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(doctor of pedagogical sciences, professor,
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CONTENTS

Ceviker A., Ozlu K., Deryahanoglu G., Demirdoken C., Turkay H. The examination of the personality traits and optimal performance mood of the university athletes	4
Erturan G., McBride R., Agbuga B. Self-regulation and self-efficacy as mediators of achievement goals and leisure time physical activity: a proposed model	12
Gardasevic J., Bjelica D., Vasiljevic I. Differences in anthropometric characteristics between young soccer players (U19) members of the best soccer clubs in Montenegro, Bosnia and Herzegovina, and Kosovo	21
Pop C.L., Zamfir M.V. Nonverbal communication of young players in team sports.....	26
Rašidagić F., Nurković N., Imamović - Turković Dž., Hadžibulić – Nurković H., Nikšić E., Kapo A. Differences between morphological characteristics and motoric capabilities of physically active and inactive female students.....	30
Solovey O. M. , Mitova O.O. , Solovey D.O. , Boguslavskiy V.V. , Ivchenko O.M. Analysis and generalization of competitive activity results of handball clubs in the game development aspect.....	36
Sucuoglu E., Atamturk H. Correlation relation between professional qualifications of physical education teachers and students' attitudes towards Physical Education classes	44
Uğraş S., Özen G. Investigation of relationship between attitude to physical education course and school belonging.....	48
Information.....	53

The examination of the personality traits and optimal performance mood of the university athletes

Ceviker A.^{1ABCDE}, Ozlu K.^{1ABCDE}, Deryahanoglu G.^{1ABCDE}, Demirdoken C.^{1ABCDE}, Turkay H.^{2ABCDE}

¹ Faculty of Sport Sciences, Hitit University, Turkey

² High School of Physical Education And Sports, Kafkas University, Turkey

Authors' Contribution: A – Study design; B – Data collection; C – Statistical analysis; D – Manuscript Preparation; E – Funds Collection.

Abstract

Purpose: The aim of this study is to investigate the relationship between personality traits and optimal performance mood in response to gender, sports branch, weekly training hours of the athletes competing in the university league variables.

Material: A total of 250 volunteer athletes from 17 universities, 75 female and 175 male, participated in the study. 95 of the athletes are basketball and 155 are volleyball players. In addition to the personal information form which includes demographic information prepared by the researchers, "Optimal Performance Mood Scale" developed by Jackson and Eklund (2004) and adapted to Turkish by Aşçı et al. (2007) and "5-factor personality traits scale" developed by Benet-Martinez, John (1998) and adapted to Turkish by Schmitt, Allik, McCrae and Benet-Martinez (2007) were applied to the participants. Frequency analysis was applied in order to determine the participants' demographic information based on the statistical data analysis, and unpaired t-test was applied to determine the personal traits and optimal performance mood scores in response to gender, branch, weekly training sessions. Furthermore, in order to determine the relationship between that personal traits and optimal performance moods correlation test was applied. Statistical significance level was accepted as $p < 0.05$.

Results: As a result of the analysis of the data obtained; while there was no significant difference between the athletes according to the gender variable, it was concluded that there was a significant difference between sports branch, weekly sport variables and personality traits and optimal performance moods. In addition, a positive correlation was found between the participants' personality traits and optimal performance moods as a result of the correlation test ($r=0,608$).

Conclusions: This study has proved that personality traits and optimal performance moods effect one another positively and gender variable makes no significant difference. Yet, sport branches and weekly training hours makes meaningful differences between general and subscales scores.

Keywords: personality, optimal performance, volleyball, basketball.

Introduction¹

Sports and performance are two complementary phenomena in contemporary sports. It is desired to have high-performance scores as a result of sportive activities. The importance of psychological factors has been revealed in scientific researches to improve the quality of performance. Therefore, it is important to examine the psychological structures associated with optimal performance in order to determine the psychological conditions that may contribute to performance [1].

Since it demonstrates the mental and psychological states resulting from the optimal performance experience during exercises; "Optimal performance mood/flow state" is an important phenomenon that needs further investigation [2].

The optimal performance mood concept was introduced into the literature as a result of the researches conducted by Csikszentmihalyi [3] in order to explain the reasons that lead individuals to free-time activities. It is defined as a state associated with self completion that means personality is integrated with thoughts,

intentions, emotions and all these senses concentrate on the same goal. Optimal performance mood state tends to occur when a person encounters a clear set of objectives requiring appropriate responses. Unlike normal life, these "flow activities" allow a person to concentrate on clear and harmonious goals and provide immediate feedback. Flow also happens when a person's skills are fully involved in overcoming a challenge that is fully manageable. It, therefore, acts as a magnet to achieve new skills and to make things much more challenging. If the issues are less challenging, the person begins to resolve it by increasing them. If the issues are too much challenging it is possible to turn back to flow state after learning new skills [4]. Moneta [5] explains "flow" as the integration of the individuals' personal competences, purposes and their inner pleasure after a completed activity. Asakawa [6], defines optimal performance mood as the optimal mental state which occurs when a person feels competent, highly motivated and takes pleasure during an activity.

Peak performance or optimal performance can be identified as an personal achievement in setting standards rather than specifying a psychological state. The optimal performance experience is closely related to the optimal

performance mood and it is personal experience of a peak performance. The optimal performance experience does not always lead to the formation of an optimal performance mood [7,8]. This relationship occurs in skilled athletes with high performance and they achieve the optimal performance mood level when the task is difficult. Optimal performance mood can move the athlete to a higher level of performance letting him have a state of consciousness that they have never thought before [7].

Considering it is as a part of life and struggle, the relationship between sports performance and athletes' personality traits should be examined carefully. Personality can be defined as distinctive and characteristic patterns of thoughts, emotions and behaviors which define the way an individual interacts with the physical and social environment [9]. It includes emotional, motivational and most importantly cognitive processes that influence how the individual behaves or feels in the performance experiences and that occur in their inner world. Pervin and John [10] define personality as qualities which cause individuals to differ in their performances due to their thinking and feeling ability and the resulting behaviour.

Personal traits are among the factors affecting optimal performance mood and take part in literature. Through several studies, it is concluded that while depressive and anxious people have little opportunity to experience optimal performance mood; hardworking and neat ones are more likely to experience optimal performance mood [11].

In addition to the innate traits, the traits acquired as a result of the interaction with the environment are unique to person and differ from person to person. Therefore, different personality traits cause differences in optimal performance mood levels. To maintain a qualified and high performance the relationship between them should be taken into consideration.

Hypothesis:

- H1: There is no relationship between personality traits of Unilig athletes and their optimal performance moods.
- H2: Gender variable causes no significant difference between personality traits of Unilig athletes and their optimal performance moods.
- H3: Branch variable causes no significant difference between personality traits of Unilig athletes and their optimal performance moods.
- H4: Weekly training duration causes no difference between personality traits of Unilig athletes and their optimal performance moods.

Purpose:

In this context, the aim of this study to examine the affects of athletes' personality traits to determine their optimal performance moods and analyse their personal traits in terms of gender, branch and weekly training durations variables. At the end of the study the researchers offer further suggestions to trainers and ones work at sports clubs so as to achieve a positive affection with athletes.

Material and Method

Participants.

In this study which examines the relationship between personality traits and optimal performance moods of athletes, relational screening model aimed to determine covariance and/or the degree between two or more variables from the general screening models was used [12]. The sample of the study consists of 250 athletes (75 female, 175 male) with 21.61 age average in 2 different branches (basketball and volleyball) from 17 different universities that participate in UNILIG competitions being held in Çorum province and present at 2017-2018 activity calendar of Turkey University Sports Federation (TUSF).

Research Design.

In addition to the personal information form created by the researchers to determine the socio-demographic information of the participants within the scope of study, "Optimal performance mood scale" consisting of 9 subscales of 5 point Likert type (with 0.55 to 0.87 internal consistency coefficients) developed by Jackson and Eklund [13] and adapted to Turkish by Aşçı et al. [7] and "Five-factor personality traits scale" consisting of 5 subscales of 5-point Likert type developed by Benet-Martinez and John [14] Schmitt and adapted to Turkish by Schmitt, Allik, McCrae and Benet-Martinez [15] were used.

Statistical Analysis.

Statistical analysis of the data was performed with the SPSS 22.0 package program and the normality of the data was tested with Kolmogorov-Smirnov. After determining the normal distribution of the data, unpaired t-test was used to determine the differences between the scores obtained from gender, sports branch, weekly sports hours, and personality and optimal performance mood scale and subscales. The relationship between the participants' personality scale scores and optimal performance mood scores was analyzed by correlation test. Statistical significance level was accepted as $p < 0.05$.

Results

Table 1. Demographic traits of unilig athletes

Gender	f	%
Female	75	30.0
Male	175	70.0
Branch	f	%
Basketball	95	38.0
Volleyball	155	62.0
Sports Age	f	%
1-5	84	33.6
6-10	104	41.6
11 or More	62	24.8
Weekly Training	f	%
1-2	213	85.2
3-4	37	14.8
Total	250	100.0

Table 2. Unpaired t-test results of differentiation status according to gender of personality traits and optimal performance levels of unilig athletes

Variables	Gender	n	$\bar{x}$	ss	t	sd	p
Extroversion	Female	75	3.45	0.52	1.14	248	0.257
	Male	175	3.37	0.52			
Conscientiousness	Female	75	3.47	0.54	-0.14	248	0.891
	Male	175	3.48	0.47			
Openness	Female	75	3.60	0.57	0.67	248	0.504
	Male	175	3.55	0.50			
Agreeableness	Female	75	3.49	0.49	1.41	248	0.160
	Male	175	3.40	0.44			
Neuroticism	Female	75	3.32	0.57	0.33	248	0.745
	Male	175	3.29	0.53			
Personality General	Female	75	3.47	0.40	0.93	248	0.355
	Male	175	3.42	0.35			
Task Difficulty - Skill Balance	Female	75	3.45	0.67	0.273	248	0.785
	Male	175	3.42	0.72			
Action-Consciousness Combination	Female	75	3.56	0.83	1.218	248	0.224
	Male	175	3.43	0.78			
Open Goals	Female	75	3.93	0.78	2.015	248	0.045*
	Male	175	3.71	0.81			
Specific Feedback	Female	75	3.86	0.81	2.06	248	0.040*
	Male	175	3.63	0.81			
Concentration on Task	Female	75	3.71	0.91	-0.286	248	0.775
	Male	175	3.74	0.71			
Sense of Control	Female	75	3.85	0.72	2.292	248	0.023*
	Male	175	3.60	0.84			
Decreased Self Awareness	Female	75	3.67	0.92	1.571	248	0.117
	Male	175	3.47	0.90			
Conversion of Time	Female	75	3.81	0.79	1.989	248	0.048*
	Male	175	3.60	0.78			
Achieving Goal Experience	Female	75	3.87	0.86	0.167	248	0.867
	Male	175	3.85	0.90			
Optimal Performance Mood General	Female	75	3.75	0.61	1.688	248	0.093
	Male	175	3.60	0.60			

Table 3. Unpaired t-test results of differentiation status according to branch of personality traits and optimal performance levels of unilig athletes

Variables	Sports Branch	n	$\bar{x}$	ss	t	sd	p
Extroversion	Basketball	95	3.66	0.43	7.039	248	0.000*
	Volleyball	155	3.22	0.50			
Conscientiousness	Basketball	95	3.68	0.43	5.517	248	0.000*
	Volleyball	155	3.35	0.48			
Openness	Basketball	95	3.79	0.40	5.773	248	0.000*
	Volleyball	155	3.42	0.54			
Agreeableness	Basketball	95	3.57	0.39	3.943	248	0.000*
	Volleyball	155	3.34	0.47			
Neuroticism	Basketball	95	3.55	0.49	6.023	248	0.000*
	Volleyball	155	3.15	0.52			
Personality General	Basketball	95	3.66	0.29	8.373	248	0.000*
	Volleyball	155	3.30	0.34			
Task Difficulty - Skill Balance	Basketball	95	3.61	0.62	3.308	248	0.001*
	Volleyball	155	3.31	0.73			
Action-Consciousness Combination	Basketball	95	3.81	0.62	5.527	248	0.000*
	Volleyball	155	3.26	0.82			
Open Goals	Basketball	95	4.14	0.59	5.968	248	0.000*
	Volleyball	155	3.55	0.84			
Specific Feedback	Basketball	95	3.99	0.67	4.578	248	0.000*
	Volleyball	155	3.52	0.85			
Concentration on Task	Basketball	95	4.06	0.62	5.718	248	0.000*
	Volleyball	155	3.52	0.78			
Sense of Control	Basketball	95	4.01	0.58	5.394	248	0.000*
	Volleyball	155	3.47	0.87			
Decreased Self Awareness	Basketball	95	3.87	0.81	4.902	248	0.000*
	Volleyball	155	3.32	0.90			
Conversion of Time	Basketball	95	3.97	0.60	5.195	248	0.000*
	Volleyball	155	3.47	0.83			
Achieving Goal Experience	Basketball	95	4.22	0.63	5.239	248	0.000*
	Volleyball	155	3.64	0.95			
Optimal Performance Mood General	Basketball	95	3.97	0.45	7.084	248	0.000*
	Volleyball	155	3.45	0.61			

According to unpaired t-test results to find out whether the difference between personality traits of Unilig athletes and their optimal performance mood levels is statistically significant or not in terms of gender subscale there is no a meaningful difference ($p>0.05$). In contrast, open goals, specific feedback, sense of control, conversation of time subscales cause statistically meaningful differences ($p<0.05$).

According to the results of unpaired t-test conducted to test whether the difference of perceptions of personality scale and optimal performance mood subscales of the unilig athletes participated in the study is statistically significant according to sports branch, there was significant difference between participants' personality

scale and optimal performance mood scale general and subscale scores and sports branch ($p<0.01$).

According to the results of unpaired t-test conducted to test whether the difference of perceptions of personality scale and optimal performance mood subscales of the unilig athletes participated in the study is statistically significant according to sports branch, there was no significant difference only in agreeableness subscale scores of the participants (*= $p>0.01$, **= $p>0.05$).

According to the results of the scale scores conducted to determine the Personality Scale and Optimal Performance Moods of Unilig Athletes, it is determined that there was a high positive relationship between personality traits and optimal performance mood ($p<0.01$, $p=0.000$, $r=0.608$).

Table 4. Unpaired t-test results of differentiation status according to weekly training hours of personality traits and optimal performance levels of unilig athletes

Variables	Weekly Training Hours	n	$\bar{x}$	ss	t	sd	p
Extroversion	1-2	213	3.44	0.50	3.646	248	0.000*
	3-4	37	3.11	0.55			
Conscientiousness	1-2	213	3.54	0.46	5.526	248	0.000*
	3-4	37	3.09	0.48			
Openness	1-2	213	3.61	0.51	3.826	248	0.000*
	3-4	37	3.26	0.55			
Agreeableness	1-2	213	3.44	0.46	1.433	248	0.153
	3-4	37	3.33	0.47			
Neuroticism	1-2	213	3.34	0.55	2.762	248	0.006*
	3-4	37	3.07	0.45			
Personality General	1-2	213	3.48	0.35	4.904	248	0.000*
	3-4	37	3.18	0.31			
Task Difficulty - Skill Balance	1-2	213	3.47	0.71	2.180	248	0.030**
	3-4	37	3.20	0.67			
Action-Consciousness Combination	1-2	213	3.52	0.80	2.409	248	0.017**
	3-4	37	3.18	0.68			
Open Goals	1-2	213	3.86	0.77	3.969	248	0.000*
	3-4	37	3.30	0.89			
Specific Feedback	1-2	213	3.78	0.79	3.931	248	0.000*
	3-4	37	3.22	0.81			
Concentration on Task	1-2	213	3.80	0.76	3.532	248	0.000*
	3-4	37	3.32	0.71			
Sense of Control	1-2	213	3.76	0.79	4.183	248	0.000*
	3-4	37	3.18	0.79			
Decreased Self Awareness	1-2	213	3.61	0.90	3.623	248	0.000*
	3-4	37	3.04	0.83			
Conversion of Time	1-2	213	3.72	0.80	3.095	248	0.002*
	3-4	37	3.30	0.59			
Achieving Goal Experience	1-2	213	3.98	0.83	5.413	248	0.000*
	3-4	37	3.17	0.89			
Optimal Performance Mood General	1-2	213	3.72	0.60	4.924	248	0.000*
	3-4	37	3.21	0.49			

Table 5. Results of pearson correlation analysis to determine the relationship between personality traits and optimal performance mood of unilig athletes

Variables	Optimal Performance Mood Scale General
Personality General Scale	.608**
	.000

Discussion

The analysis to test the gender variable shows there is no significant difference between personality traits of male and female Unilig tlethes. The subscale perceptions of optimal performance mood state causes meaningful difference in terms of gender difference.

When the data obtained in our study was evaluated, there was no significant difference according to gender

variable of perceptions of personality scale and optimal performance mood subscales. Nas [16] stated that there was no difference between the students studying in the sports departments of universities according to the gender variable. The data obtained are also similar to the study conducted by Gözmen and Aşçı [17] on optimal performance, mood, personality and perfectionism in athletes.

Yıldız et al., [18] concluded that gender variable causes a meaningful difference in optimal performance mood states of 207 athletes. While Tok [19] asserted gender difference causes no meaningful difference in extreme sports athletes Lonchbaum ve ark. [20] remarked that individuals who take regular exercises and ones who don't take regular exercises have similar personality traits.

Contrary to the findings, Eryücel [21] found out that gender causes no significant difference in optimal performance mood states of individual athletes and team players when their optimal performance mood states and soliloquy. According to the data of the study sports branch variable causes meaningful differences in personality traits and optimal performance moods of Unilig athletes.

