LASE JOURNAL OF SPORT SCIENCE
is a Scientific Journal published two times per year in Sport Science
LASE Journal for sport scientists and sport experts/specialists

Published and financially supported by
the Latvian Academy of Sport Education in Riga, Latvia

p-ISSN: 1691-7669
e-ISSN: 1691-9912
ISO 3297

Language: English
Indexed in Index Copernicus Evaluation
ERIH PLUS
De Gruyter Open
DOI (Digital Object Identifiers)
Printed in 100 copies

Executive Editor:
Inta Bula – Biteniece
Language Editor:
Ieva Rudzinska

Printed and bound: "Printspot" Ltd.
Cover projects: Uve Švāģers - Griezis
Address: 14-36 Salnas Street
Riga, LV1021, Latvia
Phone: +371 26365500
e-mail: info@printspot.lv
website: www.printspot.lv

Editorial Contact Information,
Publisher Contact Information:
Inta Bula-Biteniece
Latvian Academy of Sport Education
Address: 333 Brivibas Street
Riga, LV1006, Latvia
Phone.: +371 67543410
Fax: +371 67543480
E-mail: akademija@lspa.lv

The annual subscription (2 issues) is 35 EUR
(20 EUR for one issue).
LASE Journal of Sport
Science Exemplary order form of
subscription is accessible
in our website: www.lspa.lv/research

Please send the order to:
LASE Journal of Sport Science
Latvijas Sporta pedagoģijas akadēmija
Address; 333 Brivibas Street
Riga, LV1006, Latvia
Phone: +371 67543410
Fax: +371 67543480
E-mail: akademija@lspa.lv

Method of payment:
Please send payments to the account of
Latvijas Sporta pedagoģijas akadēmija
Nr. 90000055243
Account number: LV97TREL9150123000000
Bank: State Treasury
BIC: TRELLV22
Postscript: subscription LASE Journal
of Sport Science

Full-text available free of charge at http://journal.lspa.lv/
All papers are reviewed

p-ISSN: 1691-7669/e-ISSN: 1691-9912/ISO 3297

ISSN 1691-7669 (ISO 3297)
LASE JOURNAL OF SPORT SCIENCE
Vol. 11, (2020) No. 1, pp. 2-74

CONTENTS

Original research papers

Review paper

LASE Journal of Sport Science
2020 Vol 11, No. 1, Pages 3 – 18
DOI: 10.2478/ljss-2018-0028
p-ISSN: 1691-7669/e-ISSN: 1691-9912/ISO 3297
http://journal.lspa.lv/

ORIGINAL RESEARCH PAPER

BURNOUT AND LIFESTYLE OF SPORTS COACHES IN LATVIA

Sergejs Čapulis, Valerijs Dombrovskis, Svetlana Guseva, Aļona Korniševa

Daugavpils University
Address: Vienibas iela 13, Daugavpils, LV-5401, Latvia
Phone: +371 654 28 636
E-mail: sergejs.capulis@du.lv, valerijs.dombrovskis@du.lv, svetlana.guseva@du.lv, alona.korniseva@du.lv

Abstract

Background and Study Aim: The study involves the analysis of the correlation between burnout and lifestyle of sports coaches. Material and Methods: 70 sports coaches participated in the study, 37 were male and 33 were female. The age of the respondents was between 22 and 62 years (M=42.27; SD=8.81), 34% were aged 36-45, 28% were 26-35, another 28% were 46-55, and 10% were 56-65. The Kern Lifestyle Scale and Maslach Burnout Inventory – Educators Survey were used. Results: The results on each lifestyle scale were determined for the respondents: the highest number of points was found on the Perfection scale – 56% of respondents, and the Pleasing scale – 27% of respondents. The other scales were characteristic of only 17% of respondents in total. Extremely high overall burnout level was found for 30% of respondents, high results – for 33%, average results – for 26% of respondents, and low burnout results were found for 11% of respondents. The most significant positive correlations were found between the Control lifestyle and Emotional Exhaustion (r=.338; p<.01), as well as Depersonalisation (r=.446; p<.01), and no significant correlation was found between the Pleasing scale and the burnout dimensions. A statistically significant positive correlation was found between the Perfectionism scale and Personal accomplishment (r=.455, p<.01). Conclusions: The results of the study show that lifestyles correlate with professional burnout. Sports coaches who tend to strive for excellent results - high on the Perfection scale and show no deep

concern for imperfection, perceive difficulties as a positive challenge, get actively involved in the sports activity and do not develop the burnout syndrome. Coaches with a predominant Expectation lifestyle tend to feel dissatisfied and have a set of unfulfilled expectations regarding themselves or others. If dissatisfaction and unrealistic expectations are not duly satisfied, the specialist may start having a very critical and cynical attitude to themselves and others, which is the core of depersonalisation.

Keywords: *exhaustion, expectation lifestyle, depersonalisation, perfectionism lifestyle, personal accomplishment.*

Introduction

The coaches' pedagogical competence in organising the training and competition process is very important for success in the sports training job. Generally, in sports science, psychosocial aspects of the coaches' activity are focused on the management style in work with athletes, based on a stable system of methods, means and approaches to communication with athletes (Jones et al., 2004).

Sports activity as such is characterised by constant stress, both biological and mental. Positive and negative affect during competition constantly accompanies all subjects of this activity. It is no secret that mental stress can lead to various psychosomatic disorders, which in turn affects the entire organisation of professional activity and everyday life. This is why the burnout phenomenon is given a special place in research.

First of all, Freudenberger (1974, 1975) states that the burnout syndrome can be observed in different professional environments. It involves symptoms of exhaustion, the individual not taking sufficient care of personal needs and wishes, working too intensively and hard, feeling both internal and external pressure, as well as work with a diversity of individuals, which requires a special work approach to the prevention of demoralisation, the feeling of disappointment and chronic fatigue.

Burnout is a result of continuous professional stress when the body's adaptive abilities do not meet the high work requirements, i.e., there is physical, emotional and cognitive exhaustion. The burnout syndrome manifests as chronic everyday stress and exhaustion of energy, which involves negative self-evaluation and negative understanding and attitude to work, as well as loss of empathy; moreover, it is not important in which professional field the specialist is employed (Maslach et al., 2001).

Schaufeli and Enzmann (1998) state that the burnout syndrome appears in the professional fields that are based on interpersonal relationships, which involve intensive professional communication. Relationships with others show cynicism, apathy, emotional detachment; conflicts with colleagues become more frequent; it starts feeling like the meaning of life values is lost (Schaufeli & Buunk, 2003).

In modern sports science, an important place is given to the study of the burnout phenomenon. First of all, burnout is studied in athletes in different sports (Gustafsson et al., 2018; Koçak, 2019). Secondly, it is studied in referees in competitive sports (Gama et al, 2018; Martinez-Moreno et al., 2021), and in the last ten years, researchers have given special attention to the problem of burnout in sports coaches (Olusoga et al., 2019).

Not everyone who feels stress experiences burnout. Burnout is caused by the coaches' disappointment in their work, i.e. time, intellectual and physical resources have been spent in the creation of professional athletes, but the expected results are not there. The coach feels tired and starts thinking about leaving the profession (Raedeke, 1997; Raedeke, 2004).

Either way, coaches with low satisfaction of needs tend to experience high levels of burnout (Bentzen et al., 2016; Sas-Nowosielski et al., 2018). Moreover, as a result of high demands, individuals can feel physical or cognitive fatigue, which can be considered a precondition for burnout or a component of burnout (Westman et al., 2004). Still it needs to be emphasised that burnout is not fatigue because fatigue is correlated with long-term physical powerlessness and characterised by apathy, decrease in activity levels, worsening of activity. Burnout is accompanied by mental overexertion (Hobfoll & Shirom, 2000). Moreover, an excellent characteristic of coach behaviour which indicates emotional exhaustion is their obsessive tendency for long self-reflection (Donahue et al., 2012). Thus, the burnout syndrome can manifest as a defence mechanism (Boyko, 1999).

Another idea found in studies is that burnout is caused by problems related to home and work. Therefore Lundkvist et al. (2016) single out interference of household and work problems as the main factor that promotes burnout when there is no emotional recovery (Bentzen et al., 2016; Kellmann et al., 2016).

As we can see, there are different trends and theoretical prospects in studying coach burnout. We believe that the following

question is important nowadays: Does the lifestyle and emotional state of coaches determine the solving of problems in technical and tactical preparation of athletes?

In the same work environment, individuals suffer from burnout differently – in the process of solving personal, organisational or social issues. The chance to reduce the burnout syndrome depends on the manager and the employees' job satisfaction (Sharma & Sharma, 2015), which is related to the employee's prevailing lifestyle inside or outside the organisation (Ray & Miller, 1994; Kossek & Lambert, 2005).

Lifestyle can describe a personal model of action which can be used to express one's individuality (Adler, 2015). An individual's lifestyle manifests through their thinking, speech, feelings, perception of the world, dealing with conflicts and crises. This model is the product of personal logic and shows what the person gives to life and what they gain (Libin, 2020).

Lifestyle is the basis of professional cognition and a set of principles used to determine and create a hierarchy of values and to set action priorities. This ensures the maintenance of certain stability and consistency about life problems (Allport, 1960).

Lifestyle is related to the following functions: selective perception, decision-making, control of experience, self-defence, reinforcement and prediction of actions and their consequences (Holodnaya, 2004).

Lifestyle is an instrumental procedure for describing an individual, which is required for studying the self-realisation process of the individual's personal potential. It is believed that an individual can regulate their lifestyle themselves (Morosanova, 2007; Morosanova, 2013).

Lifestyle is related to the culture that exists in society. It is emphasised that lifestyle is a feature of the modern world or modernity because lifestyle is like an activity pattern which can be used to differentiate between people. Therefore, lifestyle is described as part of everyday social life in modern society (Chaney, 1996).

Lifestyle is related to identity formation, which is why it is believed that lifestyle features are reflected in the individual's feeling of identity. Social environment is related to an individual's lifestyle (McAdams, 2011). Lifestyle is characterised by external social expression of identity because such expression is strongly affected by the context of social interaction (MacLure, 1993).

To solve professional, cooperation and other life problems, each individual inevitably expresses their sense of the deeper essence of life. Lifestyle is the unity of action; it has grown from complex childhood situations and from pursuit of ambition. Thus, the pursuit of ambition characteristic of an individual is called their lifestyle (Ansbacher & Ansbacher, 1964).

Thus, the individual's choice of lifestyle determines their action priorities (Peluso et al., 2004). In other words, lifestyle is a plan we create to deal with life problems and professional objectives.

Therefore, the following hypothesis is proposed: the origin of professional burnout syndrome in sports coaches is related to the features of their lifestyle.

Materials and methods

Participants. The participants of the study were 70 individual and team sports coaches. 37 of them were male and 33 were female. The age of the respondents ranged from 22 to 62 years (M=42.27; SD=8.81). Most of the respondents were aged 36-45 (34%); respondents in the age groups 26-35 and 46-55 were distributed equally – 28% in each group. The smallest group consisted of respondents aged 56-65 (10%). Most of the research participants had higher professional education or a bachelor's degree (70%); 6% had college level education, whereas 24% had a master's degree. The average work experience of the respondents was 11.99 years (SD=6.99). The shortest work experience was 3 years; the longest work experience was 25 years.

Tools. The Kern Lifestyle Scale (KLS) (Kern & Cummins, 1996; Kern & Kummins, 2000) and Maslach Burnout Inventory - Educators Survey (MBI-ES) (Maslach et al., 1996) were used in this study in the Latvian language. KLS is a 35-item self-assessment scoring test to measure lifestyle. The items are grouped into 5 scales: Control, Perfectionism, Pleasing, Self-Esteem or Victim, and Expectations or Martyr. Each scale contains 7 statements. The respondents had to evaluate the statements on the Likert scale from 1 to 5 where 1 means "Never applies to me"; 2 – "Rarely applies to me" 3 – "Sometimes applies to me"; 4 – "Often applies to me", 5 – "Always applies to me". Good reliability was found for these 5 scales (Cronbach's Alpha coefficient) ranging from 0.83 to 0.90. MBI-ES consists of 22 statements about job-related feelings. The items are scored via self-assessment on a 7-point scale anchored with possible responses where "Never" is 0, "A few times a year or

less" is 1, "Once a month or less" is 2, "A few times a month" is 3, "Once a week" is 4, "A few times a week" is 5, and "Every day" is 6. Processing the data obtained and applying the key provided in the test gives us three dimensions of the burnout syndrome:

- Emotional Exhaustion (EE) – designed for determining emotional exhaustion and overexertion caused by work (9 items, maximum points – 54). Low burnout is 0-16, moderate burnout is 17-26, high burnout is 27+ points.
- Depersonalisation (DP) – determines impersonal and callous attitude to other people (5 items, maximum points – 30). Low burnout is 0-6, moderate burnout is 7-12, high burnout is 13+ points.
- Personal Accomplishment (PA) – designed for determining an individual's feeling of competence and success (8 items, maximum points – 48). The scale is reversed for this dimension. Low burnout is 37+, moderate burnout is 31-36, high burnout is 0-30 points.

The overall Cronbach's Alpha coefficient is .89, which testifies to high reliability of the results.

Procedure. First, we created a questionnaire on the Google Docs platform. Research participants were selected from the Latvian Sports Federation website which shows all the registered sports coaches. The coaches received an email containing a link to the questionnaire and an invitation to take part in the survey with guaranteed anonymity and the information that participation in the research is voluntary. At the end of the survey, the data obtained were encoded and summarised.

Statistical Analysis. The data obtained were processed using the SPSS 23.0 software. The Kolmogorov–Smirnov test was used to assess the correspondence of the results to normal distribution. Spearman's rank correlation coefficient was calculated to find out whether statistically significant differences exist between the results of both respondent inventories.

Results

To obtain the results, we summarised the data and determined the score on each scale for each respondent. The scale with the highest results shows the respondent's predominant lifestyle. The distribution of lifestyles in the sample can be seen in Figure 1.

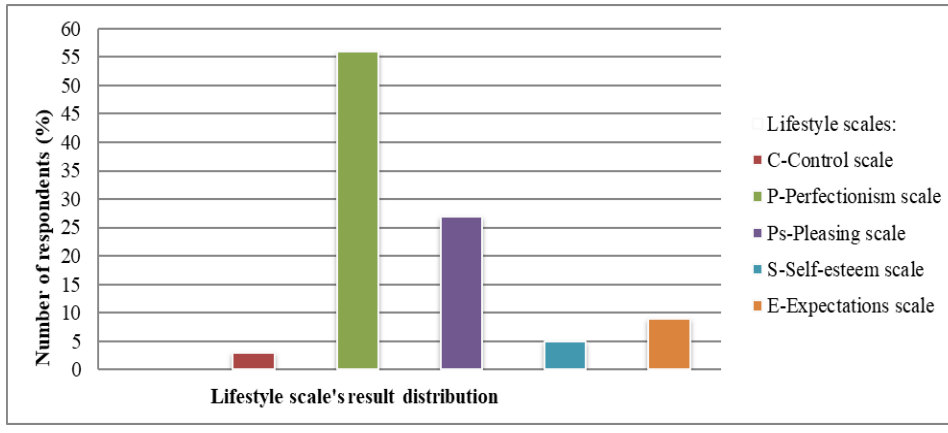


Figure 1. Proportional Distribution of Lifestyle Scale Results

The highest number of points is found on the Perfectionism scale – 56% of respondents – and on the Pleasing scale – 27% of respondents. The other scales are overall characteristic of only 17% of respondents from the sample: Control scale – 3%, Self-esteem scale – 5%, Expectation scale – 9%.

An individual's lifestyle is formed by the combination of all lifestyles; only one or some of the lifestyles are more expressed. The predominant lifestyle can show how the person tends to behave in the work environment in different situations.

Mixed lifestyles have been found among the respondents, i.e. the coaches demonstrate two lifestyles in their activity. The most expressed lifestyles and their combinations can be seen in Figure 2.

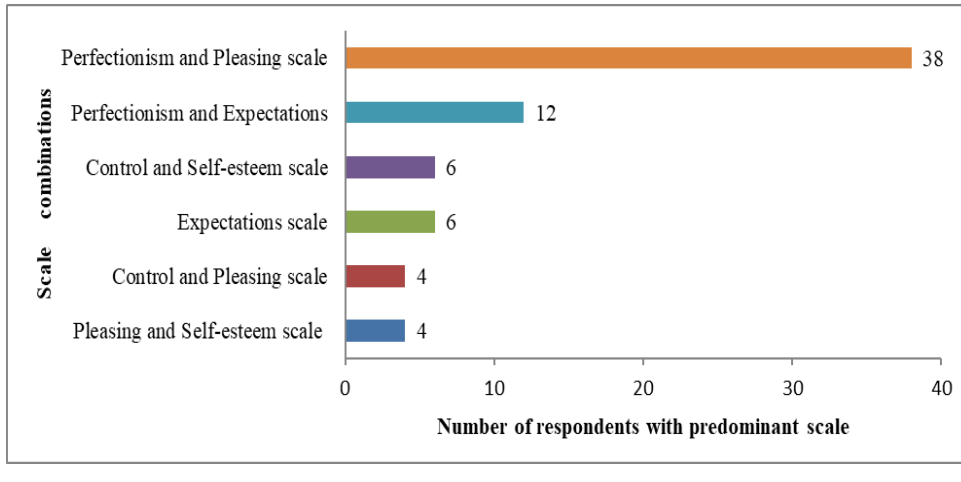


Figure 2. Coaches' lifestyle combinations

As seen from Figure 2, the Perfectionism and Pleasing lifestyle combination constitutes the largest proportion, which amounts to 40% of all respondents. The combined Perfectionism and Expectations scale amounts to 17% of respondents. According to the survey results, expressed Perfectionism scale is characteristic of 7% of the respondent sample.

Let us review the respondent distribution according to the level of burnout, which is shown in Figure 3.

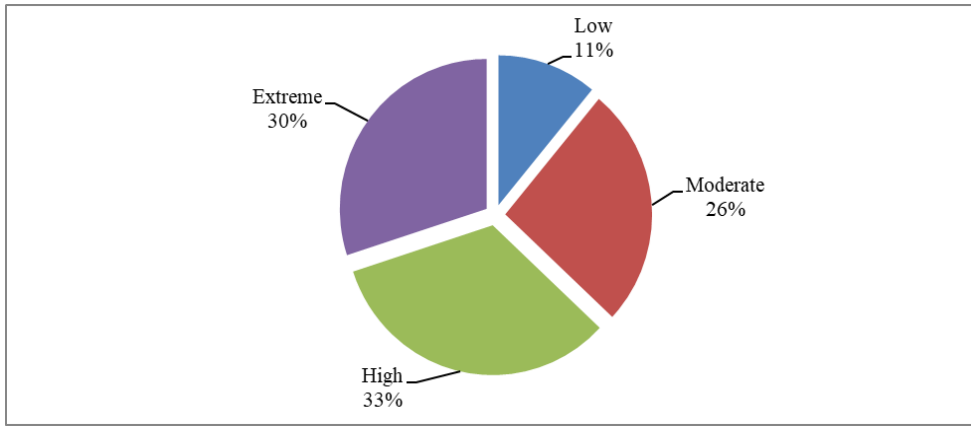


Figure 3. Respondent distribution by burnout level

As we can see from the overall level of burnout, 30% of respondents have an extremely high level of burnout, 33% of respondents have a high level of burnout, 26% of respondents have a moderate level of burnout, and 11% of respondents have a low level of burnout.

The Kolmogorov–Smirnov test was used to find out whether the results obtained in the study correspond to normal distribution. Verification of the KLS data using the Kolmogorov-Smirnov test is shown in Table 1.

Table 1

Kolmogorov-Smirnov coefficients for Kern Lifestyle Scales for empirical data (n=70)

Kern Lifestyle scales	r	p
Control	.100	.078
Perfectionism	.116	.021*
Pleasing scale	.108	.042*
Self-esteem	.130	.005**
Expectations	.091	.200

Note: **p<.01, *p<.05 Significant difference

The evaluation of the results obtained shows that the KLS data do not correspond to normal distribution.

