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CONTENT

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Editorial office

LITHUANIAN SPORTS UNIVERSITY
Sporto str. 6, LT-44221 Kaunas, Lithuania
Tel. +370 37 302636
Fax +370 37 204515
E-mail zurnalas@lsu.lt
URL www.lsu.lt/en/scientific-journals_BJSHS

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PRECOMPETITIVE EMOTIONAL STATE OF DANCESPORT ATHLETES

Victoria Andreeva, Diana Karanauskienė
Lithuanian Sports University, Kaunas, Lithuania

ABSTRACT

Background. The paper deals with the precompetitive emotional state of dancesport athletes before competition. Research aim was to analyze pre-competition emotional state of dancesport athletes.

Methods. The pre-competition emotional state of dancesport athletes was established using methods of in-depth interview and participant observation. The main reasons for different types of emotional states were identified, and finally, recommendations for athletes and coaches how to overcome immoderate anxiety interfering with good competition results were developed.

Results. Precompetitive emotional state before competition may be described as a complex multi-faceted phenomenon which consists of different psychological categories such as: anxiety, arousal, stress, self-confidence, concentration. The results of the interviews and participant observation showed that precompetitive emotional states of the dancesport athletes were both positive and negative. Positive emotional state was shown by the majority of participants. There were found six reasons of positive emotional state and five reasons of negative emotional state as well.

Conclusion. To overcome the negative emotional state or reinforce positive emotional state before the competitions it is suggested to listen to pleasant music, do breathing exercises or do the mental exercise. The choice depends on the personal characteristics of athletes.

Keywords: dancesport, precompetitive state, emotions.

INTRODUCTION

In dancesport, physical, technical and tactical preparation levels of the strongest athletes are approximately on the same level. Therefore, the result of competition depends on the level of the dancer's mental fitness. During extremely important competitions mental tension increases greatly, thus mental and psychological preparation becomes much more important. As Jones (1991) has pointed out, at the top sporting levels (at least in many sports), there is very little difference in the skill levels of the participants. It is thus often the ability to handle anxiety and stress that separates the winner and the loser. It is important to understand what the dancer feels before the competition, so that the coach could help overcome the problems of the athlete and improve the competition result.

Qualitative hypothesis of the research states that anxiety is the most frequent emotional state, but not the only one, before competition. This hypothesis is based on research of Jones and Hanton (2001) where both the facilitated and debilitated performers indicated being most "anxious". Thus, *the aim* was to describe and analyze pre-competition emotional state of dancesport athletes.

Types of athletes' precompetitive emotional states. Pre-competition states are psychological states of athletes which are experienced before the start of a competition (Vodičar, Kovač, & Tušak, 2012). Sport normally involves competition; competition normally tends to produce anxiety, characterized by a growth in arousal (Jarvis, 2006). Arousal may be defined as a general physiological

and psychological activation which may vary from deep sleep to intense excitement (Gould & Krane, 1992). According to Cashmor (2008), arousal is a diffuse model of activities, both physiological and psychological, that prepares us for a task. In sports psychology, pre-competitive anxiety is described as an unpleasant emotion which is characterized by indefinite but constant feeling of worry and dread before a competition (Athan & Sampson, 2013). Weinberg and Gould (1995) have presented the following definition of anxiety: "a negative emotional state with feelings of nervousness, worry and apprehension associated with activation or arousal of the body". According to Jarvis (2006), anxiety is a reaction to an anticipated threat: real or imaginary. Anxiety contains two elements– cognitive and somatic, which influence performance before and during competitions. The cognitive element is psychological, characterized by negative expectation about victory or self-evaluation, concern about results of the competition, images of failure and incapacity to concentrate. The somatic element is the physiological element which is associated with an autonomic arousal, and negative symptoms such as a feeling of nervosity, high blood pressure, dry throat, muscular tension, and fast heart rate (*Martens*, Burton, & Vealey, *1990).* Karageorghis (2007) partly supported this theory, but he added new, the third, category of the precompetitive anxiety. So he distinguished three elements of precompetitive anxiety: cognitive, somatic and behavioral. Martens et al. (1990) linked the term of arousal with the term of anxiety, so they saw pre-competitive anxiety as an arousal that was unpleasant or negative and occurred prior to competition. According to them, it is a negative emotional state that is characterized by the feeling of worry, nervosity associated with activation of the body. According to Moran (2004), factors such as fear of failure and lack of confidence cause a feeling of anxiety in athletes. Krane (1994) noted that the human body shows a lot of signals, for example: muscle tension, necessity to go to the toilet to demonstrate that it is not possible any more to maintain total control of the body.

The term stress has a broader meaning than anxiety. Stress is the process where an individual perceives a threat and responds with a series of psychological and physiological changes, including increased arousal and the experience of anxiety (Jarvis, 2006). Stress is a physical, chemical and emotional factor that causes bodily or mental tension and may be a factor in disease causation and a state resulting from stress; especially one of bodily or mental tension resulting from factors that tend to alter an existent equilibrium (Winkelhuis, 2001). According to Jarvis (2006), humans tend to feel stress when they meet demands that are difficult to meet, but which carry serious consequences in the case of failure to meet them. If stress is long-term, or chronic, it can cause serious harm to both physical and mental health. Whilst it is quite normal to experience some anxiety before competing, athletes should not feel constantly anxious and see themselves as facing insurmountable odds. Stress also can be considered as a constraining or propelling force or pressure that causes a significant change in a system; alternatively, it may be approached as the response of a system to force; or even the relationship between the two (Cashmor, 2008). In this case, by analyzing the scientific literature the precompetitive emotional state before competition may be described as a complex multi-faceted phenomenon which consists of different psychological categories, such as anxiety, arousal, stress, self-confidence, and concentration.

Precompetitive emotional state of athletes in different types of sport. Hanton, Jones, and Mullen (2000) examined self-reported cognitive and somatic anxiety in 50 rugby league players and 50 target rifle shooters. As to anxiety there, they did not find any differences between two groups of athletes. In their perceptions of the effect of cognitive anxiety on performance, no differences were found, either. However, rugby players were more likely to tell that somatic anxiety had a positive impact on their performance, and shooters were more likely to say it had a negative impact.

The study with elite rhythmic gymnasts showed that the levels of precompetitive somatic and cognitive anxiety were greater during the competition than during the training session, where self-confidence and concentration scores were decreased. Analysis of physical data showed that the heart rate and time of exercise were increased while the performance was decreased in the competition compared to training session (Nassib, Mkaouer, Nassib, Riahi, & Arfa, 2011).

According to Ikulayo (1990), there are many ways how precompetitive anxiety can affect sports performance. Firstly, for sports which require stamina, power or both at the same moment, precompetitive anxiety can greatly pull down the athlete's energy level. Secondly, in sport where

calmness is extremely important, for example in golf, archery, free throw shooting in basketball or direct free kick in football, precompetitive anxiety can strongly intervene with the athlete's ability to stay calm. Thirdly, anxious athletes can find it difficult to be able to remain focused on the task, and finally pre-competitive anxiety can increase tension in the muscle of the throat and chest to the point where it may seem impossible to swallow or expand the chest. According to Krane (1994), precompetitive anxiety can make a powerful influence on athlete's performance. In his research he observed that the cognitive interpretation that athlete gives to a situation influences his or her performance greatly. He also added that successful athletes can interpret pre-competitive anxiety in the way to keep up their athletic performance. According to Athan & Sampson (2013), it is usual to experience precompetitive anxiety. They said that a certain level of physical arousal is helpful and prepares athletes for competition. But they noted as well that when the physical symptoms of precompetitive anxiety are too high, they may seriously intervene with athlete's ability to show his or her best performance. According to their study it happens because the coordinated movements which are required in athletic events become increasingly difficult when the body of the athlete is in a tense state.

Jones, Hanton, and Connaughton (2007) were engaged in research in the field of the framework of mental toughness in the world's best performers. Eight performers, three coaches and four sport psychologists were chosen in order to gain a diverse representation. During this research thirteen attributes were defined that clustered under the competition dimension and were considered essential to mental toughness in a competitive situation as well as were ranked in order of importance. These attributes could be further divided into six subcomponents: belief, staying focused, regulating performance, handing pressure, awareness and control of thoughts and feelings, and, finally, controlling the environments.

Hanton, Mellalieu, and Hall (2004) defined two causal networks showing self-confidence to influence the relationship between competitive anxiety intensity and symptom interpretation. In the absence of self-confidence, increases in competitive anxiety intensity were perceived as outside of the performers' control and debilitating to performance. Under conditions of high self-confidence, increases in symptoms were reported to lead to positive perceptions of control and facilitative interpretations. To protect against debilitating interpretations of competitive anxiety, performers reported the use of cognitive confidence management strategies including mental rehearsal, thought stopping, and positive self-talk.

Precompetitive emotional state of athletes in dancesport. Sports dances belong to the group of acyclic, complicated in coordination or technically aesthetic sport that requires fast and high-quality mastering of a wide range of technical elements during the training process and perfect performance under the pressure of competitive activities (Moore, 2002). For the first time the problem of the need for development and formation of emotional stability of the athletes in the sports dance in Russia was noted by Rubshtein (Рубштейн, 2005). In particular, she emphasizes that adverse emotional states impede qualitative performance of activities such as training and competition. In the process of the competition, the dancer's anxiety and worrying reach an excessively high level, which generally has a negative impact on the effectiveness of the technical action and consequently, on the sports results. The author suggests that low levels of anxiety during competitive activity mean that the protective factors influence the body of the dancer, which makes the opening up of the technical and emotional potential of the dancer impossible. For sure, these factors have a negative impact on dancer's performance.

Already during the initial stage of preparation of the dance couples, competitions are held under the conditions full of strong rivalry and are characterized by elevated emotional stress. Stress during the competition may cause disease, but it also may not. The fact remains that stress tends to alter the existent equilibrium. The dancer may not feel the stress but it does alter his or her state of being. The reason why the dancer may not feel the stress is because he or she could be used to feeling that comes with it. Without feeling that stress the athlete might even feel something is missing (Winkelhuis, 2001). According to Winkelhuis (2001), the autonomous nervous system, which protects a human from different dangers in the world, reacts not only upon physical human threats but also mental and emotional threat. Winkelhuis (2001) divides dancer's threats into three big groups:

1) *Physical threats.* Physically dancers may face a lot of threats. For example, if there is a habit

to dance 5 final dances without any rest. Other physical threats can be lack of stamina, lack of food, lack of liquids. Physical threat may come also from a lack of warm-up and cool-down, lack of experience with the new choreography or new techniques.

2) *Mental threats.* They come from mental thoughts, demands and desires the athlete cannot control. The thought about making a good result is decoded by autonomous nervous system as a threat because the athlete cannot decide the outcome in terms of result. Other mental threats are, for instance, the focus on what the partner should or should not to do, also the thought about judges, and other competitors.
3) *Emotional threats.* They come from the situations the athlete needs to change to make himself/herself happy. For example, music in the competition.

Pressure – mental, physical or emotional – does not only cause tension in the mind of the dancer. It also prevents the body from feeling free to dance as it normally could during the training session. Stress leads to short breathing high in chest, a faster heartbreak, too much consumption of energy and too tense muscles. Excitement and tension before going to the site appear as a reaction to a stressful situation, and are mobilizing huge amounts of energy, requiring release.

According to Rubshtein (Рубштейн, 2005), if we look at how it works in nature, we can see that the situation of danger mobilizes a living being and all their resources to escape or resist attacks. The rivalry, for sure, is a kind of a situation of danger – there is the possibility to lose the status in case of losing, this danger of damage to the status of the dancer is really a serious harm to a modern person, the same as the physical one. In the point of view of Rubshtein, precompetitive anxiety is an accumulation of energy which has to be thrown out during the competition. So, that is clear that in this situation energy is urgently needed to win.

Rubshtein (Рубштейн, 2005) also says that problems with coordination, losing attention on the dance floor and other difficulties accompanying the precompetitive anxiety, are caused by efforts of the dancer to keep calm. All the energy is inhibited and blocked, and this blocking takes a huge part of effort and attention and, consequently, does not let the dancer concentrate on the performance. In addition, prolonged and regular inhibition of the energy provokes uncontrollable outbursts of energy during the dancing, and then the dancer makes mistakes in competition choreography, puts too much energy to the connection with partner (pulls the partner), loses the tempo of the music and balance.

Rohleder, Beulen, & Chen, (2007) completed five studies to examine cortisol stress responses in dancesport competitors. These five studies demonstrated that the cortisol levels were not merely from the physical strain of dancing, but also the stress of competition. Dancers were stressed more on competition days compared to noncompetition days, especially at the beginning of their careers, but the social support decreased the stress of the dancers. According to Роньь (2011), achieving a particular result in dancesport, the technique of execution of the dancing steps and complete performance in all senses depend on the mental state of mind of both partners in a dancing couple. Even the result of very experienced dancers during the competition depends on the emotional state. Highly qualified athletes practicing dancesport develop dance techniques under different conditions (a lot of couples on the dancefloor at the same time, different temperature conditions, and different slip level of the dancefloor) in order to achieve totally automatic independent coordination of the body. The most important topic in the field of psychological support of the dance couple during the preparation sessions, according to Роньь (2011), is formation of correct precompetitive emotional state. For Роньь (2011), the completely still and calm state of mind is not considered as the best mental state for achieving great performance during the execution of the competition choreography. It is necessary for the mental condition of the athlete before the competition to have an optimal level of arousal. Ron says that in this state, the dancer is able to demonstrate all technical, coordination, musical and responsiveness qualities in the best, available way. Also Ron (Роньь, 2011) just as Rubshtein (Рубштейн, 2005) confirm that disconcerting influence of the emotions can be manifested in a strong form of confusion, stiffness, low level of coordination of the body movements, slowdown of the mental processes functioning, loss of the correct rhythm of music during the execution of the competition choreography, mistakes in communication with the partner during the dance, losing control during the dialogue with the partner, in some cases even aggression.

METHODS

Research sample. Qualitative research is an empirical study where the data is not quantifiable (Blaxter, Hughes, & Tight, 2010). There is no formula which helps determine the number of informants to carry out a quality study (Yin, 2010), so the number of interviews was decided by the researcher following the criterion of data saturation. The targeted research group included athletes of dancesport who had competition experience of no less than seven years. The total number of the participants was thirty-one. The first four took part in the interview, and the other twenty-seven were observed during dancesport competition.

During participant observation, twenty-seven dancesport athletes were observed: fourteen females and thirteen males. The competition, which was observed during the participant observation, had the status of International Open Competition, which can be titled as the second most highly-qualified open competition in World DanceSport Federation. One of the participants of the observations was the couple of current Word Champions. Among the participants, there were also some couples of TOP-50 of World Ranking List of the World DanceSport Federation. The competitions of this level need a certain level of preparation and experience. So the participants of the observation possessed analogous experience characteristics as the participants of the interviews.

Methods. *Interviews.* Interviews are one of the most commonly recognized forms of qualitative research methods (Mason, 2002). In addition to what people say, it is also suggested to pay attention to the body language, moods, or attitudes of the participants, including the general environment (Mack, Woodsong, Macqueen, Guest, & Namey, 2005).

Participant observation. The terms "observation", and in particular "Participant Observation", usually refer to methods of collecting data with the researcher immersing herself or himself in a research environment so that they can observe it at first hand (Mason, 2002). Participant observation always takes place in locations which have a relevance to the research questions and can give some more information about it. Participant observation is usually used to improve the design of other methods, such as interviews and focus groups. For example, they help to secure the cultural relevance and accordance of interview and focus group questions (Mack et al., 2005).

Qualitative content analysis of the data. Cross-sectional indexing form of analyzing of the data was used during this investigation. Cross-sectional indexing of data means devising a consistent system for indexing the whole of a data set according to a set of common principles and measures. The main sense of this form is that the researcher uses a uniform set of indexing categories systematically and consistently to their data (Mason, 2002).

Research organization. The research was conducted in December, 2016–March, 2017. Each interview was agreed in advance according to convenient time and place for informants. An interview took on average 30 minutes. For busy elite dancers interviews were held intensively. Interview consisted of ten open-ended questions that allowed for individual variations (Bogdan & Biklen, 1982). The questions and the answers were collected by the first author of the work. At the beginning of each interview, the topic of conversation was presented to each subject. The interview guide was developed covering the topics from the literature analysis. The shorthand method of recording of the information was used during the interview - the text was written skipping non-essential thoughts or repetitions. The shorthand method was preferred due to the environment of the interviews as well as the wishes of the interviewees who felt uneasy knowing that their voices were recorded, and this caused extra stress to them. Besides, the method had been well mastered by the researcher-interviewer. Within 24 hours of the interview, the shorthand notes were expanded into sentences. This task was done using a computer.

The Participant Observation took place on the 19th of February, 2017, during International Competition "Trofeo Low-Cost Eta Beta Danze" in the sports hall of Prato city in Italy. The group of athletes taking part in the International Open Competition in Standard and Latin program was observed. The Participant Observation took place from 9.00 till 10.30 a.m., with the assigned beginning of the competition at 10.30. The participant observation data was done in the form of the detailed field notes that the first researcher recorded in a field notebook. The shorthand method of recording the information was used - the text was written using abbreviations. Within 24 hours of the participant observation, the shorthand was expanded into sentences. This task was done using a computer. All the collected information and data were analyzed using cross-sectional indexing form

of analysis. A special set of categories was applied systematically and consistently to the data.

RESULTS

All the participants pointed out that emotional state had a great influence on their performance during the competitions. Emotional states of dance sport athletes can be divided into two major groups: positive and negative. Organization of research results is presented in Figure 1.

External indications of each state include all actions which are visible (physical state, specific movements of the body, gestures). The internal indications involve the mental part, the state of mind of the athlete. During the research, the reasons for different emotional states were established as well.

Positive emotional state. *External indicators.* First of all it is worth noting that all participants with the prevailing positive state of mind mentioned that they had a slight arousal before the competition. The main external indicators of positive emotional state are represented in Figure 2.

As the observation field notes show that the smile is the major indicator of external positive state of mind. In the international competition, persons could be seen listening to music, telling jokes and chatting with friends. One pattern noticed during the interviews was that male dancers were more predisposed to telling jokes with others male friends and laughing. Besides, male participant D remarked "*I laugh and joke with friends who are present there, I listen to POP music*". This pattern was confirmed during the observation of the competition as well. There, the boys spent much more time laughing and making jokes than girls. Female participants preferred the easy chatting in the group with other female dancers. It was interesting to note that one dancer was also observed praying and crossing himself before the start of competition. These actions indicate the external expression of being religious, which can take place before the competition.

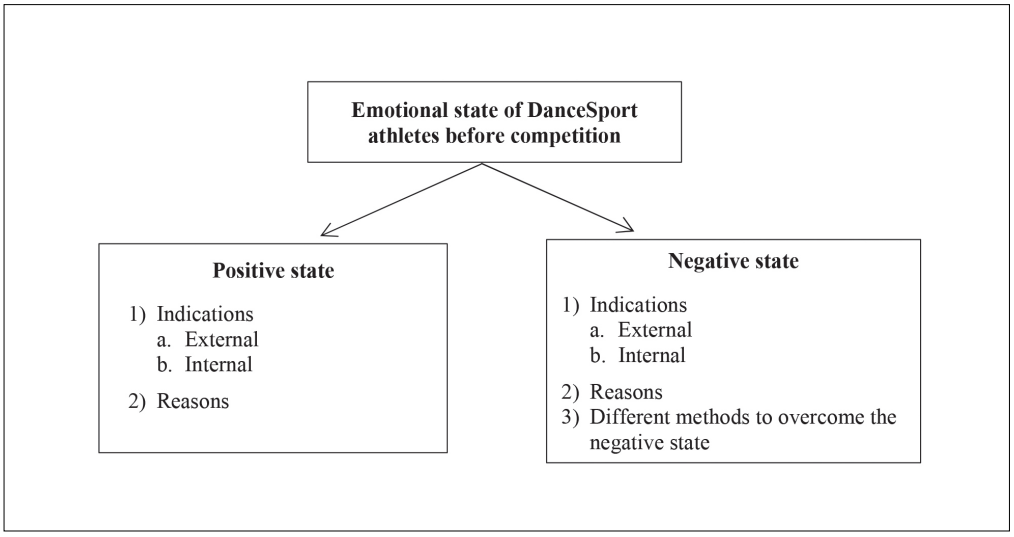


Figure 1. **Organization of research results**

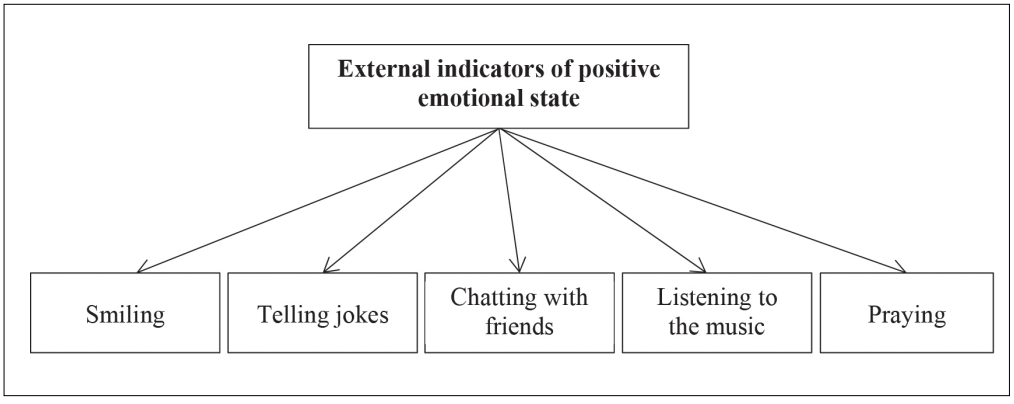
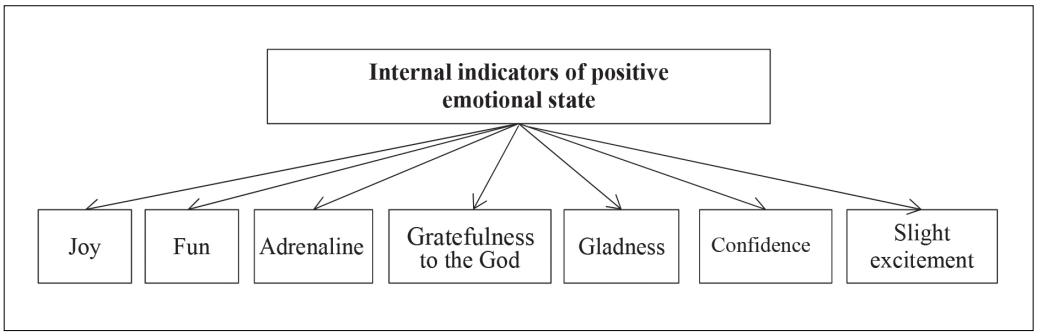


Figure 2. **The main external indicators of positive emotional state**

Figure 3. **The main internal indicators of positive emotional state**



Internal indicators. The main internal indicators of positive emotional state are presented in Figure 3.

