comparing theories opens up a whole series of problems related to the logic and philosophy of science, methodology, and the phenomenon examined in a scientific field as well as to solving practical and other problems. Since science is based on criteria, it is reasonable to ask according to which criteria the scientific theories that deal with solving problems of the same reality in a field of study are assessed and compared and what the term criterion actually means.

Criterion, criteria (Greek: kritērion, according to krínein) means: 1. the basis on which something is assessed, classified or differentiated from something else, a standard. 2. sp. elimination competition (Клајн & Шипка, 2008, p. 681).

Recently, the three sets of criteria for assessing and comparing the theories of sports training have been identified:

1) nature and origin of knowledge in the sports training theories – the criteria based on epistemological beliefs;

2) research method used in elite sports, where special attention is paid to understanding the application of scientific methodology in sports training sciences – the criteria based on methodological beliefs and

3) comparison of scientific theories, i.e. providing the justification of a theory within the system of a scientific discipline – the criteria based on a multi-disciplinary approach of assessing and comparing scientific theories, which include, e.g. logic, probability, boldness and / or simplicity of a theory.

It should be pointed out that the previous discussion within the theory of sports training was mostly based on the criteria of narrow professional orientation. These criteria and their knowledge outcomes are largely characterized by practical knowledge. Namely, the justification of a sports training theory by different authors was directed mainly towards the understanding of the training practice as one of the major criteria of theoretical justification. Certainly, the practical outcomes of a theory, regarded as a phenomenon, are significant for sports and sports training. However, is it justifiable to assess a theory only on the basis of the practical outcomes? By all odds, no! Why? Such an approach of declaring „for” and „against” a theory on the basis of only one criterion (in this case the practice is considered the outcome) can greatly refer to a particularistic understanding of the problem. Practice is just one segment, part, grain of the understanding of an issue that strives to become or is scientific.

In this paper, the thesis that the dialogue within the theory of sports training should be extended from predominantly practical criteria to predominantly scientific ones according to which the theories (hypotheses) of sports training can be assessed and compared has been advocated for. This does not mean that practice is not a scientific criterion, but it does not mean either that practice is the only scientific criterion when it comes to the theory of sports training.

CONCLUSION

The expansion of scientific knowledge is a long and painstaking work. A dialogue is one of the basic ways / methods of the science improvement. When selecting a problem, the problems that are relevant for the dialogue and those that are not should be differentiated. The relevant problems are characterized by boldness to expand the knowledge by presenting the problems in a „more risky” way. To present a problem
which does not include uncertainty actually means to hinder the knowledge, improvement, progress, and hence the scientific discipline.

In the theory of sports training, the dialogue between the supporters of two meta-theories: the traditional theory of sports training and the theory of the sports training block periodization has been ongoing. The basic motive of the ongoing dialogue is to deny or to reject the traditional theory of sports training. The mentioned dialogue should not be interrupted, but it should be conducted repeatedly, taking into account the „new” and „old” findings, and not only in order to reject one of the theories, but to acquire more objective knowledge. Sometimes, something that the theories have in common may be more valuable than what separates them. The dialogue means a new opportunity given to the supporters of both sports training concepts for the future elaboration of the scientific thought on sports training.

As for a fruitful dialogue, we should add the criteria according to which it is conducted, i.e. on the basis of which the sports training theories are assessed and compared. A small number of the criteria that have been insisted on by the supporters of TSTBP has been undermining the dialogue. In the theory of sports training, the training practice has been imposed as the basic criterion. Of course, practice is one of the important criteria, but other criteria should not be discarded, such as those relating to epistemological and methodological beliefs, as well as the logic, boldness, probability, simplicity of the theory, etc. – a multidisciplinary approach to assessing and comparing the sports training theories. In this sense, we should thank Verkhoshansky and his followers for entering into the dialogue with the supporters of the traditional theory of sports training boldly and “risky”, thus improving the scientific knowledge about sports training, but we should regret that their „scope of knowledge” has been reduced only to the „hard core”, i.e. empirical knowledge. Thus priority has been given to the particularistic understanding of the basic postulates of the sports training theory, disregarding the holistic understanding which has been reminded of by the TTST supporters.

Continuous enrichment through the dialogue will result in tolerance towards the different and the other, however, this does not mean that science should be relativized through the attitude suggesting that „everything is allowed,” but it implies an attempt to improve individuals, scientific community and knowledge within a certain science more objectively. The doubt should not be cast on the fact that a dialogue is a reliable way / manner / method of the maturing and expanding scientific knowledge.

