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ORIGINAL RESEARCH PAPER

ADAPTATION OF QUESTIONNAIRES ON PSYCHOLOGICAL PERFORMANCE, SPORTS MENTAL TOUGHNESS AND GENERAL SELF-EFFICACY

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Abstract

Psychological tests not only promote the development of talented athletes, but also help to optimize the performance of every athlete if the tests are used within a comprehensive system of psychological support for athletes. The continuous development of psychological performance, sports mental toughness and general self-efficacy tools strengthens the effectiveness of athletes' psychological training. However, the adaptation of psychological tests used in sports practice and research requires careful consideration of the cultural environment context. The test translation procedures and statistical verification of equivalence have an important role in test adaptation. The aim of the research is to validate the translated Latvian versions of the Psychological Performance Inventory Alternative version (PPI–A), the Sports Mental Toughness Questionnaire (SMTQ) and the General Self Efficacy Scale (GSE) questionnaires. Material and methods: research participants – 240 active athletes (age 20±1.7; 95 men, 145 women). The participants responded to statements of the PPI–A, SMTQ and GSE questionnaires. The questionnaire survey and data collection took place anonymously, in accordance with the Vienna Convention on Human Rights. The results show that the reliability and validity of all three translated questionnaires (PPI–A, SMTQ, GSE) is in line with the psychometric structure of the original questionnaires and its indicators. Therefore, the Latvian versions of the PPI–A, SMTQ and GSE questionnaires are valid for use in the Latvian environment, as well as for comparison of the obtained results to the scientific research conducted in the world, in which these measuring tools have been used.

Keywords: *The Psychological Performance Inventory Alternative version; The Sports Mental Toughness Questionnaire; The General Self Efficacy Scale; reliability; validity; adaptation.*

Introduction

When an athlete faces difficulties or finds oneself in stressful situations, the result may be determined by the ability to control one's positive and negative emotions. In 2002, researchers Graham Jones, Sheldon Hanton, and Declan Connaughton, through several interviews with top-class athletes, coaches, and sports psychologists, came up with the term – mental toughness, which was explained as – „congenital or established psychological dominance over one's opponent, which helps to maintain perseverance, self-confidence and act effectively in high-stress situations during the most responsible moments of competitions" (Jones, Hanton, & Connaughton, 2002, p. 209). In the Latvian sports environment, it is often observed that in case of an unsuccessful performance, athletes and their coaches plan to make adjustments to their physical or technical fitness routine, perceiving the psychological aspect as less important. The ability to control one's emotions and apply one's skills in stressful situations distinguishes good athletes from outstanding ones. This was the conclusion of a 2009 research by Gucciardi, Gordon and Dimmock, who extended the concept of mental toughness to athletes with superior mental characteristics. According to them, if the physical, technical, and tactical training of athletes is at the same level, then these mental characteristics play a decisive role in the event of victory or loss. It is important to mention that the development of the characteristics and traits necessary for an athlete does not diminish the role of physical and technical development in the training and competition process. An athlete who is endowed with good physical qualities and abilities, as well as has acquired the technical skills necessary for the sport, can become even better and increase his/her chances to achieve stable success in competitions in the long run by improving his/her mental toughness indicators. In the scientific literature, mental toughness is described as one of the most widely used but least understood terms in sports psychology. Some sports psychologists associate an athlete's mental toughness during competitions with psychic regulation – an athlete's ability to relax and regulate both the effects of mental stress and one's own psycho-emotional state and behaviour (Weinberg, Butt & Culp, 2011). The modern view of mental toughness in sport science has changed. The growing interest in sport science about the concept of mental toughness testifies to the importance of this phenomenon among sports psychologists, coaches, and athletes themselves. When faced with a challenge, athletes wonder whether they will be able to overcome the difficulties and achieve their

goals. Or is the challenge too difficult and the ability to cope with it is called into question, resulting in the athlete giving up and suffering a defeat. Research show that mental toughness affects athletes' performance in competitions (Gucciardi et al., 2009). PPI–A (Golby, Sheard, & Lavallee, 2007) and SMTQ (Sheard, Golby, & Wersch, 2009) questionnaires were used to determine the level of mental toughness of Latvian athletes. A person's belief in their own ability to succeed in a given situation is called self-efficacy (Bandura, 1997). Canadian scientist Albert Bandura developed the theory of self–efficacy within the framework of the socially cognitive theory (Perepjolkina, Ludāne, Mārtinsone, & Mihailova, 2015). According to Bandura's theory of self-efficacy, human self-efficacy is mainly formed by four different factors: personal achievements, other people's experience, verbal persuasion, as well as perception and interpretation of physiological states (Bandura, 1977). One factor that promotes the development of an athlete's self-efficacy is past personal achievements, where a person has performed a specific task. After completing this task, the person develops confidence in their own strength and faith, in the sense that the person will be able to perform similar tasks in the future (García & Zubiaur, 2019). Analysis of other people's experiences allows one to see or imagine how other people with similar abilities succeed (Rowland et al., 2020). Verbal persuasion involves the instructions given by an influential person which help the athlete to perform an activity effectively (Rubio, Hernández, Sánchez-Iglesias, Cano, & Bureo, 2018). Perception and interpretation of physiological states reflects the athlete's emotional state. Positive emotions and good mood promote a sense of self-efficacy, thus helping the athlete to overcome failures and to seek solutions to problems. And vice versa, – if an athlete is depressed ad overwhelmed, it can interfere with their concentration on achieving goals, increase anxiety, and lead to energy loss (Byl & Naydenova, 2017). In modern sport science, the concept of self-efficacy is one of the most widely researched theories (Rubio et al., 2018; Byl & Naydenova, 2017). This can be explained by the development of sports in general, where in top-class competitions the result can be decided by hundredths of a second.

Until today, there are no reliable and valid measuring tools for determining the factors of mental toughness and self-efficacy in Latvian language. Given the importance of these factors in different athlete age groups and sports, the adaptation of these questionnaires for use in the Latvian environment would serve as a good measurement tool for determining the mental toughness and self-efficacy of Latvian athletes. The aim of this research is the validation of the Psychological Performance Inventory Alternative version (PPI–A; Golby et al., 2007), the Sports

Mental Toughness Questionnaire (SMTQ; Sheard et al., 2009) and the General Self-Efficacy Scale (GSE; Schwarzer & Jerusalem, 1995) questionnaires in Latvian.

Material and methods

Research participants were students of the Latvian Academy of Sport Education, 240 active athletes with an average age of 20±1.75. Among the male respondents (*n*=95) there were representatives of individual (*n*=42) and team (*n*=53) disciplines. Female respondents (*n*=145) included representatives of individual (*n*=89) and team (*n*=56) disciplines. Respondents' training and competition experience in their sports averaged to nine years. 109 female respondents had Latvian level competition experience, 28 had participated in European Championship level competitions and 8 respondents had participated in World Championships. Among the male respondents were 71 athletes who had participated in Latvian and international level competitions, 16 participants of European Championships and 8 participants of World Championships. In 2019, the 240 respondents answered statements of three questionnaires translated into Latvian. The Psychological Performance Inventory Alternative version (PPI–A), the Sports Mental Toughness Questionnaire (SMTQ) and the General Self-Efficacy Scale (GSE) the forward – backward translation was provided by English and Latvian language experts, specializing in Sport Science. The self and content validity was determined. Respondents rated their responses to the questionnaire statements. The testing of psychometric indicators took place in three stages in 2020: the first stage took place from January to April; the second stage was performed from May to July; the third stage was implemented from August to October. The questionnaire survey and collection of respondents' data took place anonymously, in accordance with the Vienna Convention on Human Rights. The following methods were used: Latvian versions of PPI–A, SMTQ and GSE; mathematical statistics (descriptive statistics, Cronbach's coefficient alpha, variance and factor analysis were used for data analysis).

The *Psychological Performance Inventory Alternative version* (PPI–A**)** (Golby et al., 2007) consists of 14 questions and four scales: Determination, Self-belief, Positive Cognition, Visualization. The analysis of the *Determination* scale indicators shows the athlete's ability to set goals effectively and work selflessly to achieve them; as well as allows to draw conclusion about the athlete's level of self-motivation and the set priorities for realizing his/her potential. In turn, the analysis of the *Self-belief* scale indicators shows the athlete's level of self-confidence during and outside of competitions. It is possible to draw conclusions about the type of „inner speech" skills that prevail for the athlete during competitions (positive or

negative conversation with oneself). The analysis helps to draw conclusions about the athlete's ability to maintain positive emotions, repel disturbing emotions, and continue to focus on the task during competitions. The analysis of the *Positive Cognition* scale indicators shows the extent to which daily training as a process creates satisfaction with the work done and the results obtained. It also provides an indication of how effectively an athlete is able to control his/her thoughts, is able to change a negative mood into a positive one, using it for self-growth. The analysis of the *Visualization* scale indicators shows the athlete's ability to easily visualize their sport, it helps to stick to their goals on a daily basis and to think about goal achievement. An athlete with good visualization skills visualizes how to deal with difficult situations before the competition, which helps to make the right decision faster during competitions. In all scales, the answer options were ranked on a Likert scale from 1 to 5, where 1 stands for „Almost never" and 5 stands for „Almost always".

The Sports Mental Toughness Questionnaire (SMTQ) (Sheard et al., 2009) consists of 14 statements that are divided into three components of mental toughness: Confidence, Constancy and Control. The „*Confidence"* scale is characterized as a positive interpretation of threats and stress by the athlete. Belief in oneself is the athlete's unshakable confidence in one's own abilities, the athlete is firmly convinced of what he/she is able to do and this view is unchangeable. A confident athlete believes to have the necessary skills and abilities to perform well in stressful situations. Self-confident athletes are able to make decisions with determination and confidence in stressful situations. Athletes who believe in themselves recover quickly after moments of losing composure. The „*Constancy"* scale provides an insight into how strong an athlete's commitment is to complete the set and planned tasks to the end. The analysis of the scale results shows an athlete's ability to set challenging goals, as well as to inspire and encourage others to continue to fight. It reveals the extent to which an athlete tends to take long-term responsibility for themselves and the consequences of one's own actions in the training and competition process. The *„Control"* scale shows how well or poorly an athlete is able to control oneself in situations where he/she begins to worry about poor performance. As well as at times when the athlete begins to have doubts about oneself. Athletes who have developed this skill do not worry about events that they cannot control or unexpected, sudden situations. Self-control is an athlete's ability to control oneself in situations when something does not happen the way one would like, is the control of one's anger and other emotions. Self-control is an athlete's belief that they have the ability to influence events, to cope or

manage stress. The answer options were ranked on a Likert scale from A to D, where A stands for „Very true" and D stands for „Not at all".

The General Self–Efficacy Scale (GSE) (Schwarzer & Jerusalem, 1995) consists of 10 statements designed to measure a person's confidence in their abilities and skills when facing difficult life situations („When faced with difficulties, I remain calm because I can rely on my ability to overcome these difficulties"). The answer options were ranked on a Likert scale from 1 to 4, where 1 stands for „Strongly disagree" and 4 stands for „Strongly agree".

Results

In the first stage, the descriptive statistics indicators were analysed, as well as the reliability and validity of the translated Latvian version of the Psychological Performance Inventory Alternative version (PPI–A) was tested.

When analysing the arithmetic mean, it was found that the average indicators of the PPI–A questionnaire's „Determination" scale, which characterizes athletes' self-motivation and goal-setting skills, are lower than the average indicators of the original version (Table 1). Similar observation can be made in the „Positive Cognition" scale, which determines athletes' ability to control their thoughts, repelling negative emotions and helping to focus on the completion of the task. In turn, the content of the „Self-belief" scale, which characterizes an athlete's ability to maintain positive thoughts and emotions during competitions, is higher compared to the average indicators of the original questionnaire. In the answers provided by the respondents of the research conducted in Latvia and the original research, there are slight differences between the assessment of the highest and lowest questionnaire statements, which is indicated by the arithmetic mean and the measures of variability (54.43±6.26) and (55.5±6.3). In general, it can be concluded that the arithmetic mean and standard deviation of PPI–A is similar to the results of the original research (Table 1).

Table 1

Descriptive Statistics Indicators (2020) of the PPI–A Questionnaire Translated into Latvian (*n*=240) and the Original PPI–A Questionnaire (*n*=455, Golby et al., 2007)

PPI-A descriptive statistics indicators	**DT**	**SB**	**PC**	**VL**	**TOTAL**
X±Σ (n=240, questionnaire translated into Latvian, 2020)	11.5±2.06	16.6±2.57	15.0±2.36	11.76±2.01	54.43±6.26
X±Σ (n=455, original questionnaire, Golby et al., 2007)	12.5±1.9	15.9±2.2	16.1±2.0	11.0±2.9	55.5±6.3

(X- arithmetic mean; Σ – standard deviation, DT- Determination, SB – Self-belief, PC – Positive cognition, VL - Visualization)

The internal coherence indicators of the Psychological Performance Inventory Alternative version (PPI–A) show adequate reliability of the version translated into Latvian. The total Cronbach's alpha coefficient of the PPI–A questionnaire is .809 (n=14 items), with an amplitude on four scales from α=.681 to α=.727. Analysing the initial and obtained eigenvalues, it was concluded that all components are suitable for factor analysis, as each of the variables used explains a large enough part of the variance to be used in further analysis. According to the value of the KMO (Kaiser-Meyer-Olkin) criterion, the sample of the research (n=240) is suitable for factor analysis (0.79>0.7), as well as the data of the research sample are suitable for factor analysis (p<0.05) (Table 2).

Table 2

Determining the Suitability of the Research Group for Factor Analysis According to KMO and Bartlett's Criteria (PPI–A)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.790
Bartlett's Test of Sphericity	Approx. Chi-Square	942.676
	df	91
	Sig.	.000

The analysis of the total variance explained shows that the first component explains 29.67%, the second component 12.4%, the third component 10.07% and the fourth component 9.03%, while all components together explain 61.19% of the variance. In the scree plot, the eigenvalue of the four factors is greater than one, which confirms the 4-factor structure, which is the same as in the original PPI–A version (Figure 1).

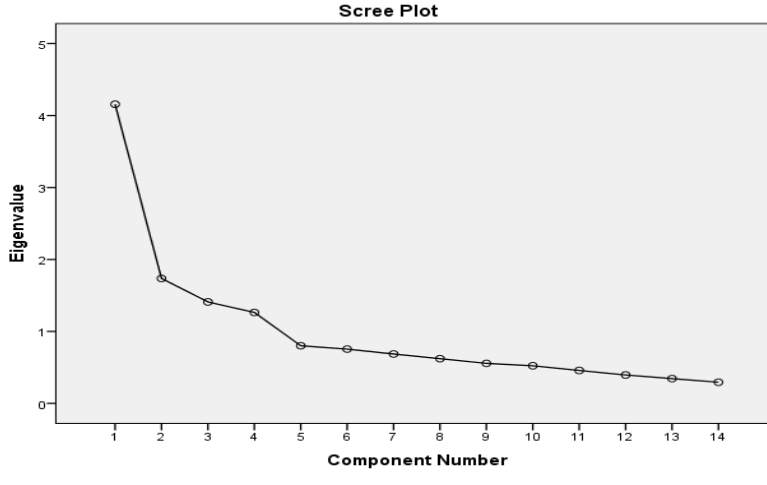

Figure 1. Scree Plot of the PPI–A Version Translated into Latvian

The data analysis was conducted using the selection method: Extraction Method: Principal Component Analysis and Rotation Method: Varimax with Kaizer Normalization. The factor structure was obtained after the fifth rotation. Table 3 shows which variables and how closely correlate with each of the components.

Table 3

Factor Structure of the PPI–A Version Translated into Latvian

Rotated Component Matrix[a]				
	Component			
	1	2	3	4
I am a positive thinker during competition	.795			
I can keep strong positive emotion flowing during competition	.789			
My self-talk during competition is negative	.733			
I lose my confidence very quickly	.724			
I can turn crisis into opportunity		.785		
I can change negative moods into positive ones by controlling my thinking		.709		
I can clear interfering emotion quickly and regain my focus		.678		
Playing this sport give me a genuine sense of joy and fulfilment		.526		
The goals I've set for myself as a player kop me working hard			.803	
I'm willing to give whatever it takes to reach my full potential as a player			.790	
I don't have to be pushed to play or practice hard. I am my own best igniter			.741	
Thinking in pictures about my sport comes easy for me				.802
I visualise working through tough situations prior to competition				.763
I mentally practise my physical skills				.747
Extraction Method: Principal Component Analysis. *Rotation Method: Varimax with Kaiser Normalization.*				
a. Rotation converged in 5 iterations.				