The verification of empirical data for correspondence to normal distribution was also performed for MBI-EI results. The MBI-EI data verification results using the Kolmogorov-Smirnov test are available in Table 2.

Table 2

Kolmogorov-Smirnov coefficients for MBI-EI dimensions for empirical data (n=70)

MBI-EI dimensions	r	p
Emotional exhaustion	.068	.200
Depersonalisation	.144	.001**
Personal accomplishment	.172	.000**

Note: **p<.01, *p<.05 Significant difference

The evaluation of the results obtained shows that MBI-EI empirical data do not correspond to normal distribution.

Thus, after summarising the data, to find out whether a significant correlation exists between sports coach lifestyles and professional burnout dimensions, we performed a Spearman rank correlation analysis of the KLS and MBI-EI dimension results, which is available in Table 3.

Table 3

Spearman's rho for the Kern Lifestyle Scale and professional burnout dimension results (n=70)

MBI-EI dimensions	Emotional exhaustion		Depersonalisation		Personal accomplishment	
	r	p	r	p	r	p
Kern Lifestyle scales						
C (Control)	.338**	.004	.446**	.000	-.098	.422
P (Perfection)	.148	.221	.055	.649	.455**	.000
Ps (Pleasing Scale)	.103	.396	.109	.370	.067	.579
S (Self-esteem)	.261*	.029	.295*	.013	-.219	.068
E (Expectations)	.190	.115	.304*	.011	.123	.310

Note: **p<.01, *p<.05 Significant difference

As we can seen from Table 3, no significant correlation was found between the Pleasing scale and the burnout dimensions only.

Statistically significant positive correlations were found between the Control lifestyle scale and the Emotional exhaustion dimension (r=.338, p<.01), as well as the Control lifestyle scale and the Depersonalisation dimension (r=.446, p<.01).

A statistically significant positive correlation was found between the Perfectionism scale and Personal accomplishment (r=.455, p<.01). Thus, the higher the results on the Perfectionism lifestyle scale and the more expressed the Perfectionism lifestyle, the more expressed the reduction of Personal accomplishment.

Statistically significant positive correlations were found between the Self-esteem lifestyle and Emotional exhaustion (r=.261, p<.05), as well as between the Self-esteem lifestyle and Depersonalisation (r=.295, p<.05).

A statistically significant positive correlation was found between the Expectations lifestyle and Depersonalisation (r=.304, p<.05).

Discussion

Most coaches – almost half of the respondents – are Perfectionists in combination with the Pleasing style. According to the description of lifestyles by Kern and Cummins (1996), perfectionists strive for the ideal, set high standards for themselves, criticise their own achievements, and listen to others' suggestions. Whereas professionals with expressed reduction of personal accomplishment tend to give a negative evaluation to their work and their achievements; they see only negative aspects of the profession, ignoring positive aspects and growth opportunities; criticise their abilities, knowledge; believe that other colleagues are more successful; the feeling of one's insignificance grows (Maslach et al., 2001). However, perfectionism can manifest itself in two ways. For example, Stoeber and Rennert (2008), in their study on the correlation of perfectionism and burnout in teachers, divided perfectionism into two dimensions – striving for excellence and negative reaction to imperfection. The researchers have concluded that professionals who strived for excellence without expressed worry about imperfection perceived difficulties as a positive challenge and actively participated in work. Thus, they did not develop the burnout syndrome. In the context of our study, it can be supposed that most of the coach respondents have a negative reaction to imperfection.

When the Perfectionism and Pleasing lifestyle are combined, a positive effect is achieved by striving for an excellent result together with satisfaction with interaction with others. However, the large number of coaches with the burnout syndrome leads us to believe that a negative reaction to imperfection combined with concern for possible negative reaction from other people poses

difficulty for conflict resolution and implementing their own intentions. This creates the feeling of internal discomfort and increases the risk of burnout. Our research case shows that reduction of personal accomplishment can develop here.

As for the Martyr lifestyle, it is based on false expectations of oneself. False perception of oneself leads to incorrect perception of the surrounding situation. This results in a tendency to feel dissatisfied, in a constant set of unfulfilled expectations of oneself and others. Therefore, if dissatisfaction and unrealistic expectations are not properly controlled, the individual may resort to very critical and cynical attitude to oneself and others, which is also the basis of depersonalisation.

The research results have discovered some coaches with the combination of Perfectionism and Martyr lifestyles. Such combination of lifestyles shows that an individual has difficulty taking responsibility for their life and is possibly hindered by past life events that prevent them from developing adequate self-esteem. They can have difficulty in situations of big change when, on the one hand, there is a desire to do everything perfectly, but, on the other hand, they are overwhelmed by concern that they might fail. Still, the combination of such contradictory scales can testify to their ability to react well in specific situations, as well as the ability to get mobilised if necessary.

Representatives of the Victim lifestyle usually express a high level of empathy and social interest, as well as high sensitivity to criticism due to low self-esteem. Therefore, just like in the case with the Controlling lifestyle representatives, the burnout syndrome was found in the dimensions of emotional exhaustion and depersonalisation.

Representatives of the Controlling lifestyle are assertive, success-oriented, influential, tend to dominate, do not avoid solving problems, are logical and rational. However, no pure representatives of this style have been found, therefore the correlation with emotional exhaustion and depersonalisation leads us to believe that low self-esteem combined with sensitivity to criticism promotes the burnout syndrome.

Representatives of the Pleasing lifestyle show no significant correlation with burnout dimensions. Although they have difficulty maintaining focus on work tasks, they demonstrate a high level of social interest and persistence, sociability and friendliness, sympathy and benevolence. Usually, representatives of the Pleasing lifestyle

are loyal and seek approval from others, which is why they demonstrate the ability to maintain internal emotional comfort and, as a result, avoid burnout.

There is ample description of athlete support systems for maintaining a balanced lifestyle and of the coach's input into physical and psychosocial development of an athlete (Earle, 2003; Andersen, 2016). However, there are currently few systems that describe support for the life of a coach. Still, some concepts applicable to athletes can just as well be applied to coaches (Gastin, 2004; Sabato et al., 2016; Kardeliene et al., 2017).

Among the EU countries, Latvia was the first to include the burnout syndrome in the list of occupational diseases (Flash Eurobarometer 398 – TNS Political & Social, 2014; Lastovkova et al., 2018). This is why, to decrease the risk of the burnout syndrome and prevent further occupational disease, it is believed to be important to support the coach's autonomy in their work, increase resources and diversify coping behaviour strategies in stressful situations, focusing on preventing the development of professional destruction and protecting mental health (Ahola & Hakanen, 2014; Korniseva et al., 2019). It is also recommended to monitor their physical and mental state on the individual level as well as the organisation of their working environment. It is recommended to monitor the level of professional efficiency, signs of cynicism in relationships, and the feeling of internal tension at work. It is good for coaches to remember that sports results are only part of their life achievements, not the other way around. This means that a coach needs to find time for family, friends, self-education, as well as interests and hobbies besides sports, in order to maintain balance in life. At the same time, they need to find a moment to get charged with positive energy outside of sports, no matter how brief such moment might be (Madigan et al., 2019).

Based on the analysis performed and the evaluation of current tendencies in coach burnout research, we believe it is necessary to continue investigating the experience of coach burnout in different sports.

Conclusions

1. Professional burnout of sports coaches is related to the features of their lifestyle.
2. Lifestyle features can serve as predictors of professional burnout in sports coaches.

3. The burnout syndrome does not manifest in those professionals who strive for excellence and show no expressed worry about imperfection, perceive difficulties as a positive challenge and actively participate in work.
4. Professional participation in sports requires of coaches the ability to distribute time between sports and personal life. The ability to balance personal resources between professional activity and private life improves the quality of the coaches' work and stability in the profession.
5. Understanding the features of one's lifestyle allows predicting the success of the coaches' business interaction with athletes.

References

1. Adler, A. (2015). *Practice and theory of Individual Psychology*. Academicheskiy proyekt. (in Russian)
2. Ahola, K., & Hakanen, J. (2014). Burnout and health. In M.P. Leiter, A.B. Bakker, & C. Maslach (Eds.), *Burnout at work: A psychological perspective* (pp. 10-31). Psychology Press.
3. Allport, G.W. (1960). *Becoming: Basic Considerations for a Psychology of Personality*. Yale University Press.
4. Andersen, S.A., Ronglan, L.T., & Houlihan, B. (2016). *Managing elite sport systems: Research and practice*. (1st ed.). Routledge.
5. Ansbacher, H.L., & Ansbacher, R.R. (Eds.). (1964). *The Individual Psychology of Alfred Adler: A systematic presentation in selections from his writings*. Harper & Row.
6. Bentzen, M., Lemyre, P.N., & Kenttä, G. (2016). Development of exhaustion for high-performance coaches in association with workload and motivation: A person-centered approach. *Psychology of Sport and Exercise*, 22, 10-19. https://doi.org/10.1016/j.psychsport.2015.06.004
7. Boyko, V.V. (1999). *Burnout Syndrome in Professional Communication*. Sudarinya. (in Russian)
8. Chaney, D. (1996). *Lifestyles*. Routledge.
9. Donahue, E.G., Forest, J., Vallerand, R.J., Lemyre, P.N., Crevier-Braud, L., & Bergeron, E. (2012). Passion for work and emotional exhaustion: The mediating role of rumination and recovery. *Applied Psychology Health and Well Being*, *4*(3), 341-368. doi: 10.1111/j.1758-0854.2012.01078.x
10. Earle, C. (2003). Lifestyle management for young athletes. *Faster, Higher, Stronger*, 20, 16-17.
11. Flash Eurobarometer 398 – TNS Political & Social. (2014). *Working conditions* (report). European Commission. http://ec.europa.eu/commfrontoffice/publicopinion/flash/fl_398_en.pdf
12. Freudenberger, H.J. (1974). Staff burn-out. *Journal of Social Issues, 30*(1), 159-165. https://doi.org/10.1111/j.1540-4560.1974.tb00706.x

13. Freudenberger, H.J. (1975). The staff burn-out syndrome in alternative institutions. *Psychotherapy: Theory, Research & Practice*, *12*(1), 73-82. https://doi.org/10.1037/h0086411
14. Gama, D., Nunes, R., Guimarães, G., Silva, L., Castro, J., & Vale, R. (2018). Analysis of the burnout levels of soccer referees working at amateur and professional leagues of Rio de Janeiro, Brazil. *Journal of Physical Education and Sport*, *18*(2), 1168-1174. doi: 10.7752/jpes. 2018.s2174
15. Gastin, P. (2004). Lifestyle management. *Faster, Higher, Stronger*, 23, 18-22.
16. Gustafsson, H., Madigan, D., & Lundkvist, E. (2018). Burnout in athletes. In R. Fuchs & M. Gerber (Eds.), *Handbuch Stressregulation und Sport*. *Springer Reference Psychologie* (pp. 489-504). Springer. https://doi.org/10.1007/978-3-662-49322-9_24
17. Hobfoll, S.E., & Shirom, A. (2000). Conservation of resources theory: Applications to stress and management in the workplace. In R.T. Golembiewski (Ed.), *Handbook of Organization Behavior* (pp. 57-80). Marcel Dekker.
18. Holodnaya, M.A. (2004). *Cognitive styles. About the nature of the individual mind* (2nd ed.). Piter. (in Russian)
19. Jones, R.L., Armour, K.M., & Potrac, P. (2004). *Sports coaching cultures: From practice to theory*. Routledge.
20. Kardeliene, L., Šarkauskiene, A., & Masiliauskas, D. (2017). Subjective well-being of physical education teachers and its connection to the attitude towards social communication (Kūno kultūros ugdytojų subjektyvi asmeninė gerovė ir jos sąsajos su socialinės komunikacijos nuostata). *Pedagogika*, *128*(4), 248-257. http://dx.doi.org/10.15823/p.2017.67 (in Lithuanian)
21. Kellmann, M., Altfeld, S., & Mallett, C.J. (2016). Recovery–stress imbalance in Australian Football League coaches: A pilot longitudinal study. *International Journal of Sport and Exercise Psychology*, *14*(3), 240-249. https://doi.org/10.1080/1612197X.2015.1020662
22. Kern, R.M., & Cummins, C.C. (1996). *Kern Lifestyle Scale interpretation manual*. CMTI Press.
23. Kerns, R.M., & Kummins, Č.K. (2000). *Kerna dzīves skalas interpretācijas rokasgrāmata* (Kern Life Style Scale interpretation manual). Rīgas pilsētas Skolu valdes Skolu psiholoģiskās palīdzības centrs. (in Latvian)
24. Koçak Ç.V. (2019). The relationship between self-efficacy and athlete burnout in elite volleyball players. *Pedagogics, psychology, medical-biological problems of physical training and sports*, *23*(5), 231-8. https://doi.org/10.15561/18189172.2019.0504
25. Korniseva, A., Guseva, S., Dombrovskis, V., & Capulis, S. (2019). Professional burnout level and mental health of teachers in Latvia. *The European Proceedings of Social & Behavioural Sciences*, LXXIV, 337-345. https://doi.org/10.15405/epsbs.2019.12.02.40

26. Kossek, E.L., & Lambert, S.J. (2005). *Work and life integration: Organizational, cultural, and individual perspectives*. Lawrence Erlbaum Assoc.
27. Lastovkova, A., Carder, M., Rasmussen, H.M., Sjoberg, L., Groene, G.J., Sauni, R., Vevoda, J., Vevodova, S., Lasfargues, G., Svartengren, M., Varga, M., Colosio, C., & Pelclova, D. (2018). Burnout syndrome as an occupational disease in the European Union: An exploratory study. *Industrial Health, 56*(2), 160-165. https://doi.org/10.2486/indhealth.2017-0132
28. Libin, A.V. (2020). *Differential psychology* (6th ed.). Yurait. (in Russian)
29. Lundkvist, E., Gustafsson, H., Davis, P., & Hassmen, P. (2016). Workaholism, homework/work-home interference, and exhaustion among sports coaches. *Journal of Clinical Sport Psychology, 10*(3), 222-236. https://doi.org/10.1123/jcsp.2015-0029
30. MacLure, M. (1993). Arguing for Your Self: identity as an organising principle in teachers' jobs and lives. *British Educational Research Journal, 19*(4), 311–322. https://doi.org/10.1080/0141192930190401
31. Madigan, D., Gustafsson, H., Smith, A., Raedeke, T., Hill, A. (2019). The BASES expert statement on burnout in sport. *The Sport and Exercise Scientist,* 61. https://www.bases.org.uk/imgs/tses___issue_61_autumn_19_expert_statement_online__pages_579.pdf
32. Martínez-Moreno, A., Ibáñez-Pérez, R., Sánchez-Roca, C. (2021). Leadership, stress and burnout among basketball referees. *Journal of Human Sport and Exercise, 16*(1), in press. https://doi.org/10.14198/jhse.2021.161.08
33. Maslach, C., Jackson, S.E., & Schwab, R.L. (1996). Maslach Burnout Inventory-Educators Survey (MBI-ES). In C. Maslach, S.E. Jackson, & M.P. Leiter (Eds.), *MBI Manual* (3rd ed., pp. 27-32). Consulting Psychologists Press.
34. Maslach, C., Schaufeli, W.B., & Leiter, M.P. (2001). Job burnout. *Annual Review of Psychology,* 52, 397-422. http://dx.doi.org/10.1146/annurev.psych.52.1.397
35. McAdams, D.P. (2011). Personal narratives and the life story. In O.P. John, R.W. Robins, & L.A. Pervin (Eds.), *Handbook of personality: Theory and research,* (pp. 242-264). The Guilford Press.
36. Morosanova, V.I. (2007). Individual self-regulation and human character. *Voprosy Psikhologii,* 3, 59-68+191.
37. Morosanova, V.I. (2013). Self-regulation and personality. *Procedia - Social and Behavioral Sciences,* 86, 452-457. https://doi.org/10.1016/j.sbspro.2013.08.596
38. Olusoga, P., Bentzen, M., & Kentta, G. (2019). Coach burnout: A scoping review. *International Sport Coaching Journal, 6*(1), 42-62. https://doi.org/10.1123/iscj.2017-0094

39. Peluso, P.R., Peluso, J.P., White, J.F., & Kern, R.M. (2004). A comparison of attachment theory and Individual Psychology: A review of the literature. *Journal of Counseling and Development*, *82*(2), 139-145. https://doi.org/10.1002/j.1556-6678.2004.tb00295.x
40. Raedeke, T.D. (1997). Is athlete burnout more than just stress? A sport commitment perspective. *Journal of Sport and Exercise Psychology*, *19*(4), 396–417. https://doi.org/10.1123/jsep.19.4.396
41. Raedeke, T.D. (2004). Coach commitment and burnout: A one-year follow-up. *Journal of Applied Sport Psychology*, *16*(4), 333-349. https://doi.org/10.1080/10413200490517995
42. Ray, E.B., & Miller, K.I. (1994). Social support, home/work stress, and burnout: Who can help? *The Journal of Applied Behavioral Science*, *30*(3), 357-373. https://doi.org/10.1177/0021886394303007
43. Sabato, T.M., Walch, T.J., & Caine, D.J. (2016). The elite young athlete: Strategies to ensure physical and emotional health. *Open Access Journal of Sports Medicine*, 7, 99-113. https://doi.org/10.2147/OAJSM.S96821
44. Sas-Nowosielski, K., Szostak, W., & Herman, E. (2018). What makes coaches burn out in their job? Prevalance and correlates of coaches' burnout in Poland. *International Journal of Sport Science & Coaching*, *13*(6), 874-882. https://doi.org/10.1177/1747954118788539
45. Schaufeli, W.B., & Buunk, B.P. (2003). Burnout: an overview of 25 years of research in theorizing. In M.J. Winnubst & C.L. Cooper (Eds.), *The handbook of work and health psychology* (pp. 383-425). Wiley.
46. Schaufeli, W.B., & Enzmann, D. (1998). *The Burnout Companion to Study and Practice: A Critical Analysis*. Taylor and Francis.
47. Sharma, R., & Sharma, N. (2015). Opening the gender diversity black box: causality of perceived gender equity and locus of control and mediation of work engagement in employee well-being. *Frontiers in Psychology*, 6, 1-14. https://doi.org/10.3389/fpsyg.2015.01371
48. Stoeber, J., & Rennert, D. (2008). Perfectionism in schoolteachers: Relations with stress appraisals, coping styles, and burnout. *Anxiety, stress, and coping*, *21*(1), 37-53. https://doi.org/10.1080/10615800701742461
49. Westman, M., Hobfoll, S., Chen, S., Davidson, O., & Laski, S. (2004). Organizational stress through the lens of Conservation of Resources (COR) Theory. In P. Perrewe, D. Ganster (Eds.), *Exploring interpersonal Dynamics (Research in Occupational Stress and Well Being)*, 4, (pp. 167-220). Emerald Group Publishing Limited

Submitted: May 5, 2020
Accepted: June 15, 2020

LASE Journal of Sport Science
2020 Vol 11, No. 1, Pages 19 – 36
DOI: 10.2478/ljss-2018-0029
p-ISSN: 1691-7669/e-ISSN: 1691-9912/ISO 3297
http://journal.lspa.lv/

ORIGINAL RESEARCH PAPER

THE PARADIGM OF SCHOOL AS A LEARNING ORGANIZATION: KEY FEATURES FORMING A MODERN ORGANIZATION

Paulina Palujanskiene, Biruta Svagzdiene

Lithuanian Sports University
Adress: Sporto str. 6, Kaunas, 44221, Lithuania
Phone: +37067777171
E-mail: paulina.gailiun@gmail.com biruta.svagzdiene@lsu.lt

Abstract

The article defines perspectives of school's turning into a learning organization in the age of media and information. In the course of overcoming of challenges raised by a dynamic society and while trying to satisfy the needs of interested parties, the problem of content is encountered – as the concept and context of school are changing in the society, higher and higher requirements or even their contrasts need to be faced. The main objective of this article is to use the research analysis to identify the key features formed by a modern organization. In order to achieve this objective, the following questions for discussion were raised: what is a contextualization of the school as a learning organization with regard to search and presentation of own identity? What are the key formative features of the school as a modern organization? The method of analysis and synthesis of scientific literature is applied for disclosure of the theoretical ground of the article. It is evident that the expectations of the school are changing when formal and informal education is organized. The need for interdisciplinary competences, interinstitutional cooperation with business, public or other budgetary institutions or private suppliers, and organizers is encountered. Such expansion of the scope of provided services presupposes the need for a school to become a learning organization. This process is the stage of a modern school. It is characterized by such individual features as personal excellence, learning culture, thinking flexibility, community, and cooperation, systemic thinking, division of responsibilities, motivating environment, self-reflection, and feedback.