If we speak about internal indicators, the most common sense experienced is joy. Another important point is the sense of the adrenaline mentioned by a couple of participants, e.g. "*I like to compete in the competition! I am a really a gambling man. When I come to the competition, and hear music, the dancing passion adds to my dance a lot of bright moments and emotions!*" (Participant D). From the facts represented below we can conclude that in some cases gratefulness to God and general connection with the religion may take place, too e.g. "*I am grateful to God and all my family for having the ability to do it the day by day...*" (Participant B). As it was already mentioned, the most experienced and positively-minded participants marked the presence of slight excitement. Some quotes of participants A and B confirm this fact: "*Anyway... in any competition I feel a little bit nervous...*" and "*For sure, there is some excitement*". Most different reasons of positive emotional state were noted. It is important to say that participant B may be characterized as the most positively-minded participant of the research. During the whole interview she was quiet and relaxed, kept a pleasant tone of voice and smiled a lot. There was definite and very strong sense of positivity and serenity in all her answers. She named some general positive feelings before starting the competition: joy, fun, slight excitement, feeling confident and assured. She talked a lot about the reasons for each state: "*Joy, because again I can go to the floor and show my dance. Fun, because the dance is what I really like to do in all my life. ... usually I am sure I look great on the dance floor, my dress and make up look good... When I know for sure that I remember all, even the smallest details of the choreography, and then I feel that my performance is really great. ... Anyway, me and my partner have worked before the competition and we are always feel confident and sure in our performance*".

Participant C told a lot about his positive mood before the competition as well. He noted quiet the same categories as Participant B: joy and gladness. "*Most often, I feel emotions with a "plus" ... Do you understand? It means something positive. After all, I am doing things that I really love. Dancing means a lot in my life. I plan to dedicate my whole life to dance. So that's why, I feel the joy and gladness when I am dancing in competition*". Moreover, both participants B and C highlighted the fact that they really loved dancesport and the possibility to practice this sport makes them really happy.

Reasons for the positive emotional state. The key reasons of positive emotional state mentioned by research participants were:

1) Ability to demonstrate proper qualification to judges and the audience
   "Because I can finally again enter the dance floor and show my dance to the audience... Show all my abilities and to show the result of many hours of hard work in the dance school and gym..." – Participant B
2) Identifying dancing as thing the person likes to do
   "The dance is what I really like to do in all my life..." – Participant B
   "After all, I'm doing thing that I really love. Dancing means a lot in my life" – Participant C
3) Being sure of the perfect total looks (competition dress, make-up, hairstyle)
   "...usually I'm sure I look great on the dance floor, my dress and make up look good..." – Participant B
4) Clear understanding of all steps and details of the competition choreography
   "When I know for sure that I remember all, even the smallest details of the choreography, then I feel that my performance is really great...." – Participant B
   "I prefer to go to the dancefloor to warm up, and repeat my choreography. As the size of the dance floor may be different a bit, for me

as partner, is important to repeat the whole choreography" – Participant C

5) Confidence about the preparation work done with the partner and coach
   "Anyway, me and my partner have worked before the competition and we always feel confident and sure in our performance." – Participant B
6) Support of the public
   "And I really like when in the competition there are a lot of spectators. They give me a lot of good, positive energy and it's very cool! During my dancing I am trying to keep in touch with the audience. After all, we dance not only for ourselves, but also for all people who are watching and supporting us!" – Participant C

Negative emotional state. *External indicators.* The main external indicators of negative emotional state are presented in Figure 4.

As the observation field notes show, the major external indicator of negative emotional state is changing facial expressions. During the competition, this switch of expressions was clearly visible. Many times the faces of the athletes on different reasons, from calm and smiling were turned into displeased, sad, angry and annoying ones. One girl who was noticed during the observation of the international competition was even going to cry. Participant D spoke about changes of the facial expressions as well; he identified this indicator as more frequent and visible – *"My facial expression changes immediately and unconsciously, making visible my uncomfortable situation."* Another indicator which was noticed during the research is using the particular tone of voice during the communication with the partner. Participant A confessed that sometimes his tone of voice can be unpleasant and the connection with the partner not always correct – *"I can speak not in the correct way with my partner using angry voice sometimes but it's all the fault of the anxiety before competition... "*. Also during the observation of international competition the using of particular tone of the voice was noticed. There was noticed the boy who was speaking with angry voice with his partner during the warm-up, the girl who was using disgruntled voice to communicate with her partner. Beside of that, some typical indicators of stress take place before the dancesport competition. Participant D marks the respiratory difficulties and shortening of the breath – *"As a knot that closes your throat and does not let you breathe..., ... and the breath becomes shorter..."*. As the observation field notes show among the external indicators there is also sweating of the palms, because during the observation was noted the boy who was drying the palms after just concentrating before the competition.

Internal indicators. During research, the following internal indicators of negative state were identified: anxiety, nervousness, fear, worry, annoyance. These indicators are shown in Figure 5.

Feeling of anxiety is the most common negative state. It is interesting to note that the word *"anxiety"* was used by all participants of the research, even if their dominant emotional state was positive. Participant B considered slight anxiety as the normal state before the competition for each athlete: *"Of course during the competition there is excitement and may be even some anxiety. I think this is the normal state."* The opinion of the Participant B coincided with the words of Participant C: *"Therefore, before the start the each comp, I feel a little bit of pre competition excitement, sometimes even anxiety, but anyway I think it is normal and natural."* Moreover, during the interview with Participant C, the strong feeling of responsibility for the performance was emphasized. He used the word *"responsibility"* many times and the pressure of the responsibility about his partner, his family and coach was marked by different expressions: *"I understand all the responsibility not only about*

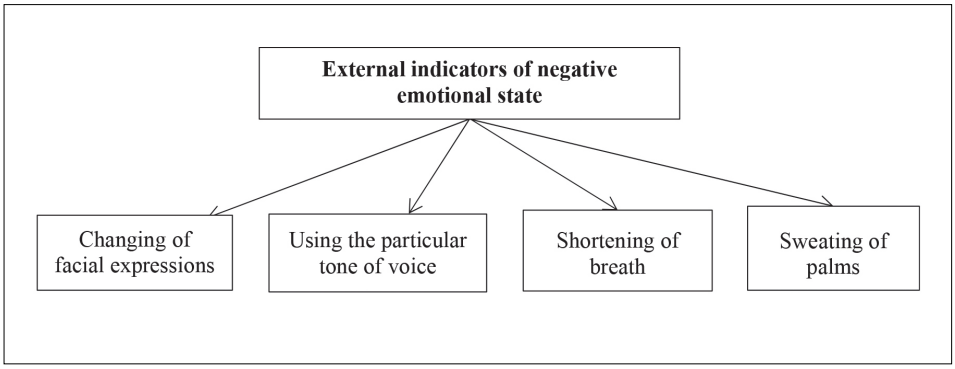
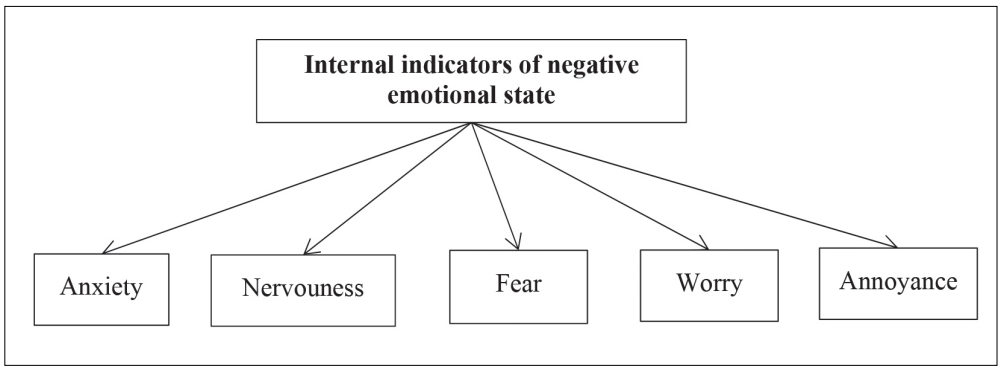


Figure 4. **The main external indicators of negative emotional state**

Figure 5. **The main internal indicators of negative emotional state**



my performance, but also about my partner, my coach. Because we, as a couple are representing his work with us… also for sure my parents… I try to make them be proud of me… for me personally it's very and very important… Also I want to feel myself the strong part of our couple. I would like to be reliable partner and give as much support as possible to the other part of the couple. I am a male part of the couple and from me depends really a lot of different things." Also Participant C was unique to demonstrate the feeling of annoyance before the competition. Especially he emphasized it when speaking about the uncomfortable time table of the competition. – *"It's surely is annoying and puts me out of my internal balance".* Some participants noted feeling nervous on the day of competition. *"I feel very nervous generally about each single thing on the day of competition before the beginning, but once it starts all the worries go away"*– remarked Participant D. Participant A also mentioned being nervous before the competition: *"Anyway... in any competition I feel a little bit nervous… Of course in small competitions I am a little bit more secure but if the competition is big a start to be very nervous…"* From this expression it can be also noted that for this participant the level of the nervous state depends on the importance of the competition. One of the patterns noticed is that despite various reasons the common feeling of fear was very frequent as well: *"May be I am afraid that something will go wrong, you know... There are so much different factors… My partner... The judges…", "On the other hand fear of "mistakes" and disappoint the expectations that you have created about yourself or that friends, family and coaches have made about you."* – Participants A and D. The feeling of worry was mentioned by participants as often as the feeling of nervousness. *"I am little bit worried about my performance and my result as well…, …I start to worry if me and my partner have enough time to prepare ourselves..", "I worry about the judges as well, I have a fear that they will not like my dancing…".* It shows that the feeling of worry was mentioned by participants as well.

Reasons for the negative emotional state:

1) Uncertainty about the competition choreography "*May be I am afraid that something will go wrong with the choreography, you know…" –* Participant A
2) Improper communication with the partner *"… I can speak not in the correct way with my partner using angry voice sometimes but it's all the fault of the anxiety before competition…" –* Participant A. During the observation of the competition, some dancers were noticed using unpleasant tone of voice with their partners.
3) Difficulties with the competition looks (dress, shoes, hairstyle, make-up)

This is one of the most frequent reasons of negative state of the dance sport athletes. When participants talked about the most stressful competition in their career, half of them associated it with forgetting or losing something from their competition stuff. Participant B said that once she forgot her competition shoes at home – *"An hour before the start of the competition I understood that my shoes for standard program were at home. Can you even imagine? It was very unexpected and stressful…".* Participant C told that one time the air lines lost his bags with the shoes and dance dress just before the competition: – *"I was shocked! Tomorrow we have competition, and I have no clothes and no shoes… Tanning, hair styling stuff, and everything I need for preparing myself to the competition was in my luggage".* During the observation a lot of dancers had negative emotions because of this reason. One girl was going to cry because she had broken her dress and needed to fix it as soon as possible, the other girl seemed dissatisfied with her make up.

4) Pressure of responsibility and expectations made by coach, parents and friends

"I think I am anxious a bit before competition because I understand all the responsibility not only about my performance, but also about my partner, my coach. Because we as a couple are representing his work with us... also for sure my parents... I try to make them be proud of me... for me personally it's very and very important..." – Participant C.

"On the other hand fear of "mistakes" and disappointment of the expectations that you have created about yourself or that friends, family and coaches have made about you" – Participant D

5) Judges

"I worry about the judges as well; I have a fear that they will not like my dancing... " – Participant D. Also during the interview participant A mentioned the word *"judges"* when he was talking about factors which sometimes give him negative emotions.

Different methods to overcome the negative state. Different ways were identified to overcome the negative emotional state before the competition. All methods can be divided into two major groups: mental and physical. The mental group includes all psychological techniques which are used to overcome the negative emotional state. The physical group involves all actions that athletes do to overcome the negative emotional state. In the physical group the most common method is listening to the music. It is interesting to note that collocation *"listen to music"* was used by all participants of the interview. In addition, the major part of participants named this method of overcoming the negative state as one of their favorites. The field notes of the observation show that most dancers listen to music before the start of the competition, which makes this method one of the most popular. Participant B told about the breathing exercises as well: *"Also before the competition I like to do breathing exercises. I try to focus on how I breathe. It helps me a lot"*. Some persons prefer to enjoy the company of their friends, for example, Participant D: *"I laugh and joke with friends who are present there..."*. This fact was also confirmed during the international competition, where there were some boys also joking and laughing with the friends. Participant C spoke about other methods which help him overcome the negative state: *"Before the competition, to keep calm and feel fine I prefer to go to the dancefloor to warm up and repeat my choreography. As the size of the dance floor may be different a bit, for me as partner, it is important to repeat the whole choreography"*. Generally, this method is quiet frequent as well because before the competition really a lot of dancers not only warm up their muscles but also repeat their choreography.

In the mental group, two methods were emphasized which have opposite bases. Despite having two completely opposite bases, these two methods have the same popularity among the dancers. The first method was trying to concentrate on the performance itself, on the technical quality and the connection with the partner without thinking about the result, judges or opponents. The example of using this method is the words of the Participant A and C: *"I try not to think about the result, I am concentrating on my dancing and technical quality..."*, *"Before the competition I try to concentrate on the most essential things – performance, my partner"*. The other method is trying to divert the attention from the competition in general, think about abstract topics and try to isolate the mind as well. This method was used by the Participants B and D:*" First of all I try to distract from thoughts about the performance... I try to think about abstract topics..."*, *"I always try to divert my attention from the competition itself"*.

DISCUSSION

The aim of this research was to analyze pre-competition emotional state of dancesport athletes. This was achieved by analyzing the answers of the participants of the interviews and analyzing the results of participant observation. In accordance with Jones and Hanton (2001), we predicted that the *anxiety* emotional state would be the most frequent among dancesport athletes. In general, the way the anxiety is expressed among dancesport athletes was demonstrated across all participants of the interview and also some persons who were observed. Actually, all participants of the interviews used the word "anxiety", even if in some cases the participant used the word "slight". During the observations, not all persons had the external indicators of anxiety, some of them seemed calm. Anyway the majority of dancers during the observation had the external indicators of anxiety. Generally, there was no clearly defined division between positive or negative states of mind, but in all cases one of the states was strongly dominant. Positive state of mind was shown by the majority of participants. It is interesting to add that

positive emotional state was demonstrated by most experienced participants. Dominant negative state was shown by fewer participants and these athletes had less experience than the athletes who showed the dominant positive state of mind. So, the current findings provide full support for one of the points of the work by Rohleder et al. (2007). According to Rohleder et al. (2007), dancers were stressed more on competition days, especially at the beginning of their careers. Actually this statement got full support because in the investigation the highest anxiety level was shown by the competitors with the lowest experience. Some of the current findings corresponded to the work by Winkelhuis (2001). Winkelhuis (2001) suggests that stress leads to short breathing high in chest, a faster heartbeat, too much consumption of energy and too tense muscles. In this case, if we can interpret stress as a negative state, we get a full support for the opinion Winkelhuis (2001) because the participants of the investigation mentioned this term during their interviews. Also during the interviews, indicators of both emotional states were identified as well as reasons corresponding to each state. Also there is an interesting relationship between the results of the investigation and the opinion of Ron (Ронь, 2011). In her point of view, the technique of execution of the dancing steps and complete performance in all senses depend on the mental state of mind of both partners in a dancing couple. However, during the investigation clear understanding of all steps and details of the competition choreography was indicated as one of the reasons of positive emotional state of the dancers. So, if the dancer has a clear understanding of all details of the choreography, this will lead to the positive mental state, which will help the dancer perform his choreography better in the competition. It is important to note that the findings of the current investigation emphasize significant relationship between positive and negative emotional state of dancesport athlete. No one athlete feels only negative or positive emotions before the competition. The results of the interviews show that even if the athlete feels mostly positive, slight anxiety will take place, and if the athlete has the dominant negative state of mind, the feeling of joy or fun will appear as well. This mixed relationship between positive and negative emotional states shows versatility and complexity of pre-competitive emotional state phenomenon.

Another important aspect of this investigation is emphasizing the reasons of both groups of emotional states. It is extremely important because when the reasons of each state are clear, it is easier for the coach or athlete alone to avoid the negative state or maintain the positive state. The current findings provide full support for other points in the work by Rohleder et al. (2007) as well. The fact that the social support decreased the stress of the dancers (Rohleder et al., 2007) was confirmed as well as the support of the public was characterized as one of the reasons which lead to the positive emotional state of dancesport athletes before competition. The current findings also found support for some opinions of Ikulayo (1990). Some of the participants of the interview noticed that they found it difficult to be able to remain focused. It was also mentioned that pre-competitive anxiety state increased tension in the muscle of the throat and chest to the point where it seemed impossible to swallow or they had other respiration difficulties. The other interesting pattern of the observation is that the reasons for negative state like “difficulties with the competition looks” are mostly related with female part of the dancers. It suggests that the females among the dancers care much more about details in the competition looks than their male counterparts. During the investigation we observed some methods which dancesport athletes used to overcome negative emotional state. One particular thing was noticed that two mental methods were based on two completely different views on concentration before competition. This paradox of using two completely different methods to overcome the negative state may be based on particular individual characteristics of each single dancer. Interestingly, the findings of the current study provide some support to research findings by Rubshtein (Рубштейн, 2005) and Ron (Ронь, 2011). The basic external indicators of negative state, for example, stiffness, low level of coordination of the body movements, loss of correct rhythm of music during the execution of the competition choreography, mistakes in communication with the partner during the dance, losing control during the dialogue with the partner, mostly corresponded to the indicators established by Rubshtein (Рубштейн, 2005) and Ron (Ронь, 2011). Unfortunately, there is not so much research done in the field of dancesport. For sure, it is connected with very young age of this discipline as a sport. Subsequently, future research to expand the knowledge in this field should increase the number of participants and the number of observed competitions.

CONCLUSIONS

Precompetitive emotional state before competition may be described as complex multi-faceted phenomenon which consists of different psychological categories: anxiety, arousal, stress, self-confidence, concentration. Precompetitive emotional states of the dancesport athletes could be combined into two major groups: positive and negative. Positive emotional state was shown by the majority of participants in high-performance sport.

All the participants of the interview used the word "anxiety", so it is the most popular psychological state for the dancesport athletes before competition, which has both positive and negative sides. Positive emotional state was shown by the majority of participants and it helped them better concentrate for their performance.

Future research should focus not only on high-class athletes, but also on the athletes of medium and low levels.

REFERENCES

Athan, A., & Sampson, U. (2013). Coping with precompetitive anxiety in sports competition. *European Journal of Natural and Applied Sciences, 1*(1), 1–9.