In 1999, soon after the severe discussion between the supporters of TTST and TSTBP, Jevtic suggested the basic problems that arise in the theory of sports training on the pages of the Physical Culture journal, which represents an attempt to enhance the spirit of a scientific dialogue in the Serbian periodicals as well.

NOTE


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Zusammenfassung:

Schlüsselwörter: THEORIE DES SPORTTRAININGS / DIALOG / TRADITIONELLE THEORIE / BLOCKPERIODISIERUNG / WISSENSCHAFTLICHE ZEITSCHRIFTEN

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INTRODUCTION

Higher education has been depicted and determined by teaching and research activities, which, depending on the period of the universities' development, were in favour of the founders (church, rulers, governments ...) and the owners. History teaches us that the university's mission is dynamic and variable, that it is the result of philosophical ideas, educational policies, culture of the society, and the development of the university itself as an institution (Scot, 2009). The university's mission is also established in relation to goals, such as the development of democracy, progress, war and peace, humanity... However, it is always in the function of social welfare (Figure 1).

Observing the development of higher education through the dimension of time, we may notice a "competition" over dominance between teaching and scientific activity. In the past ninety years there has been a tendency towards the affirmation of its "third mission", which is aimed at the community and society development. At the beginning of the 1930s, the universities in the United States expressed their aspiration towards a "university triad", i.e. the need to become the institutions which include the unity of teaching, research as well as public influence and social significance (Clancy and Dill, 2009). Thus, in regard to 930 years of university education, two interdependent processes can be observed, out of which the first one is associated with national aspiration (a mission to protect national culture and social well-being), while the second one relates to international aspiration (global influence and international ranking) (Kurbatov, 2015). Accordingly, the subject matter of this paper relates to the university's assumed role in the community development, i.e. to the capacity of the "Physical Culture" scientific journal to become an intermediary between the teaching, scientific and social mission of the "Physical Education and Sport" science.
INNOVATION AND UNIVERSITIES’ THIRD MISSION

A characteristic of modern society is general development based on initiatives, creativity and innovations. Thus, the capacity of a society is measured by its economic development, within which a level of innovation is dominant. According to the European Innovation Scoreboard 2017 Serbia belongs to the „Moderate Innovators“ group of countries. This group is preceded by the groups „Innovation Leaders“ (Switzerland ...) and „Strong Innovators“ (Slovenia ...). With an innovation index of 64.2, Serbia is ranked 28th, followed by eight countries, six of which are the EU members (EU index 2017).

Pursuant to the Law on Higher Education of Serbia from 2017, the Article 59, paragraph 3, taken from the 2005 Law, it is defined that in order to commercialize the results of scientific research or artistic work, the university-faculties can establish scientific institutes, innovation centres, centres of excellence, technology transfer centres, business technology incubator, science and technology incubator, science and technology park and other organizations for performing innovation activities and providing infrastructural support for the innovation development and the commercialization of research results. Social justification and the utilization of scientific research results has not been recognized thereby, and the specification of the purpose and meaning of the term innovation has not been performed either. Nevertheless, we should believe and hope that the legislator implied not only the innovations that will stimulate the commercialization of results, economic development and enhanced financial independence of the faculties themselves, but that he primarily assumed that innovations also apply to social development as well as to the development of entrepreneurial capacity and students’ competences. The Figure 2 shows the „Mission of Modern Innovation University“, which was modified by the author bearing in mind the „third mission“ of the universities.
Even by a cursory glance at the laws that determined higher education in Serbia until 2005, the presence of a great number of the articles which regulated the teaching activity and the core affiliation of faculties regarding certain scientific fields may be noticed. The Laws adopted after 2005 have terminated the regulation of the organization of teaching activity of universities and faculties (the universities' first mission). Instead of developing the universities' "first mission", the legislator introduced the articles which define and describe the functioning of bodies responsible for quality assurance, accreditation, management of higher education courses ... Today, after the adoption of the Law on Higher Education (2017), all of these bodies have been made "state-ruled", which has directly jeopardized the autonomous development of higher education. A new dispute between the state and the academic community has been entered into, the Law has been challenged by universities, National Council of Higher Education, Commission for Accreditation and Quality Assurance, Serbian Academy of Sciences and numerous professors and researchers. "The Law decreases the level of the autonomy of educational institutions, which is why the Serbian Academy of Sciences and Arts especially demands the amendments to the newly adopted law or the adoption of a new one." There is no reply by the other party – the state, it is expected to act according to the adopted law. In the following six months, in science, and in agreement to abandon the emancipation of all three missions, the adoption of special documents (statutes) will take place, both at universities, faculties and scientific institutes. Thus, at the end of the second decade of the 21st century, the Serbian academic community will voluntarily vote for the statutes by which it will renounce not only its autonomy, but also the integration and decentralization of higher education. The state, as the university owner, has once again become the holder of higher education, just like the rulers used to be in the past. It has been given a key role, not only in the area of establishment, organization and funding, but primarily in a part of the process of accreditation and issuing working licenses of each individual higher education institution. This circle of vicious between the lawmakers and the beneficiaries of the law reflects the reality in Serbia of the 21st century whereby the entity of its higher education has been returned to the second stage of university development (Figure1)! How to establish a free and autonomous university, how to reach the next developmental stages dominated by the university that ensures progress to the community- society by which it is funded and when, all of this will remain unknown to the author as well as to the generations of teachers, associates and researchers at the universities in Serbia.
Entrepreneurial intentions and universities’ „third mission”