When analysing the data obtained, it was concluded that the first component is positively correlated with „Positive thoughts during competition" (.795), „Ability to maintain positive emotions" (.789) „Self-talk" (.733), „Self-confidence" (.724). The first factor is called *„Self-belief".* The second component is positively correlated with „Ability to turn failure into a new opportunity" (.785), „Ability to control thoughts" (.709), „Ability to repel distracting emotions" (.678), „Joy and feeling of fulfilment" (.526), the second factor is called *„Positive Cognition".* The third component consists of three statements with a weight >.5: „Goal setting and work" (.803); „Readiness to realize sports potential" (.790); „Self-motivation" (.741). The third factor is called *„Determination".* The fourth component is positively closely correlated with „Ability to visualize sports" (.802), „Ability to visualize how to cope with difficult situations" (.763), „Ability to train physical skills in the imagination" (.747). The fourth factor is called *„Visualization".* The internal coherence of the Psychological Performance Inventory Alternative version was tested during the research. The content, self and construct validity was determined. The analysis of the obtained

results confirm the reliability and validity of the *Psychological Performance Inventory Alternative version* (PPI–A) translated into Latvian.

In the second stage, the descriptive statistics indicators were analysed, as well as the reliability and validity of the translated Latvian version of the Sports Mental Toughness Questionnaire (SMTQ) was tested. Analysing the indicators of arithmetic mean (Table 4), it can be seen that the three scales of the original SMTQ questionnaire – indicators of the „Confidence" scale, which indicates an athlete's unshakeable confidence in own strength and the ability to make convincing decisions in stressful situations; indicators of the „Constancy" scale, which determines an athlete's commitment to complete a task and indicates an athlete's responsibility in setting challenging goals; and indicators of the „Control" scale, which is related to the athletes' ability to control their emotions in the event of an unexpected situation – are slightly higher than the indicators presented by the respondents of the questionnaire translated into Latvian (Table 4). The greatest differences are observed in the „Confidence" scale. In the Latvian and the original research, the answers provided by the respondents show similar differences between the highest and lowest assessment of the questionnaire statements, which is indicated by the measures of variability (40.72±5.49) and (43.7±5.7).

Table 4

Descriptive Statistics Indicators of the SMTQ Questionnaire Translated into Latvian (*n*=240) and the Original SMTQ Questionnaire (*n*=509, Sheard at al., 2009)

SMTQ descriptive statistics indicators	**CF**	**CS**	**CT**	**TOTAL**
X±Σ (n=240, questionnaire translated into Latvian)	16.77±3	13.25±2	10.69±2.62	40.72±5.49
X±Σ (n=509, original questionnaire, Sheard et al., 2009)	18.5±3.1	13.8±1.8	11.4±2.3	43.7±5.7

(*X- arithmetic mean*; *Σ – standard deviation, CF- Confidence, CS - Constancy, ST- Control)*

The internal coherence indicators of the Sports Mental Toughness Questionnaire (SMTQ) show adequate reliability of the version translated into Latvian. The total Cronbach's coefficient alpha of the questionnaire shows good internal coherence of the questionnaire (α=.790, *n*=14 items). „Confidence" scale α=.747 (6 Items), „Constancy" scale α=.713 (4 Items) and „Control" scale α=.805 (4 Items). Analysis of the initial and obtained eigenvalues shows that all components explain a sufficiently large part of the variance to be used in factor analysis. According to the value of the KMO (Kaiser-Meyer-Olkin) criterion, the sample of the research (*n*=240) is suitable for factor analysis (0.786>0.7), as well as the data of the research sample are suitable for factor analysis (p<0.05) (Table 5).

Table 5

Determining the Suitability of the Research Group for Factor Analysis According to KMO and Bartlett's Criteria (SMTQ)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.786
Bartlett's Test of Sphericity	Approx. Chi-Square	922.532
	df	91
	Sig.	.000

The analysis of the total variance explained shows that the first component explains 27.44%, the second component 14.79%, the third component 11.42%, while all components together explain 63.64% of the variance. In the scree plot, the eigenvalue of the three factors is greater than one, which confirms the 3-factor structure, which is the same as in the original version of SMTQ (Figure 2).

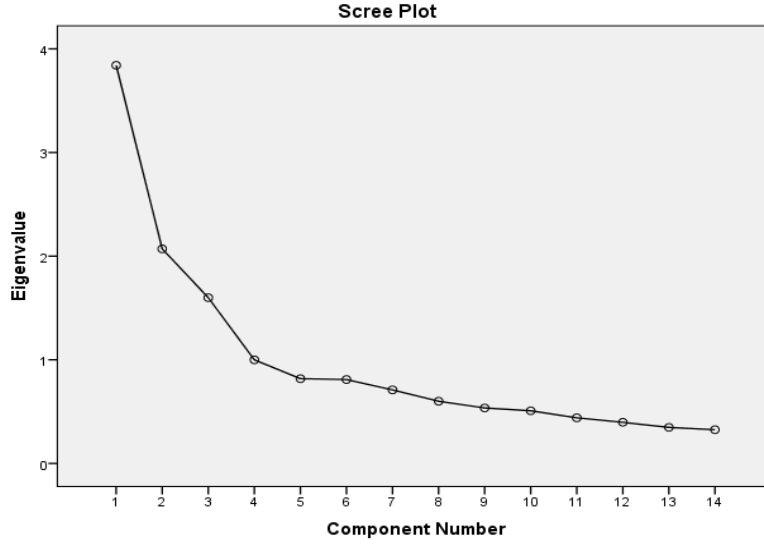

Figure 2. Scree Plot of the SMTQ Version Translated into Latvian

The factor analysis was conducted using the selection method: Extraction Method: Principal Component Analysis and Rotation Method: Varimax with Kaizer Normalization. The factor structure was obtained after the fifth rotation. Table 6 shows which variables and how closely correlate with each of the components.

Table 6

Factor Structure of the SMTQ Version Translated into Latvian

Rotated Component Matrix[a]			
	Component		
	1	2	3
Under pressure, I am able to make decisions with confidence and commitment	.766		
I have what it takes to perform well while under pressure	.758		
I have an unshakeable confidence in my ability	.685		
I have qualities that set me apart from other competitors	.626		
I can regain my composure if I have momentarily lost him	.571		
I interpret threats as positive opportunities	.464		
I get anxious by events I did not expect or cannot control		.798	
I worry about performing poorly		.788	
I am overcome by self-doubt		.776	
I get angry and frustrated when things do not go my way		.752	
I give up in difficult situations			.771
I am committed to completing the tasks I have to do			.752
I take responsibility for setting myself challenging targets			.709
I get distracted easily and lose my concentration			.639
Extraction Method: Principal Component Analysis. *Rotation Method: Varimax with Kaiser Normalization.*			
a. Rotation converged in 5 iterations.			

The first component is positively correlated with six components with a weight over .450. „Confident and determined decision-making in stressful situations" (.766), „Action in stressful situations" (.758), „Unshakable confidence in one's own abilities" (.685), „Awareness of qualities and abilities" (.626), „Ability to recover self-control" (.571), „Interpretation of stress" (.464). The first factor is called *„Confidence".* The second component is positively correlated with „Concerns about events that cannot be controlled" (.798), „Concerns about poor performance" (.788), „Doubts about oneself" (.766), „Anger and dissatisfaction when things do not happen the way I want" (.752). The second factor is called *„Constancy".* The third component correlates with four statements with a weight over .60. „Giving up in difficult situations" (.771), „Determination to complete the tasks" (.752), „Taking responsibility for set goals" (.709), „Losing focus" (.639). The third factor is called *„Control".* The analysis of the obtained results confirms the reliability and validity of the Latvian version of the *Sports Mental Toughness Questionnaire* (SMTQ).

In the third stage, the descriptive statistics indicators were analysed, as well as the reliability and validity of the General Self-Efficacy Inventory (GSE) questionnaire translated into Latvian was tested.

The indicators of the original self-efficacy questionnaire indicate an athlete's level of confidence in handling any task, taking into account the four main factors of self-efficacy: personal achievements; other people's

experience; verbal persuasion, and perception and interpretation of physiological states. The analysis of the obtained results shows that the indicators of the original GSE version are lower and with a slightly larger variability of results (29.48±5.13) than the indicators of the Latvian version of the questionnaire (31.62±4.16) (Table 7).

Table 7

Descriptive Statistics Indicators of GSE Questionnaire Translated into Latvian (*n*=240) and the Original GSE Questionnaire (*n*=1594, *Schwarzer& Jerusalem, 1995)*

GSE descriptive statistics indicators	**TOTAL**
X±Σ (n=240, questionnaire translated into Latvian)	31.62±4.16
X±Σ (n=1594, original questionnaire (*Schwarzer& Jerusalem, 1995*)	29.48±5.13

(X- arithmetic mean; Σ – standard deviation)

The internal coherence indicators of the General Self-Efficacy Inventory (GSE) show an adequate reliability of the version translated into Latvian. The total Cronbach's coefficient alpha of the questionnaire shows good internal coherence of the questionnaire (α=.852, *n*=10 items). According to the value of the KMO (Kaiser-Meyer-Olkin) criterion, the research sample (*n*=240) is appropriate for factor analysis (0.889>0.7), as well as the data of the research sample are appropriate for factor analysis ($p<0.05$). The analysis of the total variance explained shows that the overall self-efficacy explains 43.12% of the total variance, which is a high indicator. In the scree plot, the eigenvalue of one factor is greater than one, which confirms the 1-factor structure, which is the same as in the original GSE version.

Table 8

Factor Structure of the GSE Version Translated into Latvian

	Components
	1
I am confident that I could deal efficiently with unexpected events.	.726
I can always manage to solve difficult problems if I try hard enough.	.709
When I am confronted with a problem, I can usually find several solutions.	.676
I can remain calm when facing difficulties because I can rely on my coping abilities.	.662
Thanks to my resourcefulness, I know how to handle unforeseen situations.	.657
It is easy for me to stick to my aims and accomplish my goals.	.655
I can usually handle whatever comes my way.	.651
If I am in trouble, I can usually think of a solution.	.651
I can solve most problems if I invest the necessary effort.	.621
If someone opposes me, I can find the means and ways to get what I want.	.542
Extraction Method: Principal Component Analysis.	

The main factor analysis was conducted using the selection method: Extraction Method: Principal Component Analysis. A one-factor structure was obtained, which is the same as in the original questionnaire (Jerusalem,

Schwarzer, 1981). The component positively correlates ten statements with a weight above 0.5 (Table 8). The factor closely positively correlates with the following statements: „I am confident that I am able to deal with unexpected situations effectively" (0.726); „I can always deal with difficult situations if I try hard enough" (.709); „When faced with a problem, I can usually find several solutions" (.676); „When faced with difficulties, I remain calm because I can rely on my ability to overcome difficulties" (.662); „Thanks to my wittiness, I know how to deal with unforeseen situations" (.657); „It is easy for me to stick to my goals and achieve the desired results" (.655). „I usually am able to overcome any situation I come across" (.651); „If I am in trouble, I can usually find a solution" (.651); „With the necessary effort, I can solve most problems" (.621); „If anyone objects to me, I can find the means and ways to get what I want" (.542). During the research, the internal coherence of the Latvian version of the General Self-Efficacy Scale was tested. The content, self, and construct validity was determined. The analysis of the results obtained confirms the reliability and validity of the Latvian version of the General Self-Efficacy Scale (GSE).

Discussion

The results of this research indicate a successful Latvian translation of the Psychological Performance Inventory Alternative version *(*PPI–A), the Sports Mental Toughness Questionnaire (SMTQ) and the General Self-Efficacy Scale (GSE) questionnaires, observance of cultural context and acceptable validity. The Latvian version of the Psychological Performance Inventory Alternative version (PPI–A) questionnaire also includes a four-factor model: Determination, Self-belief, Positive Cognition, and Visualization. This four-factor model is equivalent to the original version. Furthermore, the Latvian version of the Sports Mental Toughness Questionnaire (SMTQ) also includes a three-factor model: Confidence, Constancy and Control, which is also equivalent to the original version of the test. In turn, the Latvian version of the General Self-Efficacy Inventory (GSE) includes a one-factor structure, which is the same as in the original questionnaire. This indicates that the cultural environment of Latvia does not differ from the countries where the tests were created. Thus, in the Latvian sports environment, the same concepts are used to describe the psychological skills, mental toughness, and self-efficacy of athletes.

From the point of view of sport science, this research has a particularly important contribution, as the tools adapted in the research provide an understanding of the content of athletes' psychological skills, mental toughness, and self-efficacy in the Latvian environment and enables further psychological evaluation of athletes in order to ensure a more

effective process of psychological preparation of athletes. Sport specialists will gain useful information on the indicators of athletes' psychological skills, mental toughness, and self-efficacy, thus being able to manage the future growth of athletes more purposefully by using useful information resources. The tools adapted in the research also ensure the equivalence of their multilingual versions, which opens the possibility to conduct further international comparative research regarding the particular features.

The strengths of this research may be interpreted in the context of limitations, as the research adapted the tools in the Latvian environment. The research results indicate the adaptation of tools for determining adult athletes' psychological skills, mental toughness, and self-efficacy, yet the question about the suitability of the use of such tools for young athletes is still open.

Conclusions

The reliability and validity of all three translated questionnaires – the Psychological Performance Inventory Alternative version (PPI–A); the Sports Mental Toughness Questionnaire (SMTQ), and the General Self-Efficacy Scale (GSE) – is consistent with the psychometric structure of the original questionnaires and their indicators.

The PPI–A, SMTQ and GSE questionnaire versions translated into Latvian language are valid for use in the Latvian environment, as well as for comparison of the obtained results with scientific research conducted around the world, in which these measuring tools were used.

References

1. Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, *84*(2), 191-215. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.315.4567&rep=rep1&type=pdf
2. Bandura, A. (1997). *Self-efficacy: The exercise of control.* New York: Freeman. https://pdfs.semanticscholar.org/89b6/8138a9f99ce8ad92e60a9272318f7355cf34.pdf?_ga=2.15805375.868631778.1606411116-960272838.1606411116
3. Byl, M., & Naydenova, I. (2017). The association between romantic relationships, self-efficacy and sports self-efficacy in female athletes as measured by salivary cortisol. *Journal of Counseling Psychology*, *1*(2), 1-25. https://digitalcommons.gardner-webb.edu/cgi/viewcontent.cgi?article=1007&context=jcp
4. García, M., & Zubiaur, M. (2019). Analysis of the perception of self-efficacy in paragliding pilots. *Revista de Psicología del Deporte/Journal of Sport Psychology*, *28*(2), 41-47.

5. Golby, J., Sheard, M., & Lavallee, D. (2007). Evaluating the factor structure of the Psychological Performance Inventory. *Perceptual and Motor Skills, 105*(1), 309–325. https://doi.org/10.2466/pms.105.1.309-325
6. Gucciardi, D. F., Gordon, S., & Dimmock, J. A. (2009). Evaluation of a mental toughness training program for youth-aged Australian footballers: I. A quantitative analysis. *Journal of Applied Sport Psychology, 21*(3), 307-323. https://doi.org/10.1080/10413200903026066
7. Jones, G., Hanton, S., & Connaughton, D. (2002). What is this thing called mental toughness? An investigation of elite sport performers. *Journal of Applied Sport Psychology, 14*(3), 205-218. https://doi.org/10.1080/10413200290103509
8. Perepjolkina, V., Ludāne, M., Mārtinsone, K., & Mihailova, S. (2015). *Personība.* Kolektīvajā monogrāfijā "Psiholoģija", Rīga: Zvaigzne ABC, 37-39. ISBN 978-9934-0-4059-7
9. Schwarzer, R., & Jerusalem, M. (1995). Generalized Self-Efficacy scale. In J. Weinman, S. Wright, & M. Johnston (Eds.), *Measures in health psychology: A user's portfolio. Causal and control beliefs* (pp. 35-37). Windsor, UK: NFER-NELSON. https://dx.doi.org/10.13072/midss.488
10. Sheard, M., Golby, J., & Wersch, A. (2009). Progress toward construct validation of the Sport Mental Toughness Questionnaire (SMTQ). *European Journal of Psychological Assessment, 25*(3), 186–193. https://doi.org/10.1027/1015-5759.25.3.186
11. Rowland, S.A., Cohen, M.Z., Pullen, C.H., Schulz, P.S., Berg, K.E., Kupzyk, K.A., & Yates, B.C. (2020). Vicarious experience to affect physical activity in working women: A randomized control trial. *Western Journal of Nursing Research, 42*(4), 286–292. https://doi.org/10.1177/0193945919856575
12. Rubio, V.J., Hernández, J.M., Sánchez-Iglesias, I., Cano, A., & Bureo, R. (2018). The effects of coaches' pre-game speeches on young players self–efficacy. *Revista de Psicologia del Deporte, 27*(1), 59–66. ISSN 1132-239X.
13. Weinberg, R., Butt, J., & Culp, B. (2011). Coach's views of mental toughness and how it is build. *International Journal of Sport and Exercise Psychology*, *9*(2), 156-174. https://doi.org/10.1080/1612197X.2011.567106

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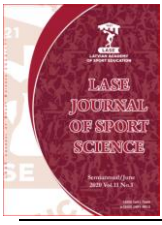

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ORIGINAL RESEARCH PAPER

FUNCTIONAL MOVEMENT SCREEN AS A PREVENTIVE PROTOCOL FOR YOUNG FOOTBALL PLAYERS FROM THE ZADAR FOOTBALL CLUB

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Abstract

The research is related to the establishment of a quality individualized prevention program as an indispensable part of any fitness training for athletes. The FMS method is a set of tests that is recognized by experts, with the limitation that the results are considered in relation to the age, types of activities, gender, and other anthropological characteristics of the tested athletes or developing children. Testing was conducted on a sample of 20 selective players of the Zadar Football Club ages 14 to 21, with a set of 7 tests. The test results indicate that with older respondents (athletes) a bigger asymmetry and greater compensatory mechanisms were found. In the light of the foregoing, it is necessary to develop individual fitness programs aimed at reducing the number of injuries, with emphasis on the development of quantitative motor skills and technical and tactical preparedness. However, the quality of their movement within their sport - football should not be overlooked, in order to avoid deficits and inequalities of movement. The results of the study indicate that timely corrections affect the quality of life of athletes and the extension of their careers. Considering the results of the research, we believe that the age period between 14 and 17 is crucial for creating an individual fitness program.