Blaxter, L., Hughes. C., & Tight, M. (2010). *How to research.* London: Open University Press.

Bogdan, R., & Biklen, S. (1982). *Qualitative research for education: An introduction to theory and methods.* Boston: Allyn and Bacon.

Cashmor, E. (2008). *Sport and exercise psychology: The key concepts.* London: Routledge.

Gould, D., & Krane, V. (1992). *The arousal performance relationship: Current status and future directions.* Champaign: Human Kinetics.

Hanton, S., Jones, G., & Mullen, R. (2000). Intensity and direction of competitive state anxiety as interpreted by rugby players and rifle shooters. *Perceptual and Motor Skills, 90*, 513–521. doi: https://doi.org/10.2466/pms.2000.90.2.513

Hanton, S., Mellalieu S., & Hall, R. (2004). Self-confidence and anxiety interpretation: A qualitative investigation. *Psychology of Sport and Exercise, 5,* 477–495.

Ikulayo, P. (1990). *Understanding sports psychology*. Lagos: Eaitch Marina.

Jarvis, M. (2006). *Sport psychology. A student's handbook.* London: Routledge.

Jones, G., Hanton, S., & Cannaughton, D. (2007). A framework of mental toughness in the world's best performers. *The Sport Psychologist, 21,* 243–264.

Jones, G., & Hanton, S. (2001). Pre-competitive feeling states and directional anxiety interpretations. *Journal of Sports Sciences, 19*, 385–395.

Jones, G. (1991). Recent developments and current issues in competitive state anxiety research. *Psychologist*, *4*, 152–155.

Karageorghis, C. (2007). Competition anxiety needn't get you down. *Peak Performance, 243*, 4–7.

Krane, V. (1994). Comparative anxiety, situation criticality and softball performance. *The Sport Psychologist, 8*, 58–71.

Mack, N., Woodsong, C., Macqueen, K., Guest, G., & Namey, E. (2005). *Qualitative research methods: A data collector's field guide.* North Carolina: Family Health International.

Martens, R., Burton, D., & Vealey, R. (1990). *Competitive anxiety in sport.* Champaign: Human Kinetics.

Mason, J. (2002). *Qualitative researching.* Second edition. London: SAGE Publications.

Moore, A. (2002). *Ballroom dancing. 10th edition.* London: Routledge.

Moran, A. (2004). *Sport and exercise psychology: A critical introduction.* London: Routledge.

Nassib, S. H., Mkaouer, B., Nassib, S., Riahi, S. H., & Arfa, Y. (2011). Precompetitive anxiety effect on concentration and performance on elite rhythmic gymnastics. *Science of Gymnastics Journal, 6*(1), 23–32.

Rohleder, N., Beulen, S., & Chen, E. (2007). Stress on the dance floor: The cortisol stress response to social-evaluative threat in competitive ballroom dancers. *PSPB, 33*(1), 69–84. doi: 10.1177/0146167206293986

Vodičar, J., Kovač, E., & Tušak, M. (2012). Effectiveness of athletes' pre-competition mental preparation. *Kinesiologia Slovenica, 18*(1), 22–37.

Weinberg, R., & Gould, D. (1995). *Foundations of sport and exercise psychology.* Champaign: Human Kinetics.

Winkelhuis, M. (2001). *Dance to your maximum.* Dongen: www.DancePlaza.com.

Yin, R. (2010*). Qualitative research from start to finish.* New York: Guilford press.

Рубштейн, Н. (2005). *V национальный конгресс тренеров и судей ФТСР. Лекция по психологии*. [Viewed 2016, December 10]. Retrieved from http://www.dancesport.ru/articles/articles_40/art_68.phtml.

Ронь, И. (2011). Проблемы эмоциональной устойчивости в спортивной деятельности танцевальных пар. *Психология и педагогика: методика и проблемы практического применения, 19(1)*, 32–36.

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Corresponding author **Diana Karanauskienė**
Lithuanian Sports University
Sport str. 6, Kaunas LT-44221
Lithuania
Tel. +370 37 302663
Email diana.karanauskiene@lsu.lt

METABOLISM ANALYSIS IN MICE WITH REDUCED CITRATE SYNTHASE ACTIVITY

Andrej Fokin[1], Petras Minderis[1], Rasa Žūkienė[2], Aivaras Ratkevičius[1]
Lithuanian Sports University[1], Kaunas, Lithuania
Vytautas Magnus University[2], Kaunas, Lithuania

ABSTRACT

Background. Citrate synthase (CS) plays an important role in the regulation of carbohydrate oxidation. Variation in citrate synthase activity has an influence on metabolic changes. We tested the hypothesis that reduced mitochondrial CS activity could affect energy expenditure (EE) and respiratory quotient (RQ) in mouse model with an emphasizing on gender differences between tested strains.

Methods. 16-week of age wild-type C57Bl/6J (B6) mouse strain, B6.A-(rs3676616-D10Utsw1)/Kjn (B6.A) and C57BL/6J-Chr 10A/J/NaJ (B6.A10) strains with reduced CS activity were studied in physiocage by the "Panlab" metabolism analysing equipment. The following parameters were calculated: EE (ml/min/kg^0.75), RQ, physical activity and rearing.

Results. In female mice EE values were lower in B6.A10 strain compared to wild-type B6 strain. RQ values were similar in all tested mouse strains. In B6 mice EE was higher in females compared to males. Rearing was elevated in females of B6 mice compared to males.

*Conclusions***.** EE was lower in B6.A10 compared to B6 mice. Gender differences were noticed only in B6 mice: EE and rearing were significantly higher in female compared to male mice. Current study did not reveal any other association between reduced CS activity and EE or RQ variation in male and female mice.

Keywords: energy expenditure, respiratory quotient, physical activity, gender effect.

INTRODUCTION

Citrate synthase (CS) is a key enzyme in Krebs cycle and a marker of mitochondrial content and function (Boushel et al., 2007; Larsen et al., 2012; Ruderman, Saha, Vavvas, & Witters, 1999). CS plays a central role in the regulation of substrate oxidation by mitochondria (Ruderman et al., 1999) and in carbohydrate metabolism. CS activity depends on many metabolism processes and can be increased, for instance, by respiratory muscle training or during endurance exercise training (Holloszy & Booth, 1976; Jaenisch, Bertagnolli, Borghi-Silva, Arena, & Lago, 2017). Our recent studies showed similar results: mice with reduced CS activity had substantially lower endurance capacity compared to control mice with no sex effect on endurance performance (Kvedaras et al., 2017). These facts suggest that variation in CS activity may influence metabolic changes. There is evidence that increased CS activity could have a negative effect on the metabolism. For example, after a meal, carbohydrate oxidation may inhibit fatty acid oxidation in mitochondria (Ranneries et al., 1998). Because of high CS activity the elevated concentration of citrate (one of the carbohydrate substrates in Krebs cycle synthesized by the influence of CS enzyme) in cytosol may indirectly inhibit the metabolism of fats, which leads to obesity and insulin resistance (Bays, Mandarino, & DeFronzo, 2004; Rogge, 2009). Therefore, *Cs* gene may be a pharmacological target to treat obesity. There is still lack of data, how reduced CS activity affects energy expenditure and respiratory quotient in mice.

Also, limited number of studies addresses gender effect on metabolism despite the fact that this effect exists, especially in mitochondrial metabolism features (Thompson et al., 2013). The differences between male and female mice may be a crucial factor in analysing point mutation, such as H55N polymorphism studied in the current experiment and its consequence – reduced CS activity (Ratkevicius et al., 2010). Higher estrogen levels in females could be a possible explanation of variation between males and females. Hence, controversial results are presented where no differences in heart, skeletal muscle and liver mitochondrial oxygen consumption were observed between male and female C57BL/6J mice (Sanz et al., 2007). It is known that respiration mechanics in lungs differs between male and female mice. A possible explanation for this finding is that the larger lung volume of female mice is adapted to higher metabolic and oxygen demands during pregnancies and lactation (Schulz et al., 2002).

Energy balance depends on the mechanisms that regulate basal metabolism, energy expenditure, respiratory quotient and physical activity. Respiratory quotient is an indirect mark to estimate energy imbalance in metabolism process (Longo et al., 2010). These metabolism parameters may be strain and gender dependent. For example, females have greater global O_2 consumption, which is indicative of higher energy expenditure than that of males in rat model (Rodriguez-Cuenca et al., 2002).

The aim of the study was to test the hypothesis if reduced CS activity could affect energy expenditure and respiratory quotient in male and female mice. Thus we investigated three strains: control C57BL/6J (B6) strain with normal CS activity, congenic B6.A-(rs3676616-D10Utsw1)/KjnB6 (B6.A) and consomic C57BL/6J-Chr 10A/J/NaJ (B6.A10) strains with reduced CS activity.

METHODS

Animals. All the procedures were approved by the Lithuanian State Food and Veterinary Service (No. 0223). Mice were kept in standard cages (cage dimensions: 267 x 207 x 140 mm) at 20–22ºC temperature and 55 ± 10% humidity with 12/12 h light/dark cycle. Mice fed for standard rodent diet (58.0% kcal from carbohydrate, 28.5% kcal from protein, 13.5% kcal from fat; LabDiet 5001, LabDiet, St. Louis, USA) and received tap water *ad libitum*. For metabolism experiment 16 week-old mice were chosen: control C57BL/6J (B6) mice with normal CS activity, B6.A-(rs3676616-D10Utsw1)/Kjn (B6.A) mice, carrying H55N polymorphism which is associated with reduced CS activity (Ratkevicius et al., 2010) and C57BL/6J-Chr 10A/J/NaJ (B6.A10) mice, carrying A/J chromosome 10 of B6 mice, this substitution is also associated with reduced citrate synthase activity (Kvedaras et al., 2017). Both male (n = 9 for each strain) and female (n = 9 for each strain) mice were studied. Mice were purchased from Jackson laboratory (Bar Harbor, USA).

Metabolism measurements. B6, B6.A and B6.A10 strains were studied by Panlab metabolism system (Panlab Harvard Apparatus, Barcelona, Spain). The following metabolic parameters were assessed by a gas analyser (LE405, Panlab Harvard Apparatus, Barcelona, Spain): daily energy expenditure (EE, ml/min/kg^0.75) and respiratory quotient (RQ). LE405 was connected to the switching device (LE400, Panlab Harvard Apparatus, Barcelona, Spain). Air flow rate of LE400 was set to 250 ml/min (optimal for mice metabolism measurements) and the switching time of 3 min, which refers to a transition time between gas concentration measurements in physiocage and the external environment. LE405 had measured O_2 and CO_2 concentrations in physiocage (Physiocage 00, Panlab Harvard Apparatus, Barcelona, Spain). With Physiocage, mice activity parameters were calculated. The Physiocage system detects changes of kinetic and potential energy produced by animal movement inside the cage. A transducer placed under the cage measured changes of mice activity. LE405 has been calibrated at the high point (50% O_2, 1.5% CO_2) and at the low point (20% O_2, 0% CO_2) by calibration gas tanks and the calibration protocol provided by LE405 manual prior to the experiment. Final results were calculated by the Metabolism software v1.5.

All the metabolism measurements were performed at light cycle (from 9:00 to 18:00). Each mouse was weighed (Kern, ABS 80-4, Germany) and tested in physiocage for 3 h (1 h of acclimation and 2 h of measurements) as a control.

Statistical analysis. Unpaired t-test was performed to evaluate differences between the strains and between male and female mice. "Graphpad Prism" and "Microsoft excel" programs were used for statistical analysis. Values of $p < .05$ were considered as statistically significant. Results are presented as mean ± *SD*.

RESULTS

No strain effect on mice body weight was identified with one exception in B6.A males (29.2 ± 1.2 g), which were lighter than B6 mice (32.2 ± 1.1 g).

Two main metabolic parameters were measured in physiocage to observe differences between B6, B6.A and B6.A10 mice strains: EE (kcal/day/kg^0.75) and RQ.

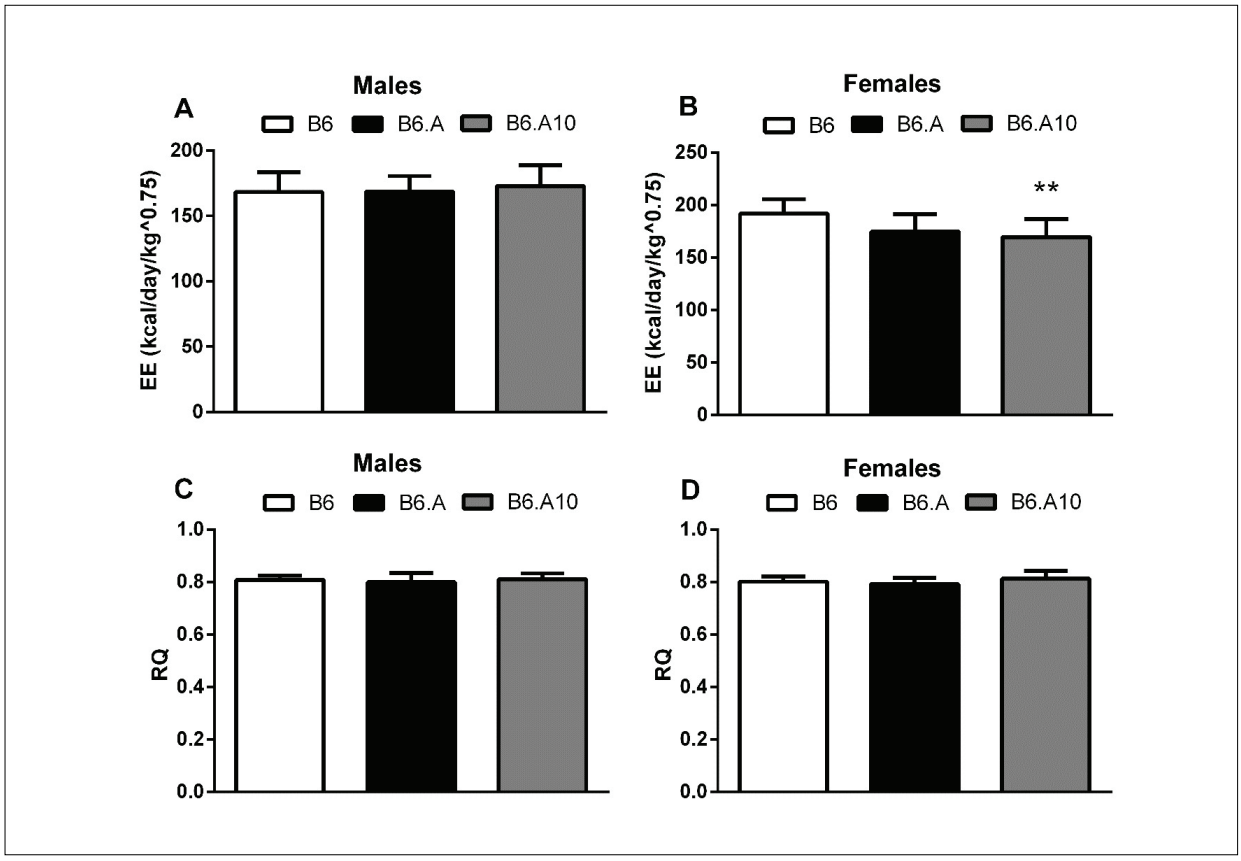
EE was stable in male mice of all (B6, B6.A and B6.A10) strains (Figure 1A) with no statistical difference ($p > .05$). In female mice EE values were lower in B6.A and B6.A10 strain with a statistical significance in B6.A10 (191.8 ± 13.7 kcal/day/kg^0.75) ($p < .01$) compared to wild-type B6 strain (169.5 ± 17 ml/min/kg^0.75) (Figure 1B).

RQ values were similar in all (B6, B6.A and B6.A10) strains of male (Figure 1C) and female (Figure 1D) mice with no statistical difference ($p > .05$). RQ have not exceeded the value of 0.8.

Metabolism analysis of gender differences in B6, B6.A and B6.A10 strains was performed. In B6 mice EE was significantly higher in females compared to males (191.8 ± 13.7 and 168.2 ± 15.4 kcal/day/kg^0.75, respectively) ($p < .01$), no gender differences were observed in B6.A and B6.A10 strain (Figure 2A). RQ did not differ between male and female mice in all tested strains (Figure 2B).

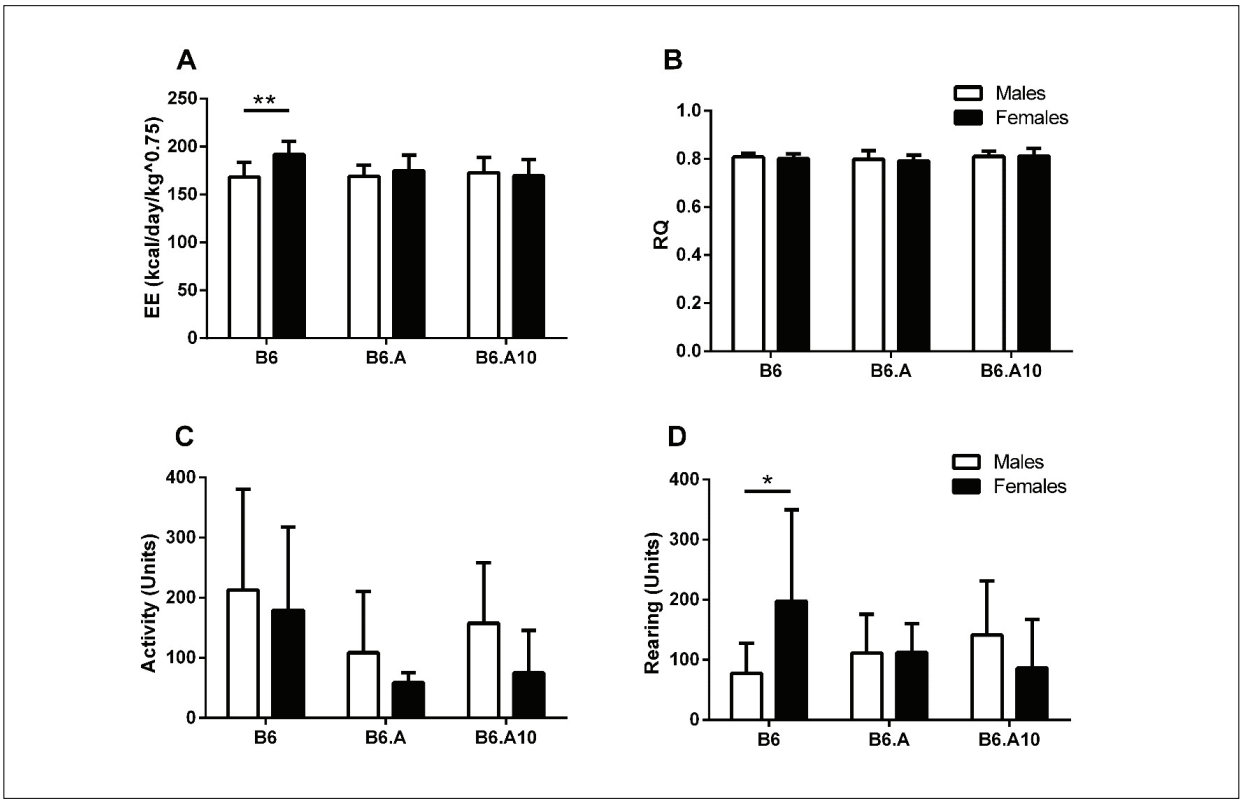
Additionally, overall physical activity (Figure 2C) and rearing (Figure 2D) parameters were measured in both male and female mice of B6, B6.A and B6.A10 strains. Because of high SD physical activity values calculated in all tested groups, no physical activity differences were identified between male and female mice ($p > .05$) (Figure 2C). Nevertheless, there was a tendency of higher physical activity in males compared to females. Interestingly, the number of rearing was significantly elevated in females ($p < .05$) of B6 mice compared to males (Figure 2D).

Figure 1. **Strain effect on energy expenditure (A, B) and respiratory quotient (C, D) in B6, B6.A and B6.A10 male and female mice**



Note. **$p < .01$ vs. B6 strain.

Figure 2. **Energy expenditure (A), respiratory quotient (B), physical activity (C) and rearing (D) gender differences in B6, B6.A and B6.A10 mice**



Notes. *$p < .05$, **$p < .01$ vs. females.