„The analysis of the curriculums taught at the universities in Serbia has indicated that they are outdated, lagging behind the modern needs and challenges of society, that the profiles that are being educated are greatly inconsistent with the needs of society. Studies are managed by the curiosity and interests of researchers and professors, and, to a lesser extent, by the needs of society. Scientific publication is the basic criterion for selecting teachers, which is the main incentive factor for the research for libraries and career development instead of the research to address the needs of society” (Domazet, 2014). On the other hand, Pupavac (2014), who considers higher education the greatest success of a social state, has stated that in Croatia 36,000 students graduate annually, in Serbia 45,000 students, and in Bosnia and Herzegovina there are 18,000 students who graduate on annual basis. He has also added that the teaching and scientific industry of this region has changed a little in relation to the time when Aristotle was teaching at the Lyceum in Athens, and that these systems have been educating students preparing them for traditional and non-innovative careers, but not for the economics and social progress based on innovations and knowledge (Bubble Education).

While the time in the geographical areas included in the analyses of Domazet (2014) and Pupovac (2014) seems to be standing or going back, the contemporary universities have been adapting to their corporate mission and are increasingly recognized as entrepreneurial institutions within which the research results significant for progress - a new economic theory and practice (through economic entrepreneurship) and social reality (through social entrepreneurship) have been intentionally published and published (Brooks, 2007). The innovative and entrepreneurial mission, both in economic as well as in social entrepreneurship, has been accompanied by a change in research funding from the traditional - linear model to the national - innovative model that was first developed in Scandinavian countries, and which includes the concept of applying science in the function of the sustainable social development (Clancy and Dill, 2009).

Modern universities are becoming a backbone of the economy based on knowledge and innovation policy (Hagen, 2008). They deal with the problems of society, primarily the needs of its general development, as well as with the problems that are „neglected or unfulfilled” by public authorities and private sector (Rat-ten, 2011a). The path to reaching these goals of the national and supranational university education implies (Clancy and Dill, 2009): (i) progress in teaching and its organization, (i) increasing the quality of research and its relationship with teaching, industry and society (business aspect), (i) emphasis on quality evaluation (normative and objective aspect of teaching outcomes and research results), (i) knowledge transfer organization, (i) knowledge application and social activity plan (sociological and applicable aspect of knowledge)...

The strategy of the „entrepreneurial university” approach evaluates the output criteria, unlike the input ones which are assessed in Serbia (budget, number of students, number of teachers, size of buildings, library fund, etc.). The output criteria, such as number of innovations, number of employed graduates, social justification of curriculum, teaching and research, economic justification and benefits, transfer of knowledge into the business environment, patents, graduates’ awards, organizational effectiveness, number of newly established business units, etc. are only some of the criteria of successful universities and the basis for their ranking. Today, it is hard to imagine a university that manages to survive by the transfer of tacit (unstructured) knowledge. In this regard, especially in developing a strategy for a new research and social paradigm of the faculties in the field of sports and physical education, a search for the meaning of social progress and the methodology of the „community engaged research”, which has been pursued, should be added to the continuum of scientific research, which extends from basic to applied research; non-experts should be involved as partners in the implementation of innovations and research findings. This is a type of research and a way in which science communicates with the community (McDonald, 2011).

The changes from the traditional Hubolt’s approach to the modern - entrepreneurial university must also be followed and accompanied by a change in the mission of scientific journals, since the common denominator of knowledge creators and disseminators must be a duality, which is the prosperity of science and society based on innovations. In this direction and for this purpose, the changes in the outcomes of doctoral studies have been taking place, which, in addition to qualifying scientific youth for carrying out university tasks (teaching and science), are also aimed at providing doctoral candidates as research leaders for the development programs regarding industry as well as society itself (Figure 2) (Scot, 2009). The universities
and faculties that comprehensively perceive their social mission as the first step in the realization of their third mission, as its most critical part, have been establishing offices for knowledge transfer, with the aim of linking creators and users of knowledge. On this path, the capacity of scientific journals should be recognized as one of the means of innovation transfer. In Serbia, in the field of sports and physical education, there is the leading national scientific journal titled „Physical Culture“.