Keywords: *school, learning organization, modern organization*.

Introduction

In present age of media and information, the society has to cope with its advantages and disadvantages. Schools are forced to reconsider their performance directions, functions, and strategy. Such self-audit of educational factors, academic results, environments, personnel management, psychological microclimate of community, and many other issues is necessary to achieve more effective results. Then a ground for stronger positions in the area of education's organization with regard to competitive aspect is formed. In contrast to a traditional performance model, these circumstances form the school's need to organize its activities on the ground of service provision, when principles of *learning organization* are applied. Therefore, several key problems should be distinguished. *First of all*, incorporation of principles of harmonious activity into the importance and relevance of the organization's (school's) activity reveals the fact that majority of the foreign and Lithuanian authors have analysed topics of harmonious organization, e.g., Navickas, K., Navickienė, R. (2009) were designing a model of harmonious organization and established preconditions that induce organizations to comply with the harmony principles; Joyce, A., Paquin R., (2016) were researching benefit of harmonious activities of organizations for those organizations and their environment; Budeanu, A., Miller, G., Moscardo, G., Ooi, C.S. (2016) were analysing introduction of the harmony principles to tourism companies that organize leisure for their customers, and many other authors. According to Sabaitytė, J. (2017), expansion of various society groups led to changes in efficiency of communication measures, and at the same time raised need for new methods of efficiency assessment, selection, and management of measures. *Secondly,* the educational institutions encounter inevitably the competitive challenges and need for competences to form competitive policy, which demands skills in management. The appearance of the concept of educational marketing in the Lithuanian scientific discourse (Kvieskienė, Kvieska 2012; Kvieskienė, Celešienė 2014; Rutkauskas 2014; Bardauskienė 2014; Putnamas 2015) caused risk for a school to get lost in its direct mission, because the school of general education and its principles aim at a *happy customer,* while at the same time, a service that would meet the pupil's needs the best should be offered. P. F. Drucker (1950), who was among the first researchers in this area, recognized that there is no universal *service for all* and suggested to classify schools according to the areas and direction of their activities. However, more than half of a century later, the discussions on this issue still continue. In order to implement this on the national level, clear and detailed agreements between educational

community and legislators are needed. However, they have not been made yet.

It should be noted that there is a constant need to investigate a school as a learning organization, its prominence, and changes in order to reach comprehensive and relevant results and tendencies of impact (Whitley, M., A. et al. 2019). This area with a focus on situation in the Lithuanian schools has been little researched (Kvedaraitė, 2009; Švagždienė, 2010). The survey on the scope of researches performed on the topic revealed that similarly to foreign countries, it is tended in our country to analyse reputation of schools (organizations), but nobody talks about importance, formation, and management of reputation of a community of public sector as a learning organization when services are provided. Successful and clear research has to be based on scientific knowledge and scientifically-based solutions intended to analyse and evaluate choice of measures in a complex mode. The scientists are analysing widely the means of a learning organization, characteristics of society members as users, and preparation of strategies for different stages of the user's life cycle. However, it has been noticed that there is shortage of scientific researches that would cover complex analysis of features of the school as a learning organization and their assessment within the context of modern theories attributable to management and education science. This knowledge would allow adding additional features to the theory.

Purpose of the work. To establish the key features forming a modern organization within a context of school as a learning organization.

Object of the work. Features of the school as a learning and modern organization.

As there is shortage of researches on features forming the school as a learning organization, the statements provided above allow raising the *problem-oriented questions:*

1. What is a particularity of identity of the school as a learning organization?
2. What are the problems encountered by the school on its way to become a modern organization and what features of the learning organization should be highlighted?

Material and methods

Research methods. The analysis of scientific literature is applied in order to disclose theoretical ground of the work. It is discussed, how the opinion of the interest groups about the learning organization and its activities has been formed in time and transmitted publicly, as it defines the probable behaviour of the school in the future and shows trust level. The content analysis of documents was chosen. This method allows examining

the text objectively as reflections of values and regulations. The essential advantages of the documents' content analysis that have determined its selection are possibilities granted by this method to work with huge amount of the text, to interpret the data in wide and various modes, while at the same time strict, clear and standardized rules of analysis are applied, which increases the objectivity degree of the results.

Results

Theoretical substantiation of Topics of the Learning Organization: interpretation, particularity, and features in self-creation of a School-learning Organization.

Each organization, including Lithuanian general education schools, is operating in the changing environment that is always developing. This shift became more intensive when the world had faced the society of knowledge and information (Kvedaraitė, 2009). According to N. Kudokienė and A. Juodaitytė (2005), within this context, the school has to face a problem and a challenge to act in dynamic environment, where demand for new competences and resources arises. The school has to select versatile or interdisciplinary knowledge necessary to improve its activities and to apply that knowledge creatively in order to project and model the activities and new strategies. For this purpose, the school as an organization has to develop continuously and to become a different – qualitatively new – learning organization (Valuckienė et al., 2015).

The substantiations of certain theories have to be used to analyse the topic. The theories of a Learning Organization (Senge, 1990; Hallowell, Gambatese 2009; Peleckienė, 2014), Autonomous Learning/Teaching and Social Constructivism (Vygotsky, 1978) were used in this work. It is important to review each of them briefly and to discuss whether they can be adapted for this article.

The theory of a *Learning Organization* is used to substantiate the experience of learning organizations. It is stated that only a complex all-embracing approach to the organization, when various development aspects of that organization are assessed, may bring the efforts of the organization's members closer to the result. Pioneer P. Senge criticized the fragmentary character of modern world, its disunity and a viewpoint that improvement of individual elements of the system will result in its successful operation. It is important to mention that there are many scientists, who are interpreting the content of the theory of the Learning Organization in their own way; however, this topic could be analysed in wider and more thorough scope in future scientific works.

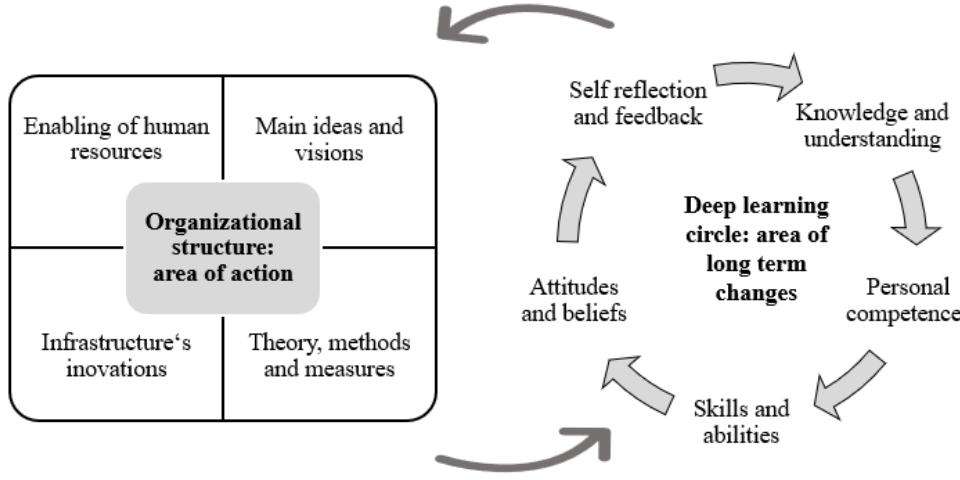


Figure 1. A systematic view of learning organization (prepared by the author based on Senge, 1990; Valuckienė and etc., 2015)

When a systemic portrayal of a learning organization by the scientists (Senge, 1990; Valuckienė et al., 2015) is analysed, it is very important to identify the functioning circumstances and components of the learning system (see Fig. 1). The space of learning and changes is illustrated as an unceasingly rotating circle of an organizational structure (area of actions) and a deep learning cycle (area of long-term changes). It reveals, how the gained new experiences improve the already present competences (professional and personal). The (expected) result is not improved or acquired single capacities, but the totality of them – certain competences. This has a positive impact on formation of positive relationship between a person and an organization based on trust, induces motivation, conscious assumption of responsibility, and fostering of the sense of joint activities and transformation of self-identification from "they" to "us". With time, the goals set by the organization and its community members are not regarded as some supreme goals-objectives, but as a strategy recognized by the entire organization, where the processes of learning and changes are implemented as their natural constituents. The change in understanding of personality's self-comprehension and relationship with surrounding environment is characteristic to this stage when it is possible to observe and assess objectively not only consequences of processes or phenomena, but also to substantiate, reason and explain the causes. According to P. Jucevičienė (2007), the learning organization is created in a long while, although individual changes may occur quickly.

"The learning circle" is rotating in interaction with a performance space (J. Valuckienė (2015) defines the term of performance space as a social environment surrounding a person in organization and a process of its (self-)formation) that is portrayed as a rectangular in the systemic model of the learning organization. It stresses that all the schematic parts are of equal importance and that they are closely interrelated. It is important to acknowledge that substantial ideas do not appear out of anywhere in the organization. The added value of the organization is created by its employees, so the attention should be given not only to infrastructural innovations, search for performance methods or measures, purification of main ideas or visions, but also to full-rate enabling of human resources. It has to be acknowledged that it is an often case when professional competences may be acquired or improved within a certain time when needed – they are acquired. The opposite case is personal competences – they are frequently improved and not acquired.

The internal vision of the organization's community members has to coincide with the organization's vision. The distribution of decision making and responsibilities is also a joint process of the organization and its members. However, the organization's community members have to be ready for effective assumption of such responsibilities, adequate comprehension and wide scope of evaluation in the organizational situations, and rational decision making – they have to be "mature" with regard to consciousness and rationality.

According to P. Zakarevičius (2012), in case of objective circumstances that demand for changes, only the organizations that have *internal critical potential* able to guarantee increase of possibilities for activities may develop. The main factor of such formation is the growth of the personnel's qualification up to the level that may impact positive changes. Therefore, the fundamental preconditions for the organization's development do not lie in the changes of its external environment, but in the "critical mass" of internal potential (personnel of certain maturity). If this "critical mass" is too small, the organization is not able to pass to more qualitative state. It cannot assess adequately the changes in the environment and react to them.

Thus, if the organization does not examine "maturity" of its employees before the organizational-change processes are started, it risks to encounter difficulties in the course of the process. Accordingly, the activities would be slowed down and disorganized, unplanned financial, time and energy investments would be needed, concentration and disposition to work would be decreased, whereas possible rotation of employees in the middle of the process-change could affect negatively

general motivation or even microclimate. This could be avoided or at least certain preparations could be made if versatile self-audit of human resources was implemented. This would allow directing the community members to work in the areas, where their competences would be the most effective; this would reduce risks down to the minimum.

Self-reflection of the organization's community members and feedback are equally important. They allow the persons and the organization observing and recording the progress, naming, solving, and improving the difficulties, purifying the most effective methods and means.

The researchers of *Autonomous Learning/Teaching* stress the theories of social learning, learning from experience and activities, as they manifest conversion of the educational paradigm from traditional (teaching paradigm) to contemporary (learning paradigm) and substantiate the new attitude to human learning that takes place through continuous observation and reflexive investigation of the environment, experience, knowledge, and activities individually or by creating relations of partnership.

The theory of *Social Constructivism* stresses learning not as autonomous activity of social life that takes place only in the educational institution, but as an interaction of cognitive behaviour and environmental determinants when a learning person and an environment are affecting each other. As boundaries between education, leisure, work, and learning activities are disappearing, the educational organization is becoming only one among many environments, where a person is learning (Collins et al., 1992; Linkaitytė, Žilinskaitė, 2007).

Many authors have defined the concept of a learning organization (De Loo, 2006, Mikalauskas, 2005; 2006; Švagždienė, 2010; Verduijn, 2016; Örtenblad, 2018). The difference between the definitions of a learning organization developed by the aforementioned authors becomes evident when different learning methods are presented and developed. V. Peleckienė (2014) notes that all the definitions of a learning organization are related to acquisition, updating, interpretation, transmission, and transformation of knowledge. Other researchers (De Loo, 2006, Mikalauskas, 2005; 2006; Švagždienė, 2010, Kuşcua, 2015; Örtenblad, 2018) determined that a learning organization may be described as an institution that has specific responsibility and that is always responsible for proper decision-making. It usually tends to give more attention and resources for its activities. The organization that is a service organization is learning when its employees are operating compatibly and sharing information when it acts according to the plan, creates its fundamentals comprehensively, implements the performance policy, and makes decisions. The (self-)formation of a learning organization in Lithuania within the context of lifelong learning is still a

challenge. The learning organization has to act in consideration of information about the organization that has to be known by employees who are making decisions, i.e. its objectives, tasks, environmental factors, structures and culture (Kvedaraitė, 2009; Morkvėnas, 2010; Kuşcua, 2015; H van Breda, Heijboer, 2016). According to N. Šedžiuvienė and J. Vveinhardt (2012), one of the key features of the learning organization is learning culture. The learning code links integrally reactions to the environment, organization's experience, human resources, individual knowledge, and databases, etc. The learning is based not only on giving a sense to experience, but also on the ability to see the future. The organizations may expect to become more competitive if they base their ideology not on experience, but on seeing the future, careful observation of market and ability to describe future needs. The realization of these criteria in practice differs. The organizations have to realize the requirements set in reality for development and its rapidity; however, it is not possible not to agree with the statement that schools – modern organizations are forming in the 21st century. According to P. Zakarevičius (2012), formation of a modern organization is a complex process that demands all the possible efforts from its management and all the members. Therefore, the organization that not only has educated, open-to-novelties employees, who are raising their qualifications all the time, but also the learning organization that is implementing and adapting the principles of a modern organization in practice has better possibilities to become modern.

It is possible to state that at present the schools have to deal with challenges of dynamic environment. In order to name that causality, it should be mentioned that the gradual conversion of society into the society of knowledge and information had the crucial influence, whereas the school had to reconsider the direction of its activities with regard to organizational aspect – to endeavour at becoming not only a school – learning organization, but also a school – modern organization within the context of learning organization. Therefore, the analysis of the works of the scientists in the field of management (Senge 1990; Pedler, Boydell, Burgoyne 1991; Drucker 1997; Peters 1992; Hamer, Champy 1993; Tichy, Devanna 1990; Cornwall, Perlman 1990; Hisrich, Peters 1992; Šedžiuvienė, Vveinhardt, 2012; Zakarevičius 2012) allows defining the most important characteristics formed by a school-modern organization within the context of learning organization.

Table 1

The most important formulated characteristics of school as a modern organization in the context of learning organization (prepared by the author based on Šedžiuvienė, Vveinhard (2012), Zakarevičius (2012)

No.	Characteristics	The description
	Learning culture	Characteristic specific culture; the provision of lifelong learning (creating and developing a general learning system); activities are based on knowledge and understanding.
	The flexibility and interdisciplinary	Flexibly adapts to dynamic and interdisciplinary environmental conditions and needs, anticipating short- and long-term changes.
	Openness and communication	A system for receiving, sharing, and applying and providing information in a targeted and structured way.
	Structural mobility and reaction	Provided services are necessary and useful for the members of the society who use them, but in case of changes in needs - operative response (if necessary - by expanding or reorganizing their functions or ways of operating).
	Flexible architecture of organization and management structure	The architecture of the organization is flexible, changing and evolving depending on new challenges and conditions; wide freedom of decisions and responsibilities for teams and individuals, also for self-government; the principles of responsible behavior are followed; horizontal connections predominate.
	Communication in local and interinstitutional level	Mutual relations, involvement of employees, formation of teams are based on the principles of equality, cooperation and collegiality, qualitatively organized self-reflection and feedback; cooperation with other institutions in dealing with successes and failures.
	The support and promotion of creativity and initiative	Creates conditions for expressing employees' creative, managerial ideas and innovation; the organization is identified as a system whose integral members are employees who identify the organization not as “them” but as “we”.
	General well-being culture	A naturally developed culture that supports the development of the individual, the well-being, and values of the organization are identified with individual well-being and values; the organization is an active participant in social change and development processes.
	Interaction of technologies and thinking	Distribution, application, and interaction of thinking activities and technologies; adaptation of spaces to activities, ensuring the needs for innovative work.

As the world is stepping into the society of knowledge and information, the Lithuania school of general education has to operate in the changing and continuously developing environment, where it has to cope with problems and challenges of operation under dynamic conditions, and where the need for new competences and resources arises. The school has to select the versatile or interdisciplinary knowledge necessary for improvement of its activities and to use that knowledge creatively for projecting and modelling of these activities and new strategies. Thus, the school as an organization has to develop continuously and to become a qualitatively new, learning organization that would comply with the

characteristics of a modern organization. The features listed above that are characteristic to modern school and that highlight a context of the learning organization – school serves as a key to successful strategical consensus for targeted activity and positive microclimate on various levels.

Theoretical Interpretations of the topics of changes in the School as a Modern Organization within the context of Learning Organization

When the situation in the area of education is analysed, when the documents governing functions and services provided by such institutions are assessed, it is evident that general education is quite a wide concept, so in order to understand it better, the supplemented structure of the Lithuanian general education is analysed (see Fig. 2).

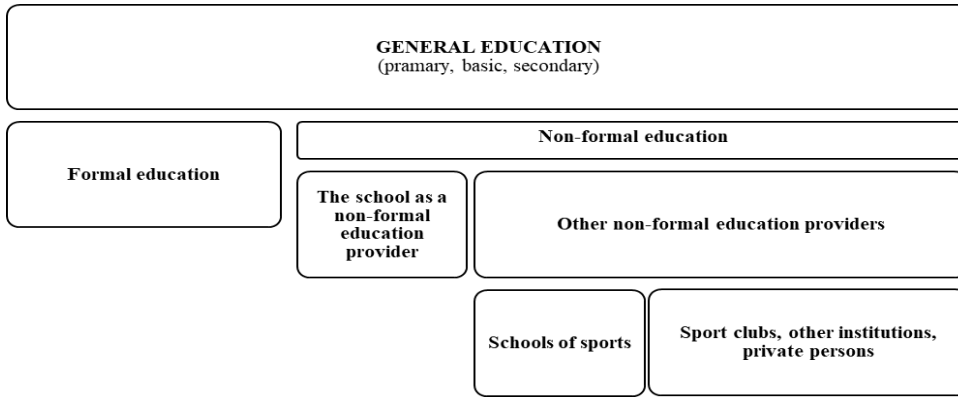


Figure 2. Structure of general education (prepared by the author based on the Education Law of Lithuania Republic (1991, consolidated version of 2020-01-01–2020-05-31), the order of Minister of Education and Science of Lithuania Republic 2016-04-14 No. V-339, consolidated version of 2020-04-03)

The cases of organization of informal education in the Lithuanian general education school reflect often the inter-institutional cooperation that presupposes need for interdisciplinary competences in practice. Contrary to informal education that is understood as a secondary need that supplements the formal education, formal education is structured and clearly defined. Despite this, although informal education at school is directed to the same group of interested persons, it is formally implemented by the school itself. This area has been organized for several years already using the human and material resources of the same school, as well as capacities of different organizers and/or providers of certain services. Thus, the school itself is providing informal education at school according to general curriculums. At the same time, other providers of educational services may initiate unformal education as an additional tool of extracurricular occupation, using various methods of performance regulation: budgetary institutions – sports schools,

private sports clubs, public institutions, even natural persons, who have registered their activities, and other legal entities. The providers are acting in compliance with the Programme of Informal Education of Children approved by the Government, or Regulations on Activities approved by appropriate municipality. The main purpose of this programme is the same as that of extracurricular activities at schools. Only the financing sources of the activities differ: the Programme of Informal Education of Children is implemented using the resources of the European Union's funds and State budget of the Republic of Lithuania, whereas the schools are funded by municipalities. It should be stressed that the investments are directed to organization and development of informal education of children in order to increase the number of informally educated children and in order to expand the assortment of available programmes of informal education (https://www.neformalusugdymas.lt/nvs-krepselis).