DISCUSSION

The main aim of the study was to investigate if reduced citrate synthase (CS) activity could affect metabolism in C57 mice. We studied three strains of C57: control B6 with normal CS activity, B6.A and B6.A10 with reduced CS activity. However, we did not observe any significant differences in energy expenditure (EE) and respiratory quotient (RQ) between these strains. One exception was noticed in female mice with significantly lower EE in consomic B6.A10 mice with reduced CS activity compared to control B6 strain. The most interesting part was that EE did not differ between B6.A and B6.A10 female mice despite the fact that both strains have reduced CS activity. One possible explanation could be different type of mutation in chromosome 10, where *Cs* gene is localized in mouse model (Johnson, Gagnon, Longo-Guess, & Kane, 2012). In B6.A strain there is a missense mutation in *Cs* gene, while in B6.A10 whole chromosome 10 is substituted by homologous chromosome (Kvedaras et al., 2017). Therefore we could speculate that other genes in chromosome 10 could affect EE in B6.A10 mice with no association with reduced CS enzyme activity. Also, in the current study no high fat diet intervention was performed to evaluate reduced CS performance and effect on oxidation of free fatty acids. For example, high fat diet significantly affected EE (which was tested by the same Panlab metabolism system as in current study) of C57BL/6 mice in comparison to mice with high fat diet intervention (Cappelli et al., 2014). Further analysis of consomic B6.A10 strain is needed for a more accurate explanation. Stable RQ values estimated in all three tested mouse strains showed that reduced citrate synthase activity under normal conditions (standard rodent diet, no interventions) did not induce energy imbalance in mice metabolism.

We also observed higher energy expenditure values in B6 female mice ($p < .01$), suggesting that females exhibited more energy in comparison to males. One study showed high energy uptake

efficiency in males (Catala-Niell, Estrany, Proenza, Gianotti, & Llado, 2008). However, more studies with mice models are necessary before reaching final conclusions with the gender effect on mice respiration properties. It is known that females have greater tissue recruitment, which is reflected mainly in their mitochondrial features. These could be responsible, at least in part, for the differences in energy expenditure found between genders (Quevedo, Roca, Pico, & Palou, 1998; Rodriguez-Cuenca et al., 2002). The interesting part is that rearing was also significantly higher in B6 female mice ($p < .05$). Therefore another possible mechanism of higher EE in B6 female mice compared to males may be higher energy demands because of increased number of rearing during the metabolism experiment.

In summary, our study has revealed one association between reduced CS activity and EE variation in female mice only with no association of RQ with missense mutation in *CS* gene.

CONCLUSIONS

1. Energy expenditure in B6.A10 female mice with reduced citrate synthase activity was statistically significantly lower in comparison to wild-type B6 mice.
2. Energy expenditure and rearing were significantly higher in B6 female mice compared to B6 male mice.

REFERENCES

Bays, H., Mandarino, L., & DeFronzo, R. A. (2004). Role of the adipocyte, free fatty acids, and ectopic fat in pathogenesis of type 2 diabetes mellitus: Peroxisomal proliferator-activated receptor agonists provide a rational therapeutic approach. *Journal of Clinical Endocrinology & Metabolism, 89*(2), 463–478. doi: 10.1210/jc.2003-030723

Boushel, R., Gnaiger, E., Schjerling, P., Skovbro, M., Kraunsoe, R., & Dela, F. (2007). Patients with type 2 diabetes have normal mitochondrial function in skeletal muscle. *Diabetologia, 50*(4), 790–796. doi: 10.1007/s00125-007-0594-3

Cappelli, A. P., Zoppi, C. C., Barbosa-Sampaio, H. C., Costa, J. M., Jr., Protzek, A. O., Morato, P. N., . . . Carneiro, E. M. (2014). Taurine-induced insulin signalling improvement of obese malnourished mice is associated with redox balance and protein phosphatases activity modulation. *Liver International, 34*(5), 771–783. doi: 10.1111/liv.12291

Catala-Niell, A., Estrany, M. E., Proenza, A. M., Gianotti, M., & Llado, I. (2008). Skeletal muscle and liver oxidative metabolism in response to a voluntary isocaloric intake of a high fat diet in male and female rats. *Cellular Physiology and Biochemistry, 22*(1–4), 327–336. doi: 10.1159/000149811

Holloszy, J. O., & Booth, F. W. (1976). Biochemical adaptations to endurance exercise in muscle. *Annual Review of Physiology, 38*, 273–291. doi: 10.1146/annurev.ph.38.030176.001421

Jaenisch, R. B., Bertagnolli, M., Borghi-Silva, A., Arena, R., & Lago, P. D. (2017). Respiratory muscle training improves diaphragm citrate synthase activity and hemodynamic function in rats with heart failure. *Brazilian Journal of Cardiovascular Surgery, 32*(2), 104–110. doi: 10.21470/1678-9741-2017-0002

Johnson, K. R., Gagnon, L. H., Longo-Guess, C., & Kane, K. L. (2012). Association of a citrate synthase missense mutation with age-related hearing loss in A/J mice. *Neurobiology of Aging, 33*(8), 1720–1729. doi: 10.1016/j.neurobiolaging.2011.05.009

Kvedaras, M., Minderis, P., Fokin, A., Ratkevicius, A., Venckunas, T., & Lionikas, A. (2017). Forced running endurance is influenced by gene(s) on mouse chromosome 10. *Frontiers in Physiology, 8*, 9. doi: 10.3389/fphys.2017.00009

Larsen, S., Nielsen, J., Hansen, C. N., Nielsen, L. B., Wibrand, F., Stride, N., . . . Hey-Mogensen, M. (2012). Biomarkers of mitochondrial content in skeletal muscle of healthy young human subjects. *Journal of Physiology, 590*(14), 3349–3360. doi: 10.1113/jphysiol.2012.230185

Longo, K. A., Charoenthongtrakul, S., Giuliana, D. J., Govek, E. K., McDonagh, T., Distefano, P. S., & Geddes, B. J. (2010). The 24-hour respiratory quotient predicts energy intake and changes in body mass. *American Journal of Physiology-Regulatory, Integrative and Comparative Physiology, 298*(3), R747–754. doi: 10.1152/ajpregu.00476.2009

Quevedo, S., Roca, P., Pico, C., & Palou, A. (1998). Sex-associated differences in cold-induced UCP1 synthesis in rodent brown adipose tissue. *Pflügers Archiv European Journal of Physiology, 436*(5), 689–695. doi: 10.1007/s004240050690

Ranneries, C., Bulow, J., Buemann, B., Christensen, N. J., Madsen, J., & Astrup, A. (1998). Fat metabolism in formerly obese women. *American Journal of Physiology, 274*(1 Pt 1), E155–161.

Ratkevicius, A., Carroll, A. M., Kilikevicius, A., Venckunas, T., McDermott, K. T., Gray, S. R., . . . Lionikas, A. (2010). H55N polymorphism as a likely cause of variation in citrate synthase activity of mouse

skeletal muscle. *Physiological Genomics, 42a*(2), 96–102. doi: 10.1152/physiolgenomics.00066.2010

Rodriguez-Cuenca, S., Pujol, E., Justo, R., Frontera, M., Oliver, J., Gianotti, M., & Roca, P. (2002). Sex-dependent thermogenesis, differences in mitochondrial morphology and function, and adrenergic response in brown adipose tissue. *Journal of Biological Chemistry, 277*(45), 42958–42963. doi: 10.1074/jbc.M207229200

Rogge, M. M. (2009). The role of impaired mitochondrial lipid oxidation in obesity. *Biological Research For Nursing, 10*(4), 356–373. doi: 10.1177/1099800408329408

Ruderman, N. B., Saha, A. K., Vavvas, D., & Witters, L. A. (1999). Malonyl-CoA, fuel sensing, and insulin resistance. *American Journal of Physiology, 276*(1 Pt 1), E1–e18.

Sanz, A., Hiona, A., Kujoth, G. C., Seo, A. Y., Hofer, T., Kouwenhoven, E., . . . Leeuwenburgh, C. (2007). Evaluation of sex differences on mitochondrial bioenergetics and apoptosis in mice. *Experimental Gerontology, 42*(3), 173–182. doi: 10.1016/j.exger.2006.10.003

Schulz, H., Johner, C., Eder, G., Ziesenis, A., Reitmeier, P., Heyder, J., & Balling, R. (2002). Respiratory mechanics in mice: Strain and sex specific differences. *Acta Physiologica Scandinavica, 174*(4), 367–375. doi: 10.1046/j.1365-201x.2002.00955.x

Thompson, J. R., Swanson, S. A., Casale, G. P., Johanning, J. M., Papoutsi, E., Koutakis, P., . . . Pipinos, II. (2013). Gastrocnemius mitochondrial respiration: Are there any differences between men and women? *Journal of Surgical Research, 185*(1), 206–211. doi: 10.1016/j.jss.2013.05.054

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Corresponding author **Andrej Fokin**
Institute of Sport Science and Innovations
Lithuanian Sports University
Sporto str. 6, Kaunas LT-44221
Lithuania
Tel. +37060914960
Email andrej.fokin@lsu.lt

REGULARITIES OF YOUNGSTER FREE TIME PHYSICAL ACTIVITY IN A LATVIAN SECONDARY SCHOOL

Monta Jakovleva, Ieva Rudzinska
Latvian Academy of Sport Education, Riga, Latvia

ABSTRACT

Background. Article investigates youngster physical activity (PA) habits, finding tendencies of PA participation, factors promoting and impeding it.

Methods. The methods include literature analysis, cross-sectional study with self-reported questionnaire consisting of 11 questions and statements about most popular leisure sports, frequency, venues, significant others, and neighbourhood influence. The questionnaire, based on EU Special Eurobarometer 412 "Sport and Physical Activity", research in Northern and Eastern countries, as well as in the Netherlands, was sent by e-mail to 91 Grade 10 subjects in a Latvian mainstream secondary school in the academic year of 2015/2016; the response rate was 60%. The statistical analysis was carried out with Index method and SPSS software.

Results. The Cronbach's alpha for neighbourhood section (5 items) of the questionnaire was .74. The validity of the questionnaire was based on the consideration that the questions were drawn from surveys, described in reliable sources. Most of the students with friends or alone did three sports at sport schools (69.50%), as well as in parks, woods, seaside, at home, most popular sports were team games (basketball, volleyball), winter sports (skiing and snowboarding), fitness sports (running), strength sports (gym workout) and gymnastics. Statistically significant, medium strong correlations were found between good relations with neighbours and high level of well-being ($r = .38$, $p = .05$).

Conclusion. The student choice to practice team games and gymnastics might be influenced by traditional youngster values and their status as trendy sports, but winter sports in Latvia traditionally are among the most popular ones. Good neighbourhood relations could help youngsters be more physically active.

Keywords: mainstream school students, leisure sports, neighbourhood social capital.

INTRODUCTION

The aim of the article was to summarize the methods of researching youngster physical activity (PA) habits, find tendencies characterizing youngster PA participation and factors promoting and impeding it in a Latvian mainstream secondary school.

Note: In this article PA is used a s a synonym to the term "sports", since in EU legislation "sport" is defined as all forms of physical activity, which, through casual or organized participation, aim at expressing or improving physical fitness and mental well-being, forming social relationships or obtaining results in competition at all levels (European Sports Charter Article 2, 1992).

Adolescent and youngster free time physical activity habits are widely researched on European Union (EU) level (General Practice Physical Activity Questionnaire, EU Special Eurobarometer 412 "Sport and Physical Activity" (2014)), as well as in separate European and Eastern countries, e.g. Dutch adolescent free time sports participation in relation to neighbourhood social capital and availability of sports facilities (Prins, Mohnen, van Lenthe, Brug, J., & Oenema 2012), and Arab Teens

Lifestyle Questionnaire (ATLS, revised 2013). Compared with EU Special Eurobarometer Arab Teens Lifestyle Questionnaire is more lifestyle oriented, it assesses lifestyle habits, including PA, sedentary behaviours and dietary habits.

In EU Special Eurobarometer has drawn the conclusion that the proportion of citizens who never exercise or play sport from year 2009 to year 2013 has even slightly increased (from 39 to 42%). Most of PA the activity takes place in informal settings: parks and outdoors (40%) at home (36%), on the journey between home and school, work, or shops (25%). Considerably less people exercise at health or fitness centres (15%), sport clubs (13%) and sport centres (8%), at work (13%), and at school or university (5%). However, engaging in a park or outdoors is less common among young people (33%), more popular being school or university (23%). In EU younger people are more likely to use formal settings (22% among 15–24 year olds), the use of sport clubs is particularly high among men aged 15–24. In Eastern European countries PA at home and engaging in PA at work are popular activities.

Considering support for sport participation in citizen local area, it has been found that most EU citizens feel that they have opportunities to be physically active, but there are mixed views on the level of support provided by local authorities. Even 76% of EU citizens either totally agree or tend to agree that their local area provides them with opportunities to be physically active. In Latvia more people than in 2009 agree that local authorities are not doing enough in this respect. People paying bills with difficulties and younger people are more likely to think that local authorities are not doing enough, especially negative in this respect are young women – 46% of 15–24-year-old women agree with the statement.

Yang, Telama, Leino, and Viikari, (1999) emphasized the importance of PA in the aspect of socialization, working life, economy and education, finding that social and behavioural factors in early life may be more important than early biological characteristics in determining activity levels in young adolescents. Adolescent participation in the intensive endurance sports was found to be most beneficial with respect to the enhancement of adult physical activity.

Vilhjalmsson and Thorlindsson's (1998) investigation showed that adolescent PA was found to be closely related to significant others' physical activity. The results suggest that socialization into PA depends on the agent and emotional vs non-emotional context. Male sex and higher social class were correlated with more PA.

Tammelin, Näyhä, Hills, and Järvelin (2003) and Telama et al. (2005) focused on tracking PA from childhood to adulthood. Participation in sports at least once a week among females and twice a week among males was associated with high level of physical activity in later life.

World Health Organization (2013), Pinto Pereira, Li, and Power (2014) and Bosdriesz, Witvliet, and Visscher (2012) raised the question of interventions to broaden PA activity participation.

METHODS

The methods include literature analysis, cross-sectional study with self-reported questionnaire about youngster free time PA in a Latvian mainstream secondary school, and the response statistical analysis with index method and SPSS software. The survey was carried out by means of an on-line questionnaire, consisting of 11 questions and sent to respondents by e-mail. According to Sheehan (2001), the acceptable response rate for on-line questionnaires was set at 40%, rate of 50% was considered to be good, and rate of 60% was considered to be very good.

The validity of the questionnaire was based on the consideration that the questions were drawn from surveys described in reliable sources summarized above. In the survey, there were questions included about the most popular sports or PA about adolescents, as well as frequency of practicing them, places of engaging in them, and important others who adolescents and youngsters do sports with, as well as about their social neighbourhood.

The respondents were asked to list three sports they did in the week before performing survey. The survey was carried on in January 2016; in Latvia at that time it was possible to do alongside with others also winter sports. Taking as the foundation similar investigations on the European Union level, as well as in some European and Eastern countries, the frequency of practicing PA was investigated on a weekly basis. The places where adolescents could do PA outside school included sport school, wood, park, sport club, other places; ways of doing sports included – being alone, with a friend, or with a group of friends.

In the second part of the questionnaire, adolescents (from totally disagree to fully agree) had to respond to the statements on a 5 point Likert scale as follows: In my neighbourhood everyone can do sport he/she likes; People's relations in my neighbourhood are good; In my neighbourhood people help each other and support each other; The household level of well-being in my neighbourhood is high; In my neighbourhood criminality level is low; In my neighbourhood the traffic is safe.

The first four questions were chosen to tap possible factors promoting PA participation; the last two – possible factors impeding it. If in the neighbourhood people help and support each other, there is high level of well-being, then youngsters could be more likely to engage in leisure time PA. If the community provides the opportunities to do free time PA, youngsters are more likely to use them. If the traffic is not safe and around are a lot of criminals, adolescents could be less likely to engage in free time PA (Prins et al., 2012).

Adolescent background was investigated as to their age, gender, living conditions (house/flat, years of living in Latvia), country of birth (Latvia or other country) and parent country of birth (Latvia or other country). The last two items were chosen to find any possible influence of adolescent and their family migration on PA habits.

Research sample. For the survey we chose a mainstream secondary school situated in the outskirts of the capital, well-known in the country for being physical activity and health oriented. The questionnaire was sent by e-mail to 91 Grade 10 students in January, 2016. The questionnaire was filled in by 55 subjects, the response rate was 60%, or very good according to Sheehan scale. From 55 students 30 (54.55%) were men, 25 – women (45.45%), their age being from 15 to 17 and above. 40 students (72.73%) were 16 years old, 14 were 17 years old (25.45%), and 1 was older than 17 (1.82%).

Adolescent background investigation revealed that:

1. All the students (55) were born in Latvia.
2. About a half of the students (27) lived in a house, and 28 – in a flat.
3. In their present place, 20 students (36.36%) have lived from 16–20 years, 17 students (30.91%) – from 1 to 5 years, 11 students (20.00%) - from 6 to 10 years, and 7 (12.73%) – from 11 to 15 years.
4. All the students' parents were born in Latvia. Only three parents of the students were born outside Latvia.

Statistical methods. Most popular sports adolescents did were characterized with the help of Index of Sport Participation. The latter was determined using index method, described in Geske & Grīnfelds monograph (Geske & Grīnfelds, 2006) as a tool highlighting considerable relationships, being both relatively simple and effective.

Index of Sport Participation (SP) was calculated summing up student participation in ten sports or groups of sports. High (SPh) index meant that sports or groups of sports were practiced by more than 10 students ($n > 10$); medium (SPm) – by 7 to 10 students ($n = 7–10$), and low (SPl) – by less than 7 students ($n < 7$).

The frequency of doing the first, second and third mentioned sport on weekly basis, place of doing sport, as well as people who adolescents did sports with, and their neighbourhood analysis was performed with IBM SPSS V.20 program. In data processing, we applied descriptive and non-parametric methods: Chi-square, Pearson correlation. For the research we chose the 95% ($p < .05$) confidence interval. Cronbach's alpha or the reliability coefficient in the part of the questionnaire, aiming at collecting information about youngster neighbourhood (5 items), was .74.

RESULTS

Most popular sports. Most popular sports students did on a weekly basis were summarized in 20 different sports or groups of sports as follows: 1) basketball, 2) football, 3) volleyball and beach volleyball, 4) hockey, 5) floorball and rugby, 6) cross-country, downhill skiing and snowboarding 7) skating, 8) swimming, 9) walking, 10) race walking, 11) running, 12) dancing, folk dances 13) gym, fitness, physical exercises 14) tennis and badminton, 15) cycling, 16) athletics, 17) gymnastics, acrobatics, aerobics, 18) orienteering, 19) kickboxing and 20) chess.

High sport participation index (SPh) was found to refer to basketball ($n = 18$, 32.73%), volleyball, skiing and snowboarding, running, working out in the gym ($n = 13$, 23.64%), gymnastics ($n = 11$, 20.00%). Medium sport participation index (SPm) characterized football, dancing, walking. Low sport participation index (SPl) was found to refer to all other sports, among them hockey and swimming.

Frequency of doing first, second and third mentioned sport on a weekly basis. Figure 1 shows

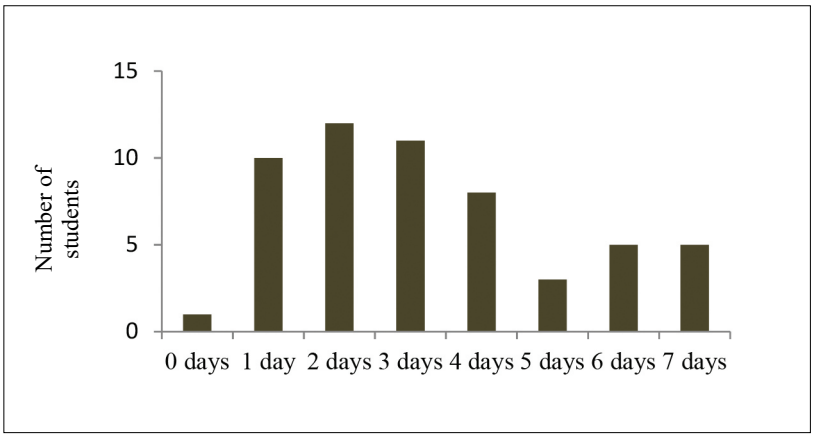


Figure 1. **Frequency of practicing the first mentioned sport on a weekly basis**

that most students practiced the first mentioned sport 2–3 days a week, the second maximum is at 6–7 days a week.

Figure 2 shows that second mentioned sport most of adolescents was practiced from one to two, and even 0 days a week. Besides, the tendency curve explicitly shows that the frequency of doing the second sport is falling.

Figure 3 shows that the maximum number of students did the third mentioned sport just once and 0 days a week, and the drop of the tendency curve is even more pronounced than in the previous graph.

Places of doing sports. Students do leisure time sports in sport schools, parks, woods, sport clubs and other places – in the stadium, in the gym, on the skating rink, at home, on the sand, at the sea, on the mountain/hill. Even 38 students (69.09%) have chosen sport schools as the place of doing their first sport, 19 students (34.54%) have chosen wood and park, 27 students (49.09%) – sport club, 26 (47.27%) prefer to do their first sport in different from above-mentioned places. Total number of students exceeds 100%, because many of them practice their first sport in several or even all of the mentioned places.