At this point and in support of the discussion on the university's third mission, Serbian participation in the international consortium in the implementation of the project „Institutional framework for the development of the third mission of the universities in Serbia“ should also be mentioned. The implementation of this project started on October 15th 2015 and should be completed in October 2018. The project is co-financed under the ERASMUS PLUS program of the European Union, and it is realized by a consortium of 18 partners including five European universities and six Serbian universities. The main aim of the project is to develop and implement the third mission (Development of society and community) which consists of three pillars of development, namely: knowledge transfer - technology and innovation, continuous learning as well as the acquisition and application of socially responsible behaviour by the Serbian universities, in addition to the existing two missions related to education and research at the universities in Serbia.

THE SCIENCE OF “PHYSICAL EDUCATION AND SPORT” AND UNIVERSITIES’ THIRD MISSION

Physical education, sports and physical recreation have a significant social role and great responsibility. The analysis conducted in Australia has shown the great capacity of sports and physical education in the area of socially responsible behaviour, but it has also determined the factors that could affect the area of community prosperity. Smith and Westerbeck (2007) have determined „strong communication power“ of physical activity through which it is possible to reach each member of the community. As a consequence, physical activity is the first tool in the „Appeal to the Young“ regarding their growing up in the family, sports, education, culture, community (participants, fans). „Positive health impact“ is an ideal platform for the activity and awareness in regard to the health issues of each community member. The following are the factors of physical activity which stimulate: (i) the „community interaction „ both in functional sense and in its democratization, a tendency towards peace, social cohesion, joy ..., (i) „awareness of sustainability“ and zero tolerance for environmental degradation; (i) „cultural identification and integration“; (i) „immediate well-being resulting from satisfaction“, which, as such, inspires the community members to practice, support and highly appreciate physical activity. Similar conclusions have been drawn by the authors in the case of responsible behaviour of professional sports clubs in the United States (Bieganek, Huber, 2015). Regarding the relationship between physical education, sports and physical recreation in relation to the benefits of the British society, a unique practice, it may be said, has been developed by Margaret Talbot (2002) through her scientific arguments and examples of good practice. An extensive study on the benefits of physical activity on the children's proper growth and integral development has been developed in the scientific monograph „Children's Sports from Practice to the Academic Field“, by a group of authors from the Faculty of Sport and Physical Education in Belgrade (Jevtic et al, 2011).

The current understanding of higher education in Serbia, and therefore of the academic activities of university units (faculties) in the field of the science of Sport and Physical Education (SSPE), is mainly related to teaching and science. The analysis of the missions of some faculties in the field of SSPE has indicated a lack of orientation towards the realization of the third mission of the university, which has made the universities across the world successful and which is responsible for the social, economic and cultural development of the community to which the university belongs (Vorley, Nellies, 2009). Thus, the Faculty of Sport and Physical Education takes over its mission from the mission of the University of Belgrade, whereby, intentionally or not, it has been giving up its identity and specificity, which has been built for eighty years, during which the „achieved values“ and the accomplished results have been bringing honour to higher education, Serbian society and even to the University of Belgrade itself. On the official web site it has been stated that the mission of this faculty is „ensuring the highest academic standards and acquiring knowledge and skills in accordance with the needs of society and envisaged national development, as well as a permanent commitment to improving the quality of higher education and
its inclusion in a single European framework of Higher Education”. Obviously, this statement lacks the internal perception of the profession to which it belongs, the purpose of existence, i.e., the contribution to students, profession, the community, the next generations ... (its external mission) cannot be observed. The faculties in Niš and Priština (relocated in Leposavić) perceive their missions identically, i.e. as „Securing one of the leading positions in education of the staff involved in sports, physical education and recreation ...”. It is difficult to determine a position and a role of the faculties in a society when their mission has been set up as a national competition regarding who will be better in qualifying the staff. It is hard to (determine) claim that the mentioned faculties are aware of their „multi-dimensional functions” in the area of culture, art, science and economy of the society to which they belong, and which pays for their operations. The specified mission statements raise the question of whether these faculty units are obsolete or contemporary in regard to the outcomes and purpose of their existence, or whether they envisage their development through the creation of a new product (for which there is a significant and growing attention), or through maintaining the existing technology by which they have been, selfishly, controlling their sustainability. Of course, the issue of these institutions’ willingness to accept that their mission, in addition to the traditional one (teaching and science), also involves the active participation in supporting the development of the society (third mission).