According to J. Skirmantienė (2013), informal education is getting more and more relevant and significant within the context of the Lithuanian education because knowledge and skill gained through the formal education are not sufficient to develop a conscious, versatile personality. The leisure culture has a big influence on the personality's development, and if it is absent, the opposite occurs – a degradation. A suitable organization and implementation of informal education of children helps to pull children away from meaningless time spending, bad habits, deviant behaviour, and antisocial activities (Novella, Santos, Brichta 2016). Participation in activities of informal education helps the children to develop their competences necessary to become active members of society who are able to solve problems arising in life independently (Ponnuswamy, Manohar, 2016).

It is difficult to answer the question whether the organization that is providing qualitative sports services based on inter-institutional cooperation (school, in this case) is a learning organization in its nature; however, differences between a traditional school and a school-service organization are evident. It could be stated that modern school is organizing not a traditional informal education anymore, but that it is providing various services meeting the needs of the interested groups-pupils. In such a way, as the school stresses its identity changed because of dynamic conditions of the environment, it becomes a modern service organization. In order to achieve this result, the school has to raise and fulfill one more goal – to become a school-learning organization. There is no doubt that many schools are organizing their activities according to the features characteristic to a learning organization, but their abundance and adaptability to the organizations of private sector rather than to the public one cause certain

difficulties. Thus, how should a learning organization, especially a school, be identified? In order to answer this question, several fundamental methodologies and characteristics were used. When they are reviewed, it is important to mention that P. Senge (1990) listed five disciplines in his book "The Fifth Discipline" that are characteristic of a learning organization. Although this scientist was not the first to analyse the term of a learning organization, but P. Senge became its main association and synonym after publication of his work (Örtenblad, 2018).

The disciplines and methodologies of the learning organization presented in the books of P. Senge, pioneer of researches on a learning organization, are not the only tools that direct the organization towards conversion to a learning one. Other authors (Pedler, Burgoyne, Boydell 1991; Jucevičienė, 2007) have named 11 managerial characteristics of a learning organization that the organization should use, as well as model "Invest" (Pearn, Roderick, Mulrooney, 1995). It can be seen that the model of P. Senge (1990) is oriented more to emphasis of the studying person rather than enabling him/her for studies. The characteristics named by Pedler, Burgoyne, Boydell (1991) are intended to enable the learning, but they do not stress the learning itself and the reality of adaptability of this list remains doubtful. The INVEST model occupies an interim position – it stresses both, learning and enabling.

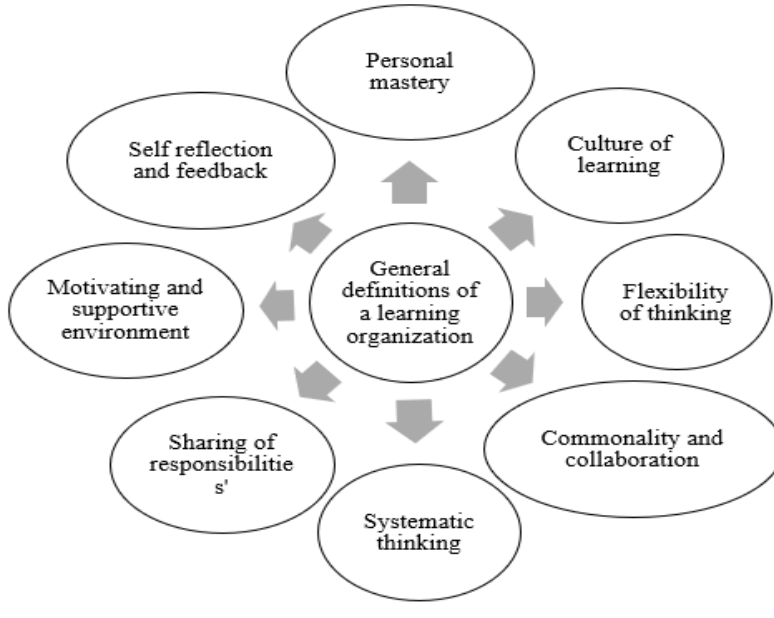


Figure 3. Common features of school as a learning organization (prepared by the author based on Senge, 1990; Pedler, Burgoyne, Boydell 1991; Pearn, Roderick, Mulrooney, 1995; Šedžiuviene, Vveinhardt 2012)

When information of these scientists is analysed and summarized, it will be possible to present general features of a school-learning organization (see Fig. 3).

It has to be stressed that the organization endeavouring at answering the question *whether* it is a learning organization and *how* it may become a learning organization should answer five questions for itself (Senge, 1990; Jucevičienė, 2007; Peleckienė, 2014). It should answer whether the organization has a defined learning agenda, whether it is open to contradictory information, whether it avoids recurrent mistakes, whether it loses the essential knowledge when the most important persons leave, and whether its activities are based on the things it knows. Depending on the results, they should be raised as the organization's objectives until they become incorporated features of the organization.

In order to determine the time needed for the organization to become a learning organization in the opinion of other authors (Jucevičienė, 2007), it is stated that the learning organization is not created in a short period, although individual changes may happen fast. The answers to the following questions may help the organization that wants to become a learning one to make the first steps:

1. What is the biggest challenge for your organization and what is its biggest potential (SWOT analysis)?
2. What should the organization learn to be able to accept the challenges and to make use of possibilities?
3. How should the necessary skills and knowledge be acquired?

The received results will help the organization to get answers about probable investments and needs for human resources, qualification improvement, enrichment of infrastructure, etc.

To summarize, it is possible to state that the Lithuanian school of general education has to cope with the issue of identity affected by dynamic environment: is it still a traditional organization, or is it already a service organization? Having evaluated the dispute of the school's self-creation comprehensively, it may be said that influence of the changing society is unavoidable. If the school wants to remain competitive, it is forced to reconsider its activities and to organize the activities using not only the features characteristic of modern organizations but also to become a knowledge-learning organization. In each case, the most effective strategy of conversion to a learning organization and learning depends on the individual situation of the organization. At present, there is no single best methodology that could be adjusted to any situation. However, the organizations and their communities that want to become learning organizations are making a step of critical significance – they agree that

learning may be controlled and directed towards efficiency of the organization's activities, quality, and maintenance and that it is not a spontaneous process. As it has been already stated, the exclusive researches on schools as learning organizations are still deficient. The analysis of theoretical material in the aspect of processes and structures of the learning organization and positive changes made in school in the recent decades lead to hypothetical considerations that a school that has characteristics of a learning organization is strengthening the supply of the provided services. These objectives are achieved through development of interinstitutional cooperation, spread of good practice, attempt to create wider choice of services, to improve their quality, to increase involvement of pupils and their motivation with regard to offered services, which leads to positive impact on the sense of personal success, more efficient construction of future perspectives, etc.

Discussion and Conclusions

The modern-day schools as organizations undoubtedly have to cope with challenges of dynamic environment. If causality had to be named, it should be mentioned that the society's changing into a society of information and knowledge was of critical importance. In turn, the school had to reconsider its performance directions with regard to organization, structure, and planning of resources more than once – it had to endeavour at becoming a school-learning organization. Such actions echo high requirements that are appearing. The school is not the same as it was earlier, in the stage of a traditional school. It will never be like that again, because the modernization of the public medium and the school's conversion into a learning organization make the school to observe modern characteristics, as well. To compare, it is important to mention that a stage of feedback and spread of good practice must be safeguarded because there are many schools (and their number is growing) that are implementing all the aforementioned steps or that have turned these steps into an integral part of the organization: the steps of a learning organization are reflected when psychological microclimate of the community and its importance are assessed more attentively; the evaluation is organized by recording and discussing not only the professional/academic progress but also that of personal goals and continuous development; the activities are organized methodically and their monitoring is carried out; structural democratisation of activities, financial and legal literacy are promoted, etc. These features allow stating that the schools as learning organizations see the unavoidable need adequately and try to find a strategical consensus.

With regard to the context of the Lithuanian education and analysis of expectations concerning formal and informal education, it is important to

mention that a modern-day school needs interdisciplinary competences characteristic to a modern organization. The school's conversion into a learning organization is a stage of a modern school. It has all the individual characteristics, such as personal excellence, learning culture, flexible thinking, commonness and cooperation, systemic thinking, distribution of responsibilities, motivating environment, self-reflection, and feedback. When an organization of formal and informal education is stressed and assessed within the context of a learning organization, in order to have qualitative and various services, and to gain effective expression of educational factors in the course of sessions, the preconditions for different, interinstitutional cooperation are created. Thus, a direct causality may be established that schools as learning organizations (or having their features) are becoming organizers of services of wider scope. Such expansion of organization of the scope of provided services increases pupils' motivation, their involvement, provides deeper knowledge about particular activity in a shorter period, and allows trying practical aspects of the subject, which creates a ground for professional success in attempt to achieve common goals and results.

References

1. Budeanu, A., Miller, G., Moscardo, G., Ooi, C. S. (2016). Sustainable tourism, progress, challenges, and opportunities: an introduction. *Journal of Cleaner Production, 111* (B), 285-294.
1. Burgoyne, J., Pedler, M., Boydell, T. (1991). The learning company: a strategy for sustainable development. London: McGraw-Hill.
2. De Loo, I. (2006). Action and organization learning in an elevator company. *The Learning Organization, 13*(3), 204–214.
3. H van Breda-Verduijn, H., & Heijboer, M. (2016). Learning culture, continuous learning, organizational learning anthropologist. *Industrial and Commercial Training, 48*(3), 123-128.
4. Hallowell, M., R., Gambatese, J., A. (2010) Qualitative Research: Application of the Delphi Method. *Journal of Construction Engineering and Management*, *136*(1), 99-107.
5. Joyce, A., Paquin, R. L. (2016). The triple-layered business model canvas: A tool to design more sustainable business models, Journal of Cleaner Production, 135, 1474-1486.
6. Jucevičienė, P. (2007). Besimokantis miestas. Monografija. Kaunas: Technologija.
7. Kokkonen, J., Yli-Piipari, S., Kokkonen, M., & Quay, J. (2019). Effectiveness of a creative physical education intervention on elementary school students' leisure-time physical activity motivation and overall physical activity in Finland. *European Physical Education Review*, *25*(3), 796-815. Prieiga per internetą https://doi.org/10.1177/1356336X18775009 [žiūrėta 2019-10-19]

8. Kudokienė, N., Juodaitytė, A. (2005). Mokyklos, kaip besimokančios organizacijos, formavimosi tendencijos. *Jaunųjų mokslininkų darbai, 1*(5), 34-42.
9. Kuşcua, Z., K., Yenerb, M., Gürbüzc, F. (2015). Learning Organization and its Cultural Manifestations: Evidence from a Global White Goods Manufacturer. *Social and Behavioral Sciences,* 210, 154-163.
10. Kvedaraitė, N. (2009). Šiuolaikinės mokyklos kaip besimokančios organizacijos bruožų raiška personalo savivaldaus mokymosi sklaidos procesuose. Daktaro disertacija. Socialiniai mokslai, edukologija. Šiaulių universitetas.
11. Kvieska, V. (2013). Duomenimis grįstos švietimo reformos ir pasiekimų sąsajos su vaiko gerove. *Socialinis ugdymas,* 3(35), 41-51.
12. Kvieskienė, G., & Petronienė, O. (2007). Neformaliojo vaikų švietimo prieinamumas. *Socialinis ugdymas,* (3), 60-78.
13. Lietuvos Respublikos švietimo įstatymas, patvirtinta 1991 m. birželio 25 d. Nr. I-1489; 2019-01-01 nauja red. Suvestinė redakcija 2020-01-01 – 2020-05-31.
14. Žilinskaitė, L. (2008). Suaugusiųjų švietimo vystimosi vadybos prielaidos ir perspektyvos Lietuvoje. *Acta Paedagogica Vilnensia,* (21), 138-148.
15. Mikalauskas, R. (2006). Sporto organizacijos vadyba: globalizacijos tendencijos ir modernizavimo krypčių apžvalga. *Sporto mokslas,* 3(45), 1392-1401.
16. Morkvėnas, R. (2010). Organizacijos žinių potencialo vertinimas. Daktaro disertacija. Vilnius: Vilniaus Gedimino Technikos Universitetas.
17. Navickas, K., Navickienė, R. (2009). Darnios organizacijos modelio kūrimas. *Ekonomika ir vadyba: aktualijos ir perspektyvos, 2*(15). 192–201
18. Novella, M., Santos, J., & Brichta, J. (2016). Moving Ahead: School-Based Interventions to Reduce Physical Inactivity and Sedentary Behaviour. Ottawa: The Conference Board of Canada.
19. NVŠ krepšelis. (2019). Internetinė prieiga https://www.neformalusugdymas.lt/nvs-krepselis [žiūrėta 2019 m. lapkričio 15 d.]
20. Örtenblad, A. (2018). What does "learning organization" mean? *The Learning Organisation*, *25*(3), 150-158.
21. Pearn, M., Mulrooney, C., Roderick, C. (1995). Learning organizations in practice. London: McGraw-Hill.
22. Peleckienė, V. (2014). Besimokanti organizacija: teorija ir praktika. Vilnius: Vilniaus Gedimino technikos universitetas.
23. Ponnuswamy, I., & Manohar, H. L. (2016). Impact of learning organization culture on performance in higher education institutions. *Studies in Higher Education, 41*(1), 21–36.
24. Sabaitytė, J. (2017). Internetinio marketingo komunikacijos sistema. Daktaro disertacija. Socialiniai mokslai, Vadyba (03S). Vilnius: VGTU leidykla „Technika"

25. Senge, P. (1990). The fifth discipline: The Art and Practice of the Learning Organization. Century Business, London.
26. Skirmantienė., J. (2013). Neformaliojo ugdymo svarba pozityviajai socializacijai. *Socialinė Teorija, Empirija, Politika Ir Praktika*, 7, 108-118.
27. Švagždienė, B. (2010). Expression of tourism service educational potential in a learning organization context= Turizmo paslaugos edukacinio potencialo raiška besimokančios organizacijos kontekste: summary of the doctoral dissertation: social sciences, education (07 S). Šiauliai: Lucilijus.
28. Valuckienė, J., Balčiūnas, S., Katiliūtė, E., Simonaitienė, B., Stanikūnienė, B. (2015). Lyderystė mokymuisi: teorija ir praktika mokyklos kaitai. *Monografija*. Šiauliai: Šiaulių universitetas.
29. Vygotsky, L. S. (1978). Interaction between learning and development. Reading on the development of children. New York: Scientific American Books.
30. Whitley, M., A., Massey, W., A., Camiré, M., Mish Boutet, M., Borbee, A. (2019). Sport-based youth development interventions in the United States: a systematic review BMC Public Health, Vol. 19 (89), https://doi.org/10.1186/s12889-019-6387-z

Submitted: May 13, 2020
Accepted: June 15, 2020

LASE Journal of Sport Science
2020 Vol 11, No. 1, Pages 36 - 46
DOI: 10.2478/ljss-2018-0030
p-ISSN: 1691-7669/e-ISSN: 1691-9912/ISO 3297
http://journal.lspa.lv/

ORIGINAL RESEARCH PAPER

ADAPTATION IN EYE GAZE DURATION AND CO-ORDINATION WITH SPEED IN HUMAN WALKING AND RUNNING

Johnny Nilsson[1,2]

[1]The Swedish School of Sport and Health Sciences, Stockholm, Sweden
[2]University of Dalarna, Falun, Sweden
Adress:
Phone: +46 08-12053700
E-mail: johnny.nilsson@gih.se

Abstract

The purpose was to study the visual information sampling in a situation where the subjects were instructed to walk and run at different speeds with foot placements on given spots/plates along a path. Seven adult male persons with a mean age, height and weight of 42.7 years, 1,78 m and 78.9 kg volunteered as participants in the study. The participants were asked to walk and run on a 10 m long straightaway with slow, medium, fast and highest possible speed. The straightaway was covered with a red plastic floor mat and on top of the mat ten white wooden plates were attached with double sided tape. The participants wore an eye tracker during each speed trial, which was calibrated according to the manufacturer´s instructions prior to locomotion trials. The cycle duration, support phase duration, eye gaze duration on each plate, the duration from the end of gaze of each plate to onset of support on the next plate i.e. the time difference between end of eye gaze to touchdown on the gazed target plate. The stride cycle and support duration versus eye gaze duration (Teg) showed a strong positive correlation. The different eye gaze periods were coordinated with the support duration periods and the eye gaze periods always occurred in advance of the support periods. Conclusion. The eye gaze duration changed with speed and followed the same time reduction pattern as support and cycle duration but the duration from end of eye gaze to corresponding onset of support was constant at higher walking speeds and all tested running speeds.

Keywords: *eye gaze, walking, running, speed adaptation*

Introduction

There is a general agreement about the enormous complexity in central and peripheral interaction during cortical control including the interaction between cortical and subcortical centers (Georgopoulos & Grillner 1989, Drew et al. 2008) in control of locomotion. Also the importance of optical flow in locomotion have been emphasized (Warren et al. 2001). In this context the visual sensory system is important to add exteroceptive information in locomotion (Patla 1991) together with internal proprioceptive and sensory information from other nonvisual sensory systems (Duysens et al. 1990, Belanger & Patla 1987, Rietdyk & Patla 1994, Eng et al. 1994). Visual information is important for steering and control of locomotion particularly over uneven ground and/or avoiding obstacles during everyday life locomotion as well as locomotion in competitive sport contexts such as orienteering and soccer. Due to the importance of visual information one focus in research has been on the stabilization of the head and eyes during locomotion (e.g. Pozzo et al. 1990). In connection with this several researchers have focused on the visual information seeking during locomotion. Several relevant studies has been performed in this field (e.g. Patla 1997, Eng et al. 1997, Higuchi et al. 2009) about how the human neuromotor system adapt to demands related to steering the body and to pass obstacles. This research also include studies on visual control by using eye tracking information (Patla 1991).

The adaptation to speed in human locomotion such as walking and running has been previously investigated (Grillner et al. 1979, Nilsson et al. 1985, Nilsson & Thorstensson 1987). Results from this research, among other things, clearly indicate the nonlinear reduction in cycle and support duration with speed.

However, despite this and above mentioned research on eye tracking, to my knowledge, no one has systematically investigated the adaptation of visual information seeking with speed in walking and running.

Therefore, the purpose was to study the visual information sampling (eye gaze) in a situation where the subjects were instructed to walk and run at different speeds with foot placements on given spots/plates along a path. This should, in a standardized fashion, simulate a situation where a person should walk or run over a terrain surface hitting stepping stones to support under the feet. It may also simulate a match situation e.g. when soccer players choose small surface areas to step on in order to pass around opponent players on the pitch.

Materials and methods

Participants. Seven adult male persons with a mean (±sd) age, height and weight of 42.7 (10.3) years, 1,78 (0.06) m and 78.9 (5.6) kg volunteered as participants in the study. The participants were informed about the test procedures and that they could withdraw from the test at any time without explanation and they signed an informed consent form. The procedures were performed according to the declaration of Helsinki and were approved by the regional ethical committee.

Procedures, test design and apparatus. The participants were asked to walk and run on a 10m long straightaway with perceived slow, medium, fast and highest possible speed. The straightaway was covered with a red plastic floor mat and on top of the mat ten white wooden plates (0.2 x 0.16 x 0.05m) were attached to the carpet with double sided tape. The distance between the center of each
plate in the movement direction was 1.0m and the medio-lateral distance between the center of the plates was 0.64m (Figure 1). The participants wore conventional sport shoes with flat rubber soles that together with the surface of the wooden plate created good friction with no risk of slipping.
There were no complaints about the friction between the shoe soles and the surface (including the white wooden plates) during the walking and running trials.