Bernier et al., [22] examined the awareness and acceptance of performance on athletes in their study. They compared elite swimmers with young elite golfers. Optimum performance levels of both groups were found to be similar. In another part of the research, 7 elite young golfers were included in the psychological skills training program and it was concluded that the program based on awareness and acceptance contributed to the increase in performance in competition. There is a significant difference between volleyball players and basketball players according to the sport branches of perceptions of personality scale and optimal performance mood subscales of UNILIG athletes. It can be said that obtaining different results according to different branch variables in both studies is due to the fact that Barnier et al. [22] conducted the study on individual athletes. On the other hand, Yanar v. d. [23] states that weekly training duration or sports cause no significant difference in optimal performance mood states.

Robazza and Bortoli [24] examined the mood, normative anger and anxiety levels of 197 rugby athletes in their study. Consequently, it is seen that rugby players have moderate anger frequency of symptoms. Similarly, it was concluded that the players had moderate anxiety and their anxiety symptoms decreased if they felt self-confidence. In our study, it is seen that there is a high positive relationship between personality traits and optimal performance moods. These results are similar to the results of the study conducted by Robazza and Bartoli [24].

Altıntaş et al. [25] concluded in their study on 167 elite male athletes that the motivation levels of the athletes had an effect on the optimal performance mood according to the branch variable. In other words, while interior motivation facilitates the formation of optimal performance mood in athletes, exterior motivation seems to prevent this situation. In our study, a significant difference was found between the general and subscales of personality scale and optimal performance mood scale and sports branches. This results in support of our study.

According to our study results, there is a highly positive relationship between personality traits and optimal

performance mood states of the participants. It can be concluded that individuals with high personality trait scores are more likely to experience optimal performance mood.

Likewise our study results, there are other researches which state similar findings about a positive correlation between personal traits and optimal performance mood states. Gozmen and Aşçı put forth that there is a positive correlation between personal traits and optimal performance moods of elite athletes. Also Ross and Kaiser [26] and Ullen et al. [11] asserted that, similar to our findings, there is a positive correlation between personal traits and optimal performance moods of athletes. There are further researches with similar results [27,28,29].

Moreno says that it is quite expected that there is a positive relationship between personal traits and optimal performance moods. According to Moreno [30] athletes with self control and open for improvement traits have inner motivation for the activities and this let them to experience optimal performance mood.

Conclusion

According to the results of the examination of the Personality Traits and Optimal Performance Moods of the total of (n = 250) male-female Unilig athletes, it is concluded that the validity and reliability aspects of the measurement tools are valid in our study as in previous studies.

In our study, when examined the difference of Unilig athletes' personality scale and optimal performance mood subscale perceptions in terms of gender variable, it is concluded that there is a meaningful difference in optimal performance mood subscale.

In our study, when examined the differences in perceptions of personality scale and optimal performance mood subscales of Unilig athletes according to gender; it is concluded that there is no significant difference according to the gender of the participants.

According to the sports branches of perceptions of personality scale and optimal performance mood subscales of Unilig athletes; it is concluded that there is a significant difference between athletes' general and subscales scores of personality scale and optimal performance mood scale and sports branches.

According to weekly training hours of perceptions of personality scale and optimal performance mood subscales of Unilig athletes, there is a significant difference in agreeableness subscale.

According to score results of scale carried out to determine the personality scale and optimal performance mood of Unilig athletes, it is concluded that personality traits and optimal performance moods affect one another positively.

Conflict of interests

The authors declare that there is no conflict of interests.

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Information about the authors:

Çeviker A. (Corresponding author); <http://orcid.org/0000-0002-6566-1251>; abdulkerimceviker@hitit.edu.tr; Hitit University, Sports Science Faculty; Çevre Yolu Bulvarı 19030, Çorum, Turkey.

Özlü K.; <http://orcid.org/0000-0003-1839-5437>; kurtulusozlu@hitit.edu.tr; Hitit University, Sports Science Faculty; Çevre Yolu Bulvarı 19030, Çorum, Turkey.

Deryahanoğlu G.; <http://orcid.org/0000-0001-5186-3453>; gamzederyahanoglu@hitit.edu.tr; Hitit University, Sports Science Faculty; Çevre Yolu Bulvarı 19030, Çorum, Turkey.

Demirdöken Ç.; <http://orcid.org/0000-0003-0212-2872>; cisemunlu@hitit.edu.tr; Hitit University, Sports Science Faculty; Çevre Yolu Bulvarı 19030, Çorum, Turkey.

Turkay H.; <http://orcid.org/0000-0002-7851-2757>; hikmetturkay06@gmail.com; High School of Physical Education And Sports, Kafkas University; 36500 Sarıkamış, Kars, Turkey.

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Self-regulation and self-efficacy as mediators of achievement goals and leisure time physical activity: a proposed model

Erturan G.^{1ABCDE}, McBride R.^{2ADE}, Agbuga B.^{1DE}

¹*Faculty of Sport Sciences, Pamukkale University, Turkey*

²*College of Education & Human Development, Department of Health & Kinesiology, Texas A&M University, USA*

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Abstract

Purpose: The purpose of this study was to examine the mediating role of self-efficacy and self-regulation between achievement goals and leisure time physical activity among Turkish high school students.

Material: Four hundred and sixty-four high school students (216 male; 248 female) enrolled in physical education classes voluntarily participated in the study. To assess whether the data fit the proposed model structural equation modelling was used.

Results: Results revealed that self-efficacy mediated the effects of mastery-approach, mastery-avoidance, and performance-approach goals on leisure time physical activity. Self-regulation was not a mediator of achievement goals and did not predict leisure time physical activity.

Conclusions: This study revealed the importance of self-efficacy in physical education to promote students' leisure time physical activity.

Keywords: 2x2 Achievement goal model, self-regulated learning, physical education, physical activity.

Introduction

Extensive data supports the importance of moderate to vigorous physical activity (MVPA) among children and youth. The (former) National Association for Sport and Physical Education (NASPE) concludes that regular PA is vital to preventing childhood obesity [1] and the World Health Organization (WHO) lists regular PA as an important goal for combating obesity and obesity-related diseases [2]. Despite compelling data, children and youth frequently fall below the recommended $\geq 50\%$ level of MVPA [3, 4].

School physical education (PE) programs represent an important conduit for promoting PA. Given that long time outcome of PE is encouraging children and youth to engage in PA outside the gymnasium setting (i.e., during their leisure time), physical educators should understand factors contributing to PA outside of PE settings. Students must first want to engage in activity outside the school setting. Motivation represents an important contributor to promoting leisure time physical activity (LTPA). Appreciating students' motivations, cognitions and affects such as effort and self-efficacy may provide important knowledge and strategies for teachers to encourage PA in student leisure time. This study draws from self-regulation (SR) and achievement goal (AG) theoretical frameworks to examine the impact of high school students' AG, self-efficacy, effort and engagement in LTPA.

Self-Regulation

Perhaps one of the most inclusive theories about learning is SR. While McBride & Xiang [5] identified the lack of a consistent operational definition of SR in the literature, most agree it encompasses a process whereby individuals "activate and sustain cognitions, affects and behaviors that are systematically oriented toward the attainment of personal goals" [6; p.10]. SR individuals are active; they

manage learning through monitoring and strategy use. SR Theory embraces cognitive, metacognitive, motivational, behavioral strategies and social contextual factors where students actively and strategically oversee their learning [7]. It is driven by environmental setting circumstances that encourage individuals to "adopt, develop and refine strategies, monitor, evaluate, set goals, and change belief process" [8; p. 68].

SR also assumes that learners employ "agency" through active control and monitoring of their learning [9]. Working within the limits of personal capabilities as well as environmental influences, students exercise agency through goal setting, making decisions and choices about reaching those goals. Woven into the SR process is the intensity with which learners engage, persist, and believe in their abilities to accomplish tasks. Persistence, effort, and self-efficacy in fact, represent key affective indicators of SR [10] and are directly influenced by the extent to which learners might be internally or externally regulated. In the PE environment, Theodosiou and Papaioannou [11] found evidence that metacognitive elements of SR mediated the effects of a mastery climate and task orientation in PE classes on the frequency of exercise recorded in out-of-class sport venues.

Achievement Goal Theory

As noted by Zimmerman [12], Kaplan, Lichtinger, & Gorodetsky [13] motivation is a major linchpin of SR. Among contemporary motivational theories, AG Theory addresses the role of cognitive, affective, and behavioral responses in educational and work-related settings. It attempts to explain how individuals in achievement situations seek to demonstrate ability and understand perceptions for engaging in achievement-related behaviors [14-16]. These purposes, in turn, then influence how students approach, experience and perform [17].

Two categories of AG initially identified (i.e., the

dichotomous model) were task and ego. A task-oriented individual is self-referenced and motivated to develop competence and ability through learning or task mastery. Ego oriented learners focus on demonstrating superiority and outperforming others or show avoidance to being judged incompetent. Mixed research findings about relationships between the two AG motivational patterns led to the 2 x 2 model with four categories: mastery-approach (MAp; “I want to learn as much as possible”), mastery-avoidance (MAv; “I worry that I may not learn all that I possibly could”), performance-approach (PAp; “It is important for me to do better than other students”), and performance-avoidance (PAv; “I just want to avoid doing poorly”) [18]. It has since been extensively validated among American, European, Asian, [19, 20] and Turkish adolescents [21].

In the 2x2 model, a MAp goal-orientation is associated with deep processing of material and increased SR [22]. MAv goals are associated with fear of failure and generally apply to achievement situations where individuals worry about skills loss [23]. Performance-approach goal-orientations encompass a need for achievement while simultaneously embracing a fear of failure and are affiliated with persistence and effort [22]. Finally, a PAv goal orientation is driven by a fear of failure and represents the least positive goal orientation. One factor linked to PAv orientations is perception of overly externally regulated environments [24].

Self-efficacy

Bandura [25] defined self-efficacy (SE) as “beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” [p. 3]. When determining self-efficacy individuals judge their skills and capacities, then convert those skills into actions. Self-efficacy addresses beliefs about perceived competence or beliefs when approaching and performing tasks. Learners with high perceived self-efficacy levels tend to be more willing to engage in challenging tasks, work harder and persevere longer than their less efficacious counterparts.

Wigfield et al. [10] present a profile of high self-efficacy that include setting ambitious goals, choosing challenging tasks, and being mindful of requisite strategies needed to complete thought-provoking activities. Early correlational studies found positive relationships between self-efficacy and SR [see 26 for a more in-depth review]. Classroom results also reveal self-efficacy mediated the effects of AG on academic outcomes. Bong [27] identified strong support for subject specificity of self-efficacy and AG among 424 Korean middle and secondary school students. PAp goals and PAv goals recorded strong cross-subject associations, while mastery goals recorded the weakest relationships. They concluded that students with PAp or PAv goal orientations in one academic subject would likely pursue the same goal orientation in other subject areas.

In the PA setting, self-efficacy has repeatedly predicted both adoption and maintenance of PA [28]. Among a population of young healthy adults, Kwan and Bryan [29] reported those who responded more favorably

to exercise had greater self-efficacy, and Dishman et al. [30] recommended self-efficacy as a mediator variable.

Gao, Lochbaum, and Podlog [31] tested the mediating effect of self-efficacy among middle school students on targeted mastery AG and students’ in-class PA. Students’ self-efficacy was significantly and positively related to the four AG and perceived motivation climates in addition to PA levels in PE class. Similarly, Gao and colleagues [32] provided additional support for self-efficacy as a mediator finding that middle school students’ self-efficacy fully mediated the effect of MAp goals on a fitness performance and partially mediated the effects of MAv and PAp goals.

Leisure Time Physical Activity

Since adolescence may be a pivotal time for decisions about continued PA engagement, promoting LTPA takes on added importance. Aarnio, Winter, Peltonen, Kujala, & Kaprio [33] reported adolescents who actively engaged in PA were more likely to continue being physically active into adulthood. While research exploring the association of participation in PE and LTPA are mixed, one congruent link identified is the type of motivation students encounter [34]. Mastery-oriented and autonomy-supporting climates tend to foster greater intrinsic interest and future intentions to be physically active [35, 36].

In summary, SR, AG orientations and self-efficacy represent important contributors to our understanding of learning and motivational behaviors in PE and PA settings. While empirical evidence provide links to self-efficacy, little information exists on the role self-efficacy and SR might play as mediators of AG and increased participation in LTPA. Cecchini-Estrada and Mendez-Gimenez [37] agree and provide support that AG orientations might yield implications for SR learning. Since PE is required in Turkey’s high schools, SR and self-efficacy as mediators of LTPA could contribute to future interests in PA and health benefits accrued from such participation.

This study utilizes both SR and self-efficacy as mediators of AG and LTPA. Following the recommendation of Dishman et al. [30] and the impact of Gao and colleagues [32], we examine the mediating role of self-efficacy and SR between the 2 x 2 AG framework and LTPA among Turkish high school students. Specifically, this study asks: 1) Does the hypothesized model fit the data? 2) Do self-efficacy and SR mediate the effects of MAp, MAv & PAp and LTPA and, 3) Do SR and self-efficacy predict LTPA?

Figure 1 presents the hypothesized model. Based on the previous studies we first hypothesized that approach-oriented goals (MAp and PAp) would positively predict self-efficacy, while avoidance-oriented achievement goals (MAv and PAv) would negatively predict self-efficacy [e.g. 38]. Second, we hypothesized students’ self-efficacy and SR would positively predict LTPA. Third we hypothesized that self-efficacy and SR would mediate the relationship between AG and LTPA. In line with earlier research [39, 31] self-efficacy was hypothesized to mediate AG and LTPA. When experiencing success students may be more inclined to continue in that achievement behavior [40].

Material and Method

Participants.

Four hundred and sixty-four high school students (216 male; 248 female; age range = 14-17 years, (M age = 15.04 ± 0.62 years) enrolled in PE classes voluntarily participated in the study. Participants attended five public high schools located in a central southwestern Turkish city and were of middle to upper middle-class SES. All programs delivered traditional sport-based lessons such as basketball, soccer, volleyball and games to meet state curriculum guidelines. Students typically participated for two hours one day per week and classes typically were teacher-centered. Distribution of gender and grade level are presented in Table 1.

Research Design

Prior to data collection permission was obtained from all participants and the Turkish Ministry of Education and Ethics Committee. During regularly scheduled PE classes, students responded to a questionnaire pack. Teachers were not present. Participants were informed there were no right or wrong answers, to respond as honestly as possible and participation in the research project (or not) would not impact their grade. Responses were kept confidential and took approximately 40 minutes to complete.

Variables and Measures

Questionnaires included demographic information and items assessing AG, SR, self-efficacy, and LTPA. Demographic information included name, age, gender, grade classification and course currently enrolled.

Achievement Goals. This construct was assessed using the 2x2 Achievement Goal Scale [41] and adapted to Turkish by Ağbuğa [21]. The questionnaire consists of 21 items beginning with the stem “in my physical education classes...” followed by a 7-point Likert scale (1 = not at all true of me; 7 = very true of

me). Item examples included “It is important for me to do better than other students” (PAp), “I just want to avoid doing poorly” (PAv), “I want to learn as much as possible” (MAp), and, “I worry that I may not learn all that I possibly could” (MAv).

Self-Regulation and Self-Efficacy. Related subscales from the Motivated Strategies for Learning Questionnaire [MSLQ; 42] was adapted for Turkish populations by Üredi [43] and confirmed by Erturan-İlker, Arslan and Demirhan [44] assessed students’ SR and self-efficacy. The SR subscale consists of 9 items and the self-efficacy subscale consists of nine items. All items are followed by a 7-point Likert type scale (1 = not at all true of me; 7 = very true of me). Example items included “When work is hard I either give up or study only the easy parts” (SR) and “Compared with other students in this class I expect to do well” (self-efficacy).

Leisure Time Physical Activity (LTPA). We used the adapted Turkish short form [45] of the International Physical Activity Questionnaire [IPAQ; 46]. It consists of 7 items that measure frequency, duration, and intensity of PA across the preceding seven days.

Statistical Analysis

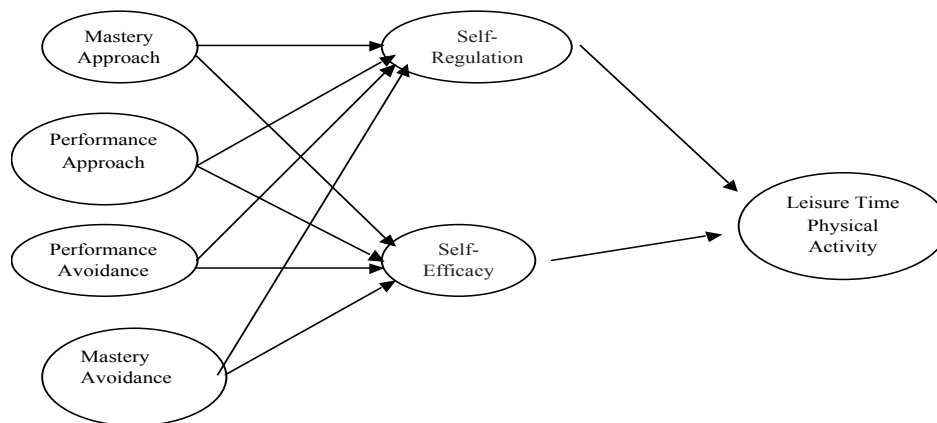


Figure 1. Hypothesized path model

Table 1. Distribution of participants by gender and grade level

	Grade Level				
	1	2	3	4	Total
Girls	82	60	46	60	248
Boys	66	54	47	49	216
Total	148	114	93	109	464

Descriptive statistics for all variables were computed and Cronbach's alphas assessed the internal reliability of the multi-item subscales. Z scores for IPAQ scores were calculated. Pearson correlation analysis examined the correlations among all the variables used in the study. To assess whether the data fit the proposed model path analysis with the version 21 of the AMOS software [47]. In each analysis, we initially evaluated the multivariate normality of the data using Mardia's multivariate kurtosis coefficient.