The entrepreneurial being of sports – stepping towards the universities’ third mission

The physical activity of a modern man is a personal incentive also filled with social values and which has been increasingly functioning within a commercial environment. It has been given the outlines of an industry including a large number of interdependent factors, such as process, services, goods, space, people, information ... Physical exercise is an area of self-employment and a market in which the annual turnover realized in the United States amounts to about 215 billion dollars (according to the data from 2015), about 160 billion euros in the EU, or about 15 billion pounds in the UK. According to the United Nations’ data, more than three percent of the world’s annual wealth has been generated through this and the related industries. It is important to point out that the economic capacity of physical activity is not related only to elite sports, since, as the analyses have shown, there are much greater commercial opportunities in the area of children’s, youth and mass sports as well as of the sports of persons with disabilities or special needs. Public - private partnership is a strategy that has led to the expanding of knowledge, greater employment and commercialization of human physical exercise.

Within the European framework, the key competences are defined as the educational outcomes, which include knowledge, skills and entrepreneurial attitudes. Knowledge is described as the ability to identify business opportunities. Skills proactively function within a project task (planning, organization, management, leadership, communication) both in individual and team work. Entrepreneurial attitudes are included in initiative, proactivity, independence and innovation, motivation and firm orientation in order to achieve goals. Knowledge and skills, expert competencies acquired through an interdisciplinary and multidisciplinary academic network and education (formal, informal) all the way to postdoctoral studies are required in order to participate in the creation of exercise as a product that will change the natural, social and economic environment of man.

Entrepreneurship has been imposed as a means of comprehensive education, which is why the terms such as „business university”, „entrepreneurial university” or „academic capitalism” have become widely known today. Universities have become centres of socio-economic development of the community. They are the ones that, through the affirmation of their third mission, meet the expectations of a narrower or wider community both in cultural and artistic sense, as well as in economic and socio-political development. The architecture of entrepreneurial university has been oriented towards a new strategy, management and business culture that will change the community and society (social entrepreneurship) (Vorley and Nelles, 2009). Entrepreneurial capacity and intended competencies are those that determine students as business individuals willing to undertake the initiatives that will lead to the changes in both business and living environment. The graduates’ entrepreneurial activity should result in personal and social success, since an entrepreneur is someone who is willing and able to convert new ideas into a successful innovative value (Marburger, 2011).

An entrepreneur is characterized by a need for achievement, proactivity, innovation, creativity, leadership, as well as the skills of problem solving, planning, negotiating, persuasion, oral and written com-
Social entrepreneurship is realized within non-professional sports and services that promote environmental sustainability, social engagement in the sector, and it is the result of engaging human capital and personal wealth, is a criterion of social entrepreneurship and not the acquisition of society (Brooks, 2007). In the literature, social entrepreneurship has been viewed as a multidimensional construct of entrepreneurial behaviour, which is realized struct of entrepreneurial behaviour, which is realized through the innovations that lead to effective public service practices and which promote the values of society (Brooks, 2007). In the literature, social entrepreneurship has been viewed as a multidimensional construct of entrepreneurial behaviour, which is realized with the goal of achieving a social mission. The realization of a social mission, and not the acquisition of personal wealth, is a criterion of social entrepreneurship that promotes environmental sustainability, social progress, non-profit organizations (Ratten, 2011b).

Social entrepreneurship is realized within non-profit sector, and it is the result of engaging human capital and strategies that change the community members, their environment and society itself (Kessene, 2005). It is placed between business and charity activities, and it stimulates problem solving through the affirmation of physical activity that leads to social inclusion, fight against social problems, environment preservation, health awareness, and the like. It starts with the identification of an existing problem, differentiating the methods of its solution, followed by a concept or draft solution, defining and ensuring resources, initiating entrepreneurial activity, completion and affirmation of tasks (Brooks, 2007).

The network that is envisaged in entrepreneurship, and which connects the actors of business initiative is the basis of the horizontal and vertical connection that already exists in the entity of sports. Consequently, this network can be the basis for social capital made up of individuals, associations, societies that, among other things, also aim at developing and utilizing the social aspect of physical exercise (Jevtić, 2014).

Sports for entrepreneurship is an interesting term and a concept that within the scope of its activity also has some „hidden networks” that are the result of the friendships developed through sports and which are additionally fostered through business and private life. Networks represent the existing social and sports capital that can be planned and used to develop the community and improve the lives of its members. In under-developed countries, it is obvious that the social capital of sports has not been used for the purpose of the society development, i.e. in developed countries, physical activity has been used for the development of social capital. The network, which is provided within sports, is connected to the networks of other professions and thus, they together strengthen social exchange. Universities and students’ sports activity represent a perfect space for establishing the relationships that will be nurtured for private and business reasons.