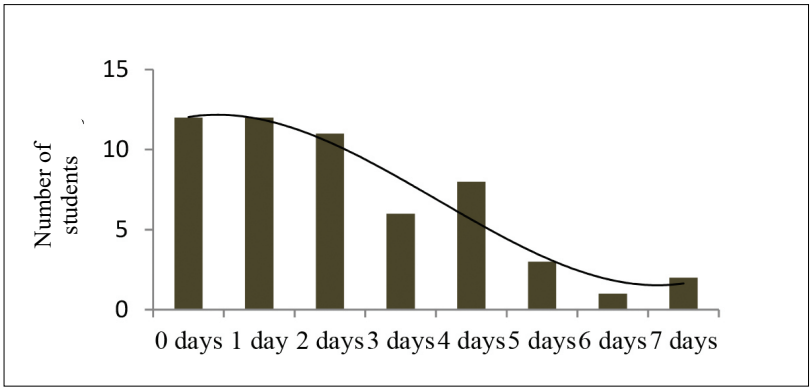


Figure 2. **Frequency of doing the second mentioned sport on a weekly basis**

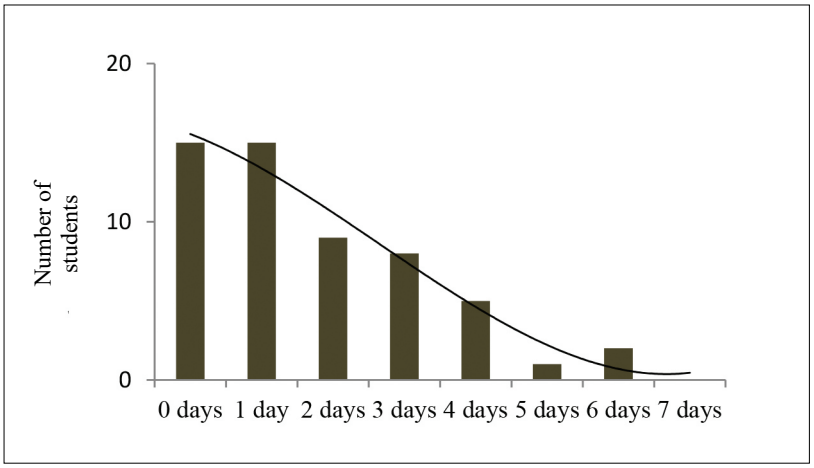


Figure 3. **Frequency of doing the third mentioned sport on a weekly basis**

Ways of doing sports. Figure 4 shows that students prefer doing sport with friends (n = 30, 54.55%) and alone (n = 17, 30.91%) to doing it with a friend (n = 8, 14.55%). Test statistics showed that Chi-Square is 13.35 (p < .05), therefore the differences are statistically significant.

Student neighbourhood analysis. Student neighbourhood was tapped with the help of several statements. Response to the Statement 1 "In my neighbourhood everyone can do sport he/she likes" is positive, students tend to agree with it (Figure 5).

Responses to Statements 2 "In my neighbourhood people's relations are good" and 3 "In my neighbourhood people help each other and support each other" are slightly less positive (for illustration See Figure 6); still the majority of youngsters tend to agree with it.

Responses to Statement 4 "In my neighbourhood the household level of well-being is high"; 5 "In my neighbourhood there is low criminality level" and 6 "In my neighbourhood the traffic is safe" follow a similar pattern: the maximum of the tendency curve is on the positive side: more students tend to agree with the statements than disagree with them, an example of the curves is shown in Figure 7.

Student neighbourhood indicator Pearson's correlation. The obtained Pearson's correlation matrix is shown in Table.

Figure 4. **Ways of doing sport**

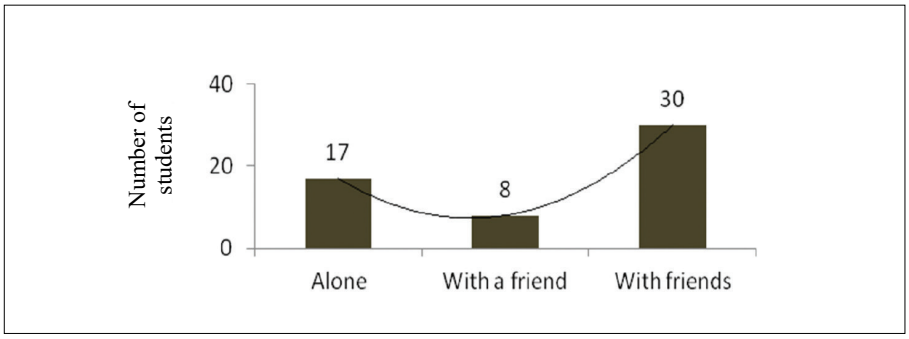


Figure 5. **Response to Statement 1 "In my neighbourhood everyone can do sport he/she likes"**

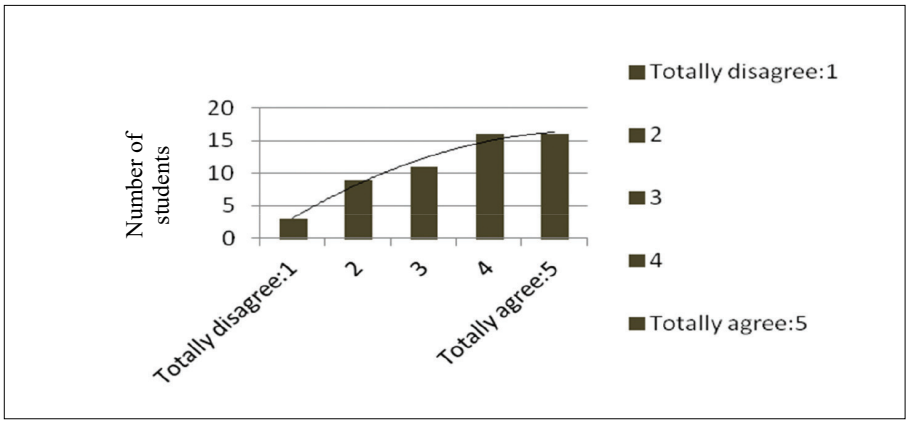
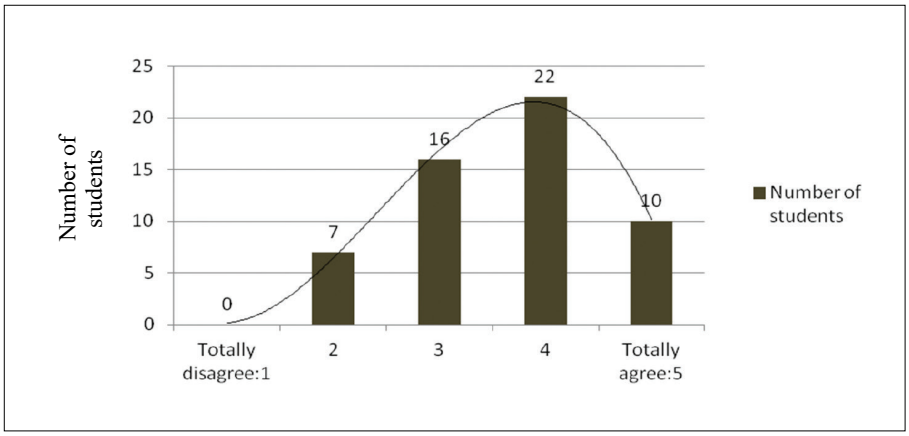


Figure 6. **Response to Statement 2 "In my neighbourhood people relations are good"**



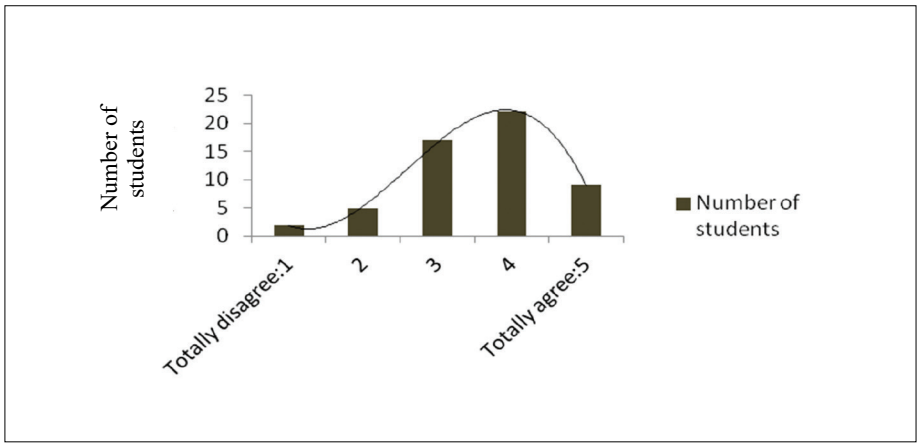


Figure 7. **Response to Statement "In my neighbourhood the household level of well-being is high"**

Indicators	Pearson's Correlation	Indicators			
		Good relations	Help and support	Low criminality	High well-being
Good relations	Pearson's Correlation	1	.682**	.396**	.377**
	Sig. (2-tailed)		.000	.003	.005
Help and support	Pearson's Correlation	.682**	1	.404	.480**
	Sig. (2-tailed)	.000		.002	.000
Low criminality	Pearson's Correlation	.396**	.404	1	.244
	Sig. (2-tailed)	.003	.002		.072
High well-being	Pearson's Correlation	.377**	.480**	.244	1
	Sig. (2-tailed)	.005	.000	.072	

Table. **Student neighbourhood parameter correlation matrix**

The results show that those who consider that their relations with neighbours are good also think that people support each other, the level of well-being is high and the level of criminality is low.

However, safe and friendly neighbourhood indicators do not correlate with the statement that in the neighbourhood everyone can do sport he/she likes because students are more positive about these opportunities, but people's relations in their neighbourhood are evaluated slightly lower. The improvement of these aspects in the community might help youngsters to be more physically active.

DISCUSSION

The obtained results show that the researched youngsters of the Grade 10 of the mainstream secondary school were more physically active than in EU and in Latvia in general. In EU Special Eurobarometer 412 "Sport and Physical Activity" it was found that a majority of 15–24-year-olds exercise or play sport at least once a week, but in the present investigation it was found that on the weekly basis most of students did three sports. We consider that this result is due to the fact that the questionnaire was filled in by those students who were actively engaged in sports, but the overall engagement in sport and physical activity among the students might be lower.

In EU young people are more likely to do sports in formal settings, less common is doing sports in a park or outdoors. Although most of Latvian youngsters in a mainstream secondary school also chose to practice at sport schools, they also practiced in the parks, woods, at the seaside and at home. Youngsters preferred to practice with friends or alone to practicing with just a friend.

Most popular sports among youngsters were team games – basketball, volleyball, winter sports - skiing and snowboarding, fitness sports – running, strength sports – working out in the gym, and gymnastics. The choice of the last sport might be influenced by the fact that gymnastics is now a trendy sport for young people. Moreover, it is not expensive because gymnasts mainly use only their body weight to perform stunts. A note should be made that the 1st Olympic gold medal after the renewal of independence was won by the Latvian gymnast Igors Vihrovs. Latvians are traditionally strong at winter sports, but the choice of strength

and fitness sports might be influenced by traditional adolescent values.

Frequency analysis of the engagement in sport showed that the first sport most students did was from 2 to 6 times a week, but the second and third sport – just a few times a week.

Youngster PA habits could be influenced by the fact that they all were born in Latvia, and only three of their parents were not born in Latvia. Living conditions – a house or a flat – showed no impact on PA habits. Statistically significant, medium strong correlations were found between good relations with neighbours and high levels of well-being ($r = .38$, $p = .05$).

CONCLUSIONS

The present research is among a few ones investigating relationship between physical activity regularities and neighbourhood. Physical activity regularities proved to be similar with the ones found at EU level and in separate Northern and Eastern countries. Most popular sports were found to be team sports, winter sports and running.

Youngsters chose to practice with friends or alone, rather than to practice in pairs. However, in the questionnaire family members and other relatives were not included as important others. Further surveys could benefit from such inclusion.

Youngster PA habits might be influenced the fact that they all live in their homeland, only three of the parents were from born in other countries, they tend to agree that their relations with neighbors are good and level of well-being is high.

The research was conducted in compliance with The Latvian Academy of Sport Education Ethics Commission Decision No. 2016-1.

REFERENCES

Bosdriesz, J. R., Witvliet, M. I., & Visscher, T. L. (2012). The influence of the macro-environment on physical activity: A multilevel analysis of 38 countries worldwide. *International Journal of Behavioral Nutrition and Physical Activity, 9*, 110. doi: 10.1186/1479-5868-9-110

European Commission, Public Opinion, Surveys, Archives. (2014). *Special Eurobarometer 412 "Sport and physical activity"*. Retrieved from http://ec.europa.eu/public_opinion/archives/eb_special_419_400_en.htm, July 19, 2016.

European Sports Charter. (1992). Retrieved from www.portal.unesco.org.

Geske, A., & Grīnfelds, A. (2006). *Izglītības pētniecība (Education research)*. LU Akadēmiskais apgāds.

Pinto Pereira, S. M., Li, L. & Power, C. (2014). Early-life predictors of leisure-time physical inactivity in mid-adulthood: Findings from a prospective British birth cohort. *Medicine & Health, American Journal of Epidemiology*, *180* (11), 1098–1108. doi: 10.1093/aje/kwu254

Prins, R. G., Mohnen, S. M., van Lenthe, F. J., Brug, J., & Oenema, A. (2012). Are neighbourhood social capital and availability of sports facilities related to sports participation among Dutch adolescents? *International Journal of Behavioral Nutrition and Physical Activity*, *9,* 90. Retrieved from https://ijbnpa.biomedcentral.com/articles/10.1186/1479-5868-9-90

Sheehan, K. (2001). E-mail survey response rates: A review. *Journal of Computer Mediated Communication*, *6*(2). doi: 10.1111/j.1083-6101.2001.tb00117.x

Tammelin, T., Näyhä, S., Hills, A. P., & Järvelin, M. R. (2003). Adolescent participation in sports and adult physical activity. *American Journal of Preventive Medicine, 24*(1), 22–28. doi: 10.1016/S0749-3797(02)00575-5

Telama, R., Yang, X., Viikar, J., Välimäki, I., Wann, O., & Raitakari, O. (2005). Physical activity from childhood to adulthood: A 21-year tracking study. *American Journal of Preventive Medicine*, *28*(3), 267–273. doi: 10.1016/j.amepre.2004.12.003

Vilhjalmsson, R., & Thorlindsson, T. (1998). Factors related to physical activity: A study of adolescents. *Social Science & Medicine, 47*(5), 665–675.

World Health Organization. (2013). *Physical Activity Promotion in Socially Disadvantaged Groups: Principles for Action*. Copenhagen, Denmark: World Health Organization Regional Office for Europe.

Yang, X., Telama, R., Leino, M., & Viikari, J. (1999). Factors explaining the physical activity of young adults: The importance of early socialization. *Scandinavian Journal of Medicine & Science in Sports*, *9*(2), 120–127.

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Corresponding author **Monta Jakovleva**
Department of Management and Communication Sciences
Latvian Academy of Sport Education
Brīvības gatve 333, Vidzemes priekšpilsēta
Rīga LV-1006
Latvia
Tel. +371 67543410
Email monta.jakovleva@lspa.lv

PARENTAL ROLE IN CHILDREN'S SPORTS ACTIVITIES IN THE CONTEXT OF ACHIEVEMENT GOAL AND SELF-DETERMINATION THEORIES

Enrika Kromerova
Lithuanian Sports University, Kaunas, Lithuania

ABSTRACT

Background. Aiming at understanding what influences youth sports experiences, researchers emphasize the significance of the role of the family not only in the decision to get engaged in sports activities, but also in the inclination to continue the activities. The increasing emphasis is on parental involvement and the impact of positive and negative verbal behaviour influence on the psychosocial state of children engaged in sport. The aim of this article was a conceptual overview of the family role, as the most significant microenvironment, in children's sports activities.

Methods. Analysis and discussion of scientific literature.

Results. Parental behaviour entails different reactions of children engaged in sports, but on the basis of self-determination and achievement goal theories, it can be argued that the behaviour of the family should encourage athletes' mastery orientation, and consequently, a more pro-social conduct and moral reasoning can be expected.

Conclusions. Systematic literature review showed that both theories are in favour of actions and strategy, with reference to parents' encouragement to involve children in a task, while reducing their ego functioning. It can be concluded that parents perceive their behaviour differently from that of their children, so often parents' positive reinforcement can have a negative impact on athletes' psychosocial state, values, behaviour and goal-setting at present and in the future.

Keywords: sport, athletes, achievement goal theory, self-determination theory, parents' influence.

INTRODUCTION

Sport in today's society is a popular, promoted and strongly established activity in which people of any age, social status, or different interests are engaged. Millions of young people around the world are involved in sports activities, and later, in competitive or professional sports, which, supposedly, have a positive impact on adolescent psychosocial development and propensity to exercise at a late age (Elliott & Drummond, 2016). In addition, sports is treated as an educational tool, shaping children and adolescents' behaviour patterns (Leo, *Sánchez-Miguel, Sánchez-Olivia, Amado, & García-Calvo,* 2015) and value orientations, which lay the foundations for pro-social or anti-social behaviour expression not only in sports, but also in other areas of social life. Sports researchers (Elliott & Drummond, 2016., Leo et al., 2015; Schwebel, Smith, & Smoll, 2016) aim at establishing what influences young people's experiences in sports and they emphasize the significance of the family role not only in the decision making to be engaged in sports activities (Timperio et al., 2013; Wheeler, 2012), but also in the inclination to continue the activities (Yesu & Harwood, 2015). Family role usually includes the necessary financial, logistic and emotional support, which gives the child the opportunity to be engaged in sports activities and to develop their physical abilities. Apart from that, more and more emphasis is put on the effect

of parental involvement (Knight, Dorsch, Osai, Haderlie, & Sellers, 2016; Stefansen, Smethe, & Strandbu, 2016; Yesu & Harwood, 2015) as well as positive and negative verbal behaviour on the psychosocial state of children engaged in sports activities. Research on microclimate created by coaches, parents and other important persons to athletes is based on a number of different theories: Achievement Goal Theory (AGT; Nicholls, 1989) and Self-Determination Theory (SDT; Deci & Ryan, 1985), which define the type of motivation according to personal goal setting and source of its derivation.

According to Shields and Bredemeir (2007), involvement in sports activities does not necessarily mean a positive impact on the formation of character, but it is unanimously recognized that exercising is an important social experience that can be useful under the right circumstances (Leo et al., 2015). Therefore, it is important to reveal the role of the family in children's sports activities as the most significant microenvironment factor and to answer the question - how parents' behaviour influences children's well-being in sport. Given the dearth of research on this topic, I felt it important to examine this topic in an attempt to provide knowledge that could be useful to educators, physical education teachers and parents.

METHODS

This review presents a synthesis of research conducted by the author. These methods were used to achieve the research aim: analysis and discussion of scientific literature.

RESULTS AND DISCUSSION

AGT-based studies have shown that significant surrounding people can have a social impact on the person's needs, expectations and awards (Chan, Londsdale & Fung, 2011). It should be noted that AGT focuses on two achievement motivation sources: *mastery orientation*, which is related to the pursuit of personal independence, commitment, systematic demonstration of effort, skill and purposefulness of the task (Leo et al., 2015). Mistakes are regarded as personal growth and self-improvement opportunities (O'Rourke, Smith, Smoll, & Cumming, 2014), thus, young athletes with a mastery orientation can perceive themselves as having less talent or ability, but still feel successful and competent (Schwebel et al., 2016). Meanwhile, *performance orientation* is related to competitiveness, the one's self-elevation, demonstration of power and force, often, disregard of rules and regulations, and purposefulness of the ego. Mistakes are unacceptable, and while making every effort to show the best performance, in case of failure, the person is likely to feel very incompetent (Schwebel et al., 2016). It should be emphasized that this orientation has influence on the personal interpretation of competence in various fields, such as sports activities (Hein & Hagger, 2007). Just as there are different achievement goal orientations, which can be classified on the basis of ego and mastery, there is also a situational climate, which can be classified similarly. Both ego and mastery climates are influenced by interaction of personal and situational factors (O'Rourke et al., 2014). Parents and coaches can be named as individuals influencing youth sport socialization, who have an undeniable impact on children's psychosocial development (Pomerantz & Thompson, 2008). As a result, the created microclimate can strongly influence children's achievement goal orientation (McArdle & Duda, 2002).