Several indices were used to assess model fit. The overall fit of the model to the data employed the chi-square test. The standardized root means square residual (SRMR) and the root mean square error of approximation (RMSEA) were used as indicators of absolute fit. Values less than .08 and .06 respectively advocate a model with a good fit good fit between the proposed model and the data [48]. Comparative fit index (CFI) was to be less than .90 to indicate adequate model [48].

Results

Preliminary Analyses

After initial data screening, three univariate outliers were removed from the dataset. Means, standard deviations, and alpha reliability coefficients for the variables are recorded in Table 2. The observed alpha coefficients indicated that the scales used in the study demonstrated acceptable internal reliability (i.e., $\alpha \geq 0.70$), except for PA, PAv goal, and SR.

Correlations among Variables

Pearson's product moment correlation analysis results are shown in Table 3 below. Bivariate correlations suggest that all the significant relationships are positive.

Path Analysis

The hypothesized path model was examined using the maximum likelihood method. The data in the measurement model did not display multivariate normality (Mardia's Multivariate kurtosis = 12.94). Multivariate normality implies that the sampling distributions of means of the

Table 2. Descriptive characteristics of participants

Characteristics	N	M	SD	Range	Skewness	Kurtosis	α
Physical Activity*	306	2227.06	1976.11	-			0.69
Mastery Avoidance	306	4.00	1.57	1-7	-0.155	-0.780	0.71
Performance Avoidance	306	5.07	1.36	1-7	-0.771	0.271	0.62
Mastery Approach	306	5.19	1.15	1-7	-0.733	0.235	0.78
Performance Approach	306	4.95	1.39	1-7	-0.733	-0.010	0.84
Self-Efficacy	306	5.30	1.18	1-7	-0.846	0.330	0.90
Self-Regulation	306	4.73	0.97	1-7	-0.141	-0.016	0.68

*PA scores were calculated as MET/minute/week and were included as original IPAQ scores

Table 3. Bivariate correlations among study variables

Variables	1	2	3	4	5	6
1. SR	-					
2. Self-Efficacy	0.02	-				
3. PAp	0.07	0.34**	-			
4. MAp	0.18**	0.49**	0.56**	-		
5. PAv	-0.00	0.14*	0.25**	0.012*	-	
6. MAV	-0.04	0.17*	0.41**	0.34**	0.31**	-
7. LTPA	0.13*	0.29**	0.13*	0.29**	0.06	0.010

* $p < 0.05$, ** $p < 0.01$

various dependent variables in each cell and all linear combinations of them are normally distributed [49]. One approach to handling multivariate non-normal data set is the bootstrap technique [50] that was employed in all further analyses and the calculation of model statistics, parameters, and standard errors are derived from the bootstrap sample distribution.

Because the AGs were interrelated their associated error terms were correlated, the indices of fit suggested the revised model adequately fit the data [$\chi^2(\text{sd}) = 2.55, p < 0.05$, CFI = 0.98, NFI = 0.96, SRMR = 0.00, RMSEA = 0.043]. See Figure 2.

According to the path model, MAV goals a revealed negative relationship with SR and self-efficacy, while the MAP goal revealed a positive relationship with SR and self-efficacy. The PAP goal showed only a positive association with self-efficacy. Lastly, the PAV goal produced no relationship with variables. Self-efficacy is an important variable in the model due to its direct link with LTPA. It positively predicted LTPA and was a mediator between AG and LTPA. Contrary to our hypotheses, SR did not significantly predict LTPA. The percentage of variance (squared multiple correlations) accounted for in each dependent variable were: Self-efficacy: 27%, LTPA: 9%, and SR: 5%. All R^2 were statistically significant ($p < .01$).

Discussion

This study tested a hypothesized model examining the mediating role of self-efficacy and SR on the effects of the 2 x 2 AG model and LTPA among Turkish high school students. After initial lack of model fit, follow-up analysis techniques yielded an acceptable fit for the final model. Results revealed self-efficacy partially mediated the effects of three of the four AG on LTPA. SR was not a mediator of AG and did not predict LTPA. However, a MAP orientation revealed a positive relationship with SR while a MAV goal orientation produced a negative

relationship with SR.

The first hypothesis stated that MAP, MAV, PAP and PAV would significantly predict self-efficacy and SR. The MAP coefficient was significantly and moderately related to self-efficacy, followed by PAP and MAV goal orientations. The MAV relationship with self-efficacy was statistically significant but negative in direction and recorded the smallest absolute value. These findings correspond to AG Theory where MAP and PAP positively associate with perceived competence, while MAV has a negative association with perceived incompetence [51]. Gao et al. [31] also confirmed this goal and suggested individuals endorsing MAP and PAP goals over MAV goals may expedite their own self-efficacy. Whether competence is perceived as mastery or task-oriented, the approach valence may be assumed to relate positively to self-efficacy. Teachers may benefit from these results through the creation of an 'approach-centered' climate that encourages and supports their student's efforts.

Only the mastery goals predicted SR. The obtained result adds further support that MAP and PAP goal orientations are positively linked to perceived competence and can operate simultaneously in the same environment, while MAV is negatively linked with perceived incompetence [52]. Since both goal orientations' positive valence (i.e., approach) yielded significant and positive predictions of self-efficacy, there are implications for practice. Though a general mastery orientation to learning is positively related to learning and self-motivation, some students respond to competition and assessing performance relative to others. Teachers might provide activities offering a blend of both approach orientations while still emphasizing task mastery and personal improvement.

That self-efficacy would mediate the effects of the four AG goals on SR and LTPA was partially met. Except for PAV, all were significant predictors of self-efficacy. MAV was not a significant predictor of self-efficacy. Specifically, the MAP coefficient was significantly related to self-

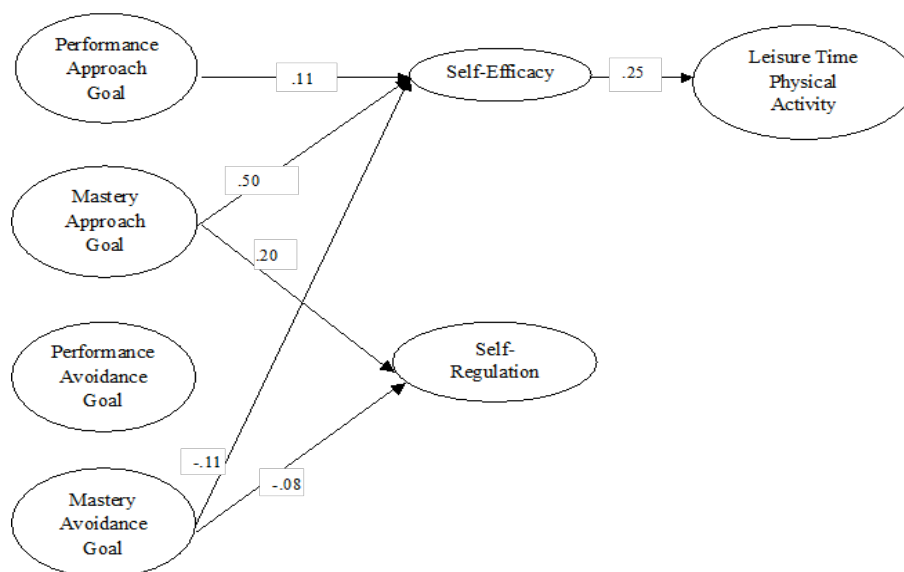


Figure 2. The path model of the interrelationships between LTPA, AG, SR and SE. Note. All coefficients presented are standardized and significant. For visual simplicity variances are not presented.

efficacy, followed by PAp. The MAV relationship with self-efficacy was statistically significant, but negative in direction. The results add further support to the theoretical underpinning that both MAp and PAp goal orientations are positively related to perceived competence and MAV is negatively correlated with perceived incompetence [32, 52]. For PE practitioners, both mastery and performance approach goal orientations can operate simultaneously in a perceived mastery-involving climate where students believe they are capable of performing activity [31, 17].

Self-efficacy fully mediating the effects of PAp and MAV goals and partially mediating MAp and LTPA is supported by related research. Gao et al. [32] reported that students' self-efficacy fully mediated the effect of MAp on a fitness test and partially mediated the effects of MAV and PAp on the same fitness test. Using the dichotomous AG model, Li, Shen, Rukavina, and Sun [53] found that both mastery and performance goals positively predicted perceived competence among a sample of middle school students. The current results offer further documentation that students exhibiting an ego-involved goal orientation with an avoidance valence may not automatically display maladaptive behaviour in achievement settings [54]. That both high-task/low-ego and high-task/high ego configurations have been found to be motivationally adaptive bodes well for PE. Motivationally adaptive students work harder, record higher levels and self-efficacy and attribute success to their effort [55]. Teachers should be prepared for multiple goal orientations in their classes and include a variety of mastery and task-oriented activities.

Though the performance avoidance goal orientation revealed no significant paths, students nevertheless recorded higher than average subscale scores ($M=5.07$). According to AGT, a negative valence indicates behaviour initiated via deleterious or undesirable events or possibilities and are problematic in achievement situations [23]. Fear of failure is often an underlying motive for performance-avoidance learners. A performance-avoidance associated with surface processing of material, avoiding help seeking, and a perception that the achievement context is overly evaluative.

These characteristics are of potential concern because Wolters et al. [55] found that students reporting a high extrinsic goal focus tended to have lower levels of self-efficacy. As seen in the results, a MAV goal orientation negatively predicted self-efficacy. Physical educators, along with a mastery approach, might establish an environment that fosters student self-efficacy while simultaneously reducing external regulators that might enhance a performance avoidance goal orientation.

Contrary to the proposed model, SR was not a mediator of AG and LTPA and did not predict LTPA. One reason for the lack of mediation/predictability of SR may be due to the instrument. Research findings on reliability and factor validity of the MSLQ are mixed. While early research on the MSLQ found acceptable internal consistency reliability, confirmatory factor analysis demonstrated modest fits only [56]. Cook et al. [56] also

produced results where Confirmatory Factor Analysis did not demonstrate a good fit but a follow-up Exploratory Factor Analysis suggested a five-factor model. Though adapted for and validated in a Turkish setting, the MSLQ is designed primarily for traditional achievement-oriented environments and may not have captured the context afforded in this setting.

High school PE in Turkey follows a traditional sports-oriented curriculum model delivered through teacher-centered instruction. Under these conditions, students may not be exposed to SR opportunities and thus may not have associated the SR items with their PE classes and intentions for future LTPA. Like any skill set, SR skills must be taught and students provided with opportunities for application. Both an examination of the context-specificity of the items and opportunities for SR in the environment may provide more definitive clues for the lack of predictability SR played here.

Finally, the model proposed that self-efficacy and SR would predict LTPA. That self-efficacy was positively related to LTPA supports previous research identifying efficacy as a predictor of PA. McAuley and Blissmer's [57] review of the predictive role of self-efficacy to exercise yielded powerful relationships. The authors reported that changes in self-efficacy over time directly related to changes in exercise behavior and predicting long-term adherence to PA. To foster belief about capabilities to engage in PA, teachers can provide students with a variety of co-operative and competitive activities as well as opportunities for success. Providing a selection of activities combined with successful engagement can enhance the likelihood of students continuing PA after their high school years.

There are, however, limitations to note. First is using self-report measures. Cross-sectional nature designs may not permit the testing of reciprocal links which may appear over time. Future research might employ a longitudinal design whereby serial measurements are made in the same individuals over time. Another limitation was the LTPA assessment. Since IPAQ requires respondents to recall PA over the past week, the reliability of the data depends on adolescents' memory. To overcome this limitation, future studies may use specific PA measures during leisure time to assess LTPA.

Conclusion

Despite these limitations the study contributes to a better understanding of the mediating role of self-efficacy in the relationships among the 2 x 2 AG orientations and LTPA by including SR as a mediator of LTPA. Though numerous studies include self-efficacy as a mediator among a variety of outcome variables, SR has largely been ignored. To the authors' knowledge, no study has included SR as a mediator AG to include and predict LTPA employing path analysis techniques.

Though SR did not mediate AG nor predict LTPA, there is a long-established relationship between goal orientations and SR. Since this relationship was not confirmed among these Turkish high school students,

further study is recommended to assess why SR had little impact on LTPA and what environmental factors might account for the lack of predictability.

Conflict of interests

The authors state that there is no conflict of interest

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Information about the authors:

Erturan G.; (Corresponding author); <http://orcid.org/0000-0002-1461-2679>; gokce.erturan@gmail.com; Pamukkale University, Faculty of Sport Sciences; Kinikli Campus, Denizli, Turkey.

McBride R.; <http://orcid.org/0000-0002-7177-6741>; mpelf4evr@gmail.com; Texas A&M University, College of Education & Human Development, Department of Health & Kinesiology; Texas, USA.

Ağbuğa B.; <http://orcid.org/0000-0002-4817-198X>; bakboga@pau.edu.tr; Pamukkale University, Faculty of Sport Sciences; Kinikli Campus, Denizli, Turkey.

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Differences in anthropometric characteristics between young soccer players (U19) members of the best soccer clubs in Montenegro, Bosnia and Herzegovina, and Kosovo

Gardasevic J.^{ABCDE}, Bjelica D.^{ABCD}, Vasiljevic I.^{BDE}

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

Authors' contribution: A – Study design; B – Data collection; C – Statistical analysis; D – Manuscript Preparation; E – Funds collection.

Abstract

Purpose: The aim of this research was to determine the differences between the young soccer players (U19) in terms of anthropometric characteristics and body composition. We considered players of three the most successful clubs in three countries of the southern region of the Balkan Peninsula.

Material: The first sub-sample of the subjects was consisted of 17 players of OFC Titograd from Montenegro of the average age 17.12 ± 0.69 . The second sub-sample was consisted of 14 players of FC Siroki Brijeg from Bosnia and Herzegovina of the average age of 18.14 ± 0.86 . The last sub-sample of the examinees was consisted of 15 players of FC Ferizuli from Kosovo of the average age 18.07 ± 0.46 . Anthropometric characteristics in the body composition were evaluated by a battery of 11 variables. The significance of the differences between the young soccer players in the anthropometric characteristics and variables for assessing body composition were determined by ANOVA and LSD Post Hoc test.

Results: The young soccer players of the three mentioned clubs have statistically significant differences by the two variables that estimate the upper leg skinfold and fat percentage. The young soccer players of OFC Titograd are significantly better in variable upper leg skinfold than other players. The young soccer players of FC Ferizuli are significantly better in variable fat percentage than players of OFC Titograd.

Conclusions: The results can be useful for coaches of other clubs for making a comparison of their soccer players with the young soccer players in this research.

Keywords: anthropometric characteristics, body composition, young soccer players, Balkan Peninsula.

Introduction

Soccer is the most popular sport in the world, with up to 270 million participants [1]. A soccer game is said to be the most important secondary thing in the world. It gathers huge masses at stadiums and in front of TVs [2]. It is a highly dynamic and fast team game which, with its richness of movement, falls under category of polystructural sports games. Soccer is a sport characterized by numerous and various complex and dynamic kinesiological activities which are then characterized by either cyclical or acyclical movement [3]. Ability to run more for players or at the other hand distance covered during each full time competition significantly influenced by aerobic capacity and endurance performance [4]. In soccer, top score can be achieved only under conditions of well-programmed training process. High quality management of the training process depends on the knowing of the structure of certain anthropological capabilities and player's characteristics, as well as their development. Various researches are to be done in order to establish certain principles and norms for the transformational processes of the anthropological characteristics important for soccer. However, in many places much more time is spent on increasing the physical fitness of athletes without taking into consideration the assessment of their body composition and their nutritional status [5]. Findings regarding anthropometric characteristics and body composition are of crucial importance for complex sports games such as soccer. The anthropometric space is defined by the longitudinal

dimension of the skeleton, the transversal dimensionality of the skeleton and the mass and volume of the body. The purpose of knowing anthropometric characteristics is to improve skills in many sports [6]. The anthropometric status of top level athletes is relatively homogeneous, depending on the sport, and it can be defined as a model of athletic achievement. Research on anthropometric characteristics and body composition among athletes of different sports indicates that athletes of different sports have their own specific characteristics. This is mostly due to the reason that absolute size contributes a significant percentage of total variance associated with athletic success [7]. Muscle mass improves performance in activities that require muscular strength and endurance, but also in those that require enviable aerobic ability [8, 9, 10]. The athlete's belonging to a certain sports branch gives to an athlete certain anthropometric characteristics and body compositions. It gives him the advantage of dealing with this sport in relation to others.

Today, soccer is certainly the number one sport in the world for its rating and popularity, and the same applies to the countries of the southern region of the Balkan Peninsula. These are the countries of the former Yugoslavia where soccer was the number one sport, and until today it has maintained its primacy in Montenegro, in Bosnia and Herzegovina, and in Kosovo. In all these countries a lot of work is being done to develop young soccer players. They all want to develop soccer players and sell them to the rich clubs in Europe. Mostly in this way soccer clubs in these countries provide their annual budgets. The three clubs that are at the top of the youth soccer of their countries

are Soccer Club Titograd (hereinafter OFC Titograd) from Montenegro, Soccer Club Siroki Brijeg (hereinafter FC Siroki Brijeg) from Bosnia and Herzegovina and Soccer Club Feronikeli (hereinafter FC Feronikeli) from Kosovo. It became interesting for researchers to determine the models of anthropometric characteristics and body composition of these soccer players, as well as to determine the differences among them.

The aim of this research was to analyze the differences in some anthropometric characteristics and body composition among young soccer players (U19), players of OFC Titograd from Montenegro, FC Siroki Brijeg from Bosnia and Herzegovina and FC Feronikeli from Kosovo.

Material and Methods

Participants: A sample of the subjects consists of a total of 46 young soccer players from three different countries, divided into three sub-samples. The first sub-sample of the subjects was consisted of 17 players of OFC Titograd from Montenegro of the average age $17.12 \pm .69$, the second sub-sample was consisted of 14 players of FC Siroki Brijeg from Bosnia and Herzegovina of the average age of $18.14 \pm .86$, and the last sub-sample of the examinees was consisted of 15 players of FC Feronikeli from Kosovo of the average age $18.07 \pm .46$. The soccer players were tested immediately after the season 2018/19 ended.