**UNIVERSITIES’ THIRD MISSION AND THE “PHYSICAL CULTURE” SCIENTIFIC JOURNAL**

In internationally recognized „sports sciences”, there is a gap of 17 years between the completion of research studies and their transfer into practice, and even then it has been noticed that this is only a partial transfer of the acquired knowledge and practice (Thoma et al, 2016). In the process of transferring
new knowledge and practice, there are several steps that are necessary to be fulfilled, and in each of them, the scientific journal „Physical Culture“ has the space and role for a new strategy and action in the direction towards the „natural knowledge“ improvement and the enhancement of social values through culture, art and science included in physical exercise.

The discussion on the universities' third mission in the Serbian legislation, but primarily due to the affirmation of the value-based attributes of physical activity influencing the development of individuals and society, the issue of the „Physical Culture“ journal, which, as the leading national journal in Serbia, covers the scientific field of sports and physical education, has been put forth. In the Impressum it has been stated that it is the official journal of the University of Belgrade, Faculty of Sport and Physical Education, which publishes papers in the field of sports, physical education and recreation, as well as in related biomedical, humanistic, social and natural sciences. The manifestations of physical culture (sports, physical education and recreation) included in the previous expression are, vulgarly, equated with (related) sciences. In regard to the confusedly specified goal and scope of activity, and as the response to the process of pre-evaluation for classifying into the scientific databases by Scopus it has been stated that the „Physical Culture“ must have a clear and concise goal and scope of activity ... and not to accept the papers that are beyond the framework - scope of the Journal ..., as well as that the international visibility of the publications is low. As this visibility is valued on the basis of the references to the published works, and, according to Scopus, the measurement is performed in the area of sports science, it is necessary to re-examine the goal and mission of the Journal in order to clearly define its scope of activity. Therefore, in order to introduce the „Physical Culture“ into international databases, the term „Physical Education and Sport“ science which has been administratively given is questionable. The title of the journal „Physical Culture“ is not problematic, in addition, in the Thomson-Reuters' response, and on request to include the Journal in their database, it has been indicated that „physical culture is a very competitive field of research“. Therefore, the search for the Journal's paradigm, based on national and international recognition and evaluation, should be initiated by the changes which are in the first step introduced by the publisher (issues of affiliation, publisher itself, defining a clear mission, goal and scientific scope of activity ...). This should be followed by the steps taken by the editorial (editorial board ...), editor-in-chief (editors of fields and areas, reviewers ...), authors' thematic frames. The issues of design, social networking strategy, connections with conferences, national and international professional, scientific and sports organization are of equal importance.... Of course, all of this is also determined by the budget! However, these and other goals are not achieved by stating that it is an official scientific journal of the University of Belgrade, but primarily by the need to engage the „whole“ of the scientific and professional community in Serbia and in the region that gravitate toward this Journal.

The “Physical Culture” journal for professions and occupations involved in physical exercise