Keywords: *functionality, movement, athlete, mobility, prevention.*

Introduction

The testing of motor patterns, through the form of postural motor control, which is imposed as an initial reflex movement on the action of

external forces and through the somatosensory system, establishes an arbitrary movement that is at that moment the best possible movement with respect to body position and task. The somatic nervous system is a part of the peripheral nervous system that is connected to skeletal muscle and transversely striated muscle tissue (under voluntary control of body movements) and "consists of afferent and efferent nerves" (Bangsbo et al., 2006). The success of each athlete, including football players, is determined by the knowledge, traits, and a high level of ability or structure of the above (Bangsbo et al., 2006). Research today emphasizes the importance of testing through a football academy as an important indicator of the risk factor for non-contact injuries (Abraham et al., 2015). Success in football also depends on how "the individual characteristics of an individual football player fit together and form a coherent team" (Matković et al., 1999). The study used the FMS method (functional movement screen) containing "7 tests of deep squat, hurdle step, inline lounge, shoulder mobility, leg raise, trunk stability, and rotary stability" (Sannasi Nair, 2015). The tests are used for the purposes of movement functionality, rehabilitation, indicators of injury occurrence, and to determine the development of instabilities, reduced mobility and asymmetry. The tests are evaluated through grades 3,2,1,0. A grade of 3 represents the best possible performance of the task, with no indication of asymmetry and compensation mechanisms. A grade 2, represents a task that has been performed but with some compensation. A grade of 1 represents a movement that is defective regardless of the compensatory mechanisms. A grade of 0 represents a movement where there is performance pain. It is also important to note the difference between the terminology of motion and movement. Although they have a similar definition, a motion is based on one or more bodily segments while movement is defined as a complex sensorimotor action. It is precisely the FMS tests that give importance to efficient movement, which without proximal stability, distal mobility, unilateral control and flexibility would not be possible. It is also worth pointing out the difference between mobility and flexibility. Mobility is the optimal motion of one or more joints and depends on neuromuscular coordination, strength, flexibility and proprioception, while flexibility depends on the elasticity of the muscular-tendon units (Marković, 2019).

Materials and methods

FMS Method (Functional Movement Screen Method).

The FMS or Functional Movement Screen method, authored by Cook and Burton, was introduced in 1995 and is a diagnostics method used for evaluating the effectiveness and the identification of weak parts of the

locomotor system and for detecting body imbalances. The evaluation of the above method is performed by evaluating the performance of basic movements through 7 tests. The tests assess the stability and mobility of the locomotor system, that is, the control and range of motion and balance. The main objective of FMS according to Lambson et al. represents "the perception of limited mobility, impaired stability, weakness and asymmetry" which are common causes of sports injuries and the elimination of them (Lambson et al., 1996). The design of the method itself came about through the synergy of knowledge of physical therapists and kinesiologists, for several practical reasons. The first is the importance of "the quality of basic movements, which is the basis for playing sports either recreationally or professionally, as specific movements can be easily upgraded on quality basic foundations" (Nelson & Sahrmann, 2014). Then, "allowing a systematic approach to assess the quality of these movements so that defects can be identified as accurately as possible" (Nelson & Sahrmann, 2014). The design of the presented system enabled a unison communication of experts regarding terminology, processing, and consideration and monitoring of results by FMS diagnosticians. FMS as a method, functions as an assessment of the base of the pyramid of sports performance, expressed through specific sports skills, the amount of functional performance, and the quality of motion functionality. Mobility and stability, and the balance between them, are often underestimated when working with athletes. Mobility is much more than muscular flexibility, and it includes the way in which certain parts of the body (hips, pelvis, torso…) interact in performing functional movements. Stability is "the ability to control the internal and external forces acting on the body to avoid placing the body in an unwanted position" (Kiesel et al., 2007). The tests applied for the FMS are based on the training principles established to respect the stability/mobility of each specific joint (joint-by-joint). The principle rests on the fact that the body must be seen as a single harmonious whole in which certain parts should in principle be stable or mobile (McGee et al., 1997). However, it is necessary to emphasize that no joint can be strictly regarded as mobile/stable, but rather it is its main and basic function. The joints as a whole represent a kinetic chain that must be balanced for a movement to be functional and economical (Kiesel et al., 2007).

Test Implementation and Methods. Instrument

The Functional Movement Screen (FMS) assessment system was applied, consisting of seven of the mentioned tests: deep squat, hurdle step, inline lounge, shoulder mobility test, leg raise, trunk stability, rotary stability. Athletes' grades and comments are recorded in the provided table. The grades for each individual test are 1 to 3, as stated previously. In the

case of pain in any segment of the body during performance, the test is evaluated with a grade of zero. The grading is performed as previously described and defined in each of the seven tests. A 100-cm-long, 5-cm-wide, 10-cm-wide board, a 1-meter-long pole, and an adjustable barrier were used to perform the test. The protocol for the implementation and evaluation of the FMS assessment is described in detail in scientific literature (Galić, 2019).

Procedure

The survey was conducted during the spring and summer of 2019, and the participants were informed that the participation in the survey was voluntary. The participants personally filled in an anamnestic questionnaire consisting of the personal information of the athlete, body height, body mass, information on sports, dominant hand, dominant and propulsion leg, and information on the existence of an injury that has removed the athlete from training and competition for at least three weeks in the last three to six months. The tests were conducted indoors, and the subjects were tested in appropriate clothing, with standardized testing equipment. The testing with the FMS method does not require an extremely long preparation, or a large and equipped space. The only prerequisite is expressed through the absence of pain when performing movement or testing the participants. Therefore, this study was conducted by observing these conditions. In case of the mentioned problems of the respondents, a referral to a specialist examination was planned. The individual testing of the subjects took 30 minutes, after the warm-up and preparation of the athletes, in order to prevent the possibility of injuries. Each individual test was "graded from 1 to 3, so that the maximum total score was 21" (Kiesel et al., 2007). The target result is not expressed through the maximum score, but through the symmetry of the left and right sides of the body.

Respondents Sample

20 selective players of the Zadar Football Club were tested within the range of 14-21 years of (u-21/n-4, u-19/n-6, u-16/n-7, u-14/n-3). All players are within a regular training process, they train daily, most are familiar with the mechanisms of fitness training, and no player has reported an injury.

Test Objectives

In accordance with the general goal of FMS, namely the confirmation of limited mobility, impaired stability, weakness and asymmetry of football players, the aim of this research is defined - the establishment of a quality individualized prevention program as an indispensable part of any fitness training. The comparison of the obtained parameters is performed with the results of 103 top football players between 14 and 21 years of age.

Results

In addition to the aforementioned information, the table lists the named test participants, who gave the necessary written consent for the presentation and processing of test results and their personal data.

Table 1.

Presents the test results

No.	ROTATORY STABILITY	DEEP SQUAT	HURDLE STEP	INLINE LOUNGE	SHOULDER MOBILITY	ACTIVE STRAIGHT-LEG RAISE	TRUNK STABILITY
No.1 - U 18	D-2 L-2	2	D2 L2	D3 L3	D2 L1	D3 L3	3
No.2 - U 18	D-2 L-1	2	D2 L2	D3 L3	D2 L2	D2 L2	3
No.3 - U 18	D2 L2	2	D1 L1	D3 L2	D1 L1	D1 L1	3
No.4 - U 18	D-2 L-2	2	D2 L2	D3 L3	D2 L1	D2 L3	2
No.5 - U 16	D-2 L-2	2	D2 L1	D3 L3	D1 L2	D2 L1	2
No.6 - U 18	D-2 L-2	1	D1 L1	D3 L3	D1 L1	D2 L2	3
No.7 - U 16	D3 L2	3	D3 L3	D3 L3	D3 L3	D3 L3	3
No.8 - U 16	D2 L2	2	D2 L2	D2 L2	D2 L2	D3 L3	3
No.9 - U 21	D3 3	3	D3 L3	D3 L3	D3 L3	D2 L2	3
No.19 - U 21	D2 L2	2	D2 L1	D3 L2	D2 L2	D2 L1	2
No.11 - U 21	D3 L3	3	D2 L2	D3 L3	D2L3	D2 L2	3
No.12 - U 18	D3 L3	3	D3 L3	D3 L3	D3 L3	D3 L3	3
No.13 - U 16	D2 L2	3	D3 L3	D3 L3	D3 L3	D3 L2	3
No.14 - U 16	D2 L2	2	D2 L1	D3 L3	D2 L1	D1 L1	2
No.15 -U 21	D2 L2	2	D1 L2	D2 L2	D1 L2	D2 L2	3
No.16 - U14	D3 L3	3	D3 L3	D3 L3	D3 L3	D3 L3	2
No.17 - U16	D2 L2	2	D2 L2	D2 L3	D1 L2	D2 L2	2
No.18 - U14	D3 L3	3	D3 L3	D3 L3	D3 L3	D3 L3	3
No.19 - U14	D3 L3	3	D3 L3	D3 L3	D3 L3	D3 L3	3
No.20 - U18	D2 L2	2	D3 L3	D3 L3	D1 L2	D2 L2	2

Analysis of the Obtained Results

FMS is a set of tests used in both recreational, professional and amateur sports, the total score, as previously stated, is a maximum of 21. It is generally accepted by field experts that a score of 18 to 21 represents excellent motor control, the range from 16 to 18 falls under good, while the total score below 14 falls into the high factor category of non-contact injuries. A group of selective players from FC Zadar – our respondents, confirms the fact about the importance of coordinated and integrated fitness training. It is within this area that fitness trainers have space to reduce the

number of non-contact muscle and tendon injuries. Studies cited in the text indicate that the combination of flexibility training, mobility and eccentric strength training significantly reduces the risk of injury to the rear muscle lodge in football players. The results indicate that 40% of test subjects received an overall rating of all tests <14, which can be compared to 103 top young European football players who scored <14 in as much as 82% for the same tests. When considering the aforementioned facts about the high correlation between the high percentage of injuries and the sum of tests <14, we can conclude about the importance of working on motor control through the introductory preventive segment of training. Motor control is a complex set of tasks that integrates the detection and integration of sensory information in order for a body to position itself, to perform a movement in space that is the most effective muscular and skeletal response in terms of space and task. We actually want our football players to be as efficient as possible, and for this reason we emphasize the importance of an integrated approach. What is interesting for this research is that more than half of our respondents with a rating of <14 belong to a cadet age class, indicating the corresponding potential for developing some of the injuries at a later age. Motor control can also be defined as postural control. A good posture is "a state of muscular and bone balance that protects the supporting structures from injury or progression of deformity regardless of position and activity" (Kiesel et al, 2007). In a good posture, the muscles will work more efficiently, that is, more purposefully. In a poor posture there is an irregular relationship between different parts of the body, which causes an increased strain on the supporting structures. The posture is not only influenced by the nervous and motor elements, but also by the psychosocial element. It is concluded that it is not accidental that the cadet age range shows the worst overall test results. It is at this age that hormone production is mostly pronounced, the body changes at the psycho-physical level, all in accordance to puberty. The group that did not meet the minimum requirements for motor control, which means that it received a score of 1 or 0 among our respondents is 60%, and almost all of the respondents belong to the cadet group. 91% of the second group received either a rating of 0 or 1. It is important to note that the second group had a significantly larger number of respondents. What is certainly worrying is the fact that in the deep squat test only 30% of the respondents in our group were satisfactory, while in the other group the percentage was only 52%. Considering that squat is one of the elementary patterns of movement, the obtained statistics are concerning. Although it is not desirable to draw definitive conclusions from a single test, the unsatisfactory results of the deep squat test lead us to think about the possible lower mobility of the ankles, the presence of gluteal

amnesia, shortness and weakness of hip muscles, a poorer lumbar stability, and poor thoracic mobility. Considering that 27% of injuries are non-contact, and that most are concentrated on the thighs (27%), ankles (19%), knees (15%), and groin (9%), we realize the alarming nature of the condition established with this test. However, we do emphasize that no final conclusions should be drawn from a single test. The emphasized asymmetry in motor control in our subjects is 65%, while in the other group it is also 65%. It should be noted that deep squats, hurdle step, and inline lounges tests are fundamental. It is with these three tests that only 15% of our respondents were satisfactory. Three fundamental tests are used to indicate poor motor control, while the other four tests are used for a detailed analysis. 75% failed in one of these four tests. After analyzing and interpreting the obtained results, the corrective exercises were initiated, which have the appropriate algorithm according to which they are applied. Initially, problems with mobility, stability, and problems in the patterns of movement of respondents are addressed.

Conclusion

The aim of this research are the parameters related to the establishment of a quality individualized prevention program as an indispensable part of any fitness training. Despite the fact that the FMS method is a set of tests that is recognized by experts, our opinion is that some results should be taken through the context of years, types of activities, gender and other anthropological characteristics. The application of this method gives the athlete the assurance that he can reach his limits with a minimum risk of injury (if other conditions in the training process are satisfied), which is expressed through the desire and the need of the athlete to participate in a training process with full intensity and capacity. Therefore, we believe that the overall score on the test is less relevant because there are no excessive associations with the injury indicator, especially for top athletes and developing children. The previous research, which has already been mentioned above, points to the fact that the higher the quality of an athlete, the longer he engages in a specific activity, the lower the overall score and the asymmetry will be. This is confirmed by our testing, which shows that the older subjects have greater asymmetry and greater compensatory mechanisms. Therefore, it is recommended that the results be taken individually for each test and, accordingly, an individual fitness program is to be created whose main task is precisely to reduce the number of injuries. When focusing on professional athletes and top-notch sports, the emphasis is on the developing of their quantitative motor skills and technical and tactical preparedness, and much less on the quality of their movement, caused as a product of that activity. Therefore, FMS is a

relatively simple method that tells us about the quality of these movements by identifying the weakest parts of the locomotor system. By recognizing these deficits and inequalities, and with a timely correction, we directly influence the prolongation of sports careers and the quality of life of athletes. Considering that the majority of our non-satisfactory respondents belong to cadet groups, it is our opinion that the range between 14 to 17 years of age is a key period for the creation of an individual fitness program.