Procedure: Anthropometric research has been carried out with respect to the basic rules and principles related to the selection of measuring instruments and measurement techniques standardized in accordance with the International Biological Program guidelines. For the purpose of this study, eight (8) anthropometric measures have been taken: body height, body weight, triceps skinfold, biceps skinfold, skinfold of the back, abdominal skinfold, upper leg skinfold and lower leg skinfold, and three (3) body composition assessment variables: body mass index, fat percentage and muscle mass. Anthropometer, caliper, and measuring tape were used for anthropometric measurements. To evaluate the body composition, Tanita body fat scale - model BC-418MA, was used. The principle of this scale is based on indirect

measurement of the body composition; a safe electrical signal is transmitted through the body via electrodes located in the standalone unit. The Tanita Scale, thanks to its athletics mode, enables athletes to closely monitor their body weight, health condition and form with all relevant parameters.

Statistical analysis: The data obtained through the research were processed by descriptive and comparative statistical procedures. For each variable, central and dispersion parameters have been processed. The significance of the differences between the players of the three successful soccer clubs in the anthropometric characteristics and variables for assessing body composition was determined by ANOVA and LSD Post Hoc tests, with statistical significance of $p < 0.05$.

Results

The variables for assessing anthropometric characteristics and body composition of young soccer players and ANOVA to identify significant differences between them are shown in Table 1.

ANOVA test (Table 1) found that the young soccer players of the three mentioned clubs have statistically significant differences by the two variables that estimate the upper leg skinfold ($F=4.68$) and fat percentage ($F=4.39$). LSD post hoc test confirmed the significant differences of upper leg skinfold and fat percentage among the soccer players of these three clubs (Table 2).

The LSD Post Hoc test showed significant differences in upper leg skinfold the young soccer players of the three clubs (Table 2). The OFC Titograd players had significantly lowest upper leg skinfold than the players of FC Siroki Brijeg ($p < 0.01$) and FC Feronikeli ($p < 0.05$). The LSD Post Hoc test also showed significant differences in fat percentage the young soccer players of the two clubs (Table 2). The FC Feronikeli players had significantly lowest fat percentage than the players of OFC Titograd ($p < 0.01$).

The significant differences of upper leg skinfold and fat percentage among the young soccer players of these clubs are shown in Figure 1.

Table 1. Descriptive data and ANOVA of 46 young soccer players, members of the three clubs

Variables	OFC Titograd	FC Siroki Brijeg	FC Feronikeli	ANOVA	
	Mean $\pm$ Standard Deviation			F	Sig.
body height (cm)	180.60 $\pm$ 5.38	181.55 $\pm$ 5.32	178.57 $\pm$ 7.19	.94	.39
body weight (kg)	71.70 $\pm$ 4.99	73.59 $\pm$ 8.79	69.41 $\pm$ 7.37	1.26	.29
triceps skinfold (mm)	6.26 $\pm$ 1.83	8.19 $\pm$ 2.45	8.04 $\pm$ 3.71	2.45	.09
biceps skinfold (mm)	4.79 $\pm$ 1.34	4.39 $\pm$.67	5.11 $\pm$ 1.39	1.29	.29
skinfold of the back (mm)	9.01 $\pm$ 1.43	8.65 $\pm$ 1.34	8.67 $\pm$ 1.66	.29	.75
abdominal skinfold (mm)	10.81 $\pm$ 4.63	9.21 $\pm$ 2.52	8.69 $\pm$ 3.77	1.3	.27
upper leg skinfold (mm)	7.88 $\pm$ 2.29	12.18 $\pm$ 4.28	11.13 $\pm$ 5.41	4.68	.01
lower leg skinfold (mm)	6.54 $\pm$ 2.29	6.56 $\pm$ 1.96	6.34 $\pm$ 2.73	.04	.96
body mass index (kg/m ²)	21.95 $\pm$ 1.22	22.16 $\pm$ 1.67	21.72 $\pm$ 1.61	.32	.73
fat percentage (%)	10.41 $\pm$ 3.42	8.37 $\pm$ 3.65	7.17 $\pm$ 2.13	4.39	.02
muscle mass (kg)	36.35 $\pm$ 2.89	37.92 $\pm$ 3.61	36.47 $\pm$ 3.76	.96	.39

Table 2. LSD Post Hoc tests

Dependent Variable	club		Mean Differ.	Std. E	Sig.
upper leg skinfold	OFC Titograd	FC Siroki Brijeg	-4.30**	1.49	.006
		FC Feronikeli	-3.25*	1.46	.032
	FC Siroki Brijeg	OFC Titograd	4.30*	1.49	.006
		FC Feronikeli	1.05	1.53	.496
fat percentage	OFC Titograd	FC Siroki Brijeg	2.04	1.13	.079
		FC Feronikeli	3.24**	1.11	.006
	FC Siroki Brijeg	OFC Titograd	-2.04	1.13	.079
		FC Feronikeli	1.20	1.17	.308

Legend: * - $p < 0.05$; ** - $p < 0.01$

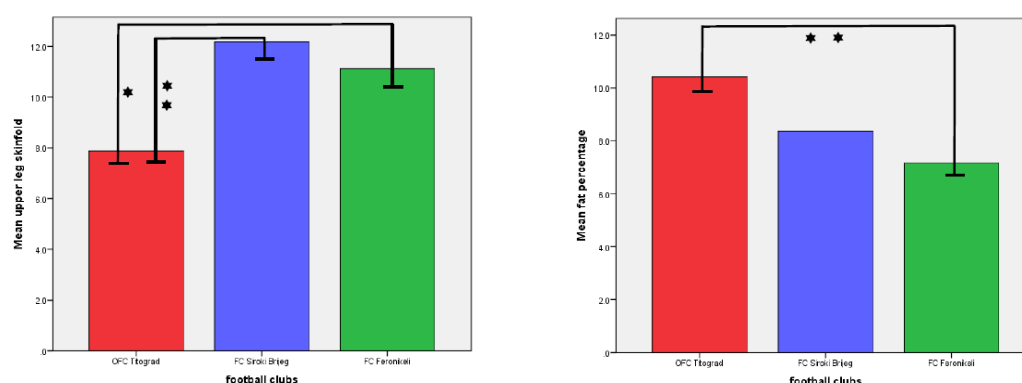


Figure 1. Statistically significant differences between young football players of football clubs in two variables - upper leg skinfold and fat percentage (* $p < 0.05$; ** $p < 0.01$)

Discussion

Considering the basic descriptive statistical parameters, it can be concluded that we have examined selected players. It can be noticed that the soccer players of these three clubs are of the approximately similar mean values of the variables analyzed. This is not surprising as these are the top three clubs in Montenegro, Bosnia and Herzegovina, and Kosovo, i.e. a concentration of the best players. The ANOVA showed that the young soccer players of the three mentioned clubs have statistically significant differences by the two variables. The first is upper leg skinfold and the second is fat percentage. The LSD Post Hoc test showed that the players of OFC Titograd have significantly lower values of upper leg skinfold than the players of FC Siroki Brijeg and FC Feronikeli. Soccer players of OFC Titograd have shown statistically better values because a smaller number means a better result when the disrupting factor of subcutaneous fat on playing soccer is considered. The second variable in which a statistically significant difference has been found is a variable that estimates body composition, fat percentage. The LSD Post Hoc test shows that the soccer players of FC Feronikeli had the significantly lowest fat percentage compared to the soccer players of OFC Titograd ($p < 0.01$), but no significant differences compared to the soccer players of FC Siroki Brijeg. Moreover, it is wellknown that low fat percentage is desirable for high physical performance in all sports. Although, not every body composition characteristic is expected to play a role in optimal performance in professional soccer. Lower

levels of body fat (that are specific to each player) are desirable for optimal performance as body mass must be moved against gravity [11]. In other words, by achieving optimal levels of body fat and fat-free mass, the player can minimize the negative effects of excess body fat without sacrificing skill.

However, despite the significant differences all the soccer players had a lower percentage of fat and these results. This was expected, because many of the previous research recognized soccer as a predominantly aerobic sport [12]. Furthermore, it is very important to soccer players to have a determined body fat percentage in order to perform well enough and achieve their full playing potential. The fat percentage soccer players of English Premier League vary from 9.9 percent to 12.9 percent, depending on the position [13], in Japan 8.5-13.7% [14], in Zimbabwe 9.2-11.2% [15]. However, these are just guidelines and the players would work together with their coaches to determine the individual body fat percentage to enhance their physical abilities and their health. The importance of body composition in sport performance is a primary concern in creating athlete profiles as well as conditioning programs throughout a season at all levels of competition [16]. Those describing anthropometric characteristics and body composition of athletes and detecting possible differences in relation to competition levels may give coaches a better working knowledge of the studied groups of athletes.

For other variables, some values are better for players of FC Feronikeli, some for players of OFC Titograd or

FC Siroki Brijeg, although, insignificantly for statistics. This indicates that these players have very similar anthropometric parameters and body composition, which is again, not surprising, considering that these three clubs are among the best in their countries. The concentration of the best soccer players in these three-member states of the southern region of the Balkan Peninsula is in these 3 clubs. The assumption is that the mean values of the analyzed variables in all of them should be the model values for the soccer players of other clubs.

Compared to all the participants in the 2018 World Soccer Championship, the average height of the players in these three countries is enough for their age. An official statistical data showed the average height in Russia 181.70 centimeters, while in Croatia league (183.60 cm), Germany (183.5 cm), Denmark (183.5 cm), Poland (183 cm).

Conclusion

The values obtained in this research can be useful for coaches of other clubs for making a comparisons and formulate their training in a way that enables reduction of those parameters that are not good, and raise those that are good to a higher level. That will surely make their soccer players even better and more successful. Also, soccer clubs in states of the southern region of the Balkan Peninsula should turn to other researches. They should check the functional-motoric status, psychological preparation as well as tactical training of their players and analyze whether there is a room for their improvement.

Conflicts of interest

The authors declare no conflict of interest.

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Information about the authors:

Gardasevic J.; (Corresponding author); <https://orcid.org/0000-0002-1387-1521>; jovan@ucg.ac.me; University of Montenegro; Cetinjski put 2, 81000, Podgorica, Montenegro.

Bjelica D.; <https://orcid.org/0000-0001-5272-528X>; dbjelica@ucg.ac.me; University of Montenegro; Cetinjski put 2, 81000, Niksic, Montenegro.

Vasiljevic I.; <https://orcid.org/0000-0001-9463-2532>; vasiljevic.ivan301@gmail.com; University of Montenegro; Cetinjski put 2, 81000, Niksic, Montenegro.

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Nonverbal communication of young players in team sports

Pop C.L.^{ABCDE}, Zamfir M.V.^{ABCDE}

Bucharest University of Economic Studies, Romania

Authors' Contribution: A –Study design; B –Data collection; C –Statistical analysis; D –Manuscript Preparation; E –Funds Collection.

Abstract

Purpose: Nonverbal communication is always present in sport teams' competition, on the court and around the court. This paper purpose is to investigate the nonverbal skills in two elite basketball cadet teams.

Material: Pursuing this goal, we applied the PONS test to a group of 38 young basketball players 15 –16-year-old: 20 girls and 18 boys. The teenagers were members of Romanian national cadet teams having at least 3 years up to 7 years of experience playing basketball. The test applied to this sample was The Profile of Nonverbal Sensitivity. The test results were statistically analysed aiming to evaluate the nonverbal decoding accuracy of each evaluated athlete and to identify the possible differences between the two teams: boys and girls.

Results: There is a statistically significant difference between the two teams in boys' favor, meaning that the girls have done lower average general scores. In decoding face cues both teams are almost equal, de difference relay on understanding the body movement and attitude.

Conclusions: Due the scores obtained by the tested players we can conclude that their nonverbal skills are at high level. Training nonverbal communication potentially enhanced game planning and building into the team a healthy psychological and social environment.

Keywords: Communication, teamwork, nonverbal sensitivity, basketball.

Introduction

Achieving a sport team goal relay on the cooperation with others towards a common goal. Sport team has all the characteristics of a small group: interaction, social structure (norms and rules), a common fate and a common purpose [1]. Teams in sports can have at least 2 members for table tennis or badminton, 3 for streetball, 5 for basketball, 6 for volleyball, 15 for rugby, up to 18 in Australian football teams. To achieve the game purpose, the cooperation with others is vital. The role of a sport team coach is to encourage the team members working together, teach social skills and strengthen team spirit.

During a game in a sport competition, the specific language is a code of visual and auditive gestures. The success is depending of the consolidated tactical teammates relations and synchronization of their actions. On the pressure of time and rapid development of the game, players must take tactical synchronized decisions [2]. In this context the nonverbal communication is prevalent because during the game, except the time outs, is no time for words. The connection between the teammates is meaningful in a social and occasionally in an emotional meaning too. Nonverbal communication usually carries more emotional meaning then words only. It was observed a prevalence of nonverbal communication in individual sports also. In athletics events for example, the athletes communicate nonverbally 52,14%, while coaches respond in 50,83% of cases with gestures and body movements [3].

Nonverbal communication is a code that has the advantage to be all known, can be delivered at long distance and understood 4.5 times more rapidly than verbal communication [4]. Nonverbal messages could

be encoded in gestures; eye contact; body movement like speed, direction, proximity or amplitude; attitude, body shape, facial expression; touching; etc. Mehrabian had stated that even 55% of the communication is happening via general body language [5]. Having such a wide range of signs and signals the channels that address nonverbal communication are, in fact, the five senses.

Due it's features the nonverbal communication is often present around the court not only on the court. The referee's signs and signals have meanings for competitors, coaches and audience whatever if they speak different languages [6]. Colors, numbers and marks also have significance in the convention of sport games.

The coach communication style, other than the verbal content, will determine the team working climate. An open climate will inspire trust, enjoyment and will support the athletes to maintain a good team spirit in training and competition [7]. A pleasant and supportive social environment will help sportsmen to take part enthusiastically in training sessions. Working in a friendly group, watching other people exercising, receiving constructive feed-back and assistance could motivate youngsters intrinsically to join and continue in a sport team [8].

Although the nonverbal communication is so present in sports teams training and competition, the phenomena received not enough attention. This paper purpose is to investigate the nonverbal skills in an elite basketball cadet team.

Material and methods.

Participants. Pursuing this goal, we applied the PONS test to a group of 38 young basketball players 15 –16-year-old: 20 girls and 18 boys. The teenagers were members of Romanian national cadet teams having at least 3 years up

to 7 years of experience playing basketball.

Research Design. The test applied to this sample was The Profile of Nonverbal Sensitivity –PONS test, translated and adapted in Romanian language. According to Ambady, La Plante, & Johnson, (2001) the PONS is useful in examining individual differences in interpersonal sensitivity as well as detecting differences in channels of communication [9].

Originally this test was designed to measure one's ability to decode nonverbal cues from the face, body, and voice [10, 11] and contained a sequence of 220 video images with sound. For our research purpose we chose one of the three short forms of the test consisting in 40 images of face and body without sound. The scenes were displayed on a screen for 3 seconds with 3 seconds break, used for choosing the correct answer from two possibilities. The answer sheet provides two possible answers reflecting an emotional state, and the participant selects what she or he believes is the most appropriate answer [12]. Each item was scored as correct or incorrect. The reference rank for nonverbal competence level is the following:

- under 20 points –low nonverbal competence;
- 20-25 points –average score;

- above 25 points –high nonverbal competence [13].

Statistical Analysis. The test results were statistically analysed aiming to evaluate the nonverbal decoding accuracy of each evaluated athlete and to identify the possible differences between the two teams: boys and girls. We used Microsoft Excel program for analyzing data and graphical representation.

Results

The scores obtained by the players in the research sample are mostly high. The average mark could be considered an exception in boys' sample; just one of 18, representing 5.6%, scored Average. In girls' case the Average mark appeared 4 time out of 20 tested subjects, representing 20%.

Girls' total mean score was 27.85 ± 2.71 . The sample homogeneity is high: $CV = 9.73\%$ having a narrow range meaning the mean value is informative. On the face images section girls scored 13.1 ± 1.68 while on body images they obtained as mean value 14.9 ± 1.89 .

Boys' total mean score was 29.5 ± 2.43 , higher than girls' results. The sample homogeneity is better: $CV = 8.23\%$ having also a narrow range meaning the mean

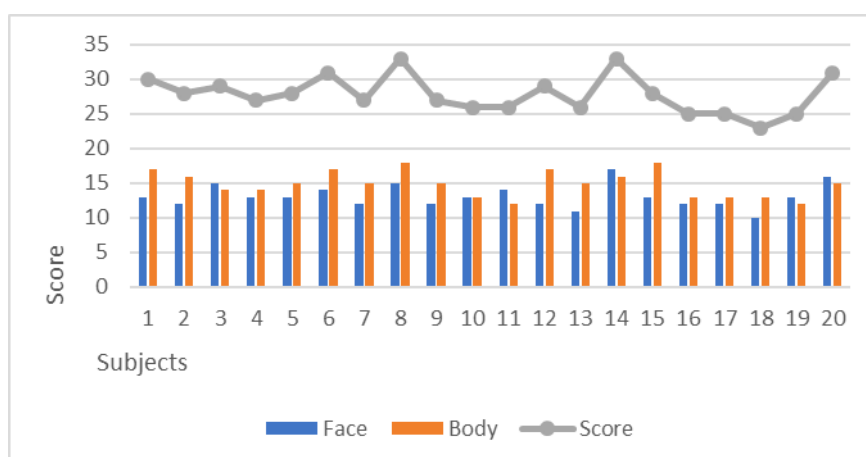


Fig. 1. PONS test results –girls' team

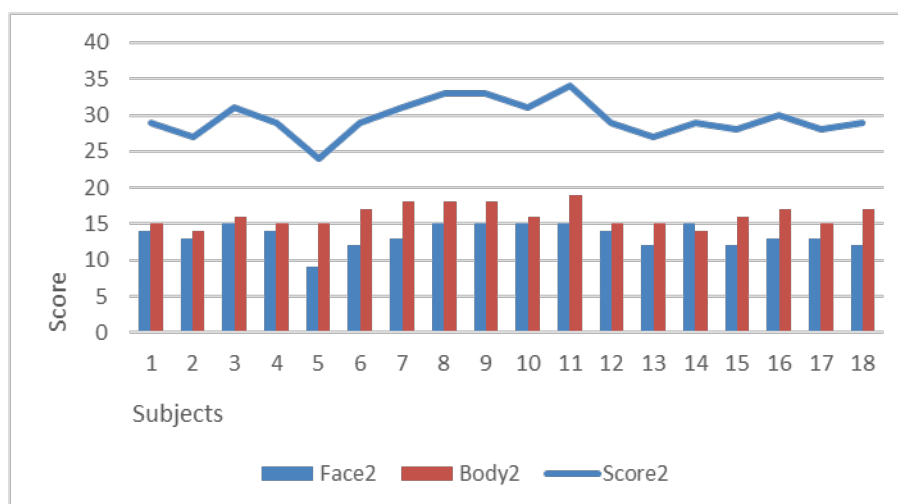


Fig. 2. PONS test results –boys' team

Table 1. Analysis of variance

ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	25.79211	1	25.79211	3.851963	0.057452	3.487303
Within Groups	241.05	36	6.695833			
Total	266.8421	37				

value is informative. On the face images section boys scored 13.4 ± 1.61 , slightly better than girls. In body images boys responded correctly in 16.1 ± 1.49 cases.