SDT explains how satisfying the natural human innate extrinsic motivation of psychological needs (relatedness, competence, autonomy) becomes intrinsic, and how this transformation can be promoted and maintained (Deci & Ryan, 2000). In SDT, in accordance with the motive autonomy and values internalization, extrinsic motivation is divided into four levels: *external regulation* (controlled by external incentives or penalties), *introjected regulation* (values are taken over from the environment, but are not yet perceived as one's personal self, associated with the ego, when any motivation to act leads to desire pride, or fault avoidance), *identified regulation* (indicates a conscious personal choice of goals and its perception as personally important) and *integrated regulation* (with the highest level of autonomy and is perceived when certain values are assimilated with one's personal self, and are intertwined with other values, objectives and desires). Essential SDT principle states that personal motivation control takes place through environmental social context (Deci & Ryan, 1985), where interpersonal relationships with others (e.g. parents, teachers, coaches and other authoritative persons) play a major role (Fenton, Duda & Barrett, 2016). When the microclimate created by these people encourages

athletes' relatedness, competence, autonomy, the last-mentioned manifest higher forms of internal motivation (Amorose & Anderson-Butcher, 2007). By analogy, when the above mentioned requirements are not satisfied, athletes experience a lower quality and more controlled motivation forms (Pelletier, Fortier, Vallerand, & Brière, 2001). From the perspective of SDT, motivation in sports is a complicated and complex phenomenon because people have many motives to get involved in sports activities (Richard & Edward, 2017), and athlete's psychosocial state during the process is strongly influenced by the approach and behaviour of the significant individuals surrounding them.

Both theories are closely correlated, and in some researchers' (Hein & Hagger, 2007; Keshtidar & Behzadnia, 2017; Standage, Duda, & Ntnoumanis, 2003) opinion, they define the same things but in different aspects. For example, what is known as internal motivation in AGT correlates very well with the orientation to the task. By analogy, what is called extrinsic motivation in self-determination theory is well-connected with the orientation to the ego. The authors of these theories agree that both theories are in favour of actions and strategies that promote engagement in the task, whilst reducing the ego functioning (Spray, Wang, Biddle, & Chatzisarantis, 2006). The very involvement in the task is likely to foster intrinsic motivation.

Parental role in children's sports activities. Parental involvement in children's sports activities was one of the most attractive research areas in the eighties (Clarke & Harwood, 2014; Elliott & Drummond, 2015), but interest in the subject increased greatly in recent years, when sports has become one of the most affordable and common leisure activities. However, the expression of youth's anti-social behaviour in social life has become a source of concern. The importance of teaching parents certain behaviour patterns is emphasized as research shows that certain parental behaviour can adversely affect children and adolescents' well-being and motivation to do sports (Elliott & Drummond, 2016; Leo et al., 2015; Wiersma & Fifer, 2008). According to Elliott and Drummond (2016), research community has been focused on parents' behaviour, such as abuse, criticism, coercion, which potentially makes a negative impact on young people, but little is known about the socially constructed meaning of parental verbal behaviour.

It is believed that the positive parent reinforcement is associated with children's, engaged in sports, satisfaction (Chan et al., 2011; Elliott & Drummond, 2016; Elliott & Drummond, 2015), higher self-esteem (Elliott & Drummond, 2015; Schwebel et al., 2016), benevolence, competence, and, in some cases, elite status (Fraser-Thomas, Cote, & Deakin, 2008; McCarthy, Jones & Clark-Carter, 2008). It was found that parents' encouragement, praise and support increase children's awareness of their athletic ability systematically and have a positive impact on their interest in sports (Lavoie & Stellino, 2008). When analysing the role of parents in children's activities, it is important to separate the influence of fathers and mothers which often can vary significantly. According to Brustad, Babkes, and Smith (2001), children can treat parents' behaviour differently. Differential perceptions of mothers' and fathers' influence appear to vary depending on the specific dimension or type of parental influence assessed (Lavoie & Stellino, 2008).

The authors argue that the children's, engaged in sports, perception of father and mother's pressures, expectations and their impact on a variety of different sports results vary. Research results by Chan et al. (2011) show that mother's punishment, far more than father's, is related to children's, engaged in sports activities, anxiety. Lavoie and Stellino's (2008) study complements to the idea stating that mother's involvement in sports activities, far more than father's, is connected with the athletes' graciousness. However, only fathers' more active involvement in children's sports activities could decrease children's whining and complaining. Also, the authors argue that learning and enjoyment climate created by mothers, unlike fathers, is significantly negatively associated with children's, engaged in sports, tendency to play and talk tough. Meanwhile it is agreed unequivocally that those athletes who are included in the mastery climate are much less likely to behave in an anti-social manner (Leo et al. 2015; Palou, Vidal, Borràs, & Garcia-Mas, 2013; Sanchez-Olivia, Leo, Sánchez-Miguel, Amado, & García-Calvo, 2012). In addition, Miller and co-authors' (2005) research shows that players who are characterized by a high-performance climate respect social norms and rules less, as compared with those athletes who are characterized by low-performance climate. Danioni, Barn, and Rosnaili (2017) found that parental involvement in children's sportive activity turned out to be a significant predictor of adolescents' sport value acceptance, and

this involvement was mainly characterized by encouragement (namely, praise and understanding) and only moderately by a directive behaviour or by active involvement. It should be noted that the participants of the research were characterized by much higher achievement values than status values. This can be interpreted that a strong sense of support for children engaged in sports inhibits their ego and promotes task orientation, resulting in the need for a natural result of their efforts to achieve the objectives without trying to compete with rivals and to gain a certain status. Research shows that those athletes who are involved in the mastery climate are much less likely to behave in an anti-social manner (Palou et al., 2013; Sanchez-Olivia et al., 2012). However, does parents' positive reinforcement always have a positive effect on children's behaviour?

The study by Leo et al. (2015) shows that parental support was not negatively associated with antisocial intention and judgment, and even antisocial performance correlated positively with parents' support. Lavoie and Stellino's (2008) research results show that both father's and mother's expectations and created concerning conducive climate is significantly associated with child's, engaged in sports activity, tendency to play and talk tough, as well as whine and complain. Côté & Hay (2002) argue that too low or too high parental expectations can suppress any child's motivation and enthusiasm to be engaged in sports activities.

Taking into account aforementioned literature facts, it should be emphasized that parental involvement in children's sports activities can be described as a complex and dynamic process of interaction between parents and children, parents and coaches, depending on parents' empathy, game-like situation, children's performances and parents' knowledge and acquired experience (Holt, Temminen, Black, Sehn, & Wall, 2008).

CONCLUSION

This work aimed at revealing parental role in children's sports activities, based on Self-Determination and Goal Achievement theories. Systematic literature analysis showed that both theories are in favour of actions and strategy by which parents should encourage children's engaged in sports involvement in a task, reducing their ego manifestation. Looking at the above-mentioned research, we can conclude that parents perceive their behaviour differently than that of children, so often parents' positive reinforcement can have a negative impact on children's, engaged in sports, psychosocial state, and later, on their values and goal-setting behaviour at present time and in the future. Undoubtedly parents play an important role in children's sports activities, but researchers produce controversial results without being able to unequivocally answer why parents' behaviour is caused by different reactions and how these reactions affect children's psychosocial state. Finally, while we now have a better understanding of the impact of parents on young athletes' well-being, further research is warranted on areas, such as athletes' age and type of sport. Thus, this area still requires more in-depth research.

REFERENCES

Amorose, A. J., & Anderson-Butcher, D. (2007). Autonomy-supportive coaching and self-determined motivation in high school and colleague athletes: A test of self-determination theory. *Psychology of Sport and Exercise*, *8*, 657–670. doi: 10.1016/j.psychsport.2006.11.003

Brustad, R. J., Babkes, M. L., & Smith, A. L. (2001). Youth in sport: Psychological considerations. In R. N. Singer, H. A. Hausenblas, & C. M. Janelle (Eds.), *Handbook of sport psychology* (2nd ed., pp. 604–635). New York: Wiley. Canadian Soccer Association. Retrieved from http://www.canadasoccer.com/eng/docs/CCCReport.pdfS

Chan, D. K., Lonsdale, C., & Fung, H. H. (2011). Influences of coaches, parents, and peers on the motivational patterns of child and adolescent athletes. *Scandinavian Journal of Medicine and Science in Sports, 22*(4), 558-568, doi: 10.1111/j.1600-0838.2010.01277.x

Clarke, N. J., & Harwood, C. G. (2014). Parenting experiences in elite youth football: A phenomenological study. *Psychology of Sport and Exercise*, *15*(5), 528–537. doi:10.1016/j.psychsport.2014.05.004

Côté, J., Hay, J. (2002). Family influences on youth sport performance and participation. In J. M. Silva & D. Stevens (Eds.), *Psychological foundations of sport* (pp. 503–519). Boston, MA: Allyn & Bacon.

Danioni, F., Barni, D., & Rosnati, R. (2017). Transmitting sport values: the importance of parental involvement in children's sport activity. *Europe's Journal of Psychology*, *13*(1), 75–92. doi: 10.5964/ejop.v13i1.1265

Deci, E. L., Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*, 227–268.

Elliott, S. K., & Drummond, M. J. N. (2016). During play, the break, and the drive home: The meaning of parental verbal behaviour in youth sport. *Leisure Studies*. doi: 10.1080/02614367.2016.1250804

Elliot, S. K., & Drummond, M. J. N. (2015). The (limited) impact of sport policy on parental behaviour in youth sport: A qualitative inquiry in junior Australian football. *International Journal of Sport Policy and Politics, 7*(4), 519-530, doi: 10.1080/19406940.2014.971850

Fenton, S. A. M., Duda, J. L., & Barrett, T. (2016). Optimising physical activity engagement during youth sport: A self-determination theory approach. *Journal of Sports Sciences*, *34*(19), 1–11. doi: 10.1080/02640414.2016.1142104

Fraser-Thomas, J., Côté, J., & Deakin, J. (2008). Understanding dropout and prolonged engagement in adolescent competitive sport. *Psychology of Sport and Exercise, 9*(5), 645–662. doi: 10.1016/j.psychsport.2007.08.003

Hein, V., & Hagger M. S. (2007). Global self-esteem, goal achievement orientations, and self-determined behavioural regulations in a physical education setting. *Journal of Sports Sciences*, *25*(2), 149-159. doi: 10.1080/02640410600598315

Holt, N. L., Temminen, K. A., Black, D. E., Sehn, Z. L., & Wall, M. P. (2008). Parental involvement in competitive youth sport settings. *Psychology of Sport and Exercise, 9*, 663–685. doi: 10.1016/j.psychsport.2007.08.001

Keshtidar, M., Behzadnia, B. (2017). Prediction of intention to continue sport in athlete students: A self-determination theory approach. *PLoS ONE 12*(2): e0171673. doi: 10.1371/journal. pone.0171673

Knight, C. J., Dorsch, T. E., Osai, K. V., Haderlie, K. L., & Sellers, P. A. (2016). Influences on parental involvement in youth sport. *Sport, Exercise, and Performance Psychology*, *5(*2), 161–178. http://dx.doi.org/10.1037/spy0000053

Lavoie, N. M., & Stellino, M. B. (2008) The relation between perceived parent-created sport climate and competitive male youth hockey players' good and poor sport behaviors. *The Journal of Psychology, 142*(5), 471–496. doi: 10.3200/JRLP.142.5.471–496

Leo, F. M., *Sánchez-Miguel, P. A., Sánchez-Olivia, D., Amado, A., & García-Calvo, T. (2015). Motivational climate created by other significant actors and antisocial behaviors in youth sport. Kinesiology, 47(1), 3–10.*

McArdle, S., & Duda, J. K. (2002). Implications of the motivational climate in youth sports. In F. L. Smoll and R. E. Smith (Eds.), *Children and Youth in Sport: A Biopsychosocial Perspective* (pp. 409–434), Kendall/ Hunt, Dubuque, Iowa, USA.

McCarthy, P. J., Jones, M. V., & Clark-Carter, D. (2008). Understanding enjoyment in youth sport: A developmental perspective. *Psychology of Sport and Exercise, 9*, 142–156. doi: 10.1016/j.psychsport.2007.01.005

Miller, B. W., Roberts, G. C., & Ommundsen, Y. (2005). Effect of perceived motivational climate on moral functioning, team moral atmosphere perceptions, and the legitimacy of intentionally injurious acts among competitive youth football players. *Psychology of Sport and Exercise*, *6*, 461–477.

Nicholls, J. G. (1989). *The competitive ethos and democratic education.* Cambridge, Mass: Harvard University Press.

O'Rourke, D. J., Smith, R. E., Smoll, F. L., & Cumming, S. P. (2014). Relations of parent – and coach-initiated motivational climates to young athletes' elf-esteem, performance anxiety, and autonomous motivation: Who is more influential? *Journal of Applied Sport Psychology, 26(4),* 395–408. http://dx.doi.org/10.1080/10413200.2014.907838

Palou, P., Vidal, F. J. P. J. C. J., Cantallops, J., Borràs, P. A., & Garcia-Mas, A. (2013). Acceptance of gamesmanship and cheating in young competitive athletes in relation to the motivational climate generated by parents and coaches. *Perceptual and Motor Skills, 117,* 290–303. http://dx.doi.org/10.2466%2F10.30.PMS.117x14z9

Pelletier, L. G., Fortier, M. S., Vallerand, & R. J., Brière, N. M. (2001). Associations among perceived autonomy support, forms of self-regulation, and persistence: A prospective study. *Motivation and Emotion*, *25*, 279–306. doi: 10.1023/A:1014805132406

Pomerantz, E. M., & Thompson, R. A. (2008). Parents' role in children's personality development: The psychological resource principle In John, O. P., Robins, R. W., Pervin, L. A (Eds.), *Handbook of Personality: Theory and Research 3* (pp. 351–374). New York, USA: Guilford.

Richard, M. R, & Edward, L. D. (2017). *Self-determination theory: basic psychological needs in motivation, development and wellness*. New York: Guilford.

Sánchez-Oliva, D., Leo, F. M., Sánchez-Miguel, P. A., Amado, D., & García-Calvo, T. (2012). Antecedentes motivacionales de los comportamientos prosociales y antisociales en el contexto deportivo. [Motivational antecedents of prosocial and antisocial behaviors in a sport context. In Spanish.] *Revista Internacional de Medicina y Ciencias de la Actividad Física y el Deporte, 12,* 253–270.

Schwebel, F. J., Smith, R. E., & Smoll, F. L. (2016). Measurement of perceived parental success standards in sport and relations with athletes' self-esteem, performance anxiety, and achievement goal orientation: Comparing parental and coach influences. *Child Development Research*, Article ID 7056075. doi: http://dx.doi.org/10.1155/2016/7056075

Shields, D. L., & Bredemeier, B. L. (2007). Advances in sport morality research. In Tenenbaum, G., Eklund, R. C. (Eds.), *Handbook of sport psychology* (3rd ed.), (pp. 662–684). Indianapolis, IN: Wiley.

Spray, C. M., Wang, C K. J., Biddle, S. J. H., & Chatzisarantis, N. L. D. (2006). Understanding motivation in sport: An experimental test of achieve-

ment goal and self-determination theories. *European Journal of Sport Science, 6*(1), 43–51. doi: 10.1080/17461390500422879

Standage, M., Duda, J. L., & Ntoumanis, N. A. (2003). Model of contextual motivation in physical education: Using constructs from self-determination and achievement goal theories to predict physical activity intentions. *Journal of Educational Psychology, 95*(1) 97–110. http://dx.doi.org/10.1037/0022-0663.95.1.97

Stefansen, K., Smethe, I., & Strandbu, Å. (2016). Understanding the increase in parents' involvement in organized youth sports. *Sport, Education and Society*, 1–11. doi: http://dx.doi.org/10.1080/13573322.2016.1150834

Timperio, A. F., van Stralen, M. M., Brug, J., Bere, E., Chinapaw, M. J., de Bourdeaudhuij, I., ... te Velde, S. J. (2013). Direct and indirect associations between the family physical activity environment and sports participation among 10–12 year-old European children: Testing the EnRG framework in the ENERGY project. *The International Journal of Behavioral Nutrition and Physical Activity*, *10,* 1–10. doi: 10.1186/1479-5868-10-15

Wiersma, L. D., & Fifer, A. M. (2008). The schedule has been tough but we think it's worth it: The joys, challenges, and recommendations of youth sport parents. *Journal of Leisure Research*, *40*(4), 505–530.

Wheeler, S. (2012). The significance of family culture for sports participation. *International Review for the Sociology of Sport*, *47*(2), 235–252. doi: 10.1177/1012690211403196

Yesu, L., & Harwood, E. A. (2015). The effects of parental involvement, support, and pressure on athletic participation. *Rivier Academic Journal*, *11*(1), 1–11.

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Corresponding author **Enrika Kromerova**
Lithuanian Sports University
Sporto str. 6, Kaunas LT-44221
Lithuania
Tel. +37060732660
Email enrika1991@gmail.com

DOES BALANCE IMPROVE AFTER THE APPLICATION OF TAI CHI EXERCISE PROGRAM IN POST-MENOPAUSAL WOMEN WITH OSTEOPOROSIS?

Ema Lašinytė, Vilma Mauricienė, Alfonsas Vainoras, Kristina Berškienė
Lithuanian University of Health Sciences, Institute of Sports, Kaunas, Lithuania

ABSTRACT

Background. Osteoporosis is an emerging medical and socioeconomic threat characterized by a systemic impairment of bone mass, strength, and microarchitecture. Due to degenerative changes in morphology and structure, the amount of bone fragility and fractures increases affecting balance function. Tai Chi is a traditional Chinese mind-body exercise that has the potential to overcome the impairments associated with frailty.

Methods. The study involved 13 post-menopausal women with osteoporosis. All subjects participated in Tai Chi exercise program which lasted for eight weeks. Two, one-hour group training sessions were taught per week. Balance assessment was performed three times: before Tai Chi exercise program, after four weeks and after eight weeks of the application of Tai Chi exercise program. Balance measurements were conducted using platform "Sigma Balance Pad" and BESS test.

Results. Research findings of "Sigma Balance Pa" showed statistically significant changes ($p < .05$) in eyes opened condition while in eyes closed condition no significant changes were observed ($p \geq .05$). Results of BESS test revealed statistically significant improvement of static balance after Tai Chi exercise program ($p = .033$).

Conclusions. Research results demonstrated balance improvement: body sway and center of pressure displacement speed decreased after Tai Chi exercise program. Further future research of reliability and validity of the BESS in subjects with osteoporosis should be considered.

Keywords: static balance, Sigma Balance Pad, Tai Chi Wudang.

INTRODUCTION

Osteoporosis is a common disease characterized by a systemic impairment of bone mass, strength, and microarchitecture (Zhou et al., 2014). It is an emerging medical and socioeconomic threat resulting in increased propensity of bone fragility and fractures (Curtis, Moon, Dennison, Harvey, & Cooper, 2015).

Postural control, described as the inherent capacity to maintain the center of mass within the base of support, which defines the stability limits (the edges of the operational areas through which the center of mass can be displaced without the need to move the base of support) (Brech, de Foncesa, Bagnoli, Baracat, & D'Andrea Greve, 2013), is critical to the maintenance of balance and avoidance of falls. When properly functioning, this multi-level neural control system produces stable balance and gait (Wayne et al., 2014). However, vertebral fractures cause a change in body posture due to increased kyphosis of the thoracic spine, which causes a forward displacement of the center of mass of the trunk (Smulders, van Lankveld, Laan, Duysens, & Weerdesteyn, 2011) such that it approximates the stability limits (Brech, de Foncesa et al., 2013). As a result, a constricted limits of stability boundary or uncontrolled center of gravity movement can impair functional balance and constrain safe performance of daily activities such as reaching, bending, walking, gait initiation, and moving from sit-to-stand (Li, 2014).

Tai Chi is a multi-component mind-body exercise that is grounded in the holistic model of traditional Chinese medicine and integrates balance, flexibility, and neuromuscular coordination training with a number of cognitive components such as deep abdominal breathing, relaxation, focused body awareness, imagery and multi-tasking (Wayne et al., 2014). Tai Chi exercises are composed of a series of graceful motions linked together in a continuous sequence so that the body is continuously shifting from one foot to another. According to Li (2014), Tai Chi is capable to expand the limits of stability boundaries. This is important for improving balance and reducing the risk of falling among older people, especially for those with osteoporosis (Li, 2014). Despite the fact that many studies presented positive effects of Tai Chi on body balance, there is still a lack of papers which include computer-based balance analysis as well as there is no research which includes BESS test to measure the balance changes after Tai Chi exercise program.

The aim of this study was to evaluate balance changes in post-menopausal women with osteoporosis after Tai Chi exercise program.

METHODS

Subjects. Post-menopausal women (n = 13) with osteoporosis were included in the study. The average age was 74.2 years (the range of the age was 67–81 years), the average height was 158.6 cm, the average weight was 67.1 kg. Subjects belonged to Kaunas district osteoporosis club "Uola". Participation in the study was voluntary. The study received the approval of the Kaunas Ethics Center of Lithuanian University of Health Sciences (No. BEC – SR(M) – 134). All participants signed a statement of informed consent after receiving information about the course of investigation and its methods.