By directing the course of this discussion from the point of understanding the relationship between the science of Sport and Physical Education and the third mission of the university, we can observe a number of doubts, out of which, for the purpose of this discussion on the mission of the scientific journal „Physical Culture“ and a new editorial paradigm, the following should be considered: 1. the reality of higher education in the field of SSPE is the existence of state and privately-owned faculties, and many of the latter, within their program orientations, have opted for the study of the managerial, but not the leadership and scientific aspects of physical activity–exercise; 2. the „sensitivity“ of the institutions founded by the state decree from the period of socialism to the issues of the continuum of human physical activity is questionable as well as its capacity to equally determine the cultural and economic values in the 21st century; 3. the question is whether the employed, and even the graduates themselves of both groups of the institutions really understand entrepreneurship, the affirmation of initiatives, innovations and business skills in the area of sports, physical education and recreation; 4. it is difficult to determine whether and to what extent it is a step forward that would affirm the ontological and axiological continuum of the scientific field, and which has been developed today, as it was the case in the past, from its cultural to its economic reality, from subjective to objective values, from sports to commercial and business function of sports organizations (Figure 3, presented through an example of sports).
The analysis of accreditation applications would suggest the presence of the statements by both groups of the faculties regarding the similarity in planning and program documents in relation to at least two foreign - European higher education institutions. The program similarity raises the issue of educational outcomes and especially whether the national faculties' curriculums lead to the professional staff and their competences to develop Serbian society, industry and technology of sports - physical education - physical recreation ... It should be emphasized that educational outcomes are precisely measured statements included in the mission by which the leading universities in the world ensure the external assessment and evaluation of curriculums and institutions and direct the prosperity of the profession, science, society and graduate students. Outcomes result in the professionals who are educated, trained and skilled and characterized by the competences required for demanding and dispersed labour market. Accordingly, new questions are being put forward, such as: what is the ratio of educational outcomes and the labour market; has the education for living and working within capitalist social order been developed in Serbia; do the domestic faculties educate the professionals who are capable of becoming the leaders in their expertise and society or are the professional hopes of the graduate students directed towards the market dominated by clearly defined and profiled professions or is it just a utopia that restrains them within the previous and outdated conditions? The answers to these or to any of the above mentioned concerns and questions require consideration on what extent the staff, profession and its scientific field have been developed and emancipated for the tasks and missions of higher education in the 21st century! The answers to the previous and many other questions may be drawn from the vector analysis of the value-based changes of society according to which the paradigm of the study of human physical activity (sports) has been changing (Figure 4).
Basic search of the indexed databases has shown that a small number of domestic authors deal with physical activity, entrepreneurial sports, entrepreneurial university and – or the universities’ third mission (Jevtić, 2014). The implications may be foreseen, suggesting a small number of those academics who will, upon acquiring their university degrees, pursue a business initiative or a job position in an environment that “escapes” the state as an employer. The subject matter of the national journal „Physical Culture“ and its services (blog) must include what the profession should discuss and deal with, toward what it should tend, explain, study ... in which direction it should be changed-emancipated itself... By analysing the Figure 5, it is easy to determine that the system of physical activity (physical education, sport, physical recreation, employees, volunteers, audience ...) in Serbia is located in the first or „bureaucratic quadrant“ - with a strong influence of the state (A) so that the path to the entrepreneurial configuration of both the system of sports and the university itself (Figure 1) should also lead through the scientific journal „Physical Culture“.

**Figure 5.** Configuration and evaluation of the national systems of physical activity – sports in the EU (Vocasport (2005)).

**CONCLUSION**

I Modern sport, physical education and physical recreation have been also observed through an additional value, which is achieved through the application of knowledge and technology in the planning, designing and affirmation of the effects of physical exercise directed towards the contemporary way of life, the needs of an individual and society. The contemporary product of these manifestations of physical culture leads to higher quality of life, stimulates life (social and natural) environment, influences the creation of new job positions, creates new products and working profiles .... (business environment).

II The knowledge necessary to develop physical exercise further, thus influencing individuals and society, constitutes an intertwined network...
of theoretical and empirical facts, including those related to education, health, communication, art, culture, ecology, axiology of nature – culture of physical exercise, ecology-related technologies, business, and international relations and policies as well. The research subject matter also includes economic issues (economics, marketing, management, planning). The research issues within sports sciences themselves have been intensely elaborated (sports, health, doping, biomechanics, training technology ...), sociological issues of physical activity (social aspects, job positions, social reform, democratization, politics, parliamentarism, volunteers ...) as well as historical and political, socio-cultural, philosophical and educational fields. The corpus of interdisciplinary and multidisciplinary knowledge and current practice may form a framework for defining the area of the „Physical Culture” scientific journal within the science, culture and art of physical activity!

III Universities have become centres of socio-economic development of the community. They are the ones that, through the affirmation of their third mission, meet the expectations of a narrower and wider community both in cultural and artistic sense as well as in economic and socio-political development. The architecture of „entrepreneurial” university is oriented towards a new strategy, management and business culture that changes the community and society (social entrepreneurship). At the universities in Serbia, the being, knowledge, values, practices, etc. of physical education, sports and physical recreation have been studied for eighty years, and now it is only necessary to organize the transfer towards individuals, community and prosperity of the society.

IV Full affirmation of „entrepreneurial” university has been also enabled by the realization of the universities’ third mission. In order to develop and direct innovations towards society efficiently and effectively, it is necessary to establish a technology transfer office. Publishing activity, and therefore scientific journals, conference proceedings, technical and technological solutions, etc. are just some of the means that can improve the transfer of knowledge and technology from the university's departments to the community and society. Technology transfer offices are faculty structures through which teachers, associates, researchers and students communicate with the „actors” outside the university. The Law on Higher Education in Serbia recognizes technological parks, incubators, departments for professional development and continuous education ... These or similar business solutions and their orientation in the field of the science of Sport and Physical Education will be possible only by accepting the culture of changes, organizational and productive values ... leading to the emancipation of the respective faculty communities and their transfer into a higher level of university development.