The difference in total score between the two teams was of 1.65 points. Using ANOVA single factor, we find a statistically significant difference between the two research groups in PONS total score in favor of boys: $F(1,36) = 3.85$, $p = 0.057$.

Discussions

Most athletes in our sample have proven a high nonverbal sensitivity. Twenty-one of twenty-four studies showed positive correlation between high score in PONS total score and several positive personality traits. Those who score higher in PONS seems to be more extraverted and popular, more interpersonally encouraging, less dogmatic and more interpersonally sensitive as judged by acquaintances and supervisors [14, 15]. All those traits are an advantage for a player in any team not only in sport teams.

The tested players are members of Romanian national cadet teams, presuming to have the proper skills for sport performance and being the best in their generation. One of the fewest study which evaluate nonverbal sensitivity in competitive sport performance states that winning players tend to score higher in PONS test. Comparing to the defeated athletes, the winning ones are more sensitive to nonverbal cues and their communication patterns are more homogenous and reliable [16].

A large body of evidence suggests that body language is under both conscious, deliberate control, and under unconscious, autonomous control. Contextual influences like score pressure, hostile supporters or fatigue could unbalance the nonverbal cues from conscious toward unconscious control [17, 18].

Studies has been equivocal with respect to gender differences in communication [19]. In our sample there is a significant difference between boys and girls. Although men and women are mostly similar in terms of nonverbal communication, gender seems to play a role in our social interactions. Women are used to reveal emotion through facial expressions more frequently and more accurately than men, while men are thought to hide

their emotions [20]. Although there is the stereotype that women communicate better, in our research case young men seems to read better body language and to be more sensitive to nonverbal cues.

Conclusions

Due the scores obtained by the tested players we can conclude that their nonverbal skills are at high level. There is a statistically significant difference between the two teams in boys' favor, meaning that the girls have done lower average general scores. In decoding face cues both teams are almost equal, de difference relay on understanding the body movement and attitude. In basketball, anticipating the opponent and teammates intentions are crucial to winning the ball and points. The anticipation of the next action is based on the understanding of the way and direction the observed body moves. Therefore, this specific PONS parameter has greater importance for a basketball player than the massages sent at face level.

In order to effectively solve the problems that may arise during a match, the basketball team resembles a well-regulated mechanism powered by subtle energy. That creative energy is expressed by a group whose strength and abilities are greater than the sum of individual qualities of team members. This synergy is based on each one's feeling of belonging to a team. The team is built on interpersonal relationships and team spirit develops through open and enhanced communication channels between teammates. Among those channels in sport teams, basketball in our study, the nonverbal communication plays a key role in solving common game tasks.

We consider PONS test a useful diagnose instrument for tactical training of young athletes in all team sports, not only in basketball. Nonverbal communication can no longer be ignored, it's components potentially enhanced communication and game planning aiming to build into the team a healthy psychological and social environment.

Conflict of interest

The authors have declared no conflict of interest.

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Information about the authors:

Pop C. L.; (Corresponding author); Professor PhD; <http://orcid.org/0000-0002-6445-8702>; crispotir@yahoo.com; Physical Education and Sport Department, Bucharest University of Economic Studies; No 6 Romana Square, Bucharest, Romania.

Zamfir M. V.; Assistant prof. PhD; <http://orcid.org/0000-0001-9422-6884>; crispotir@yahoo.com; Bucharest University of Economic Studies; No 6 Romana Square, Bucharest, Romania.

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Differences between morphological characteristics and motoric capabilities of physically active and inactive female students

Rašidagić F.^{1ABCDE}, Nurković N.^{1ACDE}, Imamović - Turković Dž.^{1ADE}, Hadžibulić – Nurković H.^{2CDE}, Nikšić E.^{3ABDCE}, Kapo A.^{3BCD}

¹Faculty of Sports and Physical Education, University of Sarajevo, Bosnia and Herzegovina

²Faculty of Natural Sciences and Mathematics, University of Sarajevo, Bosnia and Herzegovina

³Faculty of Education, University of Sarajevo, Bosnia and Herzegovina

Authors' Contribution: A – Study design; B – Data collection; C – Statistical analysis; D – Manuscript Preparation; E – Funds Collection.

Abstract

Purpose: This research was done as continuation of research made previously on male population. The goal of this research is to determine „differences between morphological characteristics and motoric capabilities of physically active and inactive female students“.

Material: Sample of physically inactive female students was made of 54 examinees and sample for active students was made of 52 girls. Average age was 12. All girls were primary school students. Physically inactive students regularly attended PE lessons and active students were involved in training process of basketball, volleyball, football and handball teams. Additional practice was done two times a week for 90 minutes. Morphological space is set by 15 variables and motoric space is set with 24 variables.

Results: Statistical difference was determined by T-test on level ($p < 0.05$). Significance given by T-test was checked by calculating Eta coefficient. Such data has differences in Chest Width (.00/.00 and $\eta^2 = 0.33$), Weight (.00/.00 and $\eta^2 = 0.34$), Stomach Skin Curves (.00/.00 and $\eta^2 = 0.37$) and Back Skin Curves (.05/.05 and $\eta^2 = 0.16$). Motoric space has differences in: Slalom with Three Medicine Balls (.00/.00 and $\eta^2 = 0.01$), Throwing medicine ball from the chest (.00/.00 and $\eta^2 = 0.10$), Long Jump (.00/.00 and $\eta^2 = 0.17$), Push-ups (.02/.02 and $\eta^2 = 0.05$), Sit-and-Reach (.04/.04 and $\eta^2 = 0.00$) and 20m low start run (.00/.00 and $\eta^2 = 0.14$).

Conclusions: After analysis it can be stated the aim of the research was completed and differences of anthropological status of physically active and inactive female students were determined. Students of age 12 can be recommended additional training activity to positively transform anthropological spaces with no transformation. Research with same or similar variables should be done on different age categories when compared to this one or to analyze quality of influence that specific sports have on transformation in this age category.

Keywords: primary school, additional sports activity, anthropological status, morphological characteristics and motoric capabilities.

Introduction

Research was done as continuation of already realized research with male population [1]. Given aim was to determine „differences between morphological characteristics and motoric capabilities of physically active and inactive female students“. Just like male population with same age characteristics it is determined that sedentary way of life causes different diseases. Besides, child develops system of values and learns about some valuable characteristics, positive ways of behavior and communication, changes and shapes life habits by doing sports activities. Also, several researches have shown that doing sports positively decreases number of delinquency [2]. To prevent the disease to happen, it is necessary that children are active at least 60 minutes a day with medium to energetic intensity [3, 4]. Additional negative effect for health is also the fact that when students finish their education so do they stop with process of exercises [5]. Estimated 70% of young people stops doing any kind of physical activity after they finish education. Data is confirmed by statistics done in USA where about 20 million children under the age of 14 does

some kind of sport but three of four children give up those activities when they hit puberty or the age of 15 at the latest [6]. Such data shows strong negative influence of sedentary way of life so it is recommended that children choose their sports activities individually and what interests them so they will be highly motivated to practice [7, 8]. According to some theoreticians, developing period of a 12-year-old is characterized by proportional emotional stability when compared to some other growing stages [9], so this life period should be properly used to promote and apply sports activities. Physically inactive female students have regularly attended PE lessons two times a week and those who were physically active had additional training activities outside of school also two times a week. Activities lasted for 90 minutes and selected sports were basketball, volleyball, handball and football. Since physically active students practice 4 times a week it is assumed their anthropological status is on higher development level than inactive students who practice 2 times a week [10, 11]. For a student to be considered as athlete it is necessary to spend one year in training process. Students who participated in research are the same age so result of morphological and motoric transformation status can be a cause of ergogenic factors

that is transformational processes which are result of sports clubs training [12]. Results of this research should determine higher level of morphological and motoric status development for physically active students and confirm increased movement activity which positively affects transformation of morphological characteristics and motoric capabilities. Research like this is important since it finds out different ways to increase movement activities of female students and decreases negative effects of sedentary way of life [13].

Material and Methods

Participants

Examinee sample are primary school girls from the area of Srednjobosanski Canton in Bosnia and Herzegovina. Average age is 12 years $\pm$ 11 months. There were $N=54$ of physically inactive female students. $N=52$ is the number of physically active female students. According to Helsinki Measuring and Testing Propositions, student, parent and teacher permissions were given to do this tests. Only students who were completely healthy during the research could participate. Students could leave the research at any time.

Research Desing

Variables of morphological status are gathered in a way described by authors Šoše, & Rađo [14] and measured: Body Height (VIST), Arm Length (DUZRUK), Leg Length (DUZNOG), Shoulders Width (SIRRAM), Pelvic Width (SIRKARL), Hand Width (SIRSAK), Foot Width (SIRSTOP), Middle Size of Chest (OBGRU), Size above knee (OBNTK), Size above elbow (OBNDL), Back Skin Curves (NBLED), Stomach Skin Curves (NBTRB), Above Elbow Curves (NBNDL), Above Knee Curves (NBNTK), Body Mass (MASTJ).

Variables of morphological status are gathered in a way described by authors Drljačić et al. [15] and Mikić [16] and measured: Bat Coordination (KOOPAL), Slalom with three medicine balls (SLA3MED), Low Eights (OSMSAG), Throwing medicine ball from laying position (BACMED), Long Jump (SKOKDAL), 20m running (TRC20M), Leg Tapping (TAPNOG), Leg Tapping against the Wall (TAPNOGZ), Hand Tapping (TAPRUK), Push-ups on Loom (SKLEK), Sit-ups (LEZSJED), Deep Sit-ups with Pressure (CUCANJ), Standing on one leg on a bench with open eyes (OTVOCIUZ), Standing on one leg on a bench with closed eyes (ZATVOCIPOP), Standing on one leg on a balance bench with closed eyes (ZATVOCIUZ), Aiming with long stick (CILJDUGST), Leg pointing to vertical aim (CILJVERT), Hand pointing to horizontal aim (CILJHOR), Bat Turn (ISKRPAL), Laying on chest throw (ZANLEZGRU), Deep carry on bench (PRETKL), 20m running from high start (TRCVISST), 20m running from laying start (TRCLEZST), 20m running from flying start (TRCLETZST).

Statistical Analysis

Gathered data was analyzed in SPSS 22 program with license from Faculty of Sports and Physical Education, University of Sarajevo. Difference between groups was determined with T-test for independent

samples on statistical significance level $P < 0.05$. Values above stated ones were not considered as statistically relevant. Significance of T-test up to 0.05 was checked by calculating eta coefficient about variant coverage between group results. Calculating of eta coefficient (η^2) was done according to Cohen, [17] and Kolesarić, & Tomašić-Humer, [18]: .01 – high coverage; .06 – medium coverage; .13 – small coverage of variant.

Results

Taking into consideration statistical indicators, one must state that results show only variables where there is clear descriptive statistical difference. Variables are additionally marked with number 1 of inactive students group whereas variable under number 2 (Table 1) are for active athletes group. Presented variables are normally distributed and suitable for further analysis. Table 1 shows that minimum and maximum group results have appropriate differences. Chest size in minimal ($62 > 58.2$) and maximum ($86.1 > 79.2$) result is higher on athletes while weight is lower ($\text{min.}30 < 31.2$ and $43.4 < 45.3$) which can indicate „athletic body construction of this group “. Two measures of skin fat mass are also lower on athletes (NBTRB min. $1.0 < 2.0$ and NBTRB max. $9.0 < 15.0$, NBLED min. $1.0 = 1.0$ and NBLED max. $13.0 < 17.0$). When it comes to variables of motoric space, all variables presented by time component are „opposite “values and are lower in group of athletes which in this case is better result (SLA3MEDmin $20.5 < 22.5$, SLA3MEDmax $42.3 < 54.3$, TRC20min $4.1 < 4.2$, TRC20max $5.3 < 6.6$).

When morphological variables that had descriptive statistical difference were analyzed by T-test, four of them had differences. Those variables are: OBGK whose result relation in Standard Deviation are: $5.920/5.614$ (Table 2) and do not exceed relation 1:1.5. Value Sig2 is .000/.000 with significant difference between results. Sig1 value .637 assumes difference between group results which confirms calculated eta coefficient .033. Variant coverage is small – results are different.

TEZ results in Standard Deviation ($13.09/9.09$) do not exceed relations 1:1.5. Values Sig2: .000/.000 indicate there is a difference between groups. Sig1 value .637 indicates that group results are not homogenous. After checking variant coverage of eta coefficient $\eta^2 = .034$ it can be stated that there is a small variant coverage and big difference in weight measures.

NBTRB in Standard Deviation ($1.857/2.994$) does not exceed relations 1:1.5 and shows homogenous results in groups and confirms normal distribution of results. Results Sig2 value: .000/.000 indicate there is a difference between results. However, Sig1 value (.002) is somewhat higher than first two variables and is closer to limit of T-test significance. Checking results by calculating eta coefficient ($\eta^2 = .037$) makes us state low coverage of variants and one can confirm significance of T-test differences for this variable.

NBLED in Standard Deviation ($2.696/3.836$) exceeds relations 1:2. Data shows that measured group results are

Table 1. Descriptive Statistics

Variables	N	Minimum	Maximum	Mean	Std. Deviation	Std. Error Mean
OBGK1	54	58.2	79.2	68.66	5.614	.778
OBGK2	52	62.0	86.1	74.42	5.920	.805
TEZ1	54	31,2	45,3	38,25	9.09	2,49
TEZ2	52	30.0	43,4	36,72	13.09	2.50
NBTRB1	54	2.0	15.0	7.32	2.994	.415
NBTRB2	52	1.0	9.0	4.59	1.857	.252
NBLED1	54	1.0	17.0	5.64	3.836	.532
NBLED2	52	1.0	13.0	5.44	2.699	.367
SLA3MED1	54	22.5	54.3	33.15	6.381	.884
SLA3MED2	52	20.5	42.3	32.07	5.095	.693
BACMED1	54	175.0	320.0	219.17	38.241	5.204
BACMED2	52	210.0	347.0	243.59	44.755	6.206
SKOKD1	54	127.0	170.0	144.61	9.325	1.293
SKOKD2	52	129.0	180.0	151.55	12.289	1.672
SKLEK1	54	1.0	19.0	10.09	3.846	1.213
SKLEK2	52	5.0	21.0	14.09	3.722	1.506
LEZSJED1	54	10.0	28.0	20.51	3.468	.4720
LEZSJED2	52	14.0	31.0	22.63	3.597	.4989
TRC201	54	4.2	6.6	4.78	.294	.0401
TRC202	52	4.1	5.3	4.96	.336	.0467

Table 2. Morphological Characteristics, T-test for Independent Groups

VAR	F	Sig 1	t	df	Sig 2	eta η^2	Mean	Std Error	95% Low	Upp
OBGK	.224	.637	5.131	104	.000	0,33	5.754	1.121	1.387	3.925
			5.136	103.97	.000		5.754	1.120	1.120	3.533
TEZ	.224	.637	5.216	104	.000	0,34	5.874	1.226	1.136	10.34
			5.147	101.77	.000		5.854	1.304	.963	10.31
NBTRB	9.71	.002	-5.67	104	.000	0,37	-2.736	.482	-3.692	-1.780
			-5.62	84.595	.000		-2.736	.486	-3.702	-1.769
NBLED	3.774	.055	.320	104	.057	0,16	.2058.	.642	-1.068	1.479
			.318	91.261	.051		.2257	.646	-1.078	1.490

not homogenous. Values Sig2 .057/.051 indicate there is a significant difference between results. Sig1 value is .055 so one can assume that difference will be confirmed by T-test. Additional calculating of eta coefficient $\eta^2 = .16$ confirmed border value about difference in variant coverage. However, it can be stated that present values go in favour of athlete female students for this variant.

T-test has shown that motoric capabilities have statistically significant difference in six variables: SLAL3MED that in Standard Deviation (Table 3) 5.095/6.381 exceeds relation 1:3. Data shows higher difference in result variants and they are not homogenous. Values Sig2 .033/.033 in Table 3 show difference between groups and are confirmed after insight in Sig1 .174. Checking coverage of variant with eta=0.01 confirmed high coverage of results. Results between groups are not

different.

BACMED in Standard Deviation is 38.241/44.755 and does not exceed values 1:1,5. Data shows low result coverage. Values Sig2 .003/.003 and Sig1 .986 show statistical significance of differences. By calculating eta coefficient $\eta^2 = 0.14$ border low result coverage between groups is confirmed so the result is better for athlete female students.