Research protocol. The static balance of the subjects was assessed using BESS balance test and objective indicators of body balance were conducted using platform "Sigma Balance Pad". Balance assessment was performed three times: before Tai Chi exercise program, after four weeks and after eight weeks of application of Tai Chi exercise program.

"Sigma Balance Pad". This platform is a device for balance and proprioception examination and training. The device assesses any change in the position of the platform, processes these changes and transmits data wirelessly in real time to a computer with the software.

Assessment of balance included two conditions: standing on both legs on the plate for 60 s with eyes opened and for 30 s with eyes closed. Patient's safety was ensured during the whole procedure. Changes in center of pressure (COP) displacement were registered based on six objective indicators:

- in lateral direction – average deviation X (cm),
- in anterior-posterior direction – average deviation Y (cm),
- COP displacement speed in lateral direction – average velocity X (cm/s),
- COP displacement speed in anterior-posterior direction – average velocity Y (cm/s),
- path length (cm),
- area (cm^2) (Rutkauskienė, Piščalkienė, Gintilienė, Zachovajevienė, & Kavaliauskienė, 2012).

BESS balance test. The BESS has criterion-related validity with force plate measures. Reliability of the total BESS score and individual stances ranges from poor to moderate to good, depending on the type of reliability assessed. It is known that the BESS is valid to detect balance deficits where large differences exist (Bell, Guskiewicz, Clark, & Padua, 2011). Even we have not found any articles where BESS test would be used for measuring balance changes after Tai Chi exercise program, we decided to include this test in the study protocol to find out whether BESS test results can be sufficiently informative to help understand and draw conclusions about actual balance changes after exercise program.

BESS balance test consists of three standing position and two different surfaces on which subject stands. Testing must be conducted without shoes. Standing positions:

- double leg stance: the feet are flat on the testing surface approximately pelvic width apart.
- single leg stance: subject stands on the non-dominant leg with the contralateral limb held in approximately 20° of hip flexion, 45° of knee flexion and neutral position in the frontal plane.
- tandem stance: one foot is placed in front of the other with heel of the anterior foot touching the toe of the posterior foot.

The subject's non-dominant leg is in the posterior position. Leg dominance should be determined by the person's kicking preference.

The two different surfaces include both a firm (ground) and foam (Airex pad) surface.

The leg dominance was determined before testing by asking a control question "If you had to kick the ball, which leg would you do this?" The subject's preferenced leg in the answer was considered to be dominant. The investigation for failing to respond to this question, or in case of doubt on the accuracy of the response, the participant was actually asked to kick the ball.

The balance in three standing positions was tested first on firm, and then – on foam surface. Subject's stance should consist of the hands on the iliac crests, eyes closed and a consistent foot position depending on the stance. Testing in each standing positions lasted for 20 s and the number of errors (deviations) from the proper stance were calculated during that time. Counting errors was begun only after the subject had assumed the proper testing position. The errors were considered: moving the hands off the hips, opening the eyes, step, stumble or fall, abduction or flexion of the hip beyond 30°, lifting the forefoot or heel off of the testing surface, remaining out of proper testing position for more than 5 s. The maximum total number of errors for any single condition was 10. If a subject committed multiple errors simultaneously, only one error was recorded. After testing each position, the number of errors was marked in the test protocol. Errors made on firm and foam surface (separately for each surface) as well as total BESS score (errors on firm + foam surfaces) were calculated (Bell et al., 2011).

Tai Chi exercise program. The exercise program lasted for eight weeks. Sessions were held twice a week (16 Tai Chi sessions in total). The duration of each session was 60 min. Tai Chi sessions were initiated with 5–10 min duration of introductory warm-up exercises, 40–45 min of the main part of Tai Chi and 5–10 min of relaxation exercises. The main part of Tai Chi session consisted of eight basic Tai Chi movements as well as static stances for the body's center of mass training. Moreover, dynamic exercises, integrating coordinated feet – hand movements and breathing, were taught. Dynamic exercises were selected from Wudang Tai Chi Sanfeng 13th form, according to functional capacity of participants. Exercises got progressively more difficult by the course.

Statistical analysis. Statistical analysis was conducted using SPSS 22.0. The non-parametric Friedman's test for K-related samples was used. The level of statistical significance was set at $p < .05$.

RESULTS

The findings of the "Sigma Balance Pad" showed that statistically significantly changes were found only in opened eyes condition. The deviation in X axis results were better after eight weeks of Tai Chi exercise program ($\chi^2 = 1.091$ (2), $p = .032$), while the deviation in Y axis did not change significantly ($\chi^2 = 2.476$ (2), $p = .29$), which means that body sway after Tai Chi program in lateral direction was less compared to pre-exercise program results.

After eight weeks of the program, results in velocity in X axis were statistically significantly

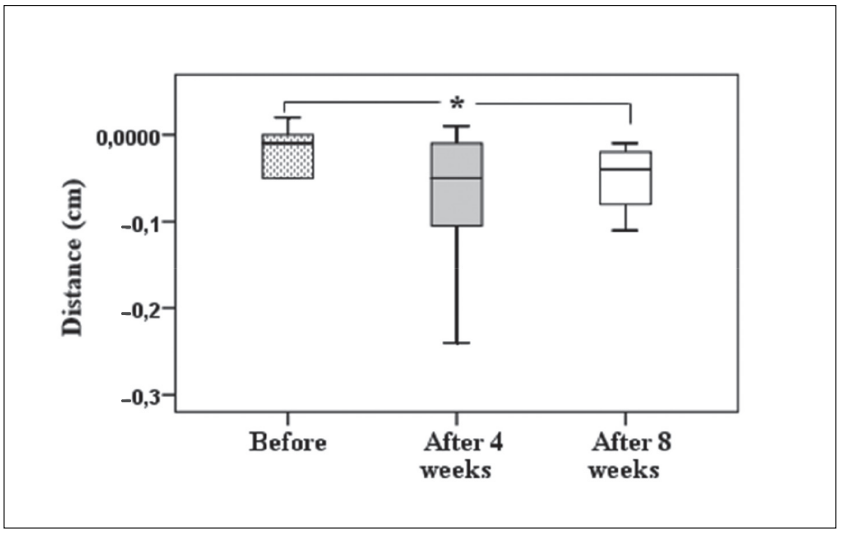

Figure 1. **Changes in deviation in X axis before and after Tai Chi exercise program**

Note. *$p < .05$.

lower compared to pre-program testing (χ^2 = 1.227 (2), p = .012) as well as significant changes were measured in comparison to the results after four and eight weeks of Tai Chi exercise program (χ^2 = 1.091 (2), p = .032).

Changes in velocity in Y axis were also found. Statistically significantly lower results were observed after eight weeks of the program (χ^2 = 1.227 (2), p = .012).

As velocity in X and Y axes represents the COP displacement speed, the lower speed means that person is more stable on the platform during the test (which is related to better balance).

After the assessment of balance, we found that results of path length and area improved after Tai Chi program: the path length statistically significantly decreased (χ^2 = 1.182 (2), p = .017) after eight weeks of exercise program and the area was also smaller after eight weeks compared to primary testing and this change was statistically significant (χ^2 = 1.182 (2), p = .017). It is known that the smaller the path length and area are, the better the balance is.

As mentioned earlier, no statistically significant changes were found in balance assessment in eyes closed condition ($p \geq .05$).

Comparing the results between opened and closed eyes conditions, the results in eyes closed condition were worse than in eyes opened condition both before and after Tai Chi exercise program.

The results of BESS test revealed no statistically significant changes in firm surface

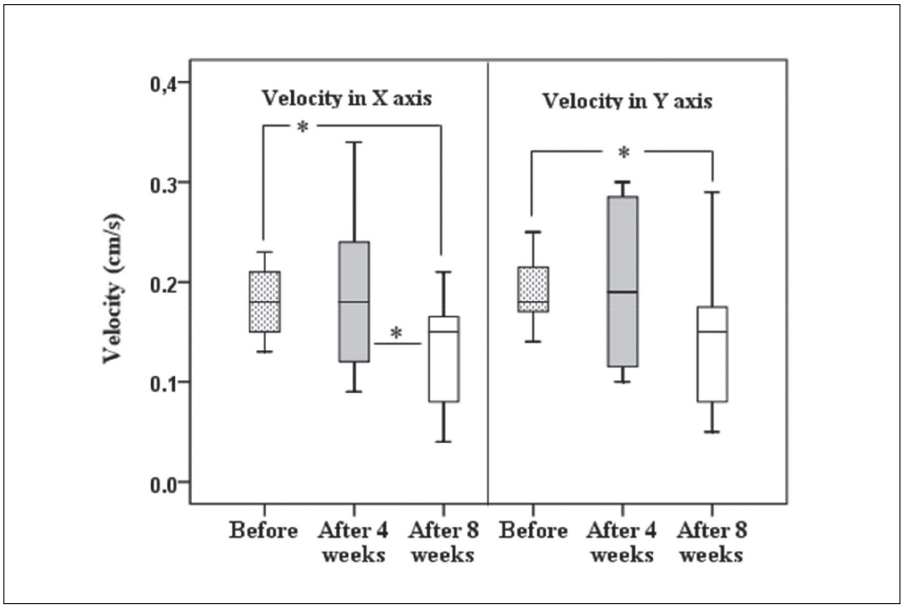

Figure 2. **Changes in velocity in X and Y axes before and after Tai Chi exercise program**

Note. *p < .05.

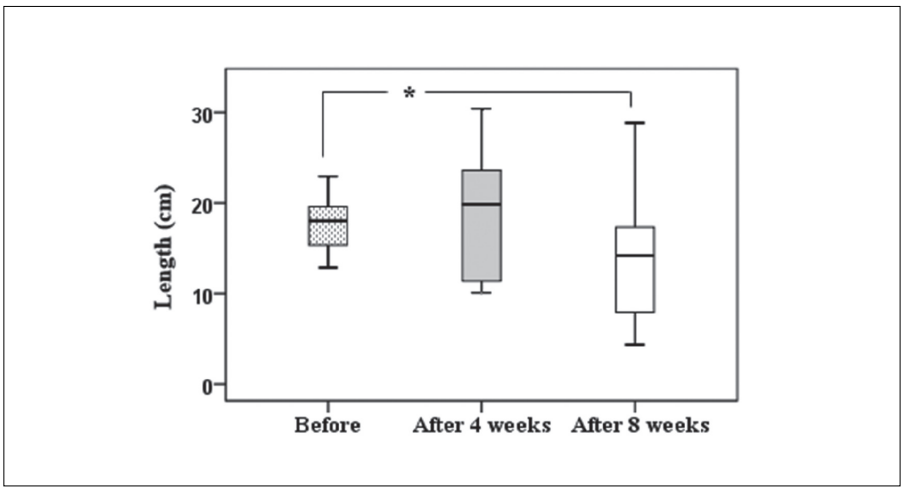

Figure 3. **Changes in path length before and after Tai Chi exercise program**

Note. *p < .05.

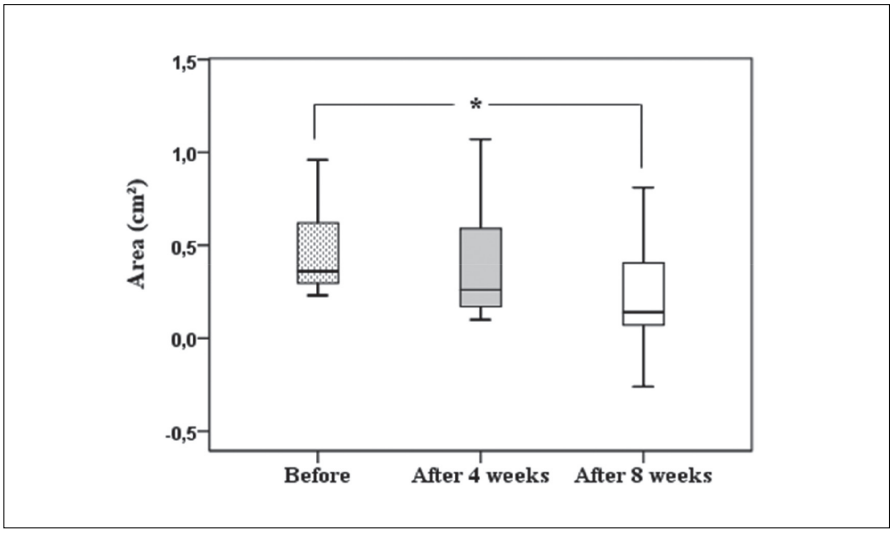

Figure 4. **Changes in area before and after Tai Chi exercise program**

Note. *$p < .05$.

test condition after Tai Chi exercise program ($p \geq .05$). Significantly lower number of errors was made in double leg stance position on foam surface ($p = .012$) after eight weeks of Tai Chi program. A tendency of lower numbers of errors made in tandem stance on foam surface was observed, although no statistically significant changes were found ($p \geq .05$). Furthermore, total number of errors on foam surface statistically significantly decreased ($p = .027$) as well as decreased total number of errors (firm + foam surface) ($p = .033$) after eight weeks of Tai chi exercise program. All results of the test are presented in the Table.

Table. **Results of BESS test**

		FIRM SURFACE			FOAM SURFACE		
		Mean ± SD	**Chi-square**	***p*-value**	**Mean ± SD**	**Chi-square**	***p*-value**
Double leg stance	1st	No mistakes during the test were made			1.75 ± 2.67	8.824	.012
	2nd				0.58 ± 1.50		
	3d				0.58 ± 2.02		
Single leg stance	1st	8.08 ± 2.25	2.867	.239	9.33 ± 1.37	0.560	.756
	2nd	7.77 ± 2.31			8.92 ± 1.37		
	3d	7.69 ± 3.19			9.08 ± 1.31		
Tandem stance	1st	3.62 ± 4.17	2.780	.249	5.67 ± 3.98	3.818	.148
	2nd	2.54 ± 2.90			4.17 ± 3.48		
	3d	2.15 ± 2.73			4.17 ± 4.56		
TOTAL	1st	11.69 ± 4.67	5.511	.064	16.33 ± 6.52	7.220	.027
	2st	10.23 ± 4.98			13.83 ± 5.09		
	3d	9.92 ± 3.90			14.08 ± 5.97		
BESS TOTAL (FIRM+FOAM)	1st	28.36 ± 10.66	6.837	.033			
	2nd	23.73 ± 8.68					
	3d	26.82 ± 9.78					

Note. 1st – before Tai Chi program;
2nd – after four weeks of Tai Chi program;
3d – after eight weeks of Tai Chi program.

DISCUSSION

In their study, Lelard et al. (2010) compared the respective effects of Tai Chi exercise program and a balance training program on static postural control and walking ability. Static postural control was assessed via the measurement of the center of pressure sway in eyes open and eyes closed conditions. The results of the study showed that performance in the eyes closed condition was lower than in the eyes open condition in pretest and posttest for the balance training and Tai Chi groups. The results of this study are similar as in our study no statistically significant changes were observed in the assessment of balance in the eyes closed condition. In another study (Wayne et al., 2012), the impact of Tai Chi exercise on multiple fracture-related risk factors in post-menopausal osteopenic women were investigated as participants were assigned to nine months of Tai Chi training. Quiet standing fall-predictive sway parameters were assessed in the study. Changes in sway parameters were observed: average sway velocity (p = .027) and anterior-posterior sway range (p = .014) were significantly improved by Tai Chi training (Wayne et al., 2012). Our study results showed statistically significantly improved parameters in the eyes opened condition: deviation in X axis (p = .032) after eight weeks of Tai Chi exercise program, average velocity in X axis after four (p = .012) and eight weeks (p = .032) of Tai Chi and velocity in Y axis (p = .012) after eight weeks of Tai Chi exercise program. As mentioned earlier, no statistically significant changes were observed in eyes closed conditions. As it is known, tests with eyes closed are known to be more "provocative" than tests performed with eyes open (Wayne et al., 2012). Therefore, it can be assumed that the two-month Tai Chi exercise program is insufficient for positive changes in sway parameters to be observed testing balance in eyes closed condition.

Results of BESS test total scores showed statistically significant improvement of static balance after Tai Chi exercise program (p = .033) while no significant changes were observed in foam surface test results. Although results of double leg stance on a foam surface improved statistically significantly after exercise program (p = .012), however, it was a reason why we also received a significant improvement in total scores section of foam surface (p = .027). As mentioned earlier, we could not find other studies which used BESS test for measuring balance changes after Tai Chi exercise program, so our research results cannot be compared with other researchers' results.

Analyzing BESS test's pros and cons in our study protocol, it can be assumed that this test includes quite complicated testing positions and conditions which might have been too difficult for our participants.

Furthermore, sophisticated Tai Chi movements (such as standing on one leg) were not included in exercise program due to the safety of participants, so, we presume that this is a possible reason why no statistically significant changes were observed in one leg and tandem stance sections of BESS test. And finally, as Bell et al. (2011) stated, BESS may not be valid when differences are more subtle, which is consistent with our study results as "Sigma Balance Pad" was capable to measure these subtle balance changes.

CONCLUSIONS

Obtained results showed that body sway was less and center of pressure displacement speed decreased after Tai Chi exercise program, which means balance improvement. Current findings of BESS test results prompt the need for further research, which could be based on the establishment of the reliability and validity of the BESS in subjects with osteoporosis.

REFERENCES

Bell, D. R., Guskiewicz, K. M., Clark, M. A., & Padua, D. A. (2011). Systematic review of the Balance Error Scoring System. *Sports Health, 3*(3), 287–295.

Brech, G. C., de Foncesa, A. M., Bagnoli, V. R., Baracat, E. C., & D'Andrea Greve, J. M. (2013). Anteroposterior displacement behavior of the center of pressure, without visual reference, in postmenopausal women with and without lumbar osteoporosis. *Clinics (Sao Paulo), 68*(10), 1293–1298.

Curtis, E. M., Moon, R. J., Dennison, E. M., Harvey, N. C., & Cooper, C. (2015). Recent Advances in the Pathogenesis and Treatment of Osteoporosis.

Clinical Medicine (London, England) 15 (Suppl. 6), 92–96.

Lelard, T., Doutrellot, P. L., David, P., & Ahmaidi, S. (2010). Effects of a 12-week Tai Chi Chuan program versus a balance training program on postural control and walking ability in older people. *Archives of Physical Medicine and Rehabilitation, 91*(1), 9–14. doi: 10.1016.apmr.2009.09.014

Li, F. (2014). The effects of Tai Ji Quan training on limits of stability in older adults. *Clinical Interventions of Aging, 9,* 1261–1268. doi: 10.2147/CIA.S65823

Rutkauskienė, L., Piščalkienė, V., Gintilienė, M., Zachovajevienė, B., & Kavaliauskienė, A. (2012). Vyresnio amžiaus asmenų pusiausvyros vertinimas naudojant „Sigma Balance Pad". *Sveikatos mokslai*, *22*(5), 52–56.

Smulders, E., van Lankveld, W., Laan, R., Duysens, J., & Weerdesteyn, V. (2011). Does osteoporosis predispose falls? A study on obstacle avoidance and balance confidence. *BMC Musculoskeletal Disorders*, *12*(1). doi: 10.1186/1471-2474-12-1

Wayne, P. M., Gow, B. J., Costa, M. D., Peng, C. K., Lipsitz, L. A., Hausdorff, J. M., . . . Manor, B. (2014). Complexity-based measures inform effects of Tai Chi training on standing postural control: cross-sectional and randomized trial studies. *Public Library of Science, 9*(12), e114731. doi: 10.1371/journal.pone.0114731

Wayne, P. M., Kiel, D. P., Buring, J. E., Connors, E. M., Bonato, P., Yeh, G. Y., . . . Davis, R. B. (2012). Impact of Tai Chi exercise on multiple fracture-related risk factors in post-menopausal osteopenic women: A pilot pragmatic, randomized trial. *BMC Complementary and Alternative Medicine, 12*(7). doi: 10.1186/1472-6882-12-7

Zhou, Z., Chen, C., Zhang, J., Ji, X., Liu, L., Zhang, G., . . . Wang, P. (2014). Safety of denosumab in postmenopausal women with osteoporosis or low bone mineral density: A meta-analysis. *International Journal of Clinical and Experimental Pathology, 7*(5)*,* 2113–2122.