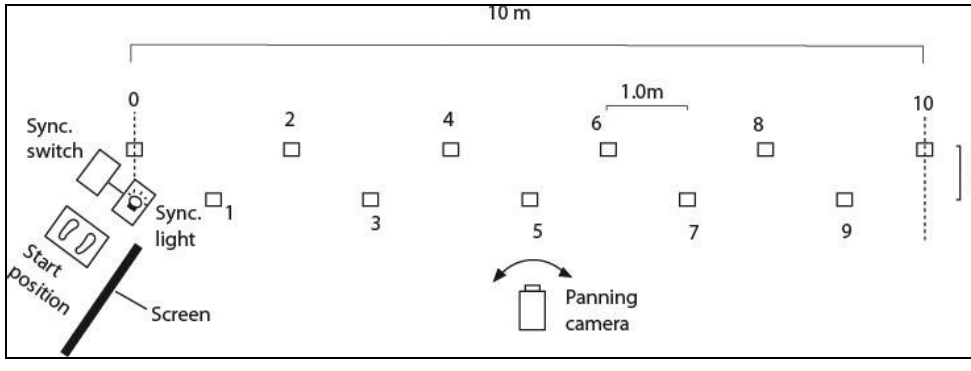


Figure 1. The straightaway with ten (+0) white wooden plates (support plates), synchronization switch and synchronization light. Before each trial the Participant was standing at the start position behind a screen with the eye tracking device mounted on the head. The eye tracking and panning camera was synchronized by means of the sync. light

The participants were asked to walk or run in the different speed categories and hit every plate with the left or right foot, respectively. If the participants were unsuccessful in hitting the stepping plates the trial was repeated. The participants were asked not to look at each plate longer than

necessary in order to hit the plates with their feet during locomotion. The participants wore an eye tracker (HED, SMI GmBh, Germany) during each speed trial. The eye tracker was calibrated according to the manufacturer instruction prior to the test. The eye trackers spatial accuracy was also checked before each trial with every participant. The eye gaze on the switch and the light (Figure 1) were used to check the calibration of the eye tracker and the synchronization between eye gaze and surround camera view as well as the external panning camera. The participants were asked to look at the lamp as they stepped on the switch and the lamp was lit. The time resolution of the eye gazes during the trials was 20 ms in each analyzed deinterlaced video frame. After each session the eye tracking data was analyzed by means of video analysis software. In this study the following parameters were analyzed: The cycle duration (Tc), left and right foot phase duration (Tsu), eye gaze duration on each plate, the duration from the end of gaze of each plate to onset of support on the corresponding plate i.e. the time difference between end of eye gaze to touchdown of the gazed target plate (see Figure 2).

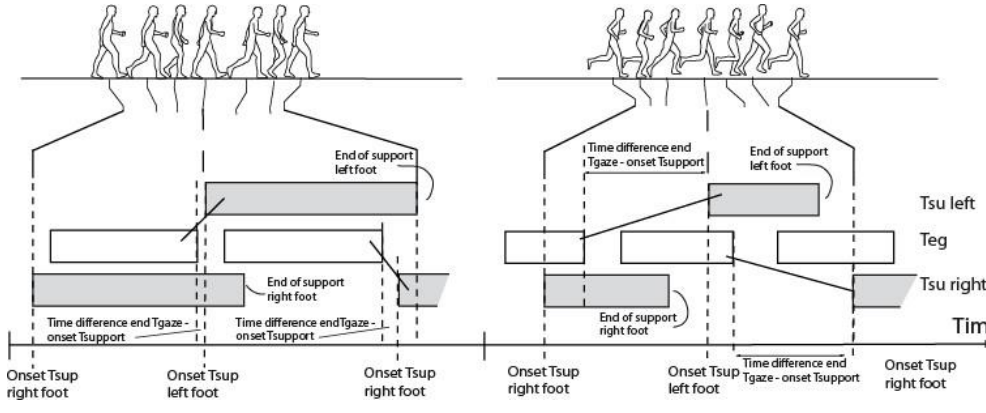


Figure 2. Examples of the temporal pattern between eye gaze and support duration in a stride cycle in walking and running. Support duration (Tsu) for the left and right foot, eye gaze duration (Teg) as well as the time difference between end of gaze-interval to onset touch down in corresponding support phase

Statistics. Conventional descriptive statistics were used to calculate mean and standard deviation (sd). The statistical calculations were performed by means of an Excel software package. The statistical significance between test parameter results were calculated by means of Student´s t-test and the alpha level for assumed statistical significance was set to 0.05. Association between research parameters was tested by means of Pearsons product moment correlation.

Results

For graphical clarity the standard deviation values are not presented in the Figure 3. Instead, all means and standard deviations are presented in Table 1. A continuous change in Tc, Tsu an Teg was seen with speed in the recorded speed range (Figure 3A and Table 1). This is in agreement with previous research on temporal changes in walking and running with speed (Nilsson et al. 1985, Nilsson & Thorstensson 1987).

Table 1.

Mean and standard deviation (sd) of the analyzed parameters versus speed level.

	Speed ($m \cdot s^{-1}$)		**Cycle duration (s)**		**Support duration (s)**		**Eye gaze duration (s)**		**"Saccade" duration (s)**		**Difference end Teg onset Tsu**	
Walk	**Mean**	**sd**	**Mean**	**sd**	**Mean**	**sd**	**Mean**	**sd**	**Mean**	**sd**	**Mean**	**sd**
Slow	0.93	0.38	**2.40**	0.76	1.34	0.41	1.03	0.37	0.19	0.08	0.20	0.22
Medium	1.29	0.40	1.64	0.41	0.92	0.25	0.68	0.20	0.14	0.04	0.18	0.14
Fast	1.78	0.42	1.17	0.27	0.66	0.13	0.42	0.15	0.19	0.07	0.33	0.11
Maximum	2.28	0.47	0.89	0.20	0.50	0.11	0.27	0.09	0.17	0.06	0.37	0.09
Run	**Mean**	**sd**	**Mean**	**sd**	**Mean**	**sd**	**Mean**	**sd**	**Mean**	**sd**	**Mean**	**sd**
Slow	1.82	0.23	1.11	0.16	0.46	0.07	0.41	0.08	0.16	0.05	0.36	0.07
Medium	2.23	0.28	1.03	0.22	0.34	0.06	0.31	0.07	0.15	0.03	0.38	0.13
Fast	2.81	0.59	0.75	0.18	0.27	0.07	0.26	0.06	0.14	0.03	0.37	0.08
Maximum	3.70	0.85	0.57	0.14	0.21	0.06	0.19	0.05	0.14	0.04	0,40	0.10

The time delay from the end of an eye gaze sequence to the beginning of corresponding support phase increased significantly ($p<0.05$) from slow and medium to fast and maximum walking speed but was constant with speed in the recorded fast and maximum walking speed range and constant with speed in running (Figure 3B and Table 1).

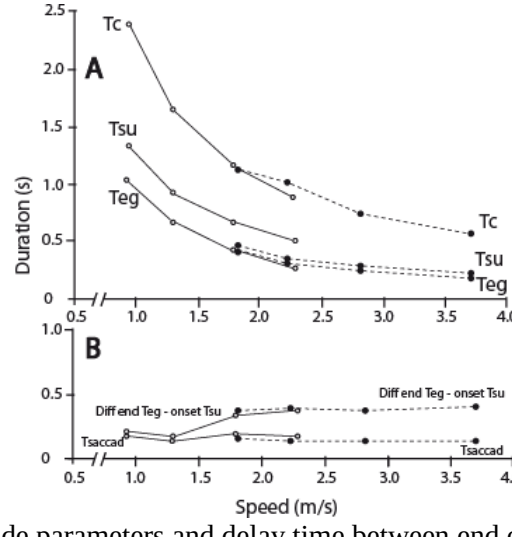
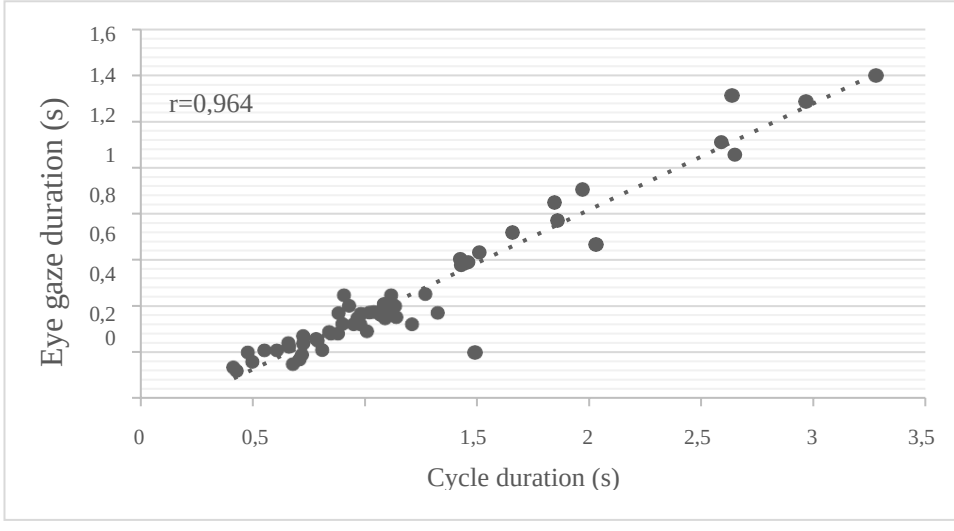


Figure 3. (A) Stride parameters and delay time between end of gaze and onset of corresponding support phases (Bl) with speed in walking and running

Walking and running at similar speeds were not significantly different ($p>0.05$. The "saccade" duration i.e. the time period when the eye gaze moves from one plate to the next in each speed level were constant with speed (Figure 3B).

In Figure 4 the stride cycle duration (Tc) and support duration (Tsu) versus eye gaze duration (Teg) are plotted showing a strong positive correlation r=0.964 and 0.957, respectively.

A



B

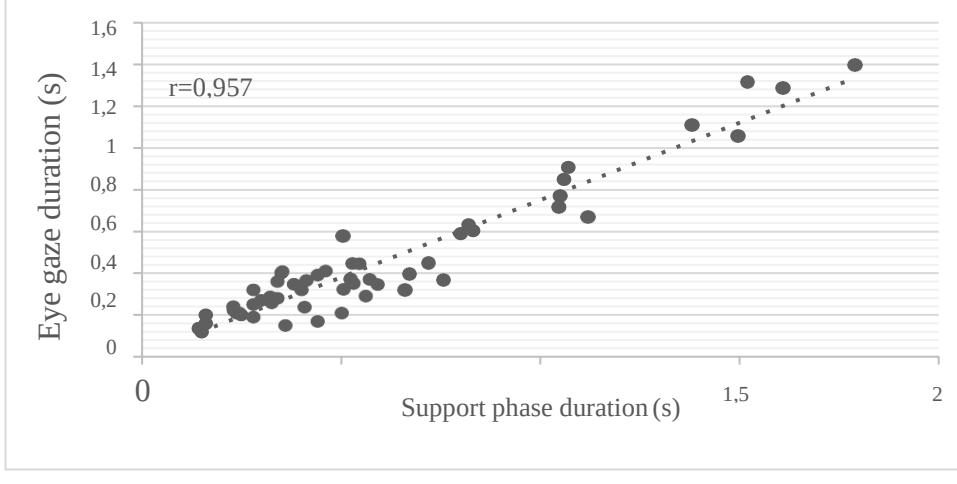


Figure 4. Correlation between cycle duration and eye gaze duration (A) as well as support phase duration and eye gaze duration (B) in walking and running

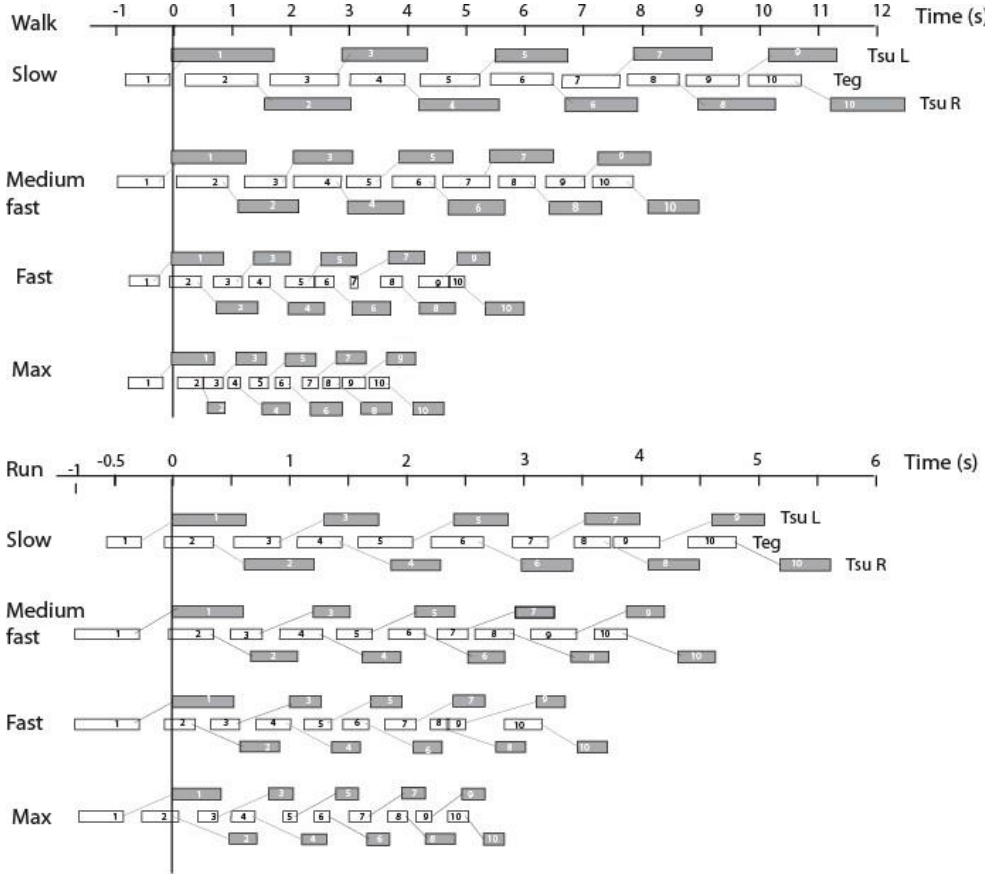


Figure 5. Time relations between support periods (Tsu) of the left (L) and right (R) feet (grey squares) and corresponding gaze intervals (Teg) represented by open squares with corresponding number, respectively. The thin lines between eye gaze periods and corresponding support periods are used to facilitate the reading of the figure

The plots in Figure 5 show that the different eye gaze periods are coordinated with the support duration periods, respectively. It is clear from the figure that the eye gaze periods always occur in advance of the corresponding support periods (Figure 5A and B).

Discussion

The cycle and support phase duration changes with speed are in agreement with previous research (Grillner et al. 1979, Nilsson et al. 1985, Nilsson & Thorstensson 1987). The results show a clear pattern with visual information seeking (eye gaze fixations) ahead of the occurring support phase. The present analysis is built on the assumption that the eye gaze

fixation is a deliberate action to obtain relevant information to ongoing movement execution.

It is clear from the results that eye gaze duration (Teg) follows cycle duration (Tc) and support duration (Tsu) with speed in both walking and running in the recorded speed range (Figure 3A) and show strong positive linear association with Tc and Tsu (Figure 4). Thus, the time for information seeking about upcoming ground support locations are made faster with speed and there is a shorter time for collecting information. This adaptation occurs despite the fact that the gaze periods occur in advance of the actual corresponding support period. The system adapts to a certain speed level with respect to Teg and the execution of a planned process will probably happens if nothing drastic occurs during the occurring support phase.

However, the time that elapses from the end of the gaze period to the start of the corresponding support period is similar and constant at higher speeds in walking and in running from slow to maximum in the investigated speed range and is about 0.36 s. This time period allows the visual information collected during the eye gaze periods to be connected to the programming of that step. This constant time may be related to the time that is compulsory to the programming process, at least at high speed in walking and in the whole measured speed range in running. This function of the neuro-motor system may be named "constant time sensory-motor sequencing" due to the constant time between end of visual sampling to execution of e.g. a support phase.

The eye gaze from one stepping plate to the next on the opposite side in the movement direction (saccade) was performed momentarily and the time for the gaze to switch from one side to the opposite side for the next support phase was constant and about 0.15s.

From Figure 5 e.g. running medium speed eye gaze number 4 is connected to the support phase number 4 and the eye gaze period is started and occurring during the support period number 2 and 3. This tells us that parallel processes are occurring in the visuo-motor process and that an "old" eye gaze is stored and processed together with motor and proprioceptive information while a new eye gaze period is introduced (Figure 5). This also indicates that it may be possible for phase dependent functional reflexes to contribute in the late support phase and/or in the transition between support phases (Duysens et al. 1990, Belanger & Patla 1987, Eng et al. 1994).

It is most likely that short term sensory store is used to hold visual and other information such as proprioceptive, tactile and kinesthetic signals. In the short-term sensory store the information is held for a very short time, probably less than a few hundred milliseconds (Schmidt & Wrisberg 2000). It is reasonable to assume that the sensory stored data is used in the motor

programming of the upcoming step and then replaced by new information to be integrated in the programming of the following step a.s.o. In the present situation with symmetrically placed stepping plates, and no sudden occurring obstacle etcetera, the participants mainly have to maintain a serial step programming with no typical problem solving. Thus, it is not likely that the short term memory has been activated.

If we assume that the motor control system model contains three stages; stimulus identification, response selection and response programming (Schmidt & Wrisberg 2000) a certain amount of time will elapse from stimulus to response action. This is based on the assumption that only one response programming can be produced at a time and that the temporal structure specific for that movement program can only occur in a serial fashion. It has been shown that chunks of motor activity occurs in a serial fashion not faster than about 200ms (Kahneman 1973). Thus, the duration from stimulus to motor response is at least 0.2sec.

In the present investigation the visual sensory system contributed with essential information to solve the specific movement demands defined. Due to the importance of the visual sensory system, information collected in the study about eye gaze temporal pattern and duration is relevant. It is interesting to note that the eye gaze duration was reduced similar to support duration (Tsu) with speed and there was a strong positive linear relationship between eye gaze duration versus cycle duration (Tc) and support duration (Tsu). The time for visual information seeking during walking and running was reduced with speed and this information is assumed to be the basis for response selection and response programming. This process probably occurred during the period after the information was collected until the intended support phase starts, when a new program sequence has to be ready to steer the movement at least during that particular support phase. In this study at higher walking speeds and all investigated running speeds this period was constant and about 0.36sec.

From a control point of view the neuro-motor system allows (can handle) several gaze periods and motor synchronizations within the 0.36sec range (Figure 5). The participants needed to get information about the distance to the next support plate, position in relation to present location and information about displacement per unit of time to enable estimation of speed etcetera. The objective in each support phase is to handle the motor control demands of that particular support phase but also to create forces that steers the movements in the correct direction and distance to the next support plate. As a rule, in the present context in walking and running, the time of eye gaze (Teg) is performed at least one support phase ahead in time.

It is also obvious in both walking and running (Figure 5) that the eye gaze (Teg) period, as a rule, is terminated before the end of the previous support phase. This, still allows adjustment of eventual forces needed to occur to steer the movements correctly to the next support plate. Note also that especially at high running speeds the Teg occurs two support phases ahead before corresponding Tsu. This points to the possibility for the neuromotor system to pre-program the motor action in the near future. A programmed sequence for the target support phase shall be ready before touch down of that phase. The eye gaze duration at very high running speeds (max in present context) was about 0.19sec seemingly adjusted to support duration. Still a question is how brief Teg can be.

It seems reasonable to assume that the constant period from end Teg to onset target support phase is scaled for programming in a constant manner but with a shorter Teg. Thus, from each eye gaze and motor synchronization a programmed visuo-motor sequence will be delivered after about 0.36sec at the same time as new visual information is collected and ongoing locomotion occurs.

Conclusion

The eye gaze duration change with speed and followed the same time reduction pattern as Tsu and Tc but the duration from end of eye gaze to corresponding onset of support was constant at higher walking speeds and all tested running speeds.