SKOKD in Standard Deviation is 12.289/9.325 and does not exceed values 1:1,5 so group results are confirmed. Values Sig2: .001/.001 and Sig1: .056 show statistically significant differences between group results. Calculating eta coefficient $\eta^2 = .17$ confirms low results coverage which shows that **SKOKD** is better realized within athlete female students.

SKLEK in Standard Deviation is (3.722/3.846) and

Table 3. Motoric Capabilities, T-test for Independent Groups

VAR	F	Sig 1	t	df	Sig 2	eta η^2	Mean	Std Error	95% Low	Upp
SLA3MED	1.878	.174	-.964	104	.033	0.01	-1.07	1.119	-3.299	1.140
			-.960	97.48	.033		-1.07	1.124	-3.310	1.151
BACMED	.000	.986	3.024	104	.003	0,14	24.41	8.075	8.405	40.43
			3.015	100.24	.003		24.41	8.099	8.350	40.48
SKOKD	3.745	.056	3.326	104	.001	0,17	7.066	2.125	2.852	11.28
			3.343	98.66	.001		7.066	2.114	2.871	11.26
SKLEK	5.11	0.14	2.32	104	.021	0.05	4.99	2.32	.5386	5.45
			1.10	91.12	.022		4.31	2.12	.5366	5.45
LEZSJED	.012	.911	-.169	104	.048	0.00	-.1161	.6863	-1.47	1.24
			-.163	103.423	.046		-.1341	.6525	-1.47	1.24
TRC20	.110	.741	-2.93	104	.004	0,14	-.1801	.0614	-.301	-.058
			-2.92	101.04	.004		-.1925	.0615	-.302	-.058

does not exceed relations 1:1,5. Data shows group results in both samples. Sig2 .021/.021 and Sig1 0.14 show significant difference between groups and low coverage of variant. Additional checking of $\eta^2=0.05$ confirmed medium to high result coverage and it can be stated they are not significantly different.

LEZSJED in Standard Deviation is (3.468/3.597) and has concentrated result relation in groups (1:1,5). Value Sig2 .048/.046 shows statistical difference between groups. Sig1 value is .911 and eta coefficient is $\eta^2=0.00$ which shows high result coverage and confirms small significance of differences given by T-test.

TRC20 in Standard Deviation (.294/.336) has values 1:1,5 that is there are group results within groups. Values (Table 4.) Sig2 .004/.004 show there is difference between results. Sig1 value is .741 so it is assumed that T-test is not so statistically significant and there is result coverage. This is confirmed by calculating eta coefficient $\eta^2=0.14$ which shows small difference between results.

Discussion

Numerous researches have established that additional movement activity affects more developed anthropological status [19, 20, 1, 21]. Second important factor is cognitive readiness and child's capability to understand reasons why sport is important which is a characteristic of a 12-year-old population [22]. Because of that, determining influences of additional movement activity on anthropological status transformation of primary school female students is organized and this research was done.

Difference between anthropological statuses was checked for morphological characteristics and motoric capabilities. Even though large number of morphological variables was examined – 15 to be exact, after final T-test determination and calculation of eta coefficient, this research presented only four of them. Given procedure was done since there was a difference shown by T-test and additionally checked by calculating eta coefficient for each of above mentioned variables. Only variables with

low result coverage and high eta coefficient (η^2) were accepted as significantly different. Such criteria were insisted upon because values of T-test have been set on border level ($p < 0.05$).

Morphological characteristics checked by T-test have shown differences in: Chest Size (OBGK), Weight (TEZ), Stomach Skin Curves (NBTRB) and Back Skin Curves (NBLED). Everything indicates that additional sports activity realized through training process of games has influence on lower body weight and less skin fat tissue on female athletes (Witt and co. 2005). This data is not so important for back skin curves which is surprising since other variables should be significantly lower on female athletes. Given result is not in accordance with research results done by [23, 24, 25].

Same work methods were applied on motoric capabilities as well as morphological characteristics when it comes to result representation in this research. T-test has shown significant development in six variables: SLA3MED, BACMED, SKOKD, SKLEK, LEZSJED and TRC20. To check significant difference given by T-test, variant coverage for each of these variables was done. Variables with low result coverage have been accepted as significantly different. It can be stated that three variables had low result coverage that is eta coefficient was calculated (η^2). Throwing medicine ball from chest (BACMED), Long jump (SKOKD) and 20m running from low start (TRC20) are better developed on athlete female students. The rest of the variables in motoric space do not show statistically significant difference. Given results are in accordance with research done by [26, 27] as well as research by authors Đukić, et al. [28] and Vrbik, et al. [29]. Thanks to additional sports activity of two times a week per 90 minutes, female active athletes have had certain transformation of motoric and morphological status. However, it can be stated because of calculated eta coefficients that there was bigger transformation on morphological characteristics [30, 31]. Also, one can claim that research aim was completed and „differences

between morphological characteristics and motoric capabilities of physically active and inactive female students” were determined. Weakness of this research can be seen in the absence of insight into adjustment of training activities to age group of examinees in this research. Students should give additional data about their nutrition and free time movement. Research could be organized and done on different age or sex categories and all given data would give additional knowledge about existence of determined differences.

Conclusion

Thanks to additional sports activity of two times a week per 90 minutes, female active athletes have had certain transformation of motoric and morphological status. However, it can be stated because of calculated eta coefficients that there was bigger transformation on morphological characteristics. Also, one can claim that

research aim was completed and „differences between morphological characteristics and motoric capabilities of physically active and inactive female students” were determined. Weakness of this research can be seen in the absence of insight into adjustment of training activities to age group of examinees in this research. Students should give additional data about their nutrition and free time movement. Research could be organized and done on different age or sex categories and all given data would give additional knowledge about existence of determined differences.

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Conflicts of Interest

The authors declare no conflict of interest.

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Information about the authors:

Rašidagić F.; <http://orcid.org/0000-0002-1153-5719>; faris.rasidagic@gmail.com; Faculty of Physical Education and Sport, University of Sarajevo; 71000 Sarajevo, Bosnia and Herzegovina.

Nurković N.; <http://orcid.org/0000-0002-8705-4217>; n.nurkovic@gmail.com; Faculty of Physical Education and Sport, University of Sarajevo; 71000 Sarajevo, Bosnia and Herzegovina.

Imamović-Turković DŽ.; <http://orcid.org/0000-0001-8348-8053>; imamovicdzenana@gmail.com; Faculty of Physical Education and Sport, University of Sarajevo; 71000 Sarajevo, Bosnia and Herzegovina.

Hadžibulić-Nurković H.; <http://orcid.org/0000-0001-8098-9880>; 1512hana@gmail.com; Faculty of Natural Sciences and Mathematics, University of Sarajevo; 71000 Sarajevo, Bosnia and Herzegovina.

Nikšić E.; (Corresponding author); <http://orcid.org/0000-0002-1849-9693>; elvira.beganovic1982@gmail.com; Faculty of Education Science, University of Sarajevo; 71000 Sarajevo, Bosnia and Herzegovina.

Kapo A.; <http://orcid.org/0000-0002-7865-806X>; anida.kapo2@gmail.com; Faculty of Education Science, University of Sarajevo; 71000 Sarajevo, Bosnia and Herzegovina.

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Analysis and generalization of competitive activity results of handball clubs in the game development aspect

Solovey O. M.^{1ABCD E}, Mitova O.O.^{1BCDE}, Solovey D.O.^{1BCDE}, Boguslavskiy V.V.^{2BCDE}, Ivchenko O.M.^{2BCDE}

¹*Prydniprovsk State Academy of Physical Culture and Sports, Ukraine*

²*Dnipropetrovsk State University of Internal Affairs, Ukraine*

Authors' Contribution:

A - Study design; B - Data collection; C - Statistical analysis; D - Manuscript Preparation; E-Funds Collection.

Abstract

Purpose: an analysis of the competitive activity of men's club handball teams in the final tournament of the European Champions and Champions League Cup gives you the opportunity to determine the rating of the teams on the continent and the development tendencies of the game.

Material: the best men's handball clubs from 52 national federations in Europe which competed in the qualifying tournament and the group stages of the draw and were the winners and prize winners of the European Champions and Champions League Cup of 1956/1957-2017/2018. A systematic review of the available qualitative literature was conducted according to Preferred Reporting Items for Systematic reviews. The "Web of Science", "Physical Education Index (ProQuest)", "Google Scholar" and "Scientific Periodicals Ukraine" databases were used in order to ensure, from an early stage, the scientific quality of the revised studies. The research was conducted based on 'any field' (e.g. title, abstract, text) and no restrictions were made regarding the language of publication. The terms used in the research were "teams scoring performance", "elite handball", "game location", "players exclusions", "home advantage", "quality", "opposition", and "indicators". The quality of the articles was assessed by a set of criteria developed by members of the Evidence for Policy and Practice Information and other specialists. The initial search found 132 journal articles; for a final list of 52 publications.

Results: The article covers the organizational aspects of the competitive activity of men's handball clubs in Europe at the European Champions and Champions League tournaments from 1956 to 2018. The given analysis of the highest achievements of the leading handball clubs which are not only winners and prize winners, but also the countries that they represented. The winners and prize winners are marked both between teams of different countries and teams of one country.

Conclusions: Achievements and rankings of the leading handball clubs in the international arena are the main components of preparing them for official competitions: new approaches to planning the preparation of players and teams for higher sports achievements and maximum realization of individual opportunities; the integration of the individual readiness of highly skilled handball players into leading handball clubs; to the important aspects of the new rules of the game, which are developed in the theory and implemented in practice; the main tendencies in the international and European handball that systematically develop and apply to a core of players as well as the next reserve.

Keywords: handball, cup tournaments, competitive activity, team-winners, handball leaders.

Introduction

The modern handball is characterized by a high degree of competition of leading world teams both at the level of national teams and club teams. This situation contributes to the increase in the level of athletic skill of individual players and teams in general [1-4]. Every year handball is becoming more and more popular. The Olympic Games, World and European Championships, European club cups and other types of competitions are regularly held [5-8].

The current tendencies in handball development make it possible for specialists to state that not just the best team but the team that is better prepared for specific official games usually wins. It's not about the tactics of a game that coaches play in teams, but in philosophy, in the fantastic atmosphere they create in teams [9-14]. Each coach deserves recognition, they perform incredible work in teams and this is the reflection of their character, their fighting spirit. Over the years, scientists and coaches have been trying to anticipate these trends and factors that

influence the effectiveness of competitive activity [15-18]. Taking into account the technical and tactical indicators of the best handball players in competitions of various rank, it becomes clear that the issue of management of training and competition processes to a large extent determines the effectiveness of technical and tactical activity and the ability to achieve a high sporting result [19-22]. It is believed among many scholars [23-26] that sporting results are an integral indicator of athletes' preparedness. In our opinion, it also has a connection with the system of training. Male sportsmen played the 58-th finals and the 24th after the European Champions Cup was renamed into the Champions League [6, 27-30]. However, the most prestigious club tournament under the auspices of the European Handball Federation (EHF) is worth telling more about it. The turning point in the development of the tournament is the 1993/1994 season, when the Champions League of the European Handball Federation was created instead of the European Champions Cup. Now the group stage is added to the stages of the playoffs. The number of its participating teams increased to 28 teams over the time

[6, 13, 28, 31, 32].

Research hypothesis. The systematization of the results of the competitive activity of men's handball clubs will provide new knowledge about the distribution of handball leaders, the place of various handball schools in the European ranking, which will help to find new approaches to planning the preparation of players and teams to higher sports achievements, forecasting the results of competitions, the selection of players in the teams, etc.

The aim of the research is to analyze the involvement of male handball club teams in the final tournament of the European Champions and Champions League Cup and to determine the tendencies of the game.

Materials & methods

Data sources.

The best men's handball clubs from 52 national federations of European countries, who passed the qualifying tournament for the group stage of the European Champion and Champions League Championship 1956/1957-2017/2018, and won the prestigious trophy, were analyzed.

Search procedures and criteria

A systematic review of the available qualitative literature was conducted according to Preferred Reporting Items for Systematic reviews. The "Web of Science", "Physical Education Index (ProQuest)", "Google Scholar" and "Scientific Periodicals Ukraine" [33] databases were used in order to ensure, from an early stage, the scientific quality of the revised studies. The research was conducted based on 'any field' (e.g. title, abstract, text) and no restrictions were made regarding the language of publication. The terms used in the research were "teams scoring performance", "elite handball", "game location", "players exclusions", "home advantage", "quality", "opposition", and "indicators". The quality of the articles was assessed by a set of criteria developed by members of the Evidence for Policy and Practice Information [34] and other specialists [35]. The initial search found 132 journal articles; for a final list of 52 publications. Data search was carried out using protocols that are on the Internet at the European Handball Federation (EHF) website, the participation of handball clubs in the tournaments, their victories and defeats. Pedagogical analysis of the participation of handball clubs in Europe was conducted on the basis of official data of the final tournaments of the European Champions Cup (1956 - 1992/1993) and the Champions League (1993/94 - 2017/18) of the EHF, presented winners and finalists both among teams from different countries and one country.

Research methods. Theoretical analysis and generalization of scientific-methodical literature and technical protocols in the Internet; method of system analysis; chronological method. The study of scientific and methodological literature allowed to formulate the problem, to determine the degree of relevance of issues that were solved during the research, to substantiate theoretically the purpose and objectives of the work.

Statistical analysis. Descriptive statistics were used for the statistical analysis of the survey. The mathematical statistics were carried out by the method of calculating the quantitative indicators of the participation of handball clubs in the Cup of European Champions and League of Europe as well as between clubs of different countries.

Results

To improve the effectiveness of handball management internationally, all national federations are geographically united into five continental federations. The new rise in the development of handball began with the creation of the new European Handball Federation - EHF in Berlin (Germany) in November 1991 and it included in its membership 29 national European associations that were members of the International Handball Federation (IHF). Nowadays the European Federation has 52 national federations, of which 3 are members of the EHF with the rights of associate members, namely England, Kosovo and Scotland. The European Handball Federation represents the International Handball Federation in European countries [6, 28, 29, 36]. The European Handball Club Tournaments which were previously held under the auspices of the International Handball Federation, have since moved under the jurisdiction of the EHF since 1993. So, under the auspices of the EGF are the following: official European championships representing the Olympic sport and club competitions representing a professional (commercial) sport. It should be noted that holding cup tournaments is characteristic only for the continental level [6, 28, 31, 37].

As part of its activity the European Handball Federation is responsible for conducting European tournaments for men's and women's club teams (Champions League EHF, EHF Cup Winners' Cup, European Handball Federation Cup (since 2012, men's tournaments of the Cup Winners' Cup and the EHF Cup are combined into one tournament - EHF Cup), EHF Challenge Cup) annually. The Champions League is the largest competition for handball clubs in Europe. The tournament, which until the 1993/94 season was called the European Championship Cup, is held annually by the International Handball Federation (IHF) since 1956 for men's teams and since 1961 for women's teams. Currently, it is held under the auspices of the European Handball Federation (EHF). Between 1956 and 2019, 59 European tournaments were held, including 33 European Champions Cup and 26 Champions League tournaments, in which male handball clubs of 52 national federations participated in various stages of the draw. In the European Champions Cup and Champions League there are teams from 27 countries with the highest club rating. The tournament takes place in several stages (preliminary round, qualification, group stage, play-offs, final four). In the finals of the prestigious trophy of Europe, 52 handball clubs from 19 national federations participated and only 33 clubs from 15 countries celebrated victories and 39 clubs from 17 European countries were defeated in the finals. The first draw of the Cup involved 12 teams representing the great cities of Europe. The finals with

the participation of Czechoslovak handball players from Prague and the Swedish champions from Orebro took place on March 9, 1957 in Paris, and brought the victory to the Prague team - 21:13, which became the first winner of the tournament.

From the next draw in the tournament only club teams - champions of their countries began to participate. The finals from the 1956/57 seasons to 1977/78 took place in one game, from the seasons 1978/79 to 2008/09 - in two games, and from the 2009/10 season - again in one game. One final of the 1983-84 season determined the winner between teams of Dukla (Czechoslovakia) and Metaloplastika (Yugoslavia) with a series of 7-meter throws, as each of the teams at their site won the same score - 21:17, and on the 7-meter throws Czechoslovak handball players won.

An analysis of the achievements of leading winning countries shows that German clubs are historically dominated in men's tournaments. So, 13 clubs won 19 victories and lost 12 in the finals: according to the Federal Republic of Germany - 4 clubs, 8 wins and 3 defeats, GDR - 5-3-2, from the 1992/93 season Germany - 5-6-7). From the 1989/90 season, the championship in the ranking was headed by Spanish clubs (6 clubs won 15 victories and defeated in 12 finals, with only one lost final before this - Atlético (Madrid) season 1984/85) (tab. 1).

It is worth noting that one of the most interesting cases of handball clubs in these countries is that most of the finals of the prestigious tournament they played between clubs of one country or between clubs of these countries. The competitors for German and Spanish clubs were and still are handball clubs of the USSR (3 clubs won 5 victories and 3 finals lost), Yugoslavia (respectively 6 - 4 and 7), Czechoslovakia (2 - 3 - 2), Romania (2-3-3), France (3 - 2 - 2), Croatia (1 - 2 - 4), Macedonia (1 - 2-0). One champion's trophy was won by Slovenian clubs (1 - 1-0), Hungary (2-1-4), Sweden (1 - 1-0), Poland (3-1-3). Handball clubs in 4 other European countries played in the Champions Cup finals, Denmark (2 clubs were finalists), Iceland, Portugal and Switzerland lost in one final. 13 German handball clubs won in 19 finals and defeated in 12 finals, of which 4 were purely German (1970, 1979, 2007, 2014), 6 finals played between German and Spanish clubs (which won three club victories of each of the countries), 4 - Yugoslav clubs (3 victories and 1 defeat), 3 - clubs of the USSR (2-1), 2 - Hungarian clubs (2-0). There should be noted the victories of German clubs over the clubs of Denmark (1960), Czechoslovakia (1967), Romania (1971), Poland (1978) and Iceland (1980), as well as the defeat of the clubs of Sweden (1959), Croatia (1993) and Slovenia (2004). Six Spanish handball clubs in the 15 finals were stronger than their opponents, 12 finals were lost. Spanish clubs were played in 22 finals, of which 5 were purely Spanish (1996, 2001, 2005, 2006, 2011). The Spanish clubs were stronger than the clubs of six European countries, primarily the clubs of Yugoslavia (1991), Portugal (1994), Croatia (1995, 1997-1999), Germany (2000, 2008, 2009), Hungary (2015) and lost

to the clubs of Yugoslavia (1985), USSR (1990), Croatia (1992), France (2003) and Germany (2010, 2012, 2013).