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Corresponding author **Ema Lašinytė**
Lithuanian University of Health Sciences, Institute of Sports
Tilžės str. 18, LT-47181 Kaunas
Lithuania
Tel. +370 679 08043
E-mail ema.lasinyte@gmail.com

FUNCTIONAL PHYSICAL FITNESS IN 7–10-YEAR-OLD SCHOOL CHILDREN IN LITHUANIA. PILOT STUDY

Brigita Miežienė[1], Vida Janina Česnaitienė[1], Arūnas Emeljanovas[1], Ingun Fjortoft[2], Lise Kjønniksen[2], Rasa Kreivytė[1], Ilona Tilindienė[1], Kristina Zaičenkovienė[1]

Lithuanian sports university[1], Kaunas, Lithuania

University College of Southeast Norway[2], Notodden, Norway

ABSTRACT

Background. Physical fitness in childhood is a marker of health as it reflects the functional status of most the body functions involved in the performance of daily physical activity and/or physical exercise. Measurement and monitoring of these indicators of health beginning from early age is of highest importance. So, the aim of this study is to examine physical fitness in primary school children and test the validity of physical fitness test battery.

Methods. A sample of 415 children participated in the study. Physical fitness was measured by the 9-item test battery (Fjørtoft et al., 2011). ANOVA results show that indicators of physical fitness differ across age. In general, older children are more physically fit than the younger ones. Mastering preschool and primary school children's physical fitness evaluation techniques will allow monitoring the changes in physical fitness in the course of the school year in different age groups.

Results. In this study we presented the baseline data of a longitudinal study of 7–10-year-old children in Lithuanian schools. We found a development of achievements in physical functional physical activity across age, the 9–10 years olds being the fittest. We found a pronounced gap in the performance between the age groups of 8–9 years, while the 7–8-year-olds seemed to be more even in their functional fitness competency. The same achievement pattern also was characteristic of boys and girls. Gender differences were found in one test item only (throwing tennis ball), which was explained by different play cultures in boys and girls.

Conclusion. Our results indicate a stronger focus on the modernization of physical education programs for children in this age group, particularly for the 8-year-olds. The PE programs should be based on a multivariate sample of basic motor skills of all ages aiming at developing the children's overall functional physical fitness.

Keywords: functional fitness; primary schoolchildren; physical activity.

INTRODUCTION

Physical fitness and physical activity have been identified as important markers in health, both in children and adolescence as it reflects the functional status of most the body functions (skeletomuscular, cardiorespiratory, hematocirculatory, psychoneurological and endocrine–metabolic) involved in the performance of daily physical activity and/or physical exercise (Hallal, 2006; Ortega, Ruiz, Castillo, & Sjöström, 2008).

Motor competence has been considered as a possible determinant of children's physical activity. Several studies emphasize the level of motor competence as a common indicator of participation in physical activities that promote positive health outcomes (Cantell & Crawford, 2008, Fisher et al., 2005). Some studies also indicate that children with motor learning difficulties had significant higher body mass index (Bovet, Auguste, &Burdette, 2007).

Some researchers argue that the skill-learning gap among children with movement difficulties and their peers increases when they become older because the latter group generally achieve a higher

level of motor competence and begin to participate in more physical activity tasks. Children with high motor competence (HMC) may find it easier to participate in physical activity, whereas children with low motor competence might choose a more sedentary lifestyle because of their motor problems (Okely, Booth, & Patterson, 2001; Wrotniak, Epstein, Dorn, Jones, & Kondilis, 2006). Identification of children at risk for developing a low level of fitness may therefore be relevant so that preventive strategies on global and Governmental level can be applied at an early stage (WHO 2010).

Physical activity habits that are established during childhood tend to track into adulthood more in girls than in boys. School physical education programs seem to be important means in this process (Kjønniksen, Fjørtoft, & Wold, 2009).

A Norwegian study by Haga (2009) concluded that both the group of children of low motoric competence (LMC) and that of the children of high motoric competence (HMC) scored significantly higher on the physical fitness test after an intervention period of 3.2 months. The lack of a significant interaction effect indicated that the relative differences in physical fitness outcomes between the groups were relatively constant over time. This means that children with low motoric competence (LMC) were likely to have poor physical fitness compared with children with high motoric competence (HMC) during time. These results are interesting both concerning current health status and health status later in those children with low motoric competence. What about the consequences of this and the implications?

Another study by Vedul-Kjelsås, Sigmundsson, Stensdotter, & Haga (2012) assessed motor competence in 67 sixth- graders boys and girls and possible gender differences. No differences were found in this study in the total score between girls and boys. The researchers conclude that schools might be a good arena for developing appropriate motor skills as a possible contribution to further physical activity later. This is an interesting finding, as most other studies find gender differences in motoric competence in boys and girls (Chen, 2013).

The aim of the present study was to conduct a longitudinal assessment of functional physical fitness in a large sample of healthy boys and girls aged from 7 to 10 years in Lithuanian schools. More specifically, age- and sex-specific differences in physical fitness (i.e., agility, endurance, muscular power, speed, coordination) were quantified by test items and total scores. It was hypothesized that physical fitness would improve from 7-10 years of age and that sex-specific differences would occur over time.

The results from this study may help schools and teachers in the modernization of physical education programs in Lithuanian schools.

METHODS

Participants. The study included 8 Lithuanian primary schools (5 in Kaunas region and 3 in Kaunas city). A mixed sample of 415 children (204 girls and 211 boys) participated in the study. The research was approved by Lithuanian Bioethics Committee (Nº BE-2-42). Children were allowed to participate only if parental permission was obtained and had to be healthy as well as admitted to physical education classes. The tests were conducted by the qualified researchers who had graduated from physical education (Master or PhD degree) degree programme and had the training at the University College of Southeast Norway, where the tests were originally created (Fjørtoft Pedersen, Sigmundsson, & Vereijken, 2011). One participant was excluded as most of his test results were outliers (exceeded three standard deviations). Participants were 7–10 years of age. They performed all tests wearing gym attire.

The distribution of the children across the age groups and the anthropometric measures of height, weight, and body mass index are presented in Table 1.

Table 1. **Characteristics of participating children**

Age group (Y)	Total No. of children	No. of Girls/Boys	Height (cm)		Weight (kg)		Body Mass Index (kg/m²)	
			x	*SD*	*x*	*SD*	*x*	*SD*
7	127	63/64	128.3	5.81	26.62	5.37	16.10	2.33
8	122	64/58	133.9	6.56	29.40	5.45	16.42	2.17
9	108	51/57	139.4	6.17	34.80	6.09	17.83	2.19
10	57	26/31	144.6	7.66	37.16	9.15	17.62	3.40

The numbers of participating children were evenly distributed across age and gender, except for the 10-year-olds with relative low participation. Body composition in height, weight and BMI was in normal range (www.nhi.no).

Test Items and Materials. Physical fitness was measured by the 9-item test battery, developed by Fjørtoft and colleagues and described in details elsewhere (Fjørtoft et al., 2011). The test battery included the following tests: standing broad jump, jumping a distance of 7 m on 2 feet, jumping a distance of 7 m on one foot, throwing a tennis ball with one hand, pushing a medicine ball with 2 hands, climbing wall bars, performing a 10 x 5 m shuttle run, running 20 m as fast as possible, and performing a reduced Cooper test (6 minutes), measuring explosive power, leg muscle power, arm muscle power, upper body power, coordination, agility, speed and endurance. These tests represent typical everyday activities for children, namely, jumping, throwing, climbing, and running (Fjørtoft et al., 2011).

Procedure. Test procedures, described in details elsewhere (Fjørtoft et al., 2011), were explained and each child was tested individually. Each test item was demonstrated before testing. The 3 running tests were performed twice and the better attempt scored. If a procedural error was made by a child, instructions were repeated, and the child made a new attempt. After a second procedural error or when a child could not perform the test item, the test item was scored as missing. The overall score of total fitness was calculated in accordance with the procedure described in Fjørtoft et al. (2011).

Statistical analysis was performed using Statistics V.19.0 for Windows (SPSS, Chicago, Illinois, USA). Data were tested for normality using box plot graph analysis for each age group separately. Values outside the interval of ± 3 SDs (outliers) were excluded from further analysis. Analysis of variance (ANOVA) was used to compare differences in physical fitness between the age groups with Bonferroni correction for multiple comparisons. Student t test evaluated differences in physical fitness between gender groups. The relationship among test items and association with the total fitness score was calculated using Pearson correlation coefficient. A p value of $< .05$ was considered statistically significant.

Role of the Funding Source. This work was commissioned and supported by the The EEA Grants and Norway Grants.

RESULTS

ANOVA results using Bonferroni correction presented in Table 2 show that indicators of physical fitness differ across age. In general, older children are more physically fit than the younger ones. The indicators of explosive power (Standing broad jump) significantly differs among all ages ($p < .05$), but indicators of agility and speed (Shuttle run, Running 20 m as fast as possible,) do not significantly differ between 7- and 8-year-old and 9- and 10-year-old children. Leg muscle power, measured by jumping a distance of 7 m on 2 feet of nine-year-old is higher than that in 7-year-old children, but similar to the one in 8 and 10-year-old. Leg muscle power measured by both jumping tests in 7-year-olds is different than in any other age group ($p < .05$). Arm muscle power (Throwing a tennis ball) of 7-year-olds significantly differs from that in other age groups, the same indicator in 10-year-olds differs only from that of 7-year-olds. Indicators of upper body power (Pushing a medicine ball of 1 kg) do not differ between 8- and 9-year-olds. Indicators of endurance (Reduced Cooper test) are significantly better in 10-year-olds than those in any other age group, but are not significantly different among 7- and 8–9-years-olds. Differences were also significant in coordination (Climbing up wall bars), 10-year-olds performed significantly better and all other age groups, but indicators of coordination between 7 and 8-year-old and between 8 and 9-year-old did not differ significantly.

Results in the Table 3 show that indicators of physical fitness are not significantly different between genders, except for pushing the medicine ball test indicator. Boys performed better in this test than girls ($p < .05$).

Coefficients of Pearson correlation among total fitness scores and individual test indicators presented in Table 4 showed that all eight individual tests correlated positively with the total fitness, with correlations ranging from .289 to .699, however differently: Standing broad jump(cm) and Jumping a distance of 7 m on 2 feet (s) had high correlations, though Pushing a medicine 1 kg (m) and Shuttle run 10 x 5 (s) had low correlations with the total fitness. Correlations between indicators on individual tests items ranged from low to high (.189–.640). Indicators of Climbing up wall bars (s) and Standing broad jump(cm) were not correlated ($p > .05$).

Table 2. **Means, standard deviations, minimum and maximum scores of tests measurements**

Test Item	Age groups	Test Score		Min.	Max.	*p*
		x	*SD*			
Standing broad jump (cm)	7	117.65	19.32	77.00	181.00	$p^{b,c,d} < .05$
	8	125.50	22.94	85.00	185.00	$p^{a,c,d} < .05$
	9	142.98	22.51	83.00	190.00	$p^{a,b,d} < .05$
	10	158.65	29.47	110.00	200.90	$p^{a,b,c} < .05$
Jumping a distance of 7 m on 2 feet (s)	7	3.89	0.68	2.66	6.88	$p^{b,c,d} < .05$
	8	3.66	0.65	2.41	6.28	$p^{a,d} < .05$
	9	3.48	0.64	2.14	5.40	$p^{a} < .05$
	10	3.27	0.90	2.10	6.60	$p^{a,b} < .05$
Jumping a distance of 7 m on 1 foot (s)	7	4.01	0.66	2.53	6.42	$p^{b,c,d} < .05$
	8	3.73	0.57	2.69	5.81	$p^{a} < .05$
	9	3.61	0.62	2.14	5.20	$p^{a} < .05$
	10	3.49	0.81	2.30	6.45	$p^{a} < .05$
Throwing a tennis ball (m)	7	10.11	3.67	4.00	22.00	$p^{b,c,d} < .05$
	8	12.34	3.57	5.20	22.50	$p^{a,c} < .05$
	9	14.82	5.09	6.50	31.00	$p^{a,b} < .05$
	10	13.97	5.26	6.00	30.00	$p^{a} < .05$
Pushing a medicine ball of 1 kg (m)	7	3.05	0.80	1.40	5.44	$p^{b,c,d} < .05$
	8	3.68	1.00	2.03	7.07	$p^{a,d} <.05$
	9	3.83	1.04	2.10	7.59	$p^{a,d} < .05$
	10	4.44	0.97	2.40	7.36	$p^{a,b,c} < .05$
Shuttle run 10 x 5 (s)	7	25.37	2.18	20.63	31.56	$p^{c,d} < .05$
	8	25.11	2.55	20.80	36.93	$p^{c,d} < .05$
	9	23.44	2.45	18.65	29.67	$p^{a,b,} < .05$
	10	22.44	2.28	19.06	29.17	$p^{a,b,} < .05$
Running 20 m as fast as possible (s)	7	4.98	0.53	3.85	6.15	$p^{c,d} < .05$
	8	5.17	0.99	3.81	8.13	$p^{c,d} < .05$
	9	4.53	0.44	3.82	5.50	$p^{a,b,} < .05$
	10	4.30	0.39	3.64	5.20	$p^{a,b,} < .05$
Reduced Cooper test 6 min (m)	7	783.57	139.16	523.10	1200.50	$p^{d} < .05$
	8	750.12	178.89	350.00	1127.00	$p^{c,d} < .05$
	9	838.50	149.73	510.00	1233.00	$p^{b;d} < .05$
	10	1078.00	135.01	678.00	1345.00	$p^{a,b,c} < .05$
Climbing up wall bars (s)	7	23.80	6.39	11.34	35.42	$p^{c,d} < .05$
	8	20.28	8.15	8.06	54.01	$p^{d} < .05$
	9	19.25	6.23	9.20	39.72	$p^{a;d} < .05$
	10	12.87	7.71	5.00	37.02	$p^{a,b,c} < .05$

Note. a – the difference from 7 years; b – the difference from 8 years; c – the difference from 9 years; d – the difference from 10 years.

Table 3. **Test measurement distribution between boys and girls**

Test Item	Gender	Test Score		*p*
		x	*SD*	
Standing broad jump (cm)	Boys	133.86	26.54	$p = .244$
	Girls	130.76	27.17	
Jumping a distance of 7 m on 2 feet (s)	Boys	3.67	0.71	$p = .588$
	Girls	3.63	0.71	
Jumping a distance of 7 m on 1 foot (s)	Boys	3.76	0.66	$p = .863$
	Girls	3.77	0.66	
Throwing a tennis ball (m)	Boys	13.27	4.82	**$p = .002$**
	Girls	11.82	4.49	
Pushing a medicine ball of 1 kg (m)	Boys	3.66	0.98	$p = .232$
	Girls	3.54	1.09	
Shuttle run 10 x 5 (s)	Boys	24.15	2.83	$p = .125$
	Girls	24.56	2.37	
Running 20 m as fast as possible (s)	Boys	4.84	0.73	$p = .856$
	Girls	4.85	0.76	
Reduced Cooper test 6 min (m)	Boys	834.59	185.90	$p = .479$
	Girls	820.40	192.27	
Climbing up wall bars (s)	Boys	19.45	8.33	$p = .739$
	Girls	19.10	6.73	

Table 4. **Pearson correlation coefficients for total test score and individual tests items**

Test Item	Corelation With Total Score	Standing broad jump (cm)	Jumping a distance of 7 m on 2 feet (s)	Jumping a distance of 7 m on 1 foot (s)	Throwing a tennis ball (m)	Pushing a medicine1 kg (m)	Shuttle run 10 x 5 (s)	Running 20 m as fast as possibles (s)	Reduced Cooper test 6 min (m)	Climbing up wall bars (s)
Standing broad jump (cm)	.699	1								
Jumping a distance of 7 m on 2 feet (s)	.694	.543**	1							
Jumping a distance of 7 m on 1 foot (s)	.467	.488**	.640**	1						
Throwing a tennis ball (m)	.579	.449**	.467**	.343**	1					
Pushing a medicine ball of 1 kg (m)	.286	.424**	.382**	.379**	.495**	1				
Shuttle run 10 x 5 (s)	.309	.542**	.391**	.345**	.252**	.254**	1			
Running 20 m as fast as possible (s)	.563	.626**	.548**	.472**	.332**	.189**	.491**	1		
Reduced Cooper test 6 min. (m)	.386	.559**	.379**	.272**	.206**	.280**	.402**	.530**	1	
Climbing up wall bars (s)	.313	,070	.342**	.394**	.256**	.380**	.185**	.297**	.208**	1

Note. ** – correlation is significant at the .01 level (2-tailed).

DISCUSSION

The purpose of the present study was to monitor functional fitness in primary school children in Lithuania. Functional fitness was assessed by using the test "Measuring Physical Fitness in Children who are 5 to 12 Years Old with a Test Battery that is Functional and Easy to Administer (Fjørtoft et al. 2011).

Significant effects of age were detected for all physical fitness tests indicating performance improvements from age 7–10. The results indicated that older children seemed to be fitter than younger children and the 9–10-year-old children were the fittest. The results were in line with the baseline study of Fjørtoft et al. (2011) and the German longitudinal study (Golle, Muehlbauer, Wick, & Granacher, 2015). Generally, the results showed that the children's physical fitness increased by age although the differences were not always significant between age groups. However, the total score showed more linear development by age. At the age of 10 children have many different experiences, and thus have developed „a wide range of competences". The tendency in the results is that physical fitness increases by age, but there are potentials for improving the competencies in each test item by age.

The results also showed that the 10-year-olds were the fittest concerning endurance (Reduced Cooper test), indicating significantly better results of the 10-year-olds compared to the younger age groups. Differences were also significant in climbing up wall bars, were the 10-year-olds performed significantly better than all other groups. As we already know, physical fitness and motor competence are associated with participation in a wide range of physical activity. The results showed the importance of being physically active in a diverse range of activities, at an early age, especially before 10 years of age. According to Williams et al. (2008), exposure to diverse physical activities is assumed to result in improved motor competence in children.

All test items correlated significantly with each other except for climbing wall bars vs standing broad jump. All test items correlated positively with the total score ranging from 0.286 (pushing medicine ball) to 0.699 (standing broad jump). This corresponded with the findings of Fjørtoft et al. (2011) and indicated that a totality of the results expressed by the total fitness score was a valid expression for the children's functional physical fitness.

In this study we found gender differences in one of the test items only: "Throwing a tennis ball". This corresponded with the findings of the studies by Fjørtoft et al. (2011) and Castro-Piñero et al. (2009). Such gender differences can be explained by cultural differences. In natural games, boys seem to throw more small balls or items than girls. The differences in ball skills in the present study may be due to the different kind of games that boys and girls play. The types of sports and games in which boys and girls choose to participate offer different opportunities for developing motor competence and may contribute to gender differences in later ages (Fjørtoft et al., 2011; Wrotniak et al., 2006).

In practice, this indicates that few gender differences exist in motor competence and physical activity at early ages. Consequently, such results verify the gender equality in games and sports for children less than 10 years of age. For physical education in schools, this should also be a guideline for mixed gender classes.

To be physically active, the mastery of motor performance carrying out a variety of motor activities in childhood is suggested to contribute to further engagement in physical activity in adolescence (Barnett, van Beurden, Morgan, Brooks & Beard, 2009; Stodden et al., 2008; Wrotniak et al., 2006). This also indicates the value of multifunctional physical activity in early years.

CONCLUSION

In this study we presented the baseline data of a longitudinal study of 7–10-year-old children in Lithuanian schools. We found a development of achievements in functional physical activity across age, the 9–10-year-olds being the fittest. We found a pronounced gap in performance between the age groups of 8–9 years, while the 7–8-year-olds seemed to be more even in their functional fitness competency. The same achievement pattern also was characteristic of boys and girls. Gender differences were found in one test item only (throwing tennis ball), which was explained by different play cultures in boys and girls. Our first results indicate a stronger focus on the modernization of physical education programs for children in this age group, particularly for the 8-year-olds. The PE programs should be based on a multivariate sample of basic motor skills of all ages aiming at developing the children's overall functional physical fitness.

REFERENCES

Barnett, L. M., Van Beurden, E., Morgan, P. J., Brooks, L. O., & Beard, J. R. (2009). Childhood motor skill proficiency as a predictor of adolescent physical activity. *Journal of Adolescent Health*, *44*(3), 252–259. http://dx.doi.org/10.1016/j.jadohealth.2008.07.004

Bovet, P., Auguste, R., & Burdette, H. (2007). Strong inverse association between physical fitness and overweight in adolescents: A large school-based survey. *International Journal of Behavioral Nutrition and Physical Activity*, *4*(1), 1. doi: 10.1186/1479-5868-4-24

Cantell, M., & Crawford, S. G. (2008). Physical fitness and health in dicesin children, adolescents and adults with high or low motor competence. *Human Movement Science*, *27*(2), 344–362.

Castro-Piñero, J., González-Montesinos, J. L., Mora, J., Keating, X. D., Girela-Rejón, M. J., Sjöström, M., & Ruiz, J. R. (2009). Percentile values for muscular strength field tests in children aged 6 to 17 years: Influence of weight status. *The Journal of Strength & Conditioning Research*, *23*(8), 2295–2310. https://doi.org/10.1519/JSC.0