References

1. Abraham, A., Sannasi, R., & Nair, R. (2015). Normative values for the functional movement screentm in adolescent school aged children. *International Journal of Sports Physical Therapy*, 10(1), 29.
2. Bangsbo, J., Mohr, M., & Krustrup, P. (2006). Physical and metabolic demands of training and match-play in the elite football player. *Journal of Sports Sciences*, 24(07), 665-674.
3. Conjar, Z. (2017). Funkcionalni trening stabilizacije trupa u košarci. *Doctoral dissertation, University of Zagreb, Faculty of Kinesiology.*
4. Kiesel, K. B., Butler, R. J., & Plisky, P. J. (2014). Prediction of injury by limited and asymmetrical fundamental movement patterns in American football players. *Journal of Sport Rehabilitation*, 23(2), 88-94.
5. Lambson, R. B., Barnhill, B. S., & Higgins, R. W. (1996). Football cleat design and its effect on anterior cruciate ligament injuries: a three-year prospective study. *The American Journal of Sports Medicine*, 24(2), 155-159.
6. Matković, B. R., Besek, D., & Matković, B. (1999). Fiziološke karakteristike vrhunskih hrvatskih nogometaša. *Hrvatski Športskomedicinski Vjesnik*, 14, 16-20.
7. Galić, L. (2019). Povezanost motoričke kontrole ručnog zgloba i brzine kretanja lopte u šutiranju kod dječaka rukometaša dobi od 10 do 12 godina. *Doctoral dissertation, University of Zagreb. Faculty of Kinesiology*.
8. McGee, C., Kersting, E., Davies, G. J., & McLean, K. P. (1998). Standard rehabilitation vs. standard plus closed kinetic chain rehabilitation for patients with shoulder impingement: a rehabilitation outcomes study. *UW-L Journal of Undergraduate Research*, 1, 103-113.
9. Mikulić, P., & Marković, G. (2015). Odabrana poglavlja iz motoričke kontrole. *Interna skripta za studente Kineziološkog fakulteta Sveučilišta u Zagrebu*).Zagreb: Kineziološki fakultet sveučilišta u Zagrebu. (Internal script for students) https://www.kif.unizg.hr/_download/repository/Izvjesce-2014.pdf
10. Nelson, H. L., & Sahrmann, S. A. (2014). On"The human movement system: our professional identity..." Sahrmann SA. Phys Ther. 2014; 94: 1034-1042/*Author Response. Physical therapy*, 94(11), 1676.

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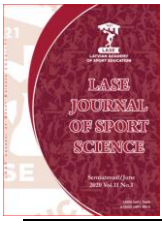

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REVIEW PAPER

EFFECTS OF OUTDOOR RECREATION ACTIVITIES ON TAEKWONDO ATHLETES' STRESS, RECOVERY

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Abstract

Athletes experience many stressors that can influence their sporting performance. The purpose of this study is to investigate the effects of outdoor recreation activities on seasonal measures of stress and recovery in Taekwondo athletes. Twenty Taekwondo athletes who will volunteer to participate in the research (under 17 years old, at least for 2 years have participated in national or international competitions) will be selected. To study the preferred outdoor recreation activities, modified Youth Physical Activity Questionnaire (YPAQ) will be given to Taekwondo coaches (N=12) and athletes (N=20). The current athletes' state of stress and recovery will be assessed by the Stress and Recovery Questionnaire for athletes (RESTQ-76 Sport). In the procession and analysis of the results MS. Excel software and methods of descriptive statistics will be used. Methods are based on scientific literature review of outdoor activities, questionnaire, and then using statistical analysis. The result and conclusion of the study will be according to the analysis. The overall advantage of this research might allow athletes to recover from last training/competition and relieve stress.

Keywords: stress-recovery, outdoor recreation activity, Taekwondo,

Introduction

In sport, for success it is crucial for athletes to achieve balance between stress, recovery. Physical and psychological recovery for athletes has gained greater attention in the literature over the past ten years due to the importance of overall performance and health for these athletes (Kellmann, 2010). Stress may be defined as the biological result produced when an organism is acted upon by forces that disrupt equilibrium

(Thomas, 1993). Research investigating sources of stress in athletes has identified physical, social, environmental, general life and secondary (emotional/cognitive/goal oriented) events which cumulatively and interactively contribute to allostatic load (Tenenbaum et al., 2003). A significant source of stress in highly trained athletes is the direct physical stress of training and competition (Kentta & Hassmen, 1998). Recovery can be defined as an "inter-individual and intra-individual multilevel (e.g., psychological, physiological, social) process in time for the re-establishment of performance abilities" (Kellmann & Kallus, 2001). The total time needed to recover depends on the previous activity and the type and duration of stress e.g., high-volume training needs more recovery time during a taper phase (Hoffman et al., 1999). Without adequate recovery the body will not adapt positively to training and negative training adaptations take place (Coutts et al., 2007). According to Kellmann (2002) active recovery is used to eliminate the effect of fatigue through specific moderate physical exercises, e.g., stretching, or low intensity exercises. Active recovery techniques have been shown to significantly accelerate recovery following 30-second sprint bouts, repeated maximal repetition squat exercise and gymnastics performance compared to lying or sitting activities (Jemni, 2003). Furthermore, Dawson and colleagues (2005) have demonstrated that 15 minutes of post-match pool walking or stretching improved the recovery of vertical jump and 6-second power, respectively, compared to a control group at 15 hours post-match in Australian footballers. Self-report measures have the added advantages of being efficient, inexpensive, and non-invasive. This is an important factor to consider for designing monitoring models, especially where there are repeated measurements and insufficient funding. Psychological tests or self-report measures include RPE (rate of perceived exertion), RESTQ-76-Sport and training diaries. Kellman and Kallus (2001) developed the 76-item Recovery-Stress Questionnaire for Athletes (RESTQ-76-Sport) to systematically measure the recovery-stress states of athletes. The RESTQ-76-Sport measures general parameters of training stress which can be used in the planning of recovery strategies. Kellmann and colleagues proposed a close relationship of RESTQ-Sport scores with sport performance and confirmed a close association between recovery-stress state and competition performance in swimmers (Kellmann, Kallus, & Kurz, 1996). Kalda and colleagues (2004) also demonstrated a similar relationship between selected RESTQ-Sport fatigue and recovery scores and performance points in power athletes (sprinters and jumpers). Bresciani *et al.* (2010) examined 14 male handball players during a 40-week season while monitoring mood states and recovery-stress states (RESTQ-76-Sport). They found that training load correlated with some of the RESTQ-76-Sport

subscales, such as Being in Shape, Physical Recovery, and Injury. Recreation is generally considered as an evaluation of leisure time with various activities. These activities can be grouped under general topics such as musical activities, sporting activities, games, artistic activities, activities that require skills, nature activities, social and cultural activities. The concept of recreation does not have a standard definition accepted by everyone, as in the definitions of time and leisure concepts (Altıngül, 2011). Some of the sources describe the recreation as mentally and physically healing activity (McLean et al., 2008). Sport is the most comprehensive, the most diverse and the most drawn attention area of recreation (Altıngül, 2011). Participation in recreation activities not only prevents disease and improves physical health, but also benefits by reducing stress (Asztalos et al., 2009). It can help decrease cardiovascular disease, metabolic complications and some cancer risks and improve physical capacity (Garber, 2011). Furthermore, several studies have observed the positive effects of nature on health, stress, and recovery (Kruize, 2020). This exposure to nature, even from a picture, could promote recovery and restore stress levels (Ulrich, 2002). According to Ilhespy (2009), students' involvement in the outdoor recreation program is important to improve their self-confidence, positive thinking, and more perfectness. Outdoor recreation has been proven useful in promoting academic achievement, work commitment, critical thinking and in preventing delinquency. Based on international research conducted by Garst, Schneider and Baker (2001), which studied the adolescents who participated in outdoor recreation activities, they found that the individuals had a positive impact on their perception while participating in outdoors activities. Taekwondo is a combat sport that has evolved in scientific and technological aspects since its inclusion as an Olympic discipline, forcing countries to seek information from the different variables involved in the sport process to achieve international best results. The greatest performance gains come from prescribing an optimal amount of physical training with appropriate recovery periods to allow for the best adaptation before competition. Rating of perceived exertion (RPE) is one of the common tools to quantify exercise bouts. RPE-method of monitoring training load in Taekwondo (Haddad M, 2011) requires each athlete to provide RPE for each exercise session along with a measure of training time (Foster, 2001). It is important that coaches and sports scientists collect objective information about their players' physical and psychological performance capabilities to substantiate the objectives of training, establish short- and long-term training programs and recovery strategies, provide objective feedback and motivate athletes during training. Combination of high intensity actions, and physical contact means

that there is a high level of physical and mental fatigue. Given this high level of fatigue, the need for recovery is clear to develop an appropriate and well-designed recovery plan in all these fatigue areas. Unfortunately, despite the importance of optimal recovery within any training program, recovery is often inadequately addressed. Time devoted to planning the training is often far disproportionate to the time spent planning the recovery. Also lack of appropriate recovery may result in the athlete being unable to train at the required intensity or complete the required load at the next training session and higher levels of fatigue may also predispose the athlete to injury. Therefore, the aim of this study is to investigate the effects of outdoor recreation activities on stress and recovery through seasonal measures in Taekwondo athletes. The hypothesis is that compared to athletes who do not use recreation activities, athletes using recreation activities will demonstrate reduced stress and improved recovery. To the best of the authors' knowledge, no studies have examined recreation activity on stress-recovery in Taekwondo athletes, then, the current research is being done to evaluate the result.

Material and methods

The aim of this study is to investigate the effects of outdoor recreation activities on stress and recovery through seasonal measures in Taekwondo athletes. The hypothesis is that compared to athletes who do not use recreation activities, athletes using recreation activities will demonstrate reduced stress and improved recovery. The theoretical and methodological grounds of the research from the literature sources and scientific articles to find a conclusion on stress-recovery, theories and categories, conclusion on recreation definition, theories and categories and conclusion about Taekwondo will be used.

Demographics

Participants will complete a demographics questionnaire that will assess their age ethnicity and gender.

Subjects

Latvian Taekwondo athletes (n=20, under 17 years old, at least for 2 years have participated in national or international competitions), who will volunteer to participate in the research, will be invited to attend a one-hour long information session. A conceptual overview of the role of stress in the conditioning process and outlined the research and subject requirements will be provided. Following the information session, consent forms will be given. The consent forms include a questionnaire to obtain relevant data to

allow stratification into intervention (17 weeks), and medical and health information which may affect eligibility of participation will be also required.

Instruments

Rate of Perceived Exertion (Session-RPE) Method (Borg's rating of perceived exertion) for monitoring and quantifying the training load has been developed to allow coaches to measure the training their players completed and consequently better control the periodization of training (Foster *et al*., 2001).

Recovery-Stress Questionnaire (RESTQ-76-Sport) is designed specifically to measure stress and recovery states in athletes for response frames ranging from three days to four weeks and will be administered weekly with a weekly response frame. A Likert-type scale is used with values ranging from 0 ("never") to 6 ("always"). The RESTQ-76-Sport will provide broad measures of general (scales 1-7) and sport-specific (scales 13-15) stress; and general (scales 8-12) and sport-specific (scales 16-19) recovery.

Statistical Analysis

Processing and analysis of results will be made by MS. Excel attachment program *Statistics 3.1*. The software function *Descriptive statistics* will be used for normal data distribution. The descriptive statistical methods will be used to describe the values and representativeness of the problem to be investigated, for example, the mean, standard deviation, standard error, compliance with the normal distribution (confidence interval $\alpha < 0.05$). To determine the reliability of the growth for various indicators the parametric method will be applied.

Results

The research is in the process and the result will be obtained after it. Analysis of the scientific literature sources and the theoretical basis of the study will be based on the scientific literature. In order to realize the objective of the research, theoretical and empirical methods will be used. The results of the present study may have implications to provide a reference to the effectiveness of various outdoor activities, enabling athletes to engage in activities that are beneficial for their recovery. So, the predicted result of this study can be that Taekwondo athletes recover for the next training session and relieve stress.

Conclusions

It has long been recognized that without adequate recovery, an athlete will not achieve his/her full performance potential (Barnett, 2006).

Therefore, optimizing recovery is an essential component of the overall training plan. It is critical for coaches of top athletes to have a training plan, yet it is also highly important to be able to adjust the plan based on how the athlete is adapting or coping with the imposed training and competition demands. To do this effectively the coach requires information based on each individual athlete's recovery abilities in response to various training stressors. In high performance sporting environments, self-report questionnaires identifying stress-recovery, feelings of fatigue and wellness, and a variety of other psychosocial factors are relied upon for "flagging" athletes in a state of fatigue. It is therefore important that coaches and sports scientists collect objective information about their athletes.

References

1. Asztalos, M., Wijndaele, K., De Bourdeaudhuij, I., Philippaerts, R., Matton, L., Duvigneaud, N., & Cardon, G. (2009). Specific associations between types of physical activity and components of mental health. *Journal of Science and Medicine in Sport, 12*(4), 468-474.
2. Altıngül, O., & Devecioğlu, S. (2011). "Spor Teknolojilerinde İnovasyon", *6 International Advanced Technologies Symposium* (IATS'11), 16-18 May 2011, Elazığ, Türkiye, s: 154-168.
3. Barnett, A. (2006). Using recovery modalities between training sessions in elite athletes: does it help? *Sports Medicine, 36*(9), 781-796.
4. Bresciani, G., Cuevas, M. J., Garatachea, N., Molinero, O., Almar, M., de Paz, J. A., et al. (2010). Monitoring biological and psychological measures throughout an entire season in male handball players. *European Journal of Sport Science, 10*(6), 377-384.
5. Coutts, A. J., Slattery, K. M., & Wallace, L. K. (2007). Practical tests for monitoring performance, fatigue and recovery in triathletes. *Journal of Science and Medicine in Sport, 10*(6), 372-381.
6. Dawson, B., Gow, S., Modra, S., Bishop, D., & Stewart, G. (2005). Effects of postgame recovery procedures on muscle soreness, power and flexibility levels over the next 48 hours. *Journal of Science & Medicine in Sport, 8*(2), 210-221.
7. Foster, C., Florhaug, J., A., Franklin, J., Gottschall, L., Hrovatin, L., A., et al. (2001) A new approach to monitoring exercise training. *J Strength Cond Res 15*: 109-115.
8. Garst, B., Scheider, I., & Baker, D. (2001). Outdoor adventure participation impacts on adolescent selfperception. *Journal of Experiential Education, 24(1)*, 41-49.
9. Garber, C., E., Blissmer, B., Deschenes, M., R., et al. (2011). Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: guidance for prescribing exercise. *Med Sci Sport Exerc*, 43: 1334-1359.

10. Hoffman, J. R., Bar-Eli, M., & Tenenbaum, G. (1999). An examination of mood changes and performance in a professional basketball team. *Journal of Sports Medicine and Physical Fitness, 39*(1), 74-79.
11. Haddad, M,, Chaouachi, A., Castagna, C., Wong, del P., Behm, D., G., et al. (2011). The construct validity of session RPE during an intensive camp in young male Taekwondo *athletes. Int J Sports Physiol Perform 6:* 252-263.
12. Ilhespy, I. (2009). Issues in the development of an inclusive curriculum: Listening to student voices in the evaluation of reusable learning objects in the subject areas of sport, leisure and outdoor adventure. *Journal of Hospitality, Leisure, Sport & Tourism Education (Oxford Brookes University)*
13. Jemni, M., & Sands, W. A. (2003). Effect of active and passive recovery on blood lactate and performance during simulated competition in high level gymnasts. *Canadian Journal of Applied Physiology, 28*(2), 240-256.
14. Kellmann, M. (2002). Underrecovery and overtraining: Different concepts – similar impact? In M. Kellmann (Ed.), *Enhancing recovery: Preventing underperformance in athletes* (pp. 3-24). Champaign, IL: Human Kinetics.
15. Kalda, J., Jurimae, T., & Jurimae, J. (2004). Relationships between recovery-stress state and performance in sprinters and jumpers. *Perceptual & Motor Skills, 99*(1), 12-16.
16. Kellmann, M., Kallus, K. W., & Kurz, H. (1996). Performance prediction by the Recovery-Stress Questionnaire. *Journal of Applied Sport Psychology, 8*(Suppl), 22.
17. Kruize, H, van Kamp, I., van den Berg, M., et al. (2020). Exploring mechanisms underlying the relationship between the natural outdoor environment and health and. well-being – Results from the PHENOTYPE project. *Environ Int*; 134: 105173.
18. Kellmann, M. (2010). Preventing overtraining in athletes in high-intensity sports and stress/recovery monitoring. *Scandinavian Journal of Medicine and Science in Sports,* 20(2), 95-102.
19. Kentta, G., & Hassmen, P. (1998). Overtraining and recovery: A conceptual model. *Sports Medicine, 26*(1), 1-16.
20. Kellmann, M., & Kallus, W. (2001). *Recovery-Stress Questionnaire for Athletes: User Manual.* Champaign, IL: Human Kinetics.
21. McLean, D., Hurd, A. R., & Rogers, B. N. (2008). Recreation and Leisure in Modern Society. *Eight edition Jones and Bartlett`s Publishers International.*
22. Thomas, C. L. (1993). *Taber's Cyclopedic Medical Dictionary*. Philadelphia: F A Davis.
23. Tenenbaum, G., Jones, C. M., Kitsantas, A., Sacks, D. N., & Berwick, J. P. (2003). Failure adaptation: Psychological conceptualisation of the stress response process in sport. *International Journal of Sport Psychology, 34*, 1-26.
24. Ulrich, R., S. (2002). Health Benefits of Gardens in Hospitals. *Plants People Int Exhib Floriade*; 1-10.

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REVIEW PAPER

ARSENAL OF TECHNIQUE, RESULTATIVITY AND EFFECTIVENESS OF JUDOKAS AT WORLD CHAMPIONSHIPS

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Abstract

The evaluation of technical mastery of judokas and its differences in high-class athletes performing in competitions have been relatively little studied. The research aim is to study the arsenal of technique, resultativity and effectiveness of high-class judokas in the 2005 and 2014 World Championships in the weight category up to 90 kilograms. The research of the technical arsenal used in the competition helps to determine the level of technical readiness, as well as permits to compare and determine the direction and development trends of technical mastery. This information will be used by judo professionals to adjust high-level judo training international competitions. In this work we study the arsenal of technique, resultativity and effectiveness of high-class judokas in the 2005 and 2014 World Championships in the weight category up to 90 kilograms. The study included literature research, an analysis of competition documents and protocols, as well as an analysis of competition videos from the 2005 and 2014 World Championships, which analysed 32 high-class athletes (award-winners). Methods of mathematical statistics. In the 2005 World Championship for men in the weight category up to 90kg, 12 resultative throws were registered, of which 6 (50%) were from the leg technique, 4 (34%) with falling on the back or on the side, 1 (8%) hand technique and 1 (8%) shoulder technique, 0 from the hip technique. In turn, in the 2014 World Championship, 58 resultative throws were observed, of which 29% were hip technique, 24% – leg technique, 23% – shoulder technique, 19% – sacrifice throws, 5% – hand technique. Resultativity (R) is the average mark of a judoka's offensive actions, it determines the quality of the offensive

actions. The highest R at the 2005 World Championship is 5.1 points in the weight category up to 90kg, while in 2014 – 4.1 points. The effectiveness indicator (E) of offensive actions is the number of assessed offensive actions divided by the total number of offensive actions. At the 2005 World Championship, the average E indicator for – 90kg is 67%, while in 2014 – 57%.

Keywords: *Judoka arsenal of technique, resultativity and effectiveness, judo world championship.*

Introduction

Through literature analysis, it was concluded that after the introduction of changes in the rules of judo competitions (forbidden leg grabs, reduced holding and match duration, etc.), there is very little information about changes in judo throwing technique and differences for high-class athletes performing in competitions (Bocioaca, 2014; Pimenovs, 2012).

Research on technical mastery include the determination of arsenal of technique, effectiveness and level of acquisition, assuming that the athlete uses a biomechanically rational technique. Sports technical mastery contains the following components: arsenal of technique, effectiveness of the technique and the level of acquisition of the technique. The arsenal of technique is characterized by the volume and variety of technique, the level of acquisition – by the characteristics of stability, durability, retention and automation. The volume of technical training is the number of techniques that an athlete is able to perform or performs during practice. This is called the total or training amount. The competition amount is the number of different technical methods performed in the competition. The training amount of technique characterizes the potential possibilities of an athlete, while the ratio of the competition amount to the training amount – the degree of their realization (Dravnieks, 1997; Fernāte, 2002).

The term *Arsenal* is used in the research. Origin – French arsenal – a warehouse for weapons and ammunition, as well as a place where weapons and ammunition were produced, maintained, stored and, if necessary, repaired. In some European countries, arsenals could be both private and public. Later, the word "arsenal" also took on a figurative meaning, referring to a set of possible measures that may have nothing in common with militarism. For example, a girl, wanting to enchant a young man, uses all her arsenal – smile, cosmetics, voice, gestures, etc., although here too the arsenal serves the purpose of conquest (Dravnieks, 1997; Horev, 2008).

Literature and electronic sources provide various information about the arsenal of judo techniques for fight in standing position – the total number of techniques for fight in standing position, the number of techniques in different countries, which techniques are used in the training process and competition practice. There are only a few studies on the volume and variety of technique, technique effectiveness and resultativity in high-class competitions in the information sources available to us (Kawaishi, 1957; Geesin, 1967; Jessink, 1974; Rudzītis, 1979; Pimenovs & Ekabsons, 1986; Hoare, 1994; Dzigoro, 1994; Pimenovs, 1996; Inogai, 2002; Pimenovs, 2004; Calmet, 2010; Pimenovs, 2015; Kodokan 67 Judo throws).

Another term used in the study is the effectiveness indicator (E) of offensive actions which gives an idea of the ratio between the training of athletes. The greater the difference in the training of athletes, the higher the indicator. Based on the formula, it can be said that the effectiveness indicator of offensive actions is the number of assessed offensive actions as a percentage divided by the total number of offensive actions (Chumakov, 1976).

Final term used is resultativity. Resultativity is the average mark of a judoka's offensive actions, it determines the quality of the offensive actions (Chumakov, 1976).

The research aim is to study the arsenal of technique, resultativity and effectiveness of high-class judokas in the 2005 and 2014 World Championships in the weight category up to 90 kilograms.

Material and methods

The research studied 32 high-class athletes (award-winners) – judo masters, men aged 18 and over, who participated in World Championships (in 2005 and 2014). In the 2005 World Championship, 7 weight categories were considered and 2 finalists and third place winners (two third places) were considered in each of them. In the 2014 World Championship, the weight category up to 90kg was analysed and here too only the award-winners were considered.

In order to study the volume and variety of judo techniques for fight in standing position, it was attempted to determine the total number of known judo throws in various sources of scientific literature. Next, the throws available to us were grouped by volume according to the classification characteristics of the techniques. The literature analysis focuses on the arsenal of offensive actions – the volume and variety, the resultativity and effectiveness of offensive actions at the 2005 and 2014 World Championships, in the weight category up to 90 kilograms. In the

study, we were guided by the classification of judo fight in standing position adopted in France, Belgium, and the Netherlands (Jessink, 1974,), developed by the Kodokan judo specialist Mikinosuke Kawaishi (Kawaishi, 1957). It divides all throws into five groups: leg techniques (ashi waza), hip techniques (koshi waza), hand techniques (te waza), shoulder techniques (kata waza) and sacrifice techniques (sutemi waza) (Dzjudo, 2006). Assessing technical training or technical mastery means determining what an athlete is able to do and how (or how well) the athlete does it. The term "sports technique" refers to a specific movement technique that allows an athlete to more or less effectively realize their potential in competition practice. (Dravnieks, 1997; Fernāte, 2002).

The formulas of resultativity and offensive actions recommended by sambo and judo experts and specialists of the Russian Federation were used to study the resultativity and effectiveness of judoka throwing techniques at the 2014 World Championship (Chumakov, 1976). Additional designations were introduced in the resultativity formula with one, two and three point evaluations (as described below).

Desk study included works on judo arsenal for fight in standing position, which is used internationally and nationally in Japan, France, Belgium, and the Netherlands. The total number of techniques for fight in standing position in the IJF is 72 (Hoare, 1994), while „Kodokan" has 67 (Geesink, 1967; Jessink, 1974; Rudzītis, 1979; Pimenovs & Ekabsons, 1986; Hoare, 1994; Dzigoro, 1994; Pimenovs, 1996; Inogai, 2002; Pimenovs, 2004; Calmet, 2010).

The distribution of throws by classification groups differs: „Kodokan" has 5 groups – leg, hip, hand technique, throws with falling on the back or on the side. IJF has 4 groups – leg, hip, hand technique, sacrifice throws. The set of basic techniques for fight in standing position contains 40 throws, 8 throws in each rank of judo mastery. This research applies the Kawaishi M. classification, which is used in France, the Netherlands, and Belgium.

Competition video analysis. Videos freely available on the website www.youtube.com were used for this research. World Judo Championships (2005 and 2014) were considered. The research studied offensive actions of high-class judokas, all of which were stenographed on specially designed protocols (Chumakov, 1976).

Results

In the first stage of the research, the 2014 World Championship, which took place in Chelyabinsk, Russia, was analysed. During the

research, the men weight category up to 90kg was analysed. With the help of stenography, 15 matches were registered on specially developed protocols and the technical mastery of 4 judokas (1st-3rd place winners) was analysed. The weight category consisted of 48 judokas from 38 countries. The obtained results are shown in Figure 1.

The study was guided by the classification of judo techniques for fight in standing position adopted in France, Belgium, Germany, and the Netherlands, developed by Kodokan judo specialist Mikinosuke Kawaishi (Kawaishi, 1957; Pimenovs, 2015; Dzjudo, 2006). It divides all throws into five groups: leg technique (ashi waza), hip technique (koshi waza), hand technique (te waza), shoulder technique (kata waza) and sacrifice technique (sutemi waza).

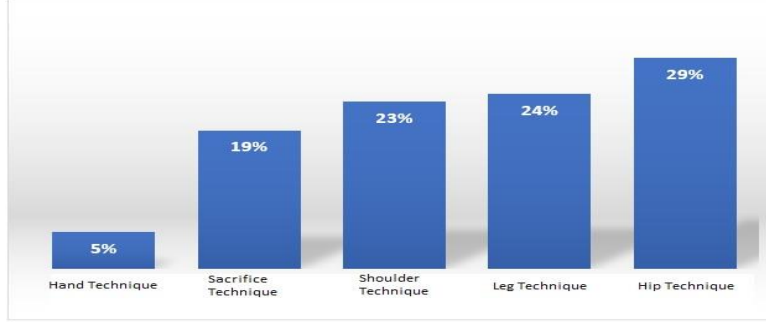

Figure 1. Distribution of Resultative Throws in Judo Competitions at the 2014 World Championship in the Weight Category up to 90kg According to Classification Groups.

From Fig.1 one can observe which throws (as in, from which classification group) the high-class judokas used most often at the World Championship. In the weight category up to 90kg, judokas mostly used hip technique, then throws from the leg technique and the shoulder technique.

For comparison, we took a 2008 study on the distribution of resultative throws at the 2005 World Championship – see Figure 2.

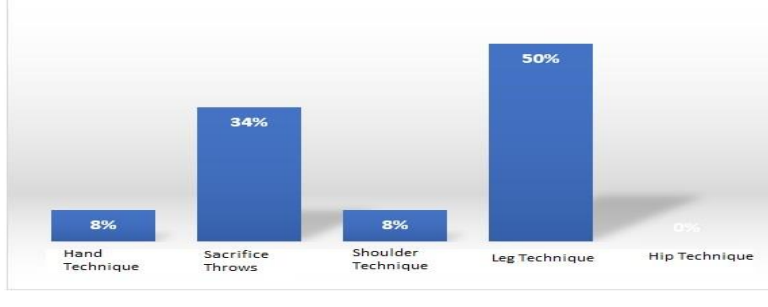

Figure 2. Distribution of Resultative Throws in Judo Competitions in the – 90kg Weight Category, 2005 World Championship for Men.

As can be seen in Fig.2, in the 2005 World Championship in the weight category up to 90kg, the most used throw was from the leg technique and sacrifice throws. No throws from the hip technique were used. (Pimenovs, 2015)

Figure 3 shows the average resultativity indicators of judoka offensive actions at the 2005 World Championship in all weight categories.

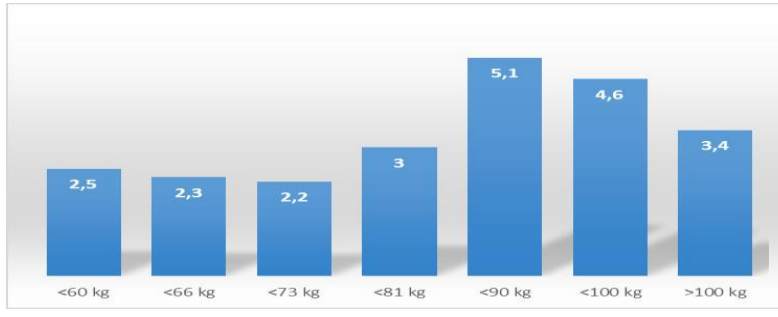

Figure 3. The Average Resultativity Indicators of Judoka Offensive Actions at the 2005 World Championship in all Weight Categories.

In this research, we want to highlight the weight category up to 90kg, thus the results are shown in Table 1.

Table 1

The Resultativity (R) Indicator of Offensive Actions of the 2005 World Championship in Weight Categories up to 90kg

Weight Category up to 90kg		
Final	I.H. (I p.)	7,5
	I.I. (II p.)	1
Semi-Final	I.I.	10
	K.A.	1
Match for the 3rd Place	K.A (III p.)	10
	M.P.	1

One of the tasks of the research was to determine the resultativity of the offensive actions of athletes of the 2014 World Championship up to 90 kilograms. In this research, we studied the resultativity of each judoka separately. See Table 2, 3, 4, 5.

Table 2

The Resultativity Indicators of Offensive Actions of the 2014 World Championship for the 3rd Place Winner in the Weight Cat. 90kg

Competition Round	Resultativity Indicator of Offensive Actions
1/16 final	10
1/8 final	10
1/4 final	0,5
Gratification fight	5,6
For the 3rd place	10

In the first fight, the resultativity indicator is 10 points, his opponent has 1 point. As the fight ended in the first minute, each of the participants managed to make one move. In the second fight, the resultativity indicator of the athlete is also 10 points, for the opponent – 2 points. In the 1/4-fianl, the indicator for the athlete is 0.5 points, for the opponent – 0.42. It was a very close fight without resultative throws. The fight was decided by the judges with a warning. In the gratification fight, the indicator for the athlete is 5.6, for the opponent – 0.5. In the fight for the third place R=10, for the opponent – R=1. The average indicator for the judoka is 7.2 points.

Table 3

The Resultativity Indicator of Offensive Actions of the 2014 World Championship for the 3rd Place Winner in the Weight Cat. 90kg

Competition Round	Resultativity Indicator of Offensive Actions
1/32 final	5,5
1/16 final	10
1/8 final	2,8
1/4 final	7
Semi-final	0,4
For the 3rd place	0

In the first fight, the resultativity indicator is 5.5 points, his opponent has 1.6 points. In the second fight, the R indicator is 10 points, for the opponent – 0 points, because the fight ended after the first attack, the opponent failed to make any moves. In the third fight, the R is 2.8, for the opponent – R=1. In the 1/4-final, R=7, for the opponent – R=4. In the semi-final fight, R=0.4, for the opponent – R=1.3. There was no fight for the 3rd place as the opponent was removed from the competition. The average indicator for the athlete is 5.1 points.

Table 4

The Resultativity Indicator of Offensive Actions of the 2014 World Championship for the 2nd Place Winner in the Weight Cat. -90kg

Competition Round	Resultativity Indicator of Offensive Actions
1/16 final	4
1/8 final	1,5
1/4 final	0,1
Semi-final	1,3
Final	0,1

The resultativity (R) indicator for the athlete is 4 points, for his opponent – R=0.1. In the second fight, R=1.5, for the opponent – R=0.5, the athlete has a large number of offence actions, but they are not resultative, so the indicator is low. In the 1/4 final, the athlete has R=0.1, the opponent has

R=0.2, despite the resultativity indicator, the athlete made 7 attempts against the opponent's 4 and the judges also evaluated it – issuing a warning to the opponent. In the semi-final fight, the athlete has R=1.3, the opponent has R=0.4. In the finale, the athlete has R=0.1, the opponent has R=3.6. The average indicator of all fights is R=1.4.

Table 5

The Resultativity Indicator of Offensive Actions of the 2014 World Championship for the 1st Place Winner in the Weight Cat. 90kg

Competition Round	Resultativity Indicator of Offensive Actions
1/16 final	4
1/8 final	2,8
1/4 final	0,3
Semi-final	3
Final	3,6

In the first fight, the athlete has resultativity R=4, his opponent – R=0.1. In the second fight, R=2.8, the opponent – R=0.3. In the 1/4 final, the athlete – R=0.3, the opponent – R=0.6, despite the resultativity indicator, the athlete made 6 attempts against the opponent's 2 and the judges also evaluated it, issuing warnings to the opponent (the fight ended with a disqualification for passivity). In the semi-final fight, the athlete – R=3, the opponent – R=0.1. In the final, the athlete – R=3.6, the opponent – R=0.1. The average indicator for the athlete is 2.7. It is a low resultativity indicator, since the athlete had a high number of attempts which resulted in the decrease of the indicator R. However, four of the five fights were won with the maximum advantage.

To make it easier to compare the average results of offensive actions of award-winners, we created Figure 4.

Figure 4. The Average Resultativity Indicator of Offensive Actions of the 2014 World Championship for Award-Winners up to 90kg

One of the tasks of the research was to determine the effectiveness of the offensive actions of the 2005 World Championship. The results are

shown in Figure 5 and the 2014 results for the four best athletes up to 90 kg are shown in Figure 6.