To a large extent, the European Champions Cup (Champions League) can safely be called the Spanish "Barcelona" tournament; at least Spanish clubs are always considered favorites. Spanish "Barcelona" is the undisputed leader in the European handball to gain honorary trophies. Starting from the 1990/91 season, "Barcelona" handball players won 9 Champions Cup and Champions League titles (1991, 1996-2000, 2005, 2011, 2015), moreover, from the 1995/1996 season to 1999/2000 for five consecutive seasons the cup remained in the hands of Spanish athletes. In four finals handball players of "Barcelona" suffered defeats from their opponents: SKA (USSR) - 1990; Portland San Antonio (Spain) - 2001; Kiel (Germany) - 2010; Hamburg (Germany) - 2013. "Barcelona" handball players always behave as hosts on the court, dominating from the first until the last minute. Even if the matches were equal, psychological advantage was entirely on the side of the Catalans. German club "Gummersbach" took part in 6 finals and won 5 Champions Cups (1967, 1970, 1971, 1974, 1983), handball players of the German club "Kiel" won 3 Champions League Cups in 7 finals (2007, 2010, 2012), the Spanish "Ciudad Real" - 3 in 5 finals (2006, 2008-2009), the German "Magdeburg" - 3 in 4 finals (1978, 1981, 2002), Croatian «Zagreb» - 2 in 6 finals (1992-1993).

100% of the participation in the prestigious handball tournament competitions belongs to the handball players of the SCA (Minsk, USSR) - 1987, 1989, 1990, and Montpellier (France) - 2003, 2018, which won all the matches against their opponents. The analysis of the final matches between clubs from different countries shows that German clubs met six times in the finals with the clubs of Spain and shared all the victories equally - won 3 times in each country (German clubs "Kiel" - 2010, 2012, "Hamburg" - 2013 and Spanish "Barcelona" - 2000, "Ciudad Real" - 2008-2009). Clubs of Spain and Croatia have met five times in Champions Cup and Champions League finals. In 4 finals, the Spanish handball players (Zagreb defeated Bidasoa 1995 and Barcelona, 1997-1999) were stronger, and in 1 final, the Croatian Zagreb won the Cantabrian club (1992). In the three finals handball players from the clubs of Germany and the Soviet Union played, the German clubs that won 2 European Championship Cups (1974, 1983) and 1 lost (1988) were stronger.

It should be noted that the handball clubs of Romania (1977) and the Soviet Union (1989), as well as the clubs of Czechoslovakia (1963) and Romania (1968), played twice in the finals with each other and won one victory. Historical events, namely the results of the participation of the best handball clubs of different years in the competitions of the European Cup, contributed to the scientific methodical literature, enriched the knowledge of specialists in the field of physical culture and sports, fans of handball.

Table 1. Results of the participation of handball clubs of European countries in the finals of the Champions Cup and Champions League EHF

defeated clubs															
winner clubs	Czechoslovakia	Sweden	Germany	Denmark	Yugoslavia	Romania	Hungary	Czechoslovakia	USSR	Poland	Iceland	Spain	Portugal	Croatia	France
Czechoslovakia	1957				1984	1963									
Sweden		1959													
Germany		1970	1960	1962	1971	1966	1967	1974	1978	1980	2010	2012	2013		
		1979		1975		2002		1983							
		2007		1981											
		2014													
Romania					1965			1968	1977						
Yugoslavia		1972	1976						1986			1985			
USSR		1988			1973	1989			1987			1990			
Spain		2000			1991		2015					1996	1994	1995	
		2008										2001		1997	
		2009										2005		1998	
												2006		1999	
												2011			
Croatia		1993										1992			
France												2003			2018
Slovenia		2004													
Poland							2016								
Macedonia							2019							2017	

Discussion.

Competitive process is constantly progressing, the number of competitions among handball clubs and at the level of national teams of these countries is growing every year, the sports qualification of participants of such competitions is constantly increasing. The game of handball teams, both foreign clubs and domestic ones, is built not only around experienced stars. Any club, if it wants to be entrenched in the elite firmly and for a long time, should focus on the preparation of its own reserve [38-41]. The foregoing determines the peculiarities of conducting a training process, the sole purpose of which is to achieve a positive result in the competitions. The focus and content of the training of handball players in clubs is as follows: athletic training of players, based on the ability to perform actions of speed-force character, that is, martial arts; group interactions that determine the minimum of improvisation and acceptance of mostly simple decisions; and actually a team game in general. Problems of increasing the athletic skill of handball players are significant in the current conditions of sports development of higher achievements. Competition and social significance of games, victories and achievements of leading teams in official prestigious tournaments are increasing.

Over the past 20 years, in the competition between the clubs of the five largest European handball leagues (the Bundesliga - Germany, the Premier League - Spain, the First Division of the National Handball League - France, the Superleague - Macedonia, the Polish Handball Cup - Poland) there has been evident a sharp distinction in the development of club handball [5, 39, 40, 42]. Successful clubs get bonuses that are getting bigger. At the same time, several leading handball clubs, thanks to big profits, increase the gap from other clubs of European countries, namely Vive Kielce (Poland), PSG, Nantes (France), Barcelona (Spain), Flensburg-Kandevitt, Kiel (Germany), Veszprém, Szeged (Hungary), Vardar (Macedonia). This allows them to strengthen competitive positions in sport, increasing the likelihood of new success. The general trend in the development of an international club handball is the movement of handball players to handball clubs where there are strong national championships for the purpose of participating in official international tournaments, gaining competitive experience of the corresponding level, as well as the desire to improve living conditions. They are the leaders of their national teams and successfully perform their duties in club level competitions.

In addition, the presence of a contract with professional clubs of European countries with a high level of handball development (Spain, Germany, France) is important for a successful professional career of highly skilled handball players. Highly skilled handball players are moving to handball clubs from other countries into strong clubs because their clubs at home have a shortage of investment in sport, planning and infrastructure. And as long as it continues, the leadership must accompany the athletes as best as possible, listening to their needs and working for their development.

As Mats Olsson, a well-known specialist in the training of goalkeepers from Norway and Sweden, says that today the game of the goalkeepers of the leading handball clubs has a major role. He introduces a new four-stage method of training goalkeepers. The most important module of his method is the training of the ability of the goalkeepers to "read" all the relevant gaming situations [5, 28, 40, 43]. In the German Bundesliga, in recent years, Michael Bigler has developed a method of "training force pressure" - an innovative approach to defence training to better meet the current complex defensive requirements of competitive handball games, including training with protective pressure and training with attacking pressure [28, 31, 44, 45]. Allan Quintallet, Coach for Physical Training, has made a significant contribution to the achievement of handball players in France. Based on an analysis of the current sports requirements of competing handball activity, he uses the training of explosive gaming activities that are often encountered in the game [27, 31, 39, 46]. An in-depth analysis of the final matches of the Champions League Men's Cup Championship shows how the winning teams tactfully implement the improved option of replacing the goalkeeper with an extra field player.

The game continues with fast breaks against the rearrangement of protection, which is an important strategic element in the modern handball. Specialists in foreign handball target their players to improve the tactical principles and strategy of the offensive game against unorganized protection, to adhere to special technical requirements for fast play, such as different variants of knowing and handing over the ball with one hand in all game situations [6, 47-49]. The throws of the ball into the goal are the culmination of the attacking action of the handball players, so their training is crucial. It should be noted that the attackers of the leading European clubs not only performed throws on the force, but also constantly change the direction of throws, throws from the closed positions, throws in close contact with the defender, change the position of the body while performing throws in the jump. In today's handball, successful bouts both in defence and in the attack are key to winning the game. As handball experts point out, tactfully-prepared players perform a developed action plan for the game in order to be able to win their matches. In addition, in recent years, more specific requirements for each gaming position are developed, and separate tactical attack actions differ from each other, especially for players in the first and second lines of attack [50-52].

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Conclusions.

In the leading handball countries in Europe, there were and still are the conditions under which handball has been actively developed. Today, the leaders of the world's male handball are the clubs of Germany, Spain, France, Hungary, Poland, Macedonia.

The analysis of scientific material makes it possible to emphasize that the main components of the preparation of the leading handball clubs for official competitions are new approaches to the preparation of players and teams for higher achievements in sport and the maximum realization of individual capabilities, the integration of the individual readiness of highly qualified handball players from the main national teams to the leading handball clubs.

Qualified players from leading European handball clubs are more integrated into important aspects of the new rules of the game, which are developed in theory and implemented in practice (replacing goalkeeper

with additional field player, passive game, fights in the free throwing zone, non-prejudiced attitude of judges to performing three steps).

The main tendencies in the international and European handball are systematically developing and spreading for juniors as well as for higher levels of training, first of all, it is a quick game at all stages of preparation (systematic training of players' ability to act quickly, using tempo changes in individual and team actions in combination, tactically significant movements of attackers to open space).

Prospects for further research include the study of the interconnection of the results of the competitive activity of club tournaments with the results of the World and European Championships of leading national teams.

Conflict of interests

The authors declare that there is no conflict of interests.

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Information about the authors:

Solovey O.M.; (Corresponding author); <http://orcid.org/0000-0001-8480-2324>; 1Soloveyaleksandr@gmail.com; Dean of faculty of physique education, Prydniprovsk State Academy of Physical Culture and Sports; Naberezhna Pobedy str., 10, Dnieper, 49010, Ukraine.

Mitova O.O.; <http://orcid.org/0000-0002-4309-9261>; elenamitova@ukr.net; Manager by the Department of Sport Games, Prydniprovsk State Academy of Physical Culture and Sports; Naberezhna Pobedy str., 10, Dnieper, 49010, Ukraine.

Solovey D.O.; <http://orcid.org/0000-0001-8105-2061>; 1Soloveydmiriy@gmail.com; Department of Sports Games, Prydniprovsk State Academy of Physical Culture and Sports; Naberezhna Pobedy str., 10, Dnieper, 49010, Ukraine.

Bohuslavskiy V.V.; <http://orcid.org/0000-0003-0806-0860>; v_bogyslavskiy@icloud.com; Manager of Department of the Special Physical Preparation, Dnipropetrovsk State University of Internal Affairs; Gagarin boulevard, 26, Dnieper, 49005, Ukraine.

Ivchenko O. M.; <http://orcid.org/0000-0003-2688-4505>; basket.ivchenko@gmail.com; Manager of Department of the Special Physical Preparation, Dnipropetrovsk State University of Internal Affairs; Gagarin boulevard, 26, Dnieper, 49005, Ukraine.

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Correlation relation between professional qualifications of physical education teachers and students' attitudes towards Physical Education classes

Sucuoglu E.^{1ABCE}, Atamturk H.^{2ABCDE}

¹*Department of Education Management, Near East University, Cyprus*

²*Faculty of Sport Sciences, Department of Recreation, Near East University, Cyprus*

Authors' Contribution: A - Study design; B - Data collection; C - Statistical analysis; D - Manuscript preparation; E - Funds collection

Abstract

Purpose: This empirical study investigated the impact of the professional qualifications of Physical Education (PE) teachers on secondary school students' attitudes towards their PE classes. Education in general and teaching and learning in particular are multidimensional phenomena and thus it is essential to determine and define these dimensions to sustain quality in education. From the psychological perspective, along with various factors, teachers' personality and qualifications may affect students' learning process. In this respect, effective teachers can foster students' learning process and help develop positive attitudes towards a course.

Material: In order to fulfill the research aim, the data were elicited through a questionnaire from five hundred and ninety-two secondary school students from grades 9, 10 and 11 in North Cyprus to be analyzed quantitatively. Kolmogorov-Smirnov Test and Shapiro-Wilk Test were run to test normality. Seeing that the data set was not well-modeled by a normal distribution, a Spearman's rank correlation coefficient was run to measure the association between the variables.

Results: A very strong positive correlation was found between the professional qualifications of teachers and the participants' attitudes towards PE classes.

Conclusions: The results indicated that there was a significant relationship between the qualifications of the teachers and the students' attitudes towards PE classes. More specifically, it was found that the higher the perceptions of students of the professional qualifications of PE teachers, the more positive attitudes they developed towards PE classes.

Keywords: physical education, secondary school students, teachers' role in education, professional qualifications.

Introduction

There is a reciprocal relationship between attitudes and behaviours since attitudes affect behaviors as they indicate appreciation or dissatisfaction towards a course. Inceoglu [1] evaluates the attitude as a pre-disposition of a mental, emotional and behavioral response, and argues that an individual constructs his/her attitudes by organizing these pre-dispositions depending on experience, motivation and prior knowledge. According to Franzoi [2], attitude is an individual's evaluation of an object as positive or negative.

Attitude Theory which informs this study poses that attitudes encompass three components, namely single, dual and multi. The single component deals with emotions only, the dual one with cognitive aspects as well as emotions and the multi one with emotions, cognitive aspects and behaviours. In this study, the dual component model was adopted since influential researchers in the related field believe the dual component model best applies to this type of research [3, 4, 5]. From the dual-component view of attitude, emotion takes place as an emotional component such as pleasure in the lesson and liking the lesson. The second component which is the cognitive aspect is the perceived benefit of the course. Therefore, Oppenheim, Gonzales and Mohsin who define attitudes as dual-component evaluate the cognitive

component as well as the emotional component of attitude [6, 7, 8]. Donovan, Mercier and Phillips [9] state that such an emotion and cognitive attitude study is effective in determining both teacher and student attitudes towards physical education classes.

Dismore and Bailey [10] have the opinion that student attitudes toward PE precede their behaviors and guide their choices and decisions for actions. Due to the fact that students' attitudes towards a course may be affected positively and negatively by several variables, it is imperative to determine these variables first and then analyze the extent each variable affects student attitudes. Subramaniam and Silverman [3], for instance, acknowledge developing positive attitudes towards physical education as the primary aim of the course. In the field of Physical education, there is a plethora of studies focusing on the issue from the enjoyment perspective being effective in developing positive attitudes of students [11,12]. Needless to say, there are also studies analyzing the role of such demographic variables as gender, age, curriculum, involvement, motivation and PE teachers' confidence on students' attitudes towards the course. However, there is only a handful of studies testing the relation between student attitudes and teachers' qualifications as perceived by the students.

Research indicates the importance of the role of teachers in students' developing positive or negative attitudes towards PE classes [13,14]. It is observed that

the students who develop negative attitudes do not find their teachers helpful and competent in their attainment of the desired skills. Likewise, it is found that students who show positive attitudes evaluate their teachers more positively [13,14]. Moreover, some study results show that physical education teachers may have an effect on student attitudes [15-19]. Amongst the negative attitudes towards PE, students report ineffective PE teachers [20]. The variables affecting learning in physical education classes are found to be the communication skills of teachers [21] and how the teacher transfers the content [22]. As argued by Silverman and Subramaniam [23], teacher behaviors affect student attitudes positively or negatively. Research has indicated that students who are contended with their PE teachers develop more positive attitudes towards physical education classes [23].

Research on teacher qualifications in the physical education is limited. They are either on teachers' self-perceptions of their qualifications as in the study conducted by Elliot, Atencio, Campbell and Jess [24] and on professionalism as in Dowling's study [25]. Some other studies, on the other hand, evaluate the PE teacher education programmes [26] and deal with research based PE teacher education [27].

Purpose of the study: The aim of this large scale empirical investigation was twofold: it aimed first to address and fill the above-mentioned gap in the relevant literature, and secondly to test the hypothesis that the more positive perceptions students hold of PE teachers' qualifications, the more positive attitudes students may develop towards PE classes.

Material and Methods

Participants: Secondary school students (N= 592; 301 females and 291 males) from ten schools resembling each district in North Cyprus served as participants for this study.

Research Design: This study was designed employing a cross-sectional survey method and a correlational

research design was adopted in this quantitative study.

Data Collection: The data for this study were elicited from 9th, 10th and 11th grade students in North Cyprus. The sample was drawn from a population of 5500 secondary students in the spring semester in 2019. Five hundred and ninety-two students were sampled from ten schools located in all rural and urban districts, namely Nicosia, Kyrenia, Famagusta, Trikomo, Omorfo and Lefka.

The instrument to collect data was adapted from that of Gullu and Guclu [28]. The attitudinal questionnaire was based on a two-component view of attitude. In order to increase the reliability of the adapted questionnaire, the internal consistency among the items included in the questionnaire was tested with Cronbach Alpha Coefficiency reliability analysis. The internal consistency of the scale was found to be 0.97 ($\alpha = 0.97$).

Statistical Analysis: SPSS 20 (SPSS Inc., Chicago IL) was performed to conduct all statistical analysis throughout the study. The distributions of the variables in the questionnaire were tested by Kolmogorov-Smirnov Test and Shapiro-Wilk Test, and it was observed that the variables did not show a normal distribution. For this reason, the strength of the association between the two variables was measured with a nonparametric test which is Spearman's rank correlation coefficient.

Results

A Spearman's rank correlation coefficient was run to determine the relationship between the means of 592 participants' perceptions of teachers' qualifications and attitudes towards PE classes. As illustrated in Table 1, a very strong positive correlation was found between participants' perceptions of teachers' qualifications and attitudes towards PE classes ($r_s = .92$, $n = 592$, $p < .001$).