V In the process of transferring new knowledge and practice, there are several steps that are necessary to be fulfilled, and in each of them, the „Physical Culture” scientific journal has its position and role in a new strategy and activity towards the improvement of „natural knowledge” and value-based enhancement of society through culture, art and science included in physical exercise.

VI The „Physical Culture” journal, in the context of the affirmation of the universities’ third mission and the transfer of innovations towards society and practice, can reach heterogeneous users of knowledge in the field of human physical exercise. The journal, in addition to the results of basic and applied research, should promote the knowledge of importance for society, community, entrepreneurs in physical exercise.... Cognitive and motor skills make the users’ expectations, and therefore the transfer process, more complex. For this purpose, social media are one of the means of knowledge dissemination, but also of starting a creative dialogue between the actors of the profession and practice of the sciences related to physical education, sports and physical recreation. Creating the „Physical Culture” journal blog on social networks would enable the broadcast of video recordings as well as the establishing of a two-way communication channel between publishers, editors, authors, reviewers and users of knowledge.
REFERENCES

Zusammenfassung


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ERRATUM

Branislav Jevtić
editor-in-chief

Erratum of the article:
Association of anthropometric, physiological and physical traits to success of elite male mountain climbers
Hamid Arazi, Saedi Tahmineh, Izadi Mani
Department of Exercise Physiology, Faculty of Sport Sciences, University of Guilan, Rasht, Iran
doi:10.5937/fizkul1701012A

The title of this article should read Association of anthropometric, physiological and physical traits to success of elite male mountain climbers.
The word „physiological“ should read „physiological“. The authors sent paper to the journal with this error.
Authors and editorial regret this omission.

The list of authors and affiliations of the same article should read as follows:
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The authors sent paper to the journal with wrong list of authors. They deeply regret this omission.
ERRATUM

Branislav Jevtić
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Erratum of the article:
The self-perception of athletes with disability
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doi:10.5937/fizkul1701043K

Name of the author should read Marijana Mladenović instead Marija Mladenović.
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The category of the papers is to be determined by the reviewer and the editors. The reviewed papers are classified into the following categories:

- original scientific article,
- review article,
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Manuscripts should be in English language, typed in Times New Roman, 11 points in size, in single spacing.

The manuscript of the paper includes: abstract with keywords, text of the manuscript, acknowledgements and notes, footnotes, references, tables and figures.

Do not enter information about the authors in the manuscript of the paper, but in the third step of application process (3. Enter metadata).

ABSTRACT
a) Article title
b) Article abstract must not exceed 250 words in a single paragraph. The abstract should concisely outline the aims, applied methods and the main results.

v) Keywords (three to eight), written in capital letters, separated by a slash (the words contained in the article title must not be stated).
The text length is limited to 10 printed pages, A4 paper size, with 2 cm margins. The text should contain the following sections, the headings of which are in capital case lettering:

A. INTRODUCTION
This part should introduce the problem, hypotheses and aim(s) of the work.

B. METHOD
This section should describe the methodology of the research – the equipment / instruments and procedures should be explained so to enable the repeating of the research. Clearly indicate the details of the applied statistical procedures of data processing. Measuring units should be expressed in compliance with the international standards.

V. RESULTS
State the results clearly, drawing attention to important details in tables and figures.

G. DISCUSSION
Should contain objective and unbiased comments of the results. The comments should be in accordance with the experimental or other data of the research. Additionally, this part must be placed in the context of comparison to the similar results and reference data.

D. CONCLUSION
This part summarizes the findings commented in the discussion. Extensive explanations should be avoided. It is advisable to highlight the practical applicability of the work results.

Note: For reference citations, use APA style (see: Publication Manual of the American Psychological Association, www.apastyle.org) and state the author name(s) and year of publication. Example: "Supplementation was found to achieve positive outcomes (Burke, Clooney, Pitt, & Riewoldt, 2009)."

ACKNOWLEDGEMENTS AND NOTES
If present, the acknowledgements should appear after the conclusion.

a) If the manuscript is an extract from a diploma (master), master thesis or doctoral dissertation, the bibliographical description of the source should be referenced as follows:
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FOOTNOTES
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References of the works cited in the text should be listed on a separate page at the end of the text. The papers are quoted according to APA system (see: Publication Manual of the American Psychological Association; www.apastyle.org). The list should begin on a separate page (after the text) under the title: Bibliography, with continuous pagination in Arabic numerals. The list should be in alphabetical order of the authors’ surnames, i.e. titles of the works (if the authors are not stated).

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Tables should be printed on a separate page numbered with ordinal numbers (for example table 1, table 2). Tables should be comprehensible without reference to the text.

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