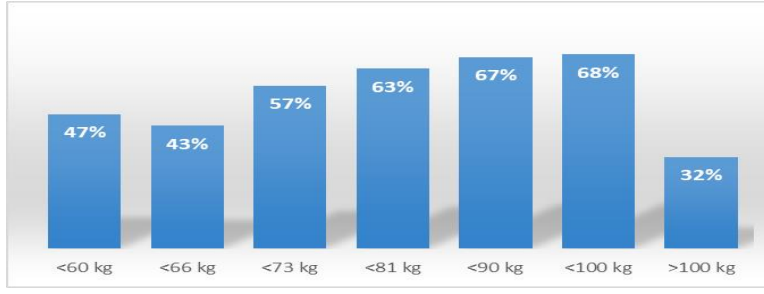

Figure 5. The Average Offensive Action Effectiveness Indicator in all Weight Categories at the 2005 World Championship.

Figure 6. The Average Offensive Action Effectiveness Indicator at the 2014 World Championship.

Discussion

The results of the competition depend on the variables – changes in the rules, change of opponents. Generally, an athlete can stay in high-class for one Olympic cycle, only rarely can athletes last for two or even three cycles. Judges may also evaluate the athlete's performance differently. The training methodology, tactics, technologies that help coaches and athletes are changing.

Until 2012, leg gripping techniques were allowed. These techniques were from the hand technique classification group. After 2012, the International Judo Federation banned techniques of gripping legs with hands. For the given violation, the judoka is disqualified from the fight. As a result, the distribution of throws by classification groups changed. Now very few hand technique methods are allowed, thus the frequency of using these techniques in competitions has decreased. Currently, the hip technique is mostly used, as most of the counter-techniques were hand technique

methods. Since most of the judokas apply the hip technique, most of the counter-techniques are from the group – throws with a fall on the back. Leg technique and shoulder technique methods are still used.

Systematic research over a long period of time will provide an opportunity to understand the development of various components of sports technical mastery (arsenal of technique, effectiveness and resultativity of the technique and the level of technique acquisition) under changing conditions (changing competition rules, changing weight categories, counteraction of various partners, changing physical properties of the carpets, quality of the competition clothes – kimono, etc.).

Weaknesses of research. Difficulties in adapting changes of quantitative indicators in the technique evaluation when the rules change. Methods of the hand technique sub-group are forbidden – gripping legs with hands. The evaluation of the performance of lower assessed technique methods has been abolished – "koka" equivalent 3 points, the holding time has been reduced from 30 seconds to 20 seconds. Different approaches of researchers in the evaluation of technical actions – loss of balance, throws on knees and stomach.

These indicators reflect an important indicator-activity of the fight, but they are not evaluated by judges (experts). This fight intensity indicator is closely related to tactics and special endurance.

As the competition rules change, the opponent's percentage of offensive actions of particular classification group's changes, etc.

The practical significance of the obtained results is to understand the development trend of judo technical mastery. By finding out what are the most applicable techniques today – to perfect them so that the automatic recognition of these throws during the fight is formed, on the so-called intuition level (anticipation). To apply adequate protection and perform appropriate counter-techniques. To develop a tactically technical model against a specific judoka. In general, it provides an opportunity to make adjustments in the training program and in the training of athletes.

Conclusions

Literature on judo arsenal for fight in standing position, which is used internationally (Hoare, 1994) and nationally in Japan (Kano, 1994), France (Kawaishi, 1957; Inogai & Habersetzer, 2002), Belgium, and the Netherlands (Jessink, 1974) was studied. The research provides information on the sets of basic techniques used in teaching in different countries in the formal complexes of pupils / students.

The total number of techniques for fight in standing position has been determined by two internationally recognized institutions – the

International Judo Federation and the „Kodokan" Judo Institute. IJF – the official list includes 72 throws, while „Kodokan" list has 67 throws. Their distribution by classification groups differs: at the „Kodokan" institute, throws are divided into five groups – leg technique, hip technique, hand technique, throws falling on the back, throws falling on the side. At IJF, the throws are divided into four groups – leg technique, hip technique, hand technique, sacrifice throws.

The set of basic techniques for fight in standing position contains 40 throws, 8 throws in each rank of judo mastery (in most countries – 5 ranks). In Latvia, the basic technique consists of 40 throws, which children learn during the training, while growing up to become high-class athletes, but a judoka uses 2 – 3 throws in competitions.

In order to register the resultative throws used in competitions, the stenography method was applied. The technical activity of judokas was registered on specially developed protocols, with the help of signs and symbols.

In the 2005 World Championship for men, 285 throws were made, of which 152 throws were resultative. In the research, it can be observed that, in competition practice, athletes use throws from all classification groups and the frequency of using these throws varies. The most frequently used throws were from the hand technique, followed by sacrifice throws, leg technique, shoulder technique, and the least used was the hip technique, respectively 42 throws or 28%, 40 throws or 26% and 38 throws or 25%, 28 throws or 18% and 4 throws or 3% of the total number of throws.

In the 2005 World Championship for men in the weight category up to 90kg, 12 throws were registered, of which 6 throws (0 sweeps, 2 reaping throws, 4 swings) or 50% were from the leg technique. In the second place were 4 throws (3 throws with the performer falling on the back, 1 throw with the performer falling to the side) or 34% of the risk group – with the performer falling on the back or to the side (sacrifice throws). This is followed by the hand technique with 1 throw (1 throw with gripping the legs) or 8% and the shoulder technique with 1 throw – 8%. The hip technique was not used in this weight category.

In turn, the athletes of the 2014 World Championship applied throws from all groups, while the frequency of use differs. In the course of the research, the men weight category up to 90kg was analysed. In the research, 58 real attacks were registered. In the weight category up to 90 kilograms, judokas used the hip technique the most – 29% (17 throws out of 58). Throws from the leg technique take the second place – 24% (14 throws out of 58), the shoulder technique was in the third place – 23% (13 throws out

of 58), and sacrifice throws were in the fourth place – 19% (11 throws out of 58) and the hand technique was in the fifth place – 5% (3 throws out of 58), which is due to the fact that IJF banned methods from the hand technique in 2012. As a result, all that was left from the hand technique was breaking the balance.

Comparing the obtained results with the 2005 World Championship, it can be concluded that the nature of the match has changed. The use of the hip technique in competitions had increased, while the use of the hand technique had decreased. The use of leg and shoulder techniques and sacrifice throws remained unchanged.

Resultativity is the average mark of a judoka's offensive actions, it determines the quality of the offensive actions. The resultativity indicators (R) of offensive actions for high-class athletes in matches of the 2005 World Championship differ greatly. The average (R) among all weight categories is 3.3 points. The lowest R is 2.2 points in the weight category up to 73kg, which means that a higher number of offensive actions was assessed with lower marks. The highest R is 5.1 points in the weight category up to 90kg.

The effectiveness of the 2005WC provides an idea of the ratio of athlete training. The greater the difference in the training of athletes, the higher this indicator. The effectiveness indicator (E) of offensive actions is the number of assessed offensive actions divided by the total number of offensive actions. This indicator is quite different for all researched athletes in all weight categories. The average E indicator is 54%. The lowest E indicator is 32% in the weight category up to 100kg, which means that only 32% of all offense attempts were assessed, i.e., were effective. The highest indicator is 68% in the weight category up to 100kg. However, in the weight category up to 90kg, which is of interest to us, the indicator is 67%.

Resultativity is the average mark of a judoka's offensive actions, it determines the quality of the offensive actions. The resultativity indicators (R) of offensive actions for high-class athletes (men) who became medal-winners at the 2014 World Championship in the weight category up to 90kg differs. The highest indicator is for the judoka who took the 3rd place. His indicator is 7.2 out of 10. The lowest indicator is for the judoka who took the 2nd place, R – 1.4. This means that the highest number of offensive action attempts was assessed with lower marks.

Effectiveness gives an idea of an athlete's level of training. The effectiveness indicator (E) of offensive actions is the number of assessed offensive actions divided by the total number of offensive actions. This indicator is sufficiently same for all judokas. The average E indicator is 57%. The lowest E indicator is for the 2nd place winner – 36%. The judoka has a very high number of attempts, but most of them were not assessed.

The judges may consider this as activity and the opponent will be issued a warning. The highest E indicator is for the 3rd place – 74%. Respectively, two out of three offenses are resultative.

References

1. Calmet, M. (2010). *Optimisation De La Performance En Judo – Sous la direction de Thierry PAILLARD*. Chap.7.5: Analyse des combats lors des compétitions de haut-niveau – Michel Calmet Editions DEBOECK.
2. Chumakov, E., M. (1976). *Taktika borca – sambista.* [Sambo wrestler tactics] Moskva: FiS, 16-17.
3. Dravnieks, J., Popovs, E., & Paeglītis, A. (1997). *Sporta zinātnisko pētījumu tehnoloģija:* [4d.]. Latvijas Sporta pedagoģijas akadēmija, Rīga, 5-26.
4. *Dzjudo. Sistema i borba:* kollektiv avtorov pod redakciej doktora pedagogicheskih nauk, profesora Shuliki Ju.A., doktora pedagogicheskih nauk, profesora Kobleva Ja.K. - Rostov n/D: Feniks, 2006. – 800s.
5. Fernāte, A. (2002). *Sporta treniņu teorijas pamati:* [1d.]. Latvijas Sporta pedagoģijas akadēmija. Rīga, 30-34.
6. Fernāte, A. (2002). *Sporta treniņu teorijas pamati:* [2d.]. Latvijas Sporta pedagoģijas akadēmija. Rīga, 5, 8.
7. Geesink, A. (1967). *Gokyo: 40 Grund und Kampfwurfe.* Frankfurt/M., Budo-Verlag, Sports-Rhode, 89.
8. Hoare, S. (1994). *The A-Z of Judo*. London: Ippon Books Ltd, 192.
9. Horev, B. (2008). *Luna v tumane. Putevoditel' po boevym iskusstvam dlja novichkov*. [The moon is in the fog. A beginner's guide to martial arts], 450.
10. Inogai, T., & Habersetzer, R. (2002). *Judo pratique*. Amphora. 400.
11. Jessink, H. (1974). Dzju – do. [Ju-do]. Moskva: *Fizkul'tura i sport*, 10-12.
12. Kano, J. (1994). *Kodokan judo*. Tokyo. New York. London. Kodansha International, 264.
13. Kawaishi, M. (1957). *The Complete 7 Katas of Judo*. London: W. Foulsham & Co. Ltd.
14. *Kodokan 67 Judo throws* (2016). Retrieved December 14, 2020 from http://judoinfo.com/gokyo.htm
15. Bocioaca, L. (2014). Technical and Tactical Optimization Factors in Judo. *Procedia - Social and Behavioral Sciences* 117, 389-394.
16. Pimenovs, A. (1996). *Džudo 5 kjū.* Latvijas Sporta pedagoģijas akadēmija. Rīga, 61.
17. Pimenovs, A., & Ekabsons, T. (1986). Ob jeffektivnosti tehnicheskih dejstvij dzjudoistov. [On the effectiveness of technical actions of athlets] *HI regional'naja nauchno – metodicheskaja konferencija po problemam sportivnoj trenirovki*. LGIFK. Riga. 36.-38.
18. Pimenovs, A., & Peļņika, N. (2004). Execution Types of Throws in Judo Competitions. *Kūno kultūra, sportas ir mokslas studentu gyvenime Phisical Education, Sport and Science in Students Life*. LKKA, Kaunas, 97-102.

19. Pimenovs, A., Puķīte, E., & Spuriņa, P. (2012). Džudo sacensību noteikumu izmaiņu ietekme uz sacensību tehnikas modeli (2009.g. džudo čempionāts – sievietes) *Teorija praksei mūsdienu sabiedrības izglītībā, RPIVA*, Rīga, 7-11.
20. Pimenovs, E., Pimenovs, A., & Krūmiņa, P. (2015). Džudistu tehniskās meistarības modeļa raksturojumi 2005.gada pasaules čempionātā (vīrieši). *Teorija praksei mūsdienu sabiedrības izglītībā, RPIVA*. Rīga, 24-29.
21. Rudzītis, Ā. (1979) *Džudo.* Rīga, Liesma, 3.

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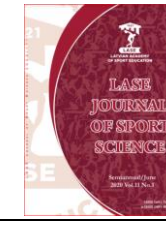

REVIEW PAPER

STUDENTS' WRITING MISTAKES IN LEARNING SPORTS TERMINOLOGY IN ENGLISH, GERMAN AND RUSSIAN LANGUAGES AT THE LATVIAN ACADEMY OF SPORT EDUCATION

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Abstract

Writing is a skill that students of sport science need to master in order to succeed in the spheres of education, the labour market and other settings. When writing reports, articles, bachelor, master and other papers, students write on the computer. But when writing tests in different study courses, taking written exams and especially an integrated state exam in sport science, students must be able to write in correct, clear and explicit language by hand. Assessing their writing skills in the context of learning sport terminology in foreign languages, it is noticeable that most students write poorly without paying attention to their spelling mistakes.

Keywords: *writing skills; sport science students; foreign languages courses*

Introduction

With the development of modern technologies, there arise numerous discussions both in Latvia and abroad on whether writing is an essential skill. On the one hand, this is a skill that any person this day, including athletes, coaches, sport managers and others, can use to be more successful and competitive both in the process of acquiring education and on the labour market, in the context of trainings, competitions and other sport events. Moreover, it is a skill that is closely related to other language skills – listening, reading and speaking, as Wassaf and Marcovechio point out when sttaing that "we believe it [writing] plays an essential role in foreign-language learning and is of considerable importance for consolidating learning in all skill areas" (Wassaf & Marcovechio, 2001). On the

other hand, we increasingly often write with the help of electronic devices that highlight and correct mistakes rather than by hand. Writing correctly has always been a skill that presented a considerable problem both in one's native language and in a foreign language. In speech, one can use ambiguous, grammatically incorrect constructions, leave out or change certain letters and still be understood. Some of these mistakes can even go unnoticed. However, mistakes committed in writing stay on paper – or in the electronic medium – and can easily be spotted.

These factors influence today's young people, including our sport students' as the future sport specialists' writing skill. In preparing reports, articles, bachelor, masters and other papers, students, of course, write on the computer. On the one hand, the use of the computer enables sport students to see and correct all grammatical and spelling mistakes except, in most cases, stylistic mistakes and mistakes in word choice, especially those of incorrectly employed sports terminology. However, while writing tests in various study course, completing written examinations and the integrated sport science state examination, sport students must be able to write in correct, clear and unambiguous language by hand. Unfortunately, here many of our sport students face considerable difficulties. Likewise, in acquiring foreign languages, it has been found that the majority of students have been writing with increasing carelessness and without paying attention to mistakes in grammar and spelling.

Aim of the stud. The aim of the study is to determine the most frequent mistakes committed by students of sport, which they make in writing tests in sport terminology in the study courses "Basics of Professional Communication" and "Professional Communication I, II" in the English, German, and Russian languages.

By knowing the typical writing mistakes, the teacher can bring sport students' attention to these, thus preventing the sport students from repeating these mistakes in future and enhancing their writing skills.

Materials and methods

This study is based on analysing the LASE students' written tests in sport terminology in the English, German and Russian languages while acquiring study courses "Basics of Professional Communication" and "Professional Communication" for students of sport science. Study courses in the English, German and Russian languages are offered to students in sport science as free choice courses provided they have acquired some knowledge of these languages at secondary school. Students' tests were selected randomly among the tests written in academic years 2017-2018, 2018-2019 and 2019-2020. For each academic year, ten tests were selected

in each of the foreign languages and in each of the study courses in order to determine the typical writing mistakes. After the students have worked on eliminating these mistakes, again ten tests were selected and analysed. In all, 180 works of students in sport science were analysed, and, out of these works, three mistakes that were most characteristic for each foreign language were selected. The mistakes were explained to the students, who subsequently performed exercises targeting these mistakes, and it was checked whether an improvement can be detected using a subsequent test. The collected data was processed using Excel 2010 software.

Results

The English language

In performing the first stage of the study, having checked thirty tests of students of sport terminology in the English language over the course of three years, the following three most typical mistakes were detected in the students use of the English language in writing tests on sport-related topics: the subject and predicate agreement in the Present Simple tense ("he/she/it have" instead of "he/she/it has") (73%); incorrect spelling ("ht" instead of "th" in words such as "strength," etc; misspelling words where several consonants or vowels occur in a cluster, for instance, "tight" instead of "thigh," "brest" instead of "breast" and "kickbord" instead of "kickboard"; or missing a consonant in a cluster, e.g., "strait" instead of "straight") (67%); and incorrect word order (69%).

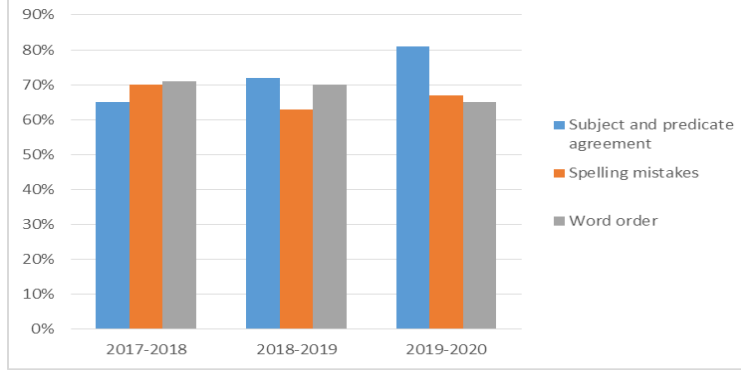

Figure 1. The most typical mistakes in tests in the English language (stage 1)

Having worked on these mistakes, explaining them to the students and providing, where necessary, exercises targeting these mistakes, the most notable improvement was noted in the first group, because the lack of agreement of the subject and the predicate in Present Simple is an elementary mistake and due to lack of attention in writing (from 73%

to40%). This theme in grammar is addressed in level A1 education, so students simply had to be reminded of this issue. The spelling mistakes are harder to address, because they require memorizing the words in the cases where the spelling is not phonetical. One way to improve spelling is to read a lot and to write by hand, but this cannot be done in class: students need to practice reading and writing working at home. However, some improvement was noticed (from 67% to 46%), especially in the cases of words with phonetical spelling, e.g., where the students mixed up the consonant combination "th," e.g., in the words "strength," "thigh," etc. The issue of incorrect word order was caused by the influence of the mother language: both Latvian and Russian, the students' native languages, are inflective, where meaning can be gained from looking at the word endings, which change according to case, number, gender, time, etc. The English language relies primarily on the word order for meaning making, and any variation of the word order can often change the meaning of the sentence. Again, this is a relative simple mistake to explain in the cases of elementary mistakes, and word order is a theme that is addressed throughout teaching from A1 through B1 and B2 levels. Some of the more complex mistakes in word order require considerable practice. By drawing attention to this characteristic mistake, it was possible to decrease the percent of mistakes from 69% to 55%.

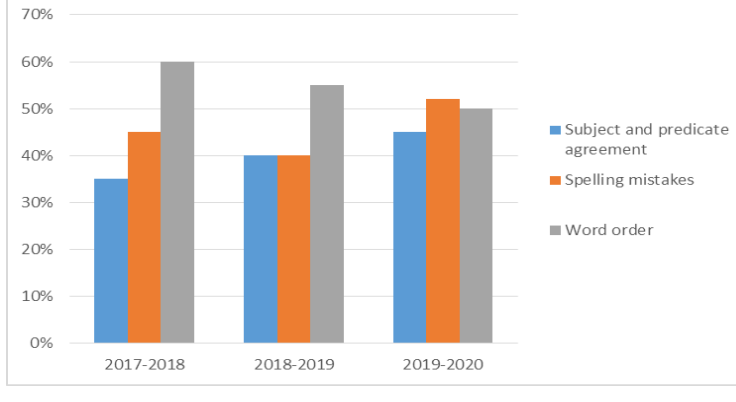

Figure 2. The most typical mistakes in tests in the English language (stage 2)

The German language

In carrying out stage 1 of this research and having checked thirty tests of students of sport terminology in the German language over the course of three years, it was found that in this language the most typical mistakes are: incorrect use of the article (80%) in sport disciplines and other sport-related terms, such as *die Sportart, der Sportler, das Laufen, das*

Geräteturnen and others; word order in a sentence (58%) and writing noun with a lower-case first letter (50%), a mistake that, again, occurs in relation to such sport terms as *der Spitzenreiter, das Schwimmen, die Sportwettkämpfe*. Other popular mistakes in the use and spelling of sport terms relate to spelling parts of the body (*der Finger – der Zeh, das Kinn – das Knie*), sport disciplines (*die Leichtathletik – die Schwerathletik*) and other sports terminology.

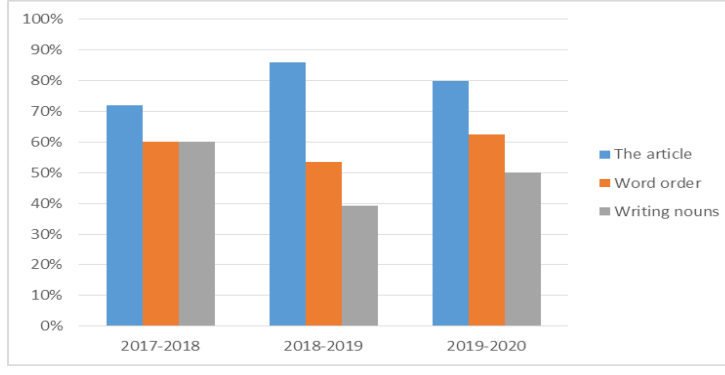

Figure 3. The most typical mistakes in tests in the German language (stage 1)

As the gender in the German language is determined by the article which is to be learned together with the noun, this mistake is very common. Unfortunately, it has been observed in recent years that sport students learn a new word without learning the article. This mistake is very hard to correct, because a person may not be aware of it. Incorrect word order is mostly found in subordinate sentences, where the object in the German language goes to the end of the sentence, but it is always in the second place in the main sentence. This rule is very important for sport-themed texts and sport science texts, because it is characteristic of academic and scientific language styles. This mistake is less common. Writing nouns with a lower-case initial letter is a mistake that has emerged over the recent years. This is a very simple rule of the German grammar, as all nouns in German are written with a capital letter. Meanwhile, students begin to commit this mistake related to the influence of other foreign languages, mostly the English language. This mistake is very easy to correct by drawing the students' attention to it. After drawing the sport students attention to all the three types of mistakes and asking them to both correct their own mistakes and complete exercises in grammar, the second stage of the study was performed. Again, thirty tests were analysed in order to consider the improvement in the students' writing concerning the occurrence of the three above mentioned mistakes.

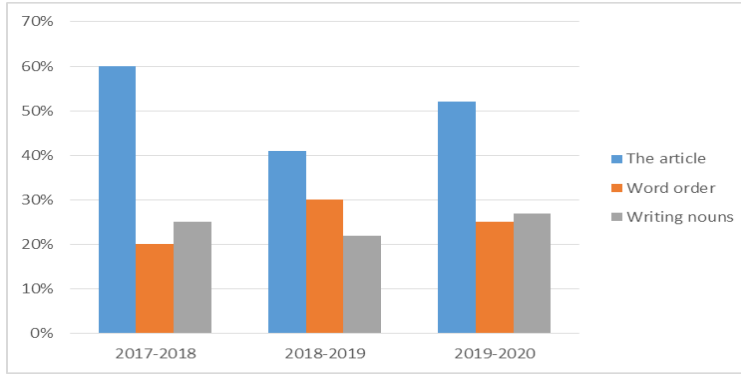

Figure 4. The most typical mistakes in tests in the German language (stage 2)

As can be seen on the chart, the most considerable improvement and decrease in the number of mistakes can be seen in the case of the word order (from 58% to 25%). This is an issue in grammar that can be easily mastered using exercises. The next marked improvement was seen in the use of writing nouns with the capital letter (from 50% to 24.5%), because this mistake was caused by lack of attention. The least marked improvement was in the use of the article (from 80% to 51%), where an article is to be learned together with the noun. In all, working on grammar and correcting these and other mistakes, related to the use and spelling of sport terminology, students' writing in tests was improved by 25-30% overall, which is a very good result.

The Russian language

Writing in the Russian language presents difficulties even for native speakers, and it naturally is hard for foreign speakers. The most characteristic problem faced by the students of sport science is confusing letters (71%), for instance the letters *б-в, г-д,* because the Russian language does not use the Latin alphabet (*б(в)ег на короткие д(г)истанции*, *л(р)ектор*, etc.). Another typical problem is the incorrect use of soft vowel groups *е-э, я-а, у-ю, и-ы* (76%), which is very frequent due to the fact that students learning Russian find it hard to understand which letter they have to write, such as *спортсме(э)н*, *тре(э)нер*, *акаде(э)мия*. The third characteristic mistake is the negative form of the verb, which is written as one word with the verb (60%). Here, we see the influence of the native Latvian language, because in Latvian verbs are written with the negative prefix "ne," for example, *не принимает участие*, *не стартует*. Another popular type of mistake is related to literally translating terminology from Latvian, such as *(на)стольный теннис*, *вольные (свободные) упражнения в гимнастике*, etc.

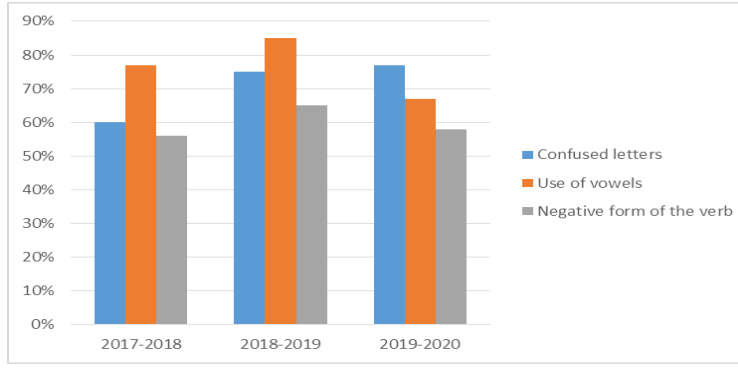

Figure 5. The most typical mistakes in tests in the Russian language (stage 1)

The most difficult task is to master the correct use of the soft and hard vowel groups е-э, я-а, у-ю, и-ы, because this requires writing continuously, which is hard to achieve in during the limited number of hours allocated to the study courses, which explains the modest improvement from (76% to 59%). Confused letters also need long-term practice, but this issue was addressed more successfully by drawing the students' attention to the problem, resulting in a decrease of mistakes from 71% to 41%. The easiest problem to address was the incorrect use of the negative form of the verb, because this mistake can be corrected with relative ease (from 60% to 34%).

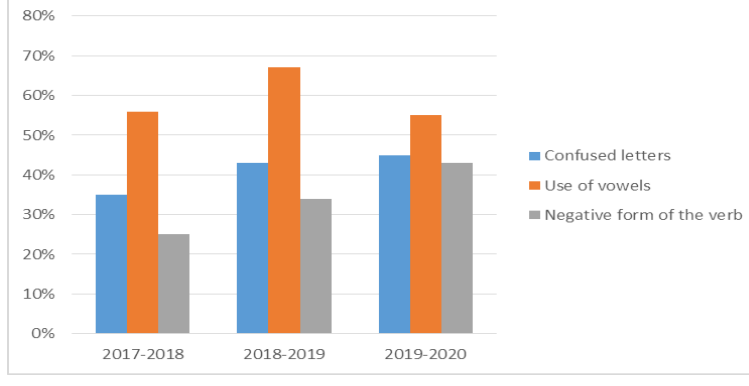

Figure 6. The most typical mistakes in tests in the Russian language (stage 2)

In all, writing in Russian presents most difficulties to our students as compared to writing in German and English due to the use of a different alphabet. If the students had not been used to writing a lot in Russian at school, this can become a significant problem.

Discussion

The issue of writing skills and mistakes in writing has been the subject of the worldwide debate due to the fact that modern technological development becomes an increasingly important part of our daily life. However, there is little controversy as to the main points of why writing is an important skills, the main arguments being summarized as follows:

- Many people are able to remember and retain the information that can be recorded in writing particularly well.
- Writing is intimately related to thinking, thus writing can help us to systematize our "chaotic" thoughts, making them more logical and coherent.
- Writing strengthens memory, revealing both the previously known and that which has not been consciously known before, as in writing people generate new ideas.
- Thoughts and ideas, opinions and references are not quite the same at beginning to write as the ones that come up while writing.
- By writing something new, students strive to develop their thoughts step by step. This circular movement is vital (Šmite, & Cimdiņa, 1996).

Moreover, it has been widely recognized that "those who can communicate their ideas and feelings effectively have a much greater chance to develop themselves, not only professionally but personally as well" (Salomone et al., 2014). Professional and personal development is the aim ultimate aim of higher education, and students of sport science would certainly benefit from studies that facilitate their advancement not only as specialists but also as individuals.

In discussing writing as a skill necessary for a successful professional career, Yagelski singles out three key areas or goals for which writing can be used: writing to analize, writing to persuade and writing to narrate (Yagelski, 2015). All these three purposes of writing are important for future specialists in sports both during their studies and during their professional career.

Moreover, the mastery grammar is undeniably one of the most important prerequisite of writing in efficient, persuasive and unambiguous prose. Salomone et al. Content that, while "a knowledge of grammar by itself will not make anyone a better writer," "the study of writing is much easier if one understands grammar" (Salomone et al., 2014).

Modern communicative approach towards language acquisition does not, however, draw sufficient attention to the development of writing skills at the initial levels of language acquisition (A1, A2), as has been the case previously, when working on the pattern of grammar and translation was

emphasized (Neuer, 1993; Waasaf & Marcovechio, 2001). Currently, the stress is more on developing the speaking and listening skills. More attention is paid to grammar and writing skills at the higher levels of language acquisition, as a secondary school pupil must be able on completing the school to:

- write clear, detailed, logically structured and developed descriptions, as well as memorable and graphic narratives in one's own style; write clear and systematic essays on complicated topics highlighting the most important issues; and develop and argue one's views in a comparatively detailed way, using the necessary arguments, clarifications and examples;
- write a clear, comprehensible report, article or essay of complex content, explaining one's position, suggesting a solution or providing an assessment of a phenomenon or situation;
- create a structured text that enables the readers to comprehend the most important details (Eiropas kopīgās pamatnostādnes valodu apguvei: mācīšanās, mācīšana, vērtēšana, 2006).

As has already been mentioned, the greatest changes in the process of writing are related to the introduction of new technologies in communication (Runkehl et al., 1998). We are writing by hand in increasingly fewer cases and spend increasingly more time writing with the help of computers and other electronic devices. Therefore, teachers in all developed countries complain about the disappearance of writing as a students' skill in its traditional meaning. Thus, a Czech teacher acknowledges that young Europeans who are able to compose a message in their mobile phone at amazing speed gradually lose the ability to write in a traditional way – on paper.

The Prague teacher Jitka Meisnerova in an interview for the newspaper *Mlada fronta Dnes* stated that the students handwriting is "horrible, which is largely influenced by computers and mobile phones." She added that, "in writing essays, the students of the ninth grade of the secondary school are unable to write a single coherent sentence." Alongside problems in writing, young people are facing problems related to the fact that they spend increasingly less time reading, which is something that can be noticed already after the second grade of secondary school, according to Meisnerova. She explains that children would be most willing to type and use other modern technologies for writing rather than write by hand, using writing by hand only to make short notes or sign a card for their grandma. Teachers conclude that this results in the gradual disappearance of writing as an art. Because children use numerous contractions, jargon and slang terms, this tendency changes the language itself (Meisnerova, 2006).

To compare, similar discussions on the role of the writing skill today take place in Germany. The German Ministry fo Education has recently reinforced lessons devoted to writing. Since academic year 2018-2019, writing mistakes in all subject, not only in the German language subjects, can be included in a secondary school student's assessment. The director of the Manheim Council of the German Language Writing Sabina Krome stated that, in her opinion, "this approach is very important, because writing is actually not just a school skill, but a skill that is used in all areas of social life" (Meidinger, 2016). Thus, one German employer, on receiving 150 written applications to a single working place, immediately rejected forty of the applications due to their low quality of writing. Writing correctly is an indicator not only of a person's intelligence and education, but also of his or her discipline (Kretschmann, 2020).

Overall, it can be concluded that writing as a skill was and remains a very important skill in a person's life. To become a specialist in any area, including sport, is possible only if a person can express one's thoughts on paper in a correct and coherent way. Sport coaches, teachers and managers have to complete various documents, write reports and communicate with colleagues from different countries in writing, and this is why our study courses in foreign languages for sport specialists can help our students, future specialists in sport science, to find their way in the world of sport. Many students of sport science recognize this fact and sign up for choice study courses "Basics of Professional Communication" and "Professional Communication I, II" in the English, German, and Russian languages.

Conclusions:

1. Every foreign language has its own characteristic writing mistakes, which are related to sport texts and sport science texts using specific sports terminology. These mistakes can be due both to lack of attention and to the peculiarities of grammatical rules.
2. The most typical mistakes were found in all sport students' tests, irrespectively of the test assessment (typical mistakes occurred both in tests assessed at 4 and those assessed at 8-9).
3. Over the course of three years, the individual mistakes in sport terminology tests may have differed, but the most characteristic types of mistakes were repeated in every year, despite the fact that students changed.
4. In learning the English language, students commit both very basic mistakes (subject and predicate agreement in Present Simple, which is introduced at level A1) and more complicated mistakes, related to difficult, non-phonetical spellings of sport terms and word order in

complex sentences, which are common in writing about the technical and scientific aspects of sport.

5. In learning the German language, students commit new mistakes that were not found five to ten years ago, such as writing nouns, such as sport disciplines and other terms, without the first capital letter.
6. The most characteristic mistakes in the Russian language are related to the different alphabet (Cyrillic).
7. Students learning German and English have one typical mistake in common – incorrect word order, while students learning English and Russian also have one typical mistake in common, that of spelling words, sports terminology included, incorrectly. However, reasons for committing these mistakes are different for each language and need to be addressed in a way that takes into account the grammatical peculiarities of each language.
8. Knowledge of the most typical mistakes enables the teachers to draw attention to these mistakes, correct them, and thus prevent their repeated occurrence and improve the writing skills of the students of sport science.

References:

1. Eiropas Padome. Valodas politikas nodaļa (2006). *Eiropas kopīgās pamatnostādnes valodu apguvei: mācīšanās, mācīšana, vērtēšana.* Rīga: Madonas poligrāfists. Retrieved January 25, 2020, from: https://valoda.lv/wpcontent/uploads/docs/Projekti/LV_mat_evp_valodu_pase.pdf.
2. Kretschmann, W. (2020). *Rechtschreibung nicht mehr so wichtig.* Stimme.de. Retrieved January 25, 2020, from: https://www.stimme.de/suedwesten/nachrichten/pl/Kretschmann-Rechtschreibung-nicht-mehr-so-wichtig;art19070,4312976.
3. Meidinger. H. P. (2016). *Rechtschreibung ist auch heute nicht ganz unwichtig!* causa.tagesspiegel.de Retrieved January 2, 2020, from: https://causa.tagesspiegel.de/gesellschaft/ist-rechtschreibung-ueberbewertet/rechtschreibung-ist-auch-heute-nicht-ganz-unwichtig.html.
4. Meisnerova, J. (2006). *Čehu skolotāji žēlojas par skolēnu izzudušo rakstītprasmi tās tradicionālajā formā.* Tvnet.lv. Retrieved March 25, 2020, from: https://www.tvnet.lv/5693999/cehu-skolotaji-zelojas-par-skolenu-izzudoso-rakstitprasmi-tas-tradicionalaja-forma.
5. Šmite, A., & Cimdiņa, R. (1996). *Metodisko rakstu krājums „Skolotāja pieredze".* Pedagogu izglītības atbalsta centrs.
6. Neuer, G., & Hunfeld, H. (1993). *Methoden des fremdsprachlichen Deutschnterrichts: Eine Einführung.* Langenscheid, Berlin: Kassel.
7. Runkehl, J., Schlobinski, P., & Siever, T. (1998). *Sprache und Kommunikation im Internet. Überblicke und Analysen*. Opladen: Wiesbaden.

8. Salomone, W., McDonald, S., & Japtok, M. (2014). *Inside Writing: Form A.* Stamford: Cengage Learning.
9. Yagelski, R. P. (2015). *Writing: Ten Core Concepts.* Stamford: Cengage Learning.
10. Waasaf, M. S., & Marcovechio, M. R. (2001). *Tracing back the teaching of the writing skill.* San Juan: Universidad National de San Juan.

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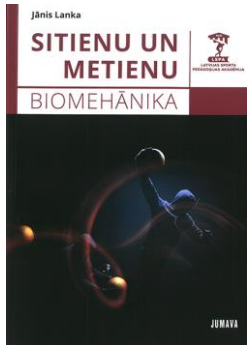
SCHORT COMMUNICATION

Review to Jānis Lanka's book "BIOMECHANICS OF THROWS AND HITS"



The book "Biomechanics of throws and hits" by Jānis Lanka, Professor of Latvian Academy of Sports Pedagogy, is very voluminous and unique in that it describes in detail the principles of movement realization, summarizing research data and findings of many authors from the world's leading specialists and professionals in the field in sports biomechanics. This type of literature on the biomechanics of throwing and hitting movements is in short supply, but in Latvian this is the first and, so far, the only book.

The book is intended for everyone who wants to understand the organization of sports movements, including in detail the biomechanics of hitting and throwing movements and their realization mechanisms – for all types of sports specialists – sports teachers, students, coaches, athletes, physiotherapists, etc. The book consists of four parts, in the first the author has described the basics of sports biomechanics, in the second – the basics of throwing and hitting biomechanics, in the third – the basics of hitting mechanics and in the fourth – the mechanics of body flight and the basics of aerodynamics. Any activity is based on the laws of fundamental physics, the author outlines and shares not only the classical, but also the modern view on the training and execution of the technical element of hitting-throwing. The human body is a complex multifunctional biomechanical system; its action to achieve the goal is strictly coordinated and works in unison as a wholesome unit. All body segments and systems are closely related. The author explains that the understanding of sports biomechanics can help to achieve higher results in the performance of movements: “Biomechanical substantiation of sports techniques is not only technique measuring and evaluating, but also its interpretation and research of the interrelationships between causes and consequences, development of future models of sports techniques, forecasting of sports achievements, managing the process of sports techniques acquisition and operative and objective control of the level of performance. It is not enough to know what it takes to achieve a high result. One should be able to reach the goals, to conduct the process of technical and physical preparation of the athlete.”

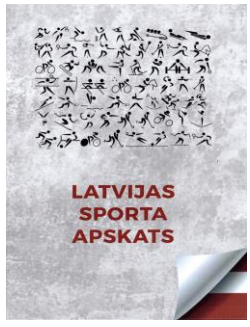
The training material in the book is not only theoretical knowledge, but also the results of practical and scientific research. The School of Theoretical Biomechanics is present, the foundations of which have been laid to the author by Vladimirs Zaciorskis, a world-renowned scientist, biomechanician and leading researcher in the field of sports theory. For Lanka, the biomechanical understanding of movement comes not only from the vast amount of scientific literature that the professor reads on a daily basis, but also from the personal experience of an Olympic Games participant, training at a high level in decathlon gave him a perfect sense of movement organization, that was later only enriched with theoretical basis.

In conclusion, I would like to thank fate for knowing Jānis Lanka not only as a knowledgeable professor, responsive colleague, and a real family man, but I was also lucky enough to write my doctoral dissertation under the supervision of Professor Lanka. I would like to express my greatest gratitude for the ongoing support and productive cooperation!

Anna Zuša
Dr.paed., Leading researcher
Head of LASE Health Care in Sports Research Center and
Sports Science Research Laboratory

SCHORT COMMUNICATION

Foreword to Ilgvars Forands' book "LATVIAN SPORTS REVIEW"



The book “Latvian Sports Review” covers the period from the beginnings of sports to 2020. Over the centuries, Latvian sports have developed, survived, lost, risen, won in the same way as the state and the nation. And yet there are differences: sport was formed under the influence of its own conditions, of course, the influence of politics, economics and socio-technical environment cannot be ruled out. In sports, the person himself is important - an athlete with his abilities and talents, will, desires and ambitions. In sports, the results and achievements are largely determined by the mutual cooperation of the athlete and the coach and the progression towards the goals. Sports are organized and people creative conditions are gormed by people, representing and managing the sports infrastructure. The book uses a historical method, the tool of which is a description or Narrative, which includes a comparative and functional description to reconstruct the historical situation and show the causal relationships of events. This method allows to distinguish the important from the insignificant, to form a hierarchy of events, as well as allows a certain subjectivity of conclusions.

History as the reality of the past is unaffected, but history is not identical to the past, because as history we understand the knowledge and perceptions of people, individuals and social communities about the past, which change with generations, value systems, as well as political, aesthetic and other priorities.

The book describes two themes - sports administration and sports achievements. The first theme is described in the sequence of historical periodization – sports administration in free Latvia, during the occupation and the Second World War, the post-war occupation period and the time after regaining independence. Athletes' achievements are systematized according to the periods of sports administration, however, the emphasis is on success in major official sports events and in the groups of adult age; biographies of athletes, historical events outside the periodization of the book are given to show causation. In the book, the period of time after regaining independence is divided into years, thus allowing tracing the factors driving and hindering the development of sports, the lives and sportive processes of athletes. The historical aspects of sports are given

superficially in the book, because books have been written and published about the history of many sports.

The book is intended for those interested in sports, also as a teaching tool for future sports specialists.

Ilgvars Forands
Dr. Paed., State Emeritus Scientist

CURRENT NEWS

Latvian Academy of Sport Education

LASE International Scientific Conference in Sport Science
February 1, 2021 LASE, Riga, Latvia

LASE 13th PhD and Master Students Conference
March 15, 2021 LASE, Riga, Latvia

LASE 70th Student Scientific Conference
27.01. – 31.05.2021, LASE, Riga, Latvia

The official languages of the Conferences for oral and poster presentations are Latvian and English. The information is placed on the website: www.lspa.lv

12th Baltic Sport Science Conference
April 29 – 30, 2021 Riga, Latvia
https://www.balticsportsciencesociety.org/

European Researchers' Night 2021 Sport Science
Latvian Academy of Sport Education, Brivibas gatve 333
April 30, 2021, Riga, Latvia

OSRESS

Outdoor Sports and Recreation Education Summer School

http://osress.weebly.com/

GUIDELINES FOR CONTRIBUTORS

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The **LASE Journal of Sport Science** is a journal of published manuscripts in English from various fields of sport science. It covers the following types of papers:

- ✓ *original research papers* (maximum 12 standard pages of typescript, including tables, figures, references and abstract),
- ✓ *review papers* commissioned by the Editor (maximum 20 standard pages of typescript, including documentation),
- ✓ *short communications* (maximum 3 standard pages of typescript plus two table or figure and up to 5 references),
- ✓ *letters to the Editor* delivering an opinion or a comment to published manuscripts (maximum 2 standard pages of typescripts),
- ✓ *current news* (information on conference, abstracts of PhD. theses and Post-Doc. theses, book reviews, biographical notes),
- ✓ *advertisements* that may be covered on separate pages of the journal (prices are subjects to individual negotiations).

Papers must be accompanied by the following submission letter (form available at journal's website), signed by all Authors: "The undersigned Authors transfer the ownership of copyright to the **LASE Journal of Sport Science** should their work be published in this journal. Authors state that the article is original, has not been submitted for publication in other journals and has not already been published except in abstract form, preliminary report or thesis. Authors state that they are responsible for the research that they have carried out and designed; that they have participated in drafting and revising the manuscript submitted, which they approve in its contents. Authors also state that the reported article (if it involves human experiments) has been approved by the appropriate ethical committee and undertaken in compliance with The Helsinki Declaration."

Research papers and short communications will be sent anonymously to two reviewers. Depending on the reviewers' opinion, the Editors will make a decision on their acceptance or rejection. The Editors' decision is ultimate.

Manuscript specifications

Articles must be submitted in English and only to the **LASE Journal of Sport Science.**

Authors should observe the ethics of manuscript preparation (avoiding duplicate publication, inaccuracy of citations, fraudulent publication, plagiarism and self-plagiarism).

Copyright will be owned by the publisher: **LASE Journal of Sport Science**. A properly completed Transfer of Copyright Agreement must be provided for each submitted manuscript. A form is available at journal website.

Authors are responsible for the factual accuracy of their papers, for obtaining permission to reproduce text or illustrations from other publications and for an ethical attitude regarding the persons mentioned in the manuscript.

Format

Document format – Microsoft Word 97-2003 or 2007.

Page format – 334x237mm (book fold). Text – single column (font Times New Roman, letter size 12 pt), line spacing – Single, paragraph alignment – Justified, Inside margine – 220mm, Qutside margin 150mm, bottom margin – 190mm, top margin – 144mm.

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Style

Papers must be written in a clear, concise style appropriate to an international readership. Familiar technical terms may be used without explanation. Acronyms and abbreviations are likely to need full presentation at least once.

Content

Research or project reports, case studies of practice, action research reports, and reports on teaching practice or techniques will be accepted.

Research reports should include a description of the practical application(s) of the ideas tested, while reports of teaching practice or techniques should contain an explanation of the theoretical foundation underlying the practice or technique in question.

Material in the form of illustrations or photos is welcomed. This material should be accompanied by text clearly setting out its philosophical or practical origins or implications. All material should be clearly referenced to its sources.

Arrangement

The manuscripts should be arranged as follows: title page, abstract and body text

Title page should contain: title of the paper, first and last names of authors with affiliation, first and last name of corresponding authors with postal address, telephone, fax and e-mail.

Abstract (up to 250 words) consisting of the following sections: justification and aim of the study, material and methods, results, conclusions, as well as 3 – 6 key words, should be provided before the body text.

Body text should be sectioned into: Introduction, Material and Methods, Results, Discussion, Conclusions, Acknowledgements (if necessary) and References. In articles of other types, the text should follow in a logical sequence and headings of its particular sections should reflect issues discussed therein.

Introduction – should be short and concise; it should introduce readers into research problems addressed in the study as well justify undertaking the research and specify its aim.

Material and methods – should describe the subject of the study (in the case of human subjects data should include their number, age, sex and any other typical characteristics) and methods applied in a sufficiently exhaustive way to enable readers to repeat the experiments or observations. For generally known methods only references should be given, whereas detailed descriptions are to be provided for new or substantially modified methods.

Results – should be presented in a logical sequence in the text, tables and figures. Data collated in table and figures should not be repeated in the text which should summarize the most important observations.

Discussion – should emphasize new or important aspects of experimental results and discuss their implications. Results of own studies are to be compared with findings described in the respective domestic and international references used by the Authors.

Conclusions – should be started in points or descriptively and should be logically connected with objectives stated in the *Introduction*. Statements and conclusions not derived from own observations should be avoided.

Author's declaration on the sources of funding of research presented in the scientific article or of the preparation of the scientific article.

References

References should follow the instructions for Authors on References (APA style).

This document describes standards for preparing the references in the APA style.

Citing in-text. Following artificial text shows different types of in-text citation:

Claessens (2010) found evidence that attention will be given to multi-compartment models, such as the 3-water, 3-mineral and 4-compartment models, to assess percentage of body fat. However, Raslanas, Petkus and Griškonis (2010) noted that Aerobic physical load of low intensity got 35.1 % of total trainings time. Research on physical loading also focused on identifying the basis of many years' research of physical activity (Bytniewski et al. 2010). According to Ezerskis (2010), "… heavy physical loads had the undulating character depending on the dynamics of workloads…" (p. 71) yet girls are more ascertained that the Track & Field training helps to develop courage.

Instructions for Authors on References (APA style)

Please provide all the required elements in the references to your paper. Please pay particular attention to spelling, capitalization and punctuation. Accuracy and completeness of references are the responsibilities of the author. Before submitting your article, please ensure you have checked your paper for any relevant references you may have missed.

A complete reference should give the reader enough information to find the relevant article. If the article/book has DOI number, the author should include it in the references. And most importantly, complete and correct references may allow automatic creation of active links by the MetaPress technology that we use for making the electronic version of our journal. Active reference linking is regarded as the greatest benefit of electronic publishing and it adds a lot of value to your publication.

Additional information about APA style writing is found on LASE web page: http://www.lspa.lv/ .

Tables – should be prepared on separate pages (saved in separate files) and numbered using subsequent Arabic letters. They should be provided with titles (above). Every column in a table should have a brief heading and more extensive explanation should be given under the table, e.g. statistical measures of variability.

Figures – should be prepared in an electronic form and saved in separate files. A separate page should be provided with legends to figures, authors' names, manuscript's title, and consecutive number of figures with "*bottom*" or "*top*" identification. Photographs or other illustrative materials may be submitted in an electronic form (*.tif, *.jpg, image resolution: 300 or 600 dpi) or any other form suitable for final technical typesetting by the Editorial Office. In the appropriate places in the text consecutive numbers of tables or figures should be provided in parentheses, e.g. (Tab. 1) or (Fig. 1).

General principles – the Editorial Office reserves for itself the right to correct stylistic errors and to make necessary changes (abridgements) in the text without Author's knowledge. Articles not accepted for publication are not returned. Manuscripts not prepared following *Instruction to Authors* will be sent back to Authors for revision. Galley proofs of manuscripts will be sent to Authors for proofreading. It is the Author's responsibility to return the proof within one week. Each Author will receive free-of-charge one copy of the issue in which their work appears.

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