References

1. Belanger, M. & Patla, A.E. (1987). Phase-dependent compensatory responses to perturbation applied during walking in humans. *Journal of Motor Behavior*, Vol 19:4, 434-453.
2. Drew, T., Kalaska, J. & Krouchev, N. (2008). Muscle synergies during locomotion in the cat: a model for motor cortex control. *Journal Physiology*, 586:5, 1239-1245.
3. Duysens, J., Trippel, M., Horstmann, G.A. & Dietz, V. (1990). Gating and reversal of reflexes in ankle muscles during human walking. *Experimental Brain Research*, Vol 82, 351-358.
4. Eng, J.J., Winter, D.A. & Patla, A.E. (1994). Strategies for recovery from a trip in early and late swing during human walking. *Experimental Brain Research*, Vol 102, 339-349.
5. Eng, J.J., Winter, D.A. & Patla, A.E. (1997). Intralimb dynamics simplify reacrive control strategies during locomotion. *Journal of Biomechanics*, Vol 30:6, 581-588.
6. Georgopoulos, A.P. & Grillner, S. (1989). Visuomotor coordination in reaching and locomotion. *Science*, Vol 245:4923, 1209-1210.

7. Grillner, S., Halbertsma, J., Nilsson, J. & Thorstensson, A. (1979). The adaptation to speed in human locomotion. *Brain Research*, 165, 177-182.
8. Higuchi, T., Cinelli, M.E. & Patla, A.E. (2009). Gaze behavior during locomotion through apertures: The effect of locomotion forms. *Human Movement Science*, Vol 28:6, 760-771.
9. Kahneman,D. (1973). *Attention and effort*. Prentice-Hall Inc, Englewood.
10. Nilsson, J., Thorstensson, A. & Halbertsma, J. (1985). Changes in leg movements and muscle activity with speed of locomotion and mode of progression in humans. *Acta Physiol Scand*, 123, 457475.
11. Nilsson, J. & Thorstensson, A. (1987). Adaptability in frequency and amplitude of leg movements during human locomotion at different speeds. *Acta Physiol Scand*, 129, 107-114.
12. Patla, A.E. (1991). Visual control of human locomotion. *Advances in Psychology*, Vol 78, 55-97.
13. Patla, A.E. (1997). Understanding the roles of vision in the control of human locomotion. *Gait & Posture*, Vol 5:1, 54-69.
14. Pozzo, T., Bertholz, A. & Lefort, L. (1990). Head stabilization during various locomotor tasks in humans. *Experimental Brain Research*. Vol 82: 97-106.
15. Rietdyk, S., Patla, A.E. (1994). Does the step length requirement in the subsequent step influence the strategies used for step length regulation in the current step? *Human Movement Science*, Vol 13:1, 109-127.
16. Schmidt, R.A. & Wrisberg, C.A. (2000). *Motor learning and performance*. Human Kinetics, Champaign, IL. (2nd ed.).
17. Warren, W.H., Kay, B.A., Zosh, W.D., Duchon, A.P. & Sahuc, S. (2001). Optic flow is used to control human walking. *Nature Neuroscience*, Vol 4:2, 213-216.

Submitted: May 11, 2020
Accepted: June 15, 2020

LASE Journal of Sport Science
2020 Vol 11, No. 1, Pages 47 – 59
DOI: 10.2478/ljss-2018-0031
p-ISSN: 1691-7669/e-ISSN: 1691-9912/ISO 3297
http://journal.lspa.lv/

ORIGINAL RESEARCH PAPER

THE EFFECT OF COLD-WATER BATHS ON RECOVERY AFTER ANAEROBIC EXERCISE IN 20-30-YEAR-OLD TRAINED MEN

Maija Dzintare, Andrejs Krišāns

Latvian Academy of Sport Education,
Address: 333 Brīvības iela, Riga, Latvia, LV-1006
Phone +371 29449934
E-mail: maija.dzintare@lspa.lv

Abstract

Recovery after physical exercise is a very important step in the training process that gives the opportunity to achieve good results in the next exercise. Cold water baths are often used for stimulation of recovery after high intensity physical loads. The aim of the study is to compare the effect of cold-water immersion to the chest (10 ^{o}C, 10min) and active recovery (25W, 10min) on the normalization of concentration of lactate in blood plasma, heart rate and blood pressure after repeated anaerobic exercise (400W, 1min). Participants in the study are 20-30-year-old amateur male soccer players with training experience of 5-15 years. Conclusions. Recovery in cold water bath causes faster reduction of lactate concentration in venous blood and heart rate after repeated anaerobic exercise in comparison with repeated anaerobic exercise that follows after active recovery. Blood pressure does not show difference depending of type of recovery.

Keywords: *ice baths, anaerobic load, lactate, heart rate, blood pressure, recovery.*

Introduction

A crucial step in the training process is recovery after physical exercise. This gives the opportunity to achieve good results in the next exercise. As is known, high-intensity loads are usually associated with metabolic, oxidative and mechanical stress resulting in reduced muscle capacity, pain and inflammation (White and Wells, 2013).

Different methods are used to accelerate recovery: heating (warm water procedures, infrared diodes with light wavelength of 940 m), contrast temperature procedures, massage, and active rest – aerobic load with moderate intensity. These methods induce dilatation of blood vessels, promote blood circulation, increase metabolism in the tissues and, therefore, reduce fatigue (the load-induced biochemical and physiological changes the body) faster.

A different approach, already known from the times of Hippocrates, is cryotherapy – exposure to the cold. For many decades, cryotherapy has been one of the most popular post-exercise therapies. Different types of cryotherapy are used to promote recovery process: cold water or ice baths, ice or gel packages, ice massages and other forms.

Cold water baths (cold water immersion) are often used for stimulation of recovery after high intensity physical loads. Water with temperature from 0ºC to approximately 20ºC is used. The lower the water temperature, the shorter the time of immersion or the smaller area of the body is exposed to cold. One of the most common variants of the method is immersion to the chest in 10ºC water for 10 min, which is used in our study. The cold water bath is safe, no literature reports of tissue damage due to cold (Tipton, 1989).

The cardiovascular system response to physical load includes activation of the sympathetic nervous system with subsequent increase in heart rate (HR), systolic blood pressure, and cardiac output. Diastolic blood pressure usually decreases due to exercise hyperaemia in muscles (Thorsson et al., 1985).

According to the literature, cold water immersion reduces the peripheral temperature and core temperature of the body, which is especially important when the work is performed in conditions of elevated temperature. The cold promotes faster redistribution of blood – increasing of the central blood volume, and faster restoration of the parasympathetic activity (Thorsson et al., 1985).

Immersion in cold water (colder than 33ºC) causes increased release of noradrenaline and subsequent adrenoreceptor activation. Adrenoreceptors alpha1, alpha2 are localized in walls of blood vessels, inducing reflective vasoconstriction that decreases peripheral blood flow. Adrenoreceptors beta1 are found in the heart, and cause tachycardia and increase cardiac output. Immersion in cold water (10min at 10°C) causes a rapid increase in HR of 135bpm. Immersion in cold water (0-10ºC) in healthy people causes tachycardia 2-3sec after immersion. Cold water at 10ºC increases heart rate by an average of 20 beats compared to warm water at 27ºC (Tipton, 1989). Similar observations are made by immersing the hand to the wrist in cold

water at 5^{o}C for 5min; after the first minute the heart rate and blood pressure increases – diastolic more than systolic; they normalize after 5 min when the body adapts to cold (Mishra et al., 2012).

Immersion in cold water decreases metabolism in the tissues, which inhibits the development of swelling and inflammation in muscle after exercise and reduces delayed onset muscle soreness (DOMS) after exercise. Cold water baths decrease release of the inflammatory and cell damage markers from damaged skeletal muscle, slow transfer of nerve impulses and reduce the sensation of pain (White and Wells, 2013). Cold water baths can decelerate the reduction of lactate concentration in blood after anaerobic exercise, because the cold induces the constriction of peripheral blood vessels and reduces peripheral blood flow. As is known, main pathway of utilization of lactate is aerobic oxidation in all tissues with sufficient oxygen supply, as muscles, heart, etc., or using as precursor in gluconeogenesis in liver (Draoui and Feron, 2011). The speed of lactate transportation from the sites of production to the sites of its consumption depends on the blood circulation. The oxidation of lactate in superficial muscles also may be restricted under these conditions (Roberts et al., 2014).

The aim of the study is to compare the effect of a cold-water bath and active recovery on the recovery after repeated anaerobic exercise; to compare the speed of normalization of physiological and biochemical indicators after repeated anaerobic exercise – level of lactate in blood, HR and blood pressure. Hypothesis – a cold water bath (10°C, 10min) accelerates the normalization of physiological and biochemical parameters (HR, blood pressure and level of lactate in blood) after repeated anaerobic load.

Materials and methods

Participants in the study were eleven amateur male soccer players from the age of 20 to 30 (mean age, in years ± SE, 24.5 ± 5.2), with training experience of 5 to 15 years. The mean body weight (kg ± SE) of athletes was 79.6 ± 9.5 and the mean body height (cm ± SE) was 183,3 ± 8.6. The study was performed during rest period without active training. The permission of the Ethics Commission of Latvian Academy of Sport Education was received for this study.

*Study design***.** The study was organized in two days; stages 1 and 2 took place at the first day, but stages 3 and 4 – at the second day (figure 1). All the participants passed stages 1; 2 and 3; 4 exactly in the same order. Study was performed at room temperature 23 ± 3°C, and humidity – 45% at both days. During each stage there was anaerobic exercise (400W, 1min) on a cycle ergometer (Ergoline 800, ERGOLINE, France) with 1min pre-load

for reaching the full power of 400W. After each exercise there was a recovery period. In stages 1, 2 and 4 active recovery on the cycle ergometer (25W, 10min) was used, but in stage 3 the method used was recovery in cold water bath – immersion to the chest in 10°C water for 10min. The temperature of the cold-water bath was controlled with adding of ice and measured with 230 mm scoop bath thermometer (S. Brannan and Sons Ltd, UK).

The interval between first and second anaerobic load at each day was 30 minutes. After 10min of active recovery in stage 1 or recovery in cold water bath in stage 3 there was approximately 20min of passive rest on a chair.

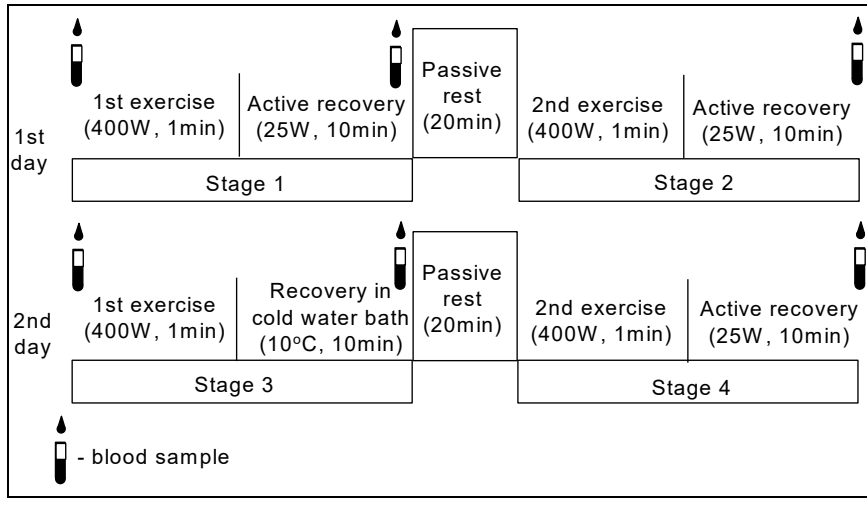


Figure 1. Organization of the study

Lactate concentration was determined in venous blood. Blood samples were taken from forearm vein at the first and the second day of the study; before first exercise (at rest) and 13min after each exercise; six samples in total. The analysis was spectrophotometrically conducted in E. Gulbis Laboratory Ltd. (Riga, Latvia) with chemistry analyser ADVIA 1800 (SIEMENS, Germany). Blood samples from vein were taken and prepared for analysis by a certified laboratory employee.

Heart rate and blood pressure were measured before and after each exercise and during each minute of the 10min of recovery time. Heart rate was measured with heart rate monitor (Polar A300, Finland). Blood pressure was measured with automatic blood pressure monitor (BP A2 Basic, Microlife, Switzerland).

Statistical methods were used for analysis of results: Shapiro-Wilk test – to detect the normal distribution of data and Student's paired sample t

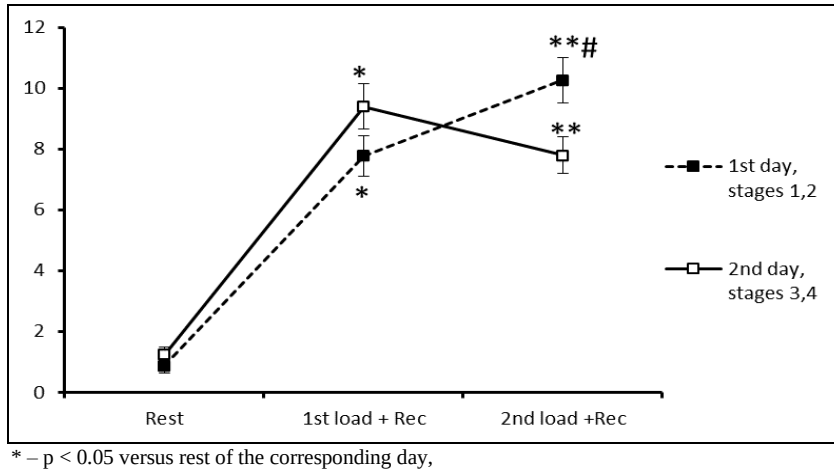
test – to find statistically significant differences between experimental groups. Results are expressed as mean values ± standard errors.

Results

Measurement of lactate concentration

Lactate concentration in venous blood before the anaerobic exercise (mmol/L, Fig.2, Rest) was 0.87±0.13 on the first day and 1.24±0.10 on the second day. They do not differ statistically ($p > 0.05$) and practically fall within the normal values of lactate (0.5-2.2mmol/L) (www.egl.lv).

On the first day after anaerobic exercise (400W, 1min) followed by 10 min of active recovery (25W, 10min), the mean lactate concentration increased to 7.77 ± 0.37mmol/L (Fig.2, 1st load + Rec). This value exceeds the anaerobic threshold (4mmol/L), so this exercise was anaerobic, and 10min of active recovery has not yet been reduced lactate concentration. After the repeated anaerobic exercise (400W, 1min) with subsequent 10min of active recovery (25W, 10min), lactate concentration increased further, reaching 10.26 ± 0.42mmol/L (Fig.2, 2nd load + Rec).



* – $p < 0.05$ versus rest of the corresponding day,
** – $p < 0.05$ versus the first load and recovery of the corresponding day,
# – $p < 0.05$ versus the second load and recovery of the first day (stage 2).

Figure 2. Lactate concentration in blood (mmol/L, mean ± SE)

On the second day after first anaerobic exercise (400W, 1min) followed by 10min of recovery in ice bath, lactate concentration increased to 9.40 ± 0.33mmol/L (Fig.2, 1st load + Rec). This value exceeds lactate concentration at the first day when active recovery took place, but both values do not differ statistically ($p > 0.05$).

During recovery in the cold-water bath, the peripheral blood vessels are constricted, and the speed of lactate entry into the bloodstream and lactate oxidation in cells was slower. After the repeated exercise, the lactate

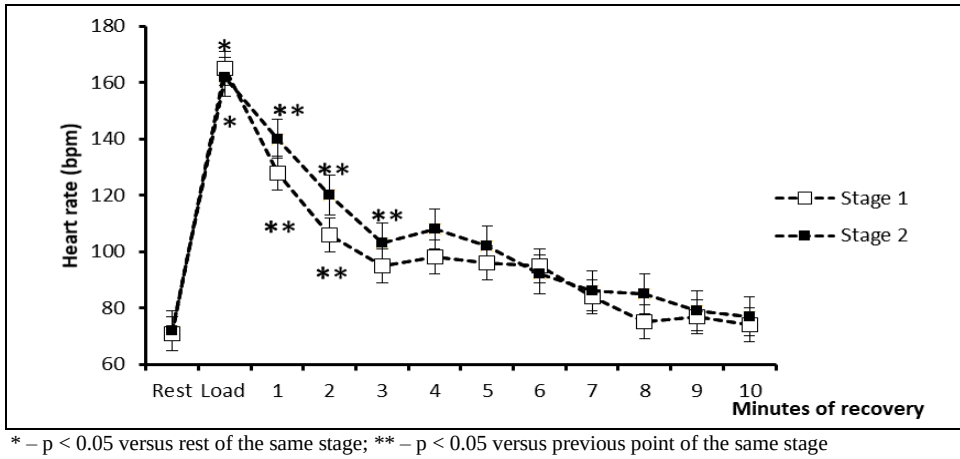
concentration decreased to 7.81±0.35 (Figure 2,2nd load + Rec). This value is statistically lower than corresponding value at the first day (by 23.8 %). Thus, the lactate level 13 min after repeated anaerobic exercise is lower if the resting method after the first exercise is cold water bath as opposed to active recovery.

Measurement of heart rate

The heart rate was measured during every stage at rest (before load), after load (400W, 1min), and every minute for the first ten minutes of recovery. At rest, HR values corresponded to the norm and did not differ statistically between stages: 71±7; 72±6; 70±7 and 75±8 (beats per minute, bpm, Figure 3, a, b).

After anaerobic exercise (400W, 1min), the HR values increased significantly and did not statistically differ between the stages: 165±8; 162±7; 167±8 and 164±6 (bpm, Fig.3, a, b). The increase shows activation of sympathetic nervous system during exercise.

During recovery, the HR values gradually decreased. Statistically significant reduction was during the first two minutes of recovery at stage 1: 128±7 and 106±7 (bpm, fig.3, a) and during first three minutes at stage 2: 140±7; 120±8 and 103±6 (bpm, fig.3, a). Later the decrease was less noticeable. HR values did not differ statistically significantly between stages 1 and 2.

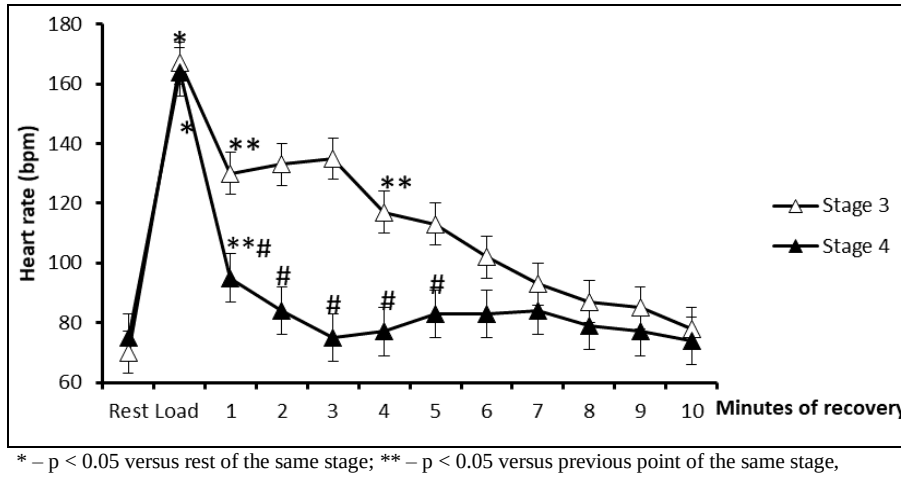


* – p < 0.05 versus rest of the same stage; ** – p < 0.05 versus previous point of the same stage
# – p < 0.05 versus corresponding minute of stage 3; $ – p < 0.05 versus corresponding minute of stage 2

Figure 3. (a) Heart rate (bpm), stages 1 and 2

At stage 3, HR value decreased statistically significantly at the first minute of recovery 130±7 (bpm, Fig.3, b), but when athletes immersed in a cold water bath, HR showed a tendency to increase at the second and the third minute: 133±8 and 135±7 (bpm, Fig.3, b). This shows effect of cold water and the activation of the sympathetic nervous system. After this, the

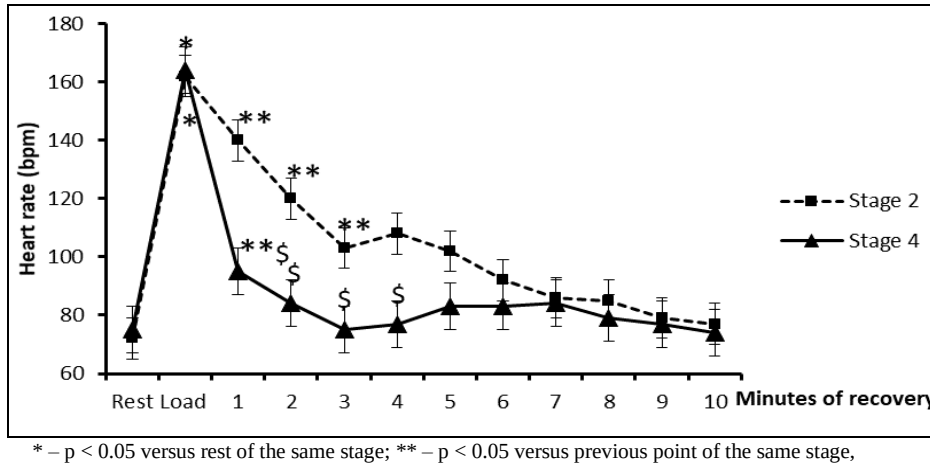
HR gradually decreased with statistically significant decrease in the fourth minute.



* – p < 0.05 versus rest of the same stage; ** – p < 0.05 versus previous point of the same stage,
# – p < 0.05 versus corresponding minute of stage 3; $ – p < 0.05 versus corresponding minute of stage 2.

Figure 3. (b) Heart rate (bpm), stages 3 and 4

At stage 4, the HR was statistically significantly reduced in the first minute of recovery: 95±7 (bpm, Fig.3, b). In comparison with stage 2, there were significantly lower values in 1-4min of recovery: 32.14 %; 30.00%; 27.17% and 28.70% (Fig.3, c). Thus, the reduction of HR is greater in the 1-4min after repeated load, following recovery in the cold-water bath (10 ^{o}C 10 min). This indicates a faster parasympathetic nervous system reactivation compared to repeated load after active recovery (Bastos et al., 2012).



* – p < 0.05 versus rest of the same stage; ** – p < 0.05 versus previous point of the same stage,
# – p < 0.05 versus corresponding minute of stage 3; $ – p < 0.05 versus corresponding minute of stage 2.

Figure 3. (c) Heart rate (bpm), stage 4 versus stage 2

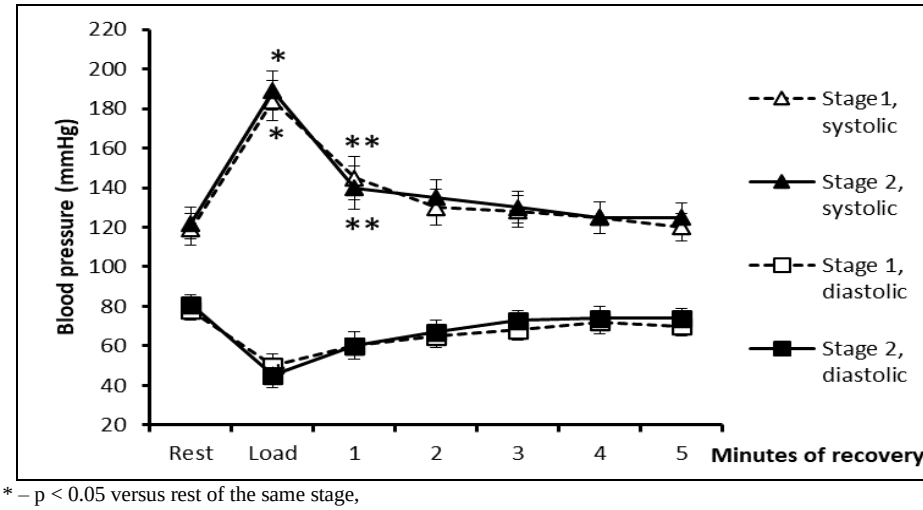
Measurement of blood pressure

The blood pressure was measured during every stage at rest, after anaerobic exercise (400W, 1min), and every minute for the first five minutes of recovery.

Systolic blood pressure before exercise corresponded to the normal rest values and did not differ statistically between stages: 119±8; 122±8; 118±8; 120±10 (mmHg, Fig.4, a, b).

After anaerobic exercise, the systolic blood pressure values increased statistically significantly and did not statistically differ between the stages: 184±10; 189±11; 186±10 and 185±11 (mmHg, Fig.4, a, b), which show activation of sympathetic nervous system during exercise.

During recovery, the systolic blood pressure values decreased and nearly reached rest values. Statistically significant decrease was observed in each stage at the first minute of recovery: 145±11; 140±11; 165±9 and 140±10 (mmHg, Fig.4, a, b); after this, the reduction was smaller. In stage 3 during immersion in cold water bath at the first and the second minute of recovery systolic blood pressure did not decrease, but remained at 165±9, that is statistically more than the corresponding values in all other stages. Statistical reliability is not shown for stages 1 and 2 versus stage 3, but stage 4 versus stage 3 is shown in figure 4, b. This phenomenon corresponds to sympathetic activation caused by cold water.



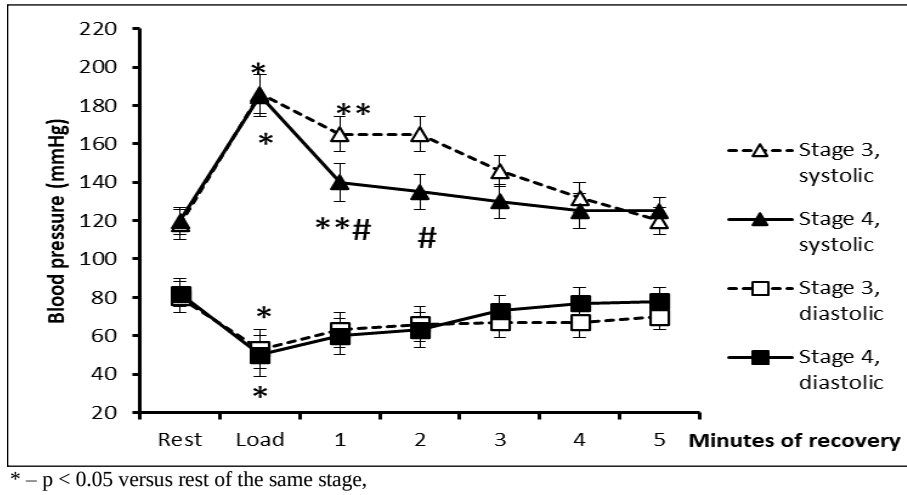
* – p < 0.05 versus rest of the same stage,
** – p < 0.05 versus load of the same stage,
# – p < 0.05 versus corresponding minute of stage 3.

Figure 4a. Blood pressure (mmHg), a) stages 1 and 2;

Diastolic blood pressure before exercise corresponded to the normal rest values and did not differ statistically between stages: 78±5; 81±6; 80±6 and 82±7 (mmHg, Fig.4, a, b).

After anaerobic exercise, the diastolic blood pressure values decreased statistically significantly and did not statistically differ between the stages: 50±6; 45±5; 54±5; 50±6 (mmHg, Fig.4, a, b). This exhibit decreases of peripheral resistance and muscle hyperaemia during exercise.

During recovery diastolic blood pressure gradually increases and reaches the rest value.



* – p < 0.05 versus rest of the same stage,
** – p < 0.05 versus load of the same stage,
# – p < 0.05 versus corresponding minute of stage 3.

Figure 4b. Blood pressure (mmHg), b) stages 3 and 4.

There are no statistically important differences for both systolic and diastolic blood pressure values between stages 4 and 2. Recovery in cold water bath (Stage 3) has no greater effect in comparison with active recovery (Stage 4) on blood pressure normalization.

Discussion

The effect of cold can be dual: the direct or immediate effect which appears during the first minutes of immersion in cold water; and on the other hand – late or delayed effect that manifests only during repeated exercise.

The direct effect of cold on cardiovascular system include, as mentioned previously, an activation of a sympathetic nervous system. This causes significant peripheral vasoconstriction and, as a result of cardiovascular response to cold water, there is an increase in arterial and

venous pressure. Arterial pressure increases 2-3 seconds after immersion and reaches its maximum value after 30 seconds, the mean systolic blood pressure reaches 175/93 mmHg at 1min in cold water. Increased blood pressure and heart rate increase the work done by the heart in the first few seconds after immersion in cold water, when the temperature contrast between air and water is high (Tipton, 1989).

Our data are in line with literature. HR was tendency of increase in stage 3 when there was recovery in cold water bath, and systolic blood pressure remains unchanged and does not decrease at first and second minutes after immersion in cold water bath.

Late effects of cold-water immersion appear during the following exercise. After repeated exercise, the cold water bath reactivates the parasympathetic nervous system (parasympathetic reactivation), which decreases the pulse and blood pressure, faster than active recovery (Buchheit et al., 2009), (Douglas et al., 2016).

Our data suggests that decrease of HR after recovery in cold water bath in stage 4 was faster than after active recovery in stage 2. But we did not detect effect of recovery in cold water bath on faster normalization of blood pressure; there was no difference between stage 4 and stage 2.

During cold water bath the blood flow in the skin and superficial muscles is reduced but in the deep muscles it is increased (Gregson et al., 2011). After the cold water bath there is a rapid blood exchange between the superficial and deep tissues (Wilcock et al., 2006), (Yeung et al., 2016). Reactive hyperaemia takes place in peripheral tissues after a cold-water bath. This is an increase in blood flow as a response to a previous restriction in blood supply. When the bloodstream recovers, the blood flow exceeds the initial level (Bastos et al., 2012). Muscular blood supply is the main limiting factor during exercise, so the change in blood flow is an important mechanism by which cold water baths can speed up recovery after high intensity physical exercise (Wilcock et al., 2006).

Cold restricts the tissue metabolism, which is positive regarding inhibition of inflammatory response and DOMS after exercise, but it may inhibit lactate oxidation, which is the main pathway of lactate elimination (White and Wells, 2013). Most authors consider that cold slows lactate elimination from blood flow and oxidation in superficial muscles by constriction of the blood vessels and slowing down metabolism in the tissues (Roberts et al., 2014), (Vaile et al., 2008). Our data suggests that concentration of lactate that increased during anaerobic exercise presumably had partially reduced during the 10 minutes of recovery. The recovery of both types did not eliminate lactate fully because it is not possible to do in 10 minutes. It can be assumed that the exercises of same intensity yield the

same increase in lactate concentration. After first exercise, lactate concentration at first day was higher than at second day, likely because the recovery in cold water bath at second day causes vasoconstriction and reduces peripheral blood flow, tissue metabolism and lactate entering in circulation. Our data are in the line with main opinion in literature about a slower removal of lactate from the blood under condition of cold-water baths.

After second exercise there was an opposite dynamic of changes in lactate level. At first day, when there was active recovery after first exercise, the level of lactate increased significantly by 32.05% or 2,49mmol/L. But at second day, when the recovery method was cold water bath, level of lactate significantly decreases – by 16.91% or 1.59mmol/L. The concentration of lactate in blood was significantly lower (by 23.8%) after recovery in cold water bath (stage 4) than after active recovery (Stage 2). This phenomenon could be explained with reactive hyperaemia – increased blood supply after cooling of tissues in cold water bath, and possibly increased myocardial lactate consumption due to increased heart rate (Bastos et al., 2012).

The opinion on the effect of cold-water baths on working capacity in repeated exercise is largely positive in the literature. Most studies have demonstrated beneficial effect of cold water immersion on working capacity during repeated exercise after a cold water bath, cold water immersion reduces body core temperature and increases total work done at the repeated exercise after cold water bath, compared to repeated exercise after active recovery (Tipton, 1989), (Vaile et al., 2008), (Rowsell et al., 2014), (Tipton and Bradford, 2014), (McCarthy et al., 2016), (Lucertini et al., 2017). Opposite results were achieved only in a few studies: peak power, total work done, lactate level and maximum HR were significantly lower during the second exercise (Schniepp et al., 2002), (Crowe et al., 2007).

We assume that the total work in our study performed by the participants during anaerobic exercise is equal, because power (400 W) and time (1 min) of exercise was equal for all participants.

The faster reduction in HR and concentration of lactate after repeated anaerobic exercise found in our study is presumably beneficial effect of the cold-water bath.

Conclusions

Recovery in cold water bath causes faster reduction of lactate concentration in venous blood and heart rate after repeated anaerobic exercise in comparison with repeated anaerobic exercise that follows active

recovery. Blood pressure does not show differences depending of type of recovery.

References

1. Bastos, F.N., Vanderlei, L.C., Nakamura, F.Y., Bertollo, M., Godoy, M.F., Hoshi, R.A., Junior, J.N., & Pastre, C.M. (2012). Effects of cold-water immersion and active recovery on post-exercise heart rate variability. *International journal of sports medicine*, 33(11):873-879. DOI: 10.1055/s-0032-1301905
2. Buchheit, M., Peiffer, J.J., Abbiss, C.R., & Laursen, P.B. (2009). Effect of cold-water immersion on postexercise parasympathetic reactivation. *American journal of physiology-Heart and circulatory physiology*, 296(2):H421-H427. DOI: 10.1152/ajpheart.01017.2008
3. Crowe, M.J., O'Connor, D., & Rudd, D. (2007). Cold water recovery reduces anaerobic performance. *International journal of sports medicine,* 28(12):994-998. DOI:10.1055/s-2007-965118
4. Douglas, J., Plews, D.J., Handcock, P.J., & Rehrer, N.J. (2016). The Beneficial Effect of Parasympathetic Reactivation on Sympathetic Drive During Simulated Rugby Sevens. *International journal of sports physiology and performance*, 11(4):480-488. DOI: 10.1123/ijspp.2015-0317
5. Draoui, N., & Feron, O. (2011). Lactate shuttles at a glance: from physiological paradigms to anti-cancer treatments. *Disease Models & Mechanisms*, 4(6):727-732. DOI: 10.1242/dmm.007724
6. Gregson, W., Black, M.A., Jones, H., Milson, J., Morton, J., Dawson, B., Atkinson, G., & Green, D.J. (2011). Influence of cold-water immersion on limb and cutaneous blood flow at rest. *The American journal of sports medicine*, 39(6):1316-1323. DOI: 10.1177/0363546510395497
7. Lucertini, F., Gervasi, M., D'Amen, G., Sisti, D., Rocchi, M.B.L., Stocchi, V., & Benelli, P. (2017). Effect of water-based recovery on blood lactate removal after high-intensity exercise. *PLoS One,* 12: e0184240. DOI: 10.1371/journal.pone.0184240
8. Mishra, S., Manjareeka, M., & Mishra, J. (2012). Blood pressure response to cold water immersion test. *International Journal of Biology, Pharmacy and Allied Sciences***,** 1(10):1483-1491.
9. McCarthy, A., Mulligan, J., & Egana, M. (2016). Postexercise cold-water immersion improves intermittent high-intensity exercise performance in normothermia. *Applied physiology, nutrition, and metabolism = Physiologie appliquee, nutrition et metabolisme*, 41(11):1163-1170. DOI: 10.1139/apnm-2016-0275
10. Roberts, L.A., Nosaka, K., Coombes, J.S., & Peake, J.M. (2014). Cold water immersion enhances recovery of submaximal muscle function after resistance exercise. *American journal of physiology Regulatory, integrative and comparative physiology*, 307(8): R998-R1008. DOI: 10.1152/ajpregu.00180.2014
11. Rowsell, G.J., Reaburn, P., Toone, R., Smith, M., & Coutts, A.J. (2014). Effect of run training and cold-water immersion on subsequent cycle training quality in high-performance triathletes. *Journal of strength and conditioning*

research/National Strength & Conditioning Association, 28(6):1664-1672. DOI: 10.1519/JSC.0000000000000455

12. Schniepp, J., Campbell, T.S., Powell, K.L., & Pincivero, D.M. (2002). The effects of cold-water immersion on power output and heart rate in elite cyclists. *Journal of strength and conditioning research*, 16(4):561-566. DOI: 10.1519/1533-4287(2002)016<0561
13. Thorsson, O., Lilja, B., Ahlgren, L., Hemdal, B., & Westlin, N. (1985). The effect of local cold application on intramuscular blood flow at rest and after running. *Medicine and science in sports and exercise*, 17(6):710-713.
14. Tipton, M., & Bradford, C. (2014). Moving in extreme environments: open water swimming in cold and warm water. *Extreme physiology & medicine*, 3:12-12. DOI: 10.1186/2046-7648-3-12
15. Tipton, M.J. (1989). The initial responses to cold-water immersion in man. *Clinical science (London, England: 1979)*, 77:581-588. DOI:10.1042/cs0770581
16. Vaile, J., Halson, S., Gill, N., & Dawson, B. (2008). Effect of cold-water immersion on repeat cycling performance and thermoregulation in the heat. *Journal of sports sciences*, 26 (5):431-440. DOI.org/10.1080/02640410701567425
17. White, G.E., & Wells, G.D. (2013). Cold-water immersion and other forms of cryotherapy: physiological changes potentially affecting recovery from high-intensity exercise. *Extreme physiology & medicine*, 2(1):26. DOI: 10.1186/2046-7648-2-26
18. Wilcock, I.M., Cronin, J.B., & Hing, W.A. (2006). Physiological response to water immersion: a method for sport recovery? *Sports medicine (Auckland, NZ)*, 36(9):747-765. DOI:10.2165/00007256-200636090-00003
19. Yeung, S.S., Ting, K.H., Hon, M., Fung, N.Y., Choi, M.M., Cheng, J.C., & Yeung, E.W. (2016). Effects of Cold-Water Immersion on Muscle Oxygenation During Repeated Bouts of Fatiguing Exercise: A Randomized Controlled Study. *Medicine (Baltimor)*, 95(1): e2455. DOI: 10.1097/MD.0000000000002455
20. Homepage of E.Gulbis Laboratory (*E. Gulbja Laboratorija*), avalable www.egl.lv, wiewed at 20.01.2020.

Submitted: March 11, 2020
Accepted: June 15, 2020

LASE Journal of Sport Science
2020 Vol 11, No. 1, Pages 60 – 69
DOI: 10.2478/ljss-2018-0032
p-ISSN: 1691-7669/e-ISSN: 1691-9912/ISO 3297
http://journal.lspa.lv/

REVIEW PAPER

INTERNATIONAL STUDENT OPINION ON STUDIES AT LASE

Iveta Boge, Behnam Boobani, Renārs Līcis

Latvian Academy of Sport Education
Address: 333 Brivibas street, Riga, LV-1006, Latvia
Phone: +371 67799527
E-mail: iveta.boge@lspa.lv, Behnam.boobani@lspa.lv, renars.licis@lspa.lv

Abstract

International students make a significant number of students in many universities around the world, including Latvia. The desire to increase opportunities for higher education for students from abroad is motivated by various factors including also the economic one. LASE also has a six-year experience in international full degree student admittance. As strategies are set to attract international students, the educational and cultural experiences of these students should also be considered. The aim of the research was to find out the opinion of foreign students studying at LASE about their studies. The research was carried out applying questionnaire method. The respondents were 25 full degree international students studying at LASE. The results show that foreign students' express satisfaction in most issues concerning their studies at LASE.

Keywords: *international students, experience, satisfaction, studies*

"Boundaries between nations are blurring; the production, marketing, and delivery of goods and services have become borderless; the nation-state is fading as the principal site of identity construction ... Within this new global order, the need for students to obtain exposure to the perspectives and practices of other cultures has been deemed essential for purposes of peace and prosperity ..."

Ross Lewin (2009)

Introduction

Internationalization has become a major theme in higher education, and international education sector has remarkably grown in recent years.

During the past two decades, international activities of universities have dramatically expanded in volume, scope and complexity. Increasing number of higher education institutions has included internationalization in their institutional missions as an indicator for quality. One of the performance indicators often used for internationalization is the number of international students enrolled at the institution (de Wit, 2011).

In addition to the traditional receiving countries, universities in other countries have made various efforts to recruit more international students as a means of generating income and adding diversity to the student number (Altbach & Knight, 2007). As a result, there has been a significant increase in the total number of foreign students in the world since the early stages of international mobility. In the year 2012, the number of students enrolled outside their country of citizenship rose to 4.5 million, which was 2.1 million in 2000 and 0.8 million in 1975[1] (OECD, 2014, p. 344). Additionally, it was predicted that by the end of 2020, the total foreign student population would rise to 7 million (Altbach, Reisberg, & Rumbley, 2009). Thus, it seems that studying abroad will be an exciting experience for more and more students in the future.

In this changing context of student mobility, new trends will have an important impact on campus environments. Along with the increasing enrollment of traditional college students, there will be migration of students worldwide and thus campuses will host a more diverse, nontraditional student body. Involvement of international students in campus life is perceived as a precondition for campus internationalization. The presence of international students enriches the environment in the classroom with various experiences and stories from different cultures (Pandit, 2007). Higher education can provide opportunities for cross-cultural interaction and thus develop international and intercultural skills of all students. Yet, researchers agree that this is not an easy task and the realization of the pluralism imperative is the most significant challenge ever faced by higher education (Kuh, 2008, p. 93). Intercultural interaction between international students and their host community is unusual and simply putting people from different cultures into the same place does not lead to internationalization any more than living in the same street creates a community (Thom, 2010, p. 58). Students from different national and cultural backgrounds are often challenged to “voluntarily” socialize. Yet, issues such as social acceptability, academic success, language, and communication skills are, however, persistent influences on the extent to which students can be successful in establishing social and academic relationships across national and cultural borders (Harrison & Peacock, 2010). Factors such as language barriers, lack of familiarity with dail

practices, fear of being misunderstood and ignored push international students to form smaller groups based on language and cultural background (Ippolito, 2007). In general, international and domestic students have little contact, which constitutes a significant barrier to internationalization. Studying abroad involves various processes from application to graduation, even after graduation. Application procedures, visa requirements, accommodation, language, study programmes, academic staff and students in host institution, and campus environment are among the factors that all shape the experience on studying abroad. Whilst coming to a new and foreign country is often an exciting and rich event, the experience can be constrained by uncertainty and disorientation of finding your way around new cultures and social expectations. While many students find methods to tackle with these challenges, some of them fail miserably both in the academics and in their social life; beset by financial burdens, depression and a sense of failure (Ramachandran, 2011, p. 202). Thus, there is a growing need for the development of innovative and well-conceptualized programs for promotion, management, and guidance of international students and for creating a multicultural campus environment (Chapman, 1999).

As international students make a significant number of students in many universities around the world, their academic success and psychological wellbeing are essential questions for both the students themselves and for universities (Chirkov, Vansteenkiste, Tao, & Lynch, 2007).

Material and methods

As universities set strategies to attract international students, they should also consider the educational and cultural experiences of their students (Snow Andrade, 2006). The Latvian Academy of Sport Education (LASE) considers internationalisation as one of the most significant issues in its strategy and, accordingly, admits international students in its study programmes of all levels. LASE has relatively small international student teaching experience, as it started their admittance in the study year 2014/2015. Considering the fact that LASE is a specialised sports university with the total student number of only about 1200, the number of international students studying is also not so great – 34. Anyway, it is very important for a university to know how satisfied the international students are in their study process and the university in general. Therefore, the aim of our research was to find out the international student's opinion about their studies at LASE.

In order to reach the forwarded aim, the inquiry – questionnaire was applied as a data collection method. The questionnaire included six

questions about the study process and the life in the university with the answers arranged in the Likert scale (strongly dissatisfied – dissatisfied – partly satisfied – satisfied – completely satisfied), and an open question of student comments was also given. The questionnaire was disseminated electronically with 25 valid answer sheets received back. The data obtained in the questionnaire were processed using Excel program.

The subjects included 25 (20 males, 5 female) full degree international students studying in the study year 2019/2020, the data were collected in the period December – January. The age of the respondents was 18 – 25 years old (64%), 26 - 30 years old (20%) and 31 – 39 years old (16%). They represented all study programmes offered to international students at LASE: the First level professional higher education programme *Education and Sport Specialist* (respondent n=8), the professional Bachelor higher education programme *Sport Science* (n=13), the professional Master higher education programmes *Sport Science* and *Health Care Specialist in Sport* (n=2), as well as the academic Doctoral higher education programmes *Sport Science* (n=2). The subjects came from such countries as Azerbaijan, Brazil, Czeck Republic, Estonia, Finland, India, Iran, Morocco, Lithuania, Russia, Pakistan, Turkey, Ukraine and Uzbekistan.

Results

In the first question of the questionnaire LASE international students were asked about their satisfaction with the study process (study organization) at LASE.

The student responses (see Fig.1) are as follows: 44% of students are completely satisfied, 36% – satisfied, 12% – partly satisfied and 8% of them are dissatisfied with the study process.

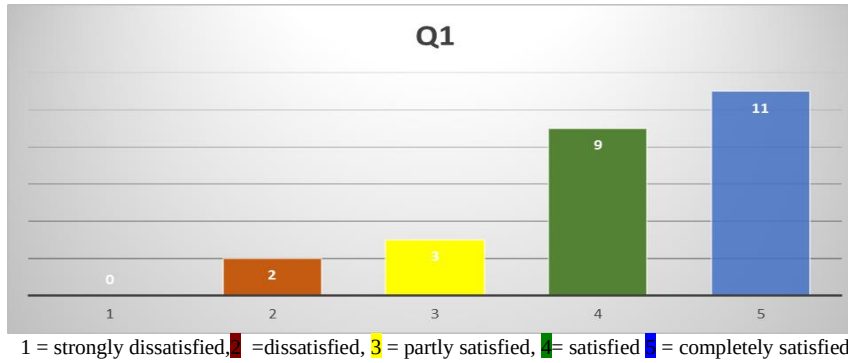


Figure 1. International student satisfaction with the study process at LASE

So, we can see that mostly international students are satisfied with the organization of the study process. In the comments students also mention that to their mind the studies are well organized, as well as contain both theoretical and practical study courses. Some student points out that at the beginning of the studies it was difficult for him/her to adapt to the study process held in the education system of different country, different culture, and the study system was something new, it differed completely from the one of the student's home country, but the academic staff helped, and now he/she is studying successfully.

Students also mention the problem that some international students are not motivated to study and often miss classes. It affects the study process of the whole group because sometimes it is not possible to carry out all planned study material and methods due to the fact that everybody is not present. They point out that *"study process also depends on students. If things are finished on time, the study process is smooth".*

Some respondent commented that comparing study organization in his/her home country to the one at LASE, he/she was strongly dissatisfied with studies at LASE.

The second question was asked about the programme content. The distribution of responses are given in Figure 2, and reveals that 40% of the students were completely satisfied, 36% – satisfied, and only 20% – partly satisfied and 4% were dissatisfied with the study programme content.

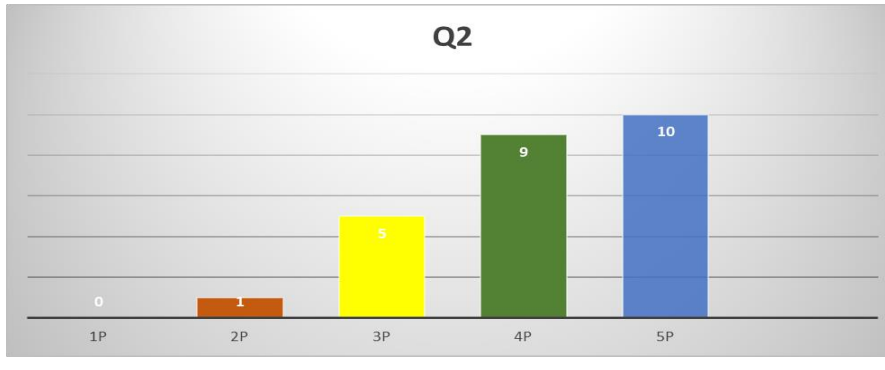


Figure 2. International student satisfaction with the programme content

Also in their comments the students point out that they are mostly satisfied with the study courses offered. They mention that LASE study programmes contain *"good subjects that will help to achieve the goals and carrier"*. Some comment says that to a student's mind the programme he/she is studying is better than he/she expected.

Although study programmes contain both theoretical and practical subjects, in some comments students mention that they would like to have

even more practical training. This refers also to health care programme as a student has pointed out that *"as a physiotherapist the student needs more number of practical hours than the theoretical, as he/she should know how to handle the cases and to learn the conditions practically"*.

There is also wish expressed to have more subjects on business and management fields. Some student has doubted the usefulness of the study courses *Adult Education* and *Accountancy* of the undergraduate programme, saying that to his/her mind these study courses are of low value.

The research interest was also to obtain respondent opinion on the study conditions at LASE, including study and sport facilities. The international student responses were as follows: 48% of the respondents were completely satisfied, 36% – satisfied, 12% – partly satisfied and 4% of them were dissatisfied.

In their comments the students mentioned that there are good study and sports facilities with the necessary equipment (projectors, laptops in all study rooms, a good library, good sports halls with sports equipment) to study and practice sports at LASE both indoors and outdoors. Although some weak sides were also mentioned, like some old sports equipment and the necessity to reconstruct some sports facilities.

Atmosphere during the studies is very important for international students. The research results on this question where as follows (see Figure 3): 52% of students were completely satisfied, 36% – satisfied, 8% – partly satisfied and 4% of them were dissatisfied with the atmosphere at LASE.

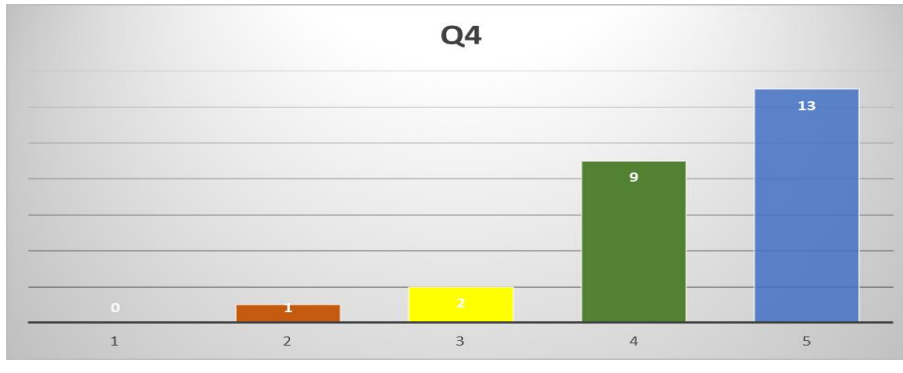


Figure 3. International student satisfaction with the atmosphere at LASE

In their comments the respondents also express a great satisfaction. They mention that there is positive and healthy atmosphere all around at LASE. They point out that "good atmosphere is the strong side of LASE" and that the Academy is a very good university.

Speaking about the atmosphere in the international student study groups themselves, the respondents say that students are friendly and kind.

They also mention that although students are nice, sometimes disciplinary issues and manners affect the overall satisfaction level.

Academic staff play a vital role in providing a study process at any university. Therefore another research question was the students' opinion on the academic staff at LASE. The distribution of responses was given as follows (see Figure 4): 28% of the students were completely satisfied, 36% – satisfied, 32% – partly satisfied and 4% of them were dissatisfied with the work of the academic staff.

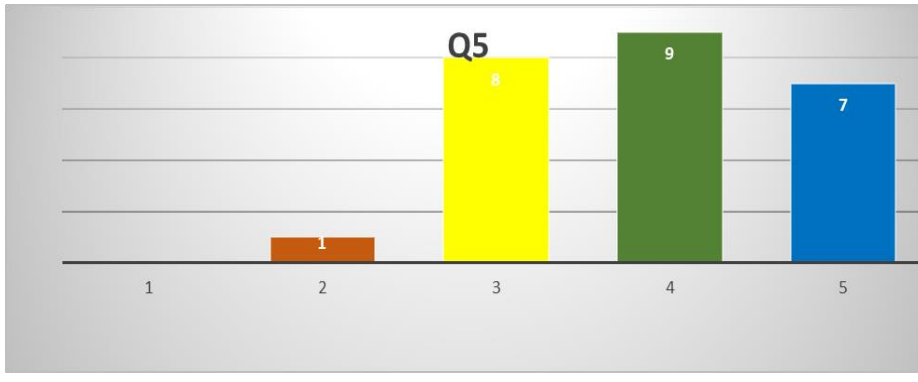


Figure 4. International student satisfaction with the academic staff

In the comments the respondents mention that the academic staff of LASE are helpful, friendly, experienced, responsible and professional. They point out that the faculty are good at teaching by the application of interactive methods, they say that they "*like learning with activities, and most teachers teach by this way".* In the international student opinion communication between academic staff and students is good and interesting. The respondents also emphasize that in some cases tutors should apply more individual approach to each student.

As, when teaching international students, the study language is English, the respondents also have commented on academic staff's English language skills. They mention that not all the tutors have fluent English, and sometimes it is hard to understand what they try to describe and what they want from a student.

For international students to study successfully, the work of administrative staff is also very significant. The respondents' opinion included the following: 68% were completely satisfied and 32% satisfied, mentioning that the administrative staff of LASE is very helpful and ready to assist. Very positive comments were given about the international office work, saying that they always support international students, give all

necessary information and are very much concerned about international students.

Discussion

In 2016 in Latvia there was a wide research made about international students of Latvia (Auers, 2016). It involved foreign students of 16 Latvia universities who answered survey questions on their life and studies in Latvia. There was the question concerning students' satisfaction with their study and life conditions, containing also issues about satisfaction with study programme content and study process, study language, academic and administrative staff. This research showed that 80% of international students studying in Latvia are satisfied with life quality in Latvia. In this research the authors focused only on students' satisfaction with their studies and study conditions in one university, but the results show a very similar situation – most part of international students are satisfied with their studies here.

As it is mentioned in studies of other researchers (Pandit, 2007; Rienties, Beausaert, Grohnert, Niemantsverdriet, & Kommers, 2011), traditionally international students chose universities of the UK or USA to study abroad. But nowadays also other, including non-English speaking, countries attract international students. LASE started to admit foreign full degree students in the study year 2014/2015, therefore the number of the students is only around thirty now. So, the number of the respondents is not so big in this research.

The research spotted several aspects which every university admitting international students is concerned about.

International students often choose as their study destination a university far away from their home country, with different culture and study system. As researchers (Chirkov, Vansteenkiste, Tao, & Lynch, 2007; Olivas, Li, 2006; Rienties, Beausaert, Grohnert, Niemantsverdriet, & Kommers, 2011) point out, adaptation process plays a great role at the beginning of studies. Also, in this research some student has emphasized this aspect and stated that, having received help from academic staff, he/she is able to study successfully.

It is mentioned in the research (Chirkov, Vansteenkiste, Tao, & Lynch, 2007) that intrinsic goals, such as meaningful relationships, personal growth and societal contribution, correspond to satisfaction of humans' basic psychological needs. The research carried out shows that, especially at the beginning of the studies and with undergraduate international students sometimes there is a lack of these intrinsic goals as they miss classes, thus affecting their personal growth, relationships with their groupmates, as well

as their social contribution, as the respondents have pointed out that occasionally some student non-attendance affect negatively on study task implementation for the whole group.

When studying abroad, it is a vital question about the study language. Both international students and academic staff who teach foreign students should have fluent study language skills, it is a factor affecting international student progress (de Wit, 2011). In the research the respondents have identified that not all academic staff's English, which is the study language in study programmes for LASE international students, is fluent. This is a drawback which should be improved in study programme implementation for foreign students at LASE.

Conclusions

Having analyzed the results of the research, it can be concluded that, in general, the international students are completely satisfied and satisfied with studies at LASE, they are satisfied with the study process and its organization, content of the study programmes, study conditions and atmosphere. As strong sides of LASE can be mentioned that study courses help to reach students' goal, there are the necessary facilities and equipment, a good atmosphere, helpful, professional academic staff. As a drawback can be mentioned the following: not so good class attendance by students themselves, old-fashioned sports equipment, the need for a part of academic staff to speak fluent English.

References

1. Altbach, P.G., & Knight, J. (2007). The internationalization of higher education: motivations and realities. *Journal of Studies in International Education*, 11(3/4), 290-305.
2. Altbach, P.G., Reisberg, L., & Rumbley, L. (2009). *Trends in global higher education: tracking an academic revolution.* Accessed through <http://unesdoc.unesco.org/images/0018/001831/183168e.pdf> on March 14th, 2017.
3. Auers, D. (2016) Latvijas konkurētspējas ziņojums. Augstākās izglītības eksporta nozare Latvijā: strauja izaugsme, augsts potenciāls. Rīga: Domnīca Certus.
4. Chapman, M.P. (1999). The campus at the millennium: a plea for community and place. *Planning for Higher Education* 2, 25-31.
5. Chirkov, V., Vansteenkiste, M., Tao, R., & Lynch, M. (2007). The role of self-determined motivation and goals for study abroad in the adaptation of international students. *International Journal of Intercultural Relations*, 31(2), 199-222.
6. De Wit, H. (2011). Internationalization of higher education in Europe and its assessment. In H. de Wit (Ed.), Trends, issues, and challenges in

internationalization of higher education (pp. 39-43). Amsterdam, The Netherlands: Centre for Applied Research on Economics and Management, School of Economics and Management of the Hogeschool van Amsterdam.
7. Harrison, N., & Peacock, N. (2010). Cultural distance, mindfulness and passive xenophobia: Using integrated threat theory to explore home higher education students' perspectives on internationalisation at home. *British Education Research Journal*, 36(6), 877-902.
8. Ippolito, K. (2007). Promoting intercultural learning in a multicultural university: Ideals and realities. Teaching in Higher Education, 12(5-6), 749-763.
9. Kuh, G. D. (2008). High-impact educational practices: What they are, who has access to them, and why they matter. Accessed through <http://provost. tufts.edu/celt/files/High-Impact-Ed-Practices1.pdf> on August 12th, 2017.
10. Lewin, R. (2009). The handbook of practice and research in study abroad: Higher education and the quest for global citizenship. New York: Routledge; Washington, D.C.: Association of American Col- leges and Universities
11. OECD (2014). Education at a glance, 2014: OECD indicators. Paris: OECD.
12. Olivas, M., Li, C. (2006). Understanding stressors of international students in higher education: what college counselors and personnel need to know. *ResearchGate*, 217-222.
13. Pandit, K. (2007). The importance of international students on our campuses. Association of Pacific Coast Geographers Yearbook, 2007/69, 156–159.
14. Ramachandran, N. T. (2011). Enhancing international students' experiences: An imperative agenda for universities in the UK. *Journal of Research in International Education*, 10(2), 201-220.
15. Rienties, B., Beausaert, S., Grohnert, T., Niemantsverdriet, S., & Kommers, P. (2011). Understanding academic performance of international students: the role of ethnicity, academic and social integration. *High Educ* 63:685-700.
16. Thom, V. (2010). Mutual cultures: Engaging with interculturalism in higher education. In E. Jones (Ed.) *Internationalization and the student voice: Higher education perspectives* (pp.155-165). New York: Routledge

Submitted: April 30, 2020
Accepted: June 15, 20

GUIDELINES FOR CONTRIBUTORS

Instruction to Authors

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.

p-ISSN: 1691-7669/e-ISSN: 1691-9912/ISO 3297

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 others 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:

p-ISSN: 1691-7669/e-ISSN: 1691-9912/ISO 3297

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 figure 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.

Manuscripts are liable to copyright resulting from the Berne Convention for the Protection of Literary and Artistic Works and from the Universal Copyright Convention. Any part of the manuscript cannot be reproduced, archived or transferred in any form without consent of the copyright owner.

Submission of manuscripts

The articles should be sent to:

Inta Bula-Biteniece
E-mail: inta.bula-biteniece@lspa.lv

p-ISSN: 1691-7669/e-ISSN: 1691-9912/ISO 3297