The significant Spearman correlation coefficient value of 0.923 confirms the very strong positive correlation between the two variables. Spearman's correlation coefficient indicated the correlation was significant at the 0.01 level. Hence, the results suggested that the higher the

Table 1. Correlation of the mean scores of attitudes towards physical education and professional qualifications of teachers

Statistical values			Mean of Professional Qualifications of Teachers	Mean of Attitudes Towards PE
Spearman's rho	Mean of Professional Qualifications of Teachers	Correlation Coefficient	1.000	.923**
		Sig. (2 – tailed)		.000
		N	592	
	Mean of Attitudes Towards PE	Correlation Coefficient	.923**	1
		Sig. (2 – tailed)	.000	
		N	592	592

** Correlation is significant at the 0.01 level (2-tailed).

mean of teachers' qualifications were, the more positive attitudes secondary students held towards PE classes.

Discussion

The hypothesis that the more positive perceptions students hold of PE teachers' qualifications, the more positive attitudes students may develop towards PE classes was rationally warranted by the findings of this empirical investigation. The results manifested that when students had positive perceptions of the professional qualifications of their PE teachers, they had more positive attitudes towards their PE classes. Thus, this study highlighted the role of teachers on students' attitudes towards PE classes. This finding of the study corroborated that of Silverman and Subramaniam [23] that students who were contended with their PE teachers developed more positive attitudes towards physical education classes. This result also went in line with that of Subramaniam and Silverman [13, 14] that the role of the PE teacher was a determinative component in students' developing positive or negative attitudes towards their PE classes. This finding also concurred with Yaylacı's [20] finding that students reported ineffective PE teachers as one of the reasons for developing negative attitudes towards PE. The result of the current study also verified those of Figley, Chung and Phillips, Hicks, Balyan et al. and Jaureguy [15-19] that PE teachers may have had an effect on students' attitudes towards PE classes.

That the participants of this study developed positive attitudes towards PE classes could be acknowledged by the fact that they were contended with the qualifications of their PE teachers. This finding went in line with Gushart, Kelly ve Rink's [21] finding that PE teachers' communication skills affected students' learning process. Moreover, this finding concurred with Rink's [22] finding that teaching skills and the delivery of instruction affected students' learning.

Conclusion

Participants' perceptions of PE teachers' qualifications affect their attitudes towards PE classes. The obtained result of this empirical investigation supports the hypothesis that the more positive perceptions students hold of PE teachers' qualifications, the more positive attitudes students may develop towards PE classes. In the light of this result, it is posed that the role of the qualifications of PE teachers should be the focus of future research on students' attitudes towards PE classes. This calls a need for more research to endorse the result of this study.

Conflict of interests

The authors declare that there is no conflict of interests.

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Information about the authors:

Sucuoglu E.; <http://orcid.org/0000-0002-0978-7984>; esen.sucuoglu@neu.edu.tr; Department of Education Management, Near East University; Near East Boulevard, ZIP: 99138 Nicosia, TRNC Mersin 10 – Turkey.

Atamturk H.; (Corresponding author); <http://orcid.org/0000-0003-4196-436X>; hakan.atamturk@neu.edu.tr; Faculty of Sport Sciences, Department of Recreation, Near East University; Near East Boulevard, ZIP: 99138 Nicosia, TRNC Mersin 10 – Turkey..

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Investigation of relationship between attitude to physical education course and school belonging

Uğraş S.^{ABCDE}, Özen G.^{ABCDE}

Department of Physical Education and Sports Teaching, Faculty of Sport Sciences, Çanakkale Onsekiz Mart University, Turkey

Authors' Contribution: A – Study design; B – Data collection; C – Statistical analysis; D – Manuscript Preparation; E – Funds Collection.

Abstract

Purpose: The purpose of this study was to investigate whether there is a relationship between students' attitudes towards physical education course and belonging to school.

Material: Research group comprised of 589 (51.5%) males and 555 (48.5%) female students in secondary schools of Malatya province. 250 (21.9%) of the students were 5th grade, 219 (19.1%) were 6th grade, 387 (33.8%) were 7th grade and 288 (25%) 2) 8th grade students. School Belonging Scale and Attitude scale to Physical Education course were used as a quantitative data collection tool. Pearson correlation test, simple and multiple regression analyses were used to statistical analysis. Significance level was accepted as $p < .05$.

Results: It was found that there were significant positive correlations in the all sub-domains of attitude and school belonging dimensions to physical education course ($p < .05$). Regression analyses revealed that the attitudes of students to physical education course predicted school belonging by 11% and students' attitudes towards physical education course predicted school belonging by 10% ($p < .05$).

Conclusions: As a result, students' attitudes towards physical education course increase, their belonging to school increases. In order to increase students' attitudes towards physical education course, it is possible to plan the content and structure of the course in a more fun way.

Keywords: attitude, belonging, physical education, school.

Introduction

It is known that feeling belonging to a certain group, family, community and school has a positive effect on the physical and mental well-being of the individual [1, 2]. Belonging to school is defined as a psychological structure supported by feelings such as attachment to the school, feeling valuable and being accepted by peers [3]. One of the most accepted definitions of school belonging in the literature is defined as a feeling about how much the student is accepted, approved and respected by other individuals [4]. Schools are one of the important opportunities for the individual in the formation of social relations and sense of belonging. Schools are the place where students can interact with their environment outside the family. The student's self-perception of being a part of the school, being happy at school, relations with friends and having a fair environment provide a sense of belonging [5, 6]. In this sense, one of the most important factors affecting school belonging is the school environment [7, 8]. The friends, teachers, and other staff members of the student who interact with the school environment are the factors that affect positively or negatively the school belonging. Positive relationships that the student encounters in the school environment will increase his / her belonging while negative situations will decrease his / her belonging. Low or good student loyalty; the acceptance of the student among his friends has a direct effect on the level of happiness, satisfaction, anxiety, feeling of rejection [9].

The adequacy of recreation areas in the school environment, the size of the school, the climate in the classroom, play and socialization are the most influential

factors affecting belonging [10, 11]. These factors need to be taken into consideration when arranging the structure of schools. Control and dominance in very large schools will be difficult, as well as problems that may occur in the school environment. The problems that the students may experience in the school environment will negatively affect their belonging. Positive relations with friends [12, 13] and teachers [14, 15] in the school environment will increase the loyalty of the student. It is stated that the academic success of the students connected to the school is increasing and that these students can avoid the inconvenient situations that they may face [16]. There are many studies examining the relationship between school belonging and academic achievement [17-20]. In these studies, it is observed that academic achievement increases as school belonging increases. Indeed, according to reports [21], students' sense of belonging to the school itself in Turkey was 61% while the average of the OECD countries is 73%. Turkey is located in the last row of school belonging. In the same report, it was determined that the academic achievement ranking was the 50th among 72 countries.

Physical education course not only contributes to the physical development of students, but also helps to increase self-confidence while reducing stress and anxiety [22]. Physical education and sports contribute to the socialization of the individual with the confidence of the group [23]. Due to its structure, physical education course includes many activities in which students interact with each other. These activities pave the way for the students to have fun with each other and to get together. It is known that physical activity activities have positive effects on the development of peer relationships. Physical

activity and motivation to do physical activity provide strengthening of social structures such as enjoyable time among peers, group harmony and trust [24-26]. It is a physical education course in the best environment where peer relations can be good. In the researches, it was stated that physical education course was very much liked by the students [27, 28]. Namlı, Temel and Güllü [29] found that the metaphors produced by the students against the physical education course included “cheerful” expression. It is seen that students have a positive attitude towards the course in the studies in which attitude to physical education course is examined [27, 30-32]. However, some studies have found that students are negative against physical education courses [33].

When the literature was examined, no direct research examining the attitude and school belonging to physical education course was found. However, there are studies about sports and extracurricular activities. Arıkan [34] examined the feelings of belonging to the school and the quality of life of the students attending the Sports high school and the students of the Anatolian high school. It was determined that the students belonging to the sports high school had higher school belonging and quality of life compared to the students attending the Anatolian high school. The reason for this is that the students who do sports perceive the quality of school life better and therefore they feel a higher belonging to their schools. Yanık [35] found that students who do not do sports have the lowest level of school commitment compared to students who do sports. Extracurricular activities and school belonging studies have shown a positive relationship between them [36-38]. In addition to having fun and good time in physical education, it is thought to have a relationship with school belonging in terms of creating a suitable environment for socializing. In this context, it is aimed to investigate whether there is a relationship between students’ attitudes towards physical education course and belonging to school.

Material and Methods

In order to investigate the relationship between secondary school students’ attitudes towards physical education course and their belonging to school, relational screening method was used in quantitative research methods. The aim of relational screening studies is to give an idea about the relationship between variables and cause - effect probability between variables [39].

Research Group

589 (51.5%) males and 555 (48.5%) female students in secondary schools of Malatya province participated in the study. 250 (21.9%) of the students were 5th grade, 219 (19.1%) were 6th grade, 387 (33.8%) were 7th grade and 288 (25%) 2) 8th grade students.

Data Collection Tools

School Belonging Scale: The original scale was adapted to Turkish culture developed by Goodenow [4] and used “School Belonging Scale”, conducted by Sarı [40]. In the scale, students’ sense of appreciation, acceptance and participation in school environment;

items were prepared in order to measure their connections with teachers, schools and friends. The scale consisted of a total of 18 items; 13 items in the school attachment dimension and 5 items in the rejected dimension. The scale is in a 5-point Likert scale. “1. Not true at all”, “2. Not true”, “3. I’m undecided”, “4. Correct” and “5. Completely correct”. Since the items which are 3rd, 6th, 9th, 12th and 16th in the scale were negative expressions, scoring was performed by reversing. Cronbach’s alpha reliability coefficient was found to be 0.87 in the school commitment dimension, 0.86 in the rejection dimension and 0.85 in the total scale.

Attitude scale to Physical Education course: The scale adapted to Turkish culture by Varol, Ünlü, Erbaş and Sünbül [41] developed by Phillips and Silverman [42] was used. The scale consists of 15 items consisting of two dimensions as cognitive and affective attitude. 4 items in the cognitive dimension and 3 items in the affective dimension contain negative expression. These items are reverse coded. The rating items were coded as “1-Strongly Disagree”, “2-Disagree”, “3-Undecided”, “4-Agree”, “5-Strongly Agree”. Cronbach’s alpha reliability coefficient was found to be 0.83 in cognitive dimension, 0.84 in affective dimension and 0.81 in total scale.

Statistical Analysis

After the research data were collected, it was found that the skewness and kurtosis coefficients were checked and distributed normally. The skewness values of the variables were found to be between -0.59 and -0.77, while the kurtosis values ranged between -0.08 and 0.43. According to Tabachnick and Fidell [43] skewness and kurtosis values between +1.5 and -1.5 is an indicator for the use of parametric tests in the analysis of data. Cronbach’s alpha coefficient was examined for reliability of the study. After, Pearson correlation test was used to examine the relationship between the variables. After correlation analysis, simple and multiple regression analyses were used. In simple regression, the independent variable was taken as the attitude to physical education course and the independent variable was taken as belonging to the school. In multiple regression, independent variables were cognitive and affective attitudes, while sub-dimensions of belongingness as school dependent variables were taken to school attachment and rejection dimensions.

Results

According to the results of the correlation analysis, between cognitive attitude and school commitment ($r = .319, p < .01$), between cognitive attitude and rejection dimension ($r = .318, p < .01$), and between cognitive attitude and school belonging ($r = .373, p < .01$) positive correlation was found. Between affective attitude and school commitment ($r = .319, p < .01$), between affective attitude and rejection dimension ($r = .306, p < .01$), and between affective attitude and school belonging ($r = .365, p < .01$) positive correlation was found. The relationship between attitudes to physical education course and school belonging ($r = .388, p < .01$) was found to be positively

significant.

When Table 3 is examined, it is seen that attitudes towards physical education course significantly predict school belonging ($r = .388$, $r^2 = 0.15$, $f = 202.025$, $p < .05$). It was found that the attitudes of students to physical education course predicted school belonging by 15%.

When Table 4 is examined, it is seen that attitude sub-dimensions to physical education course significantly predict school commitment ($r = .335$, $r^2 = 0.11$, $f = 71.963$, $p < .05$). It was found that the attitudes of students to physical education course predicted school belonging by 11%.

When Table 5 is examined, it is seen that attitude sub-dimensions to physical education course significantly predict the rejection dimension ($r = .329$, $r^2 = 0.106$, $f =$

69.079, $p < .05$). It was determined that students' attitudes towards physical education course predicted school belonging by 10%.

Discussion

According to the results of the study, it was found that the attitudes of the students in secondary education predicted school belonging by 15%. In this sense, it can be stated that increasing attitude towards physical education course increases student belonging to school. Similarly, it was found that the cognitive and affective dimensions of the physical education lesson attitude scale significantly predicted school commitment and rejection subscales. When the researches are examined, it is a known fact that the attitudes of students to physical education course have

Table 1. Descriptive statistics of attitude and school belonging dimensions to physical education course

Variables	n	x	ss	skewness	kurtosis
School Commitment	1144	3.5169	.77693	-.644	.435
Rejection	1144	3.6848	.86125	-.611	.010
Belonging to the School	1144	3.6008	.69993	-.590	.171
Cognitive Attitude	1144	3.8576	1.04976	-.748	-.201
Affective Attitude	1144	3.9481	.97342	-.859	.110
Attitude	1144	3.9028	.96335	-.770	-.081

Table 2. Results of correlation analysis of attitude and school belonging dimensions to physical education course

Variables	1	2	3	4	5	6
1. School Commitment	1					
2. Rejection	.459**	1				
3. Belonging to the School	.837**	.870**	1			
4. Cognitive Attitude	.319**	.318**	.373**	1		
5. Affective Attitude	.319**	.306**	.365**	.814**	1	
6. Attitude General	.335**	.328**	.388**	.956**	.948**	1

* $p < .05$. ** $p < .01$. *** $p < .001$

Table 3. Simple regression analysis results of attitude towards physical education course

Variables	B	Standard Error	β	t	p
Constant	2.501	0.080	-	31.398	0.000*
Attitude General	0.282	0.020	0.388	14.214	0.000*
$r = 0.388^a$ $r^2 = 0.15$ $f = 202.025$ $p = 0.000$					

* $p < 0.01$

Table 4. Results of multiple regression analysis of attitude to physical education course in predicting school commitment dimension

Variables	B	Standard Error	β	t	p
Constant	2.461	0.092	-	26.868	0.000*
Cognitive Attitude	0.130	0.036	0.176	3.664	0.000*
Affective Attitude	0.140	0.038	0.176	3.663	0.000*
$R = .335^a$ $R^2 = 0.11$ $F = 71.963$ $P = 0.000$					

* $p < 0.01$

Table 5. Results of multiple regression analysis of attitude to physical education lesson predicting rejection dimension

Variables	B	Standard Error	β	t	p
Constant	2.548	0,102	-	25.037	0.00*
Cognitive Attitude	0.168	0.039	0.204	4.247	0.00*
Affective Attitude	0.124	0.043	0.140	2.918	0.04*
R=0.329 ^a R ² =0.106 F=69.079 P=0.000					

*p<0.01

positive attitude [27, 30-32]. The reason why the attitudes of the students to physical education lessons are high can be shown as having good and fun lessons. As a matter of fact, the students defined and perceived the physical education course as cheerful [29] and loved [27, 28] and fun [44]. In this context, it can be said that physical education course may have increased the level of belonging and loyalty of students as it is a fun and good time course. It was stated that the activities including organized activities and sports activities had a positive effect on school belonging [45]. It can be stated that physical education course is a good option in creating the environment that best offers the opportunity to make these activities systematically and programmed. Physical education course has a structure of group cohesion where students can easily communicate with each other [23]. Because the group and team cooperation of the activities carried out allows students to strengthen the communication link with each other. In the literature, it is stated that physical activities lead to strengthening of social structures such as trust and group harmony among peers [24-26]. In this sense, the best course of peer relations is physical education. It has been clearly demonstrated in studies that peer relationships affect school belonging [12, 46]. It can be stated that physical education course creates an environment that can strengthen peer relations and has an effect on increasing the loyalty of students to school.

Avşar [47] found that physical education teachers had high social skills. The high level of social skills of physical education teachers enables better dialogue with

the students. The reasons such as not approaching the students at school based on their academic success and wearing tracksuits with students may make them feel closer to the physical education teacher. It can be said that this affinity to physical education teacher has a positive effect on school belonging. Research has shown that good dialogue with teachers increases school belonging [14, 15, 48]. Arastaman [49] showed that teachers are among the reasons that reduce students' commitment to school. In the researches, it is seen that teacher character plays an important role in decreasing and increasing the students' belonging. Physical education teachers' ability to establish good dialogue with students, good communication skills and high social skills may have positively affected students' commitment and belonging to school.

Conclusion

Based on the results of the research, as students' attitudes towards physical education course increase, their belonging to school increases. In order to increase students' attitudes towards physical education course, it is possible to plan the content and structure of the course in a more fun way.

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The authors state that there is no conflict of interest

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Information about the authors:

Uğraş S.; <http://orcid.org/0000-0001-5756-653X>; sinanugras@comu.edu.tr; Department of Physical Education and Sports Teaching, Faculty of Sport Sciences, Çanakkale Onsekiz Mart University ; Sports Science Faculty 17000 Çanakkale, Turkey.

Özen G.; (Corresponding author); <http://orcid.org/0000-0001-5756-653X>; gokmenozen44@gmail.com; Department of Physical Education and Sports Teaching, Faculty of Sport Sciences, Çanakkale Onsekiz Mart University ; Sports Science Faculty 17000 Çanakkale, Turkey.

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CONTACT INFORMATION

box 11135, Kharkov-68, 61068, Ukraine

phone. 38-099-430-69-22

<http://www.sportpedagogy.org.ua>

e-mail: sportart@gmail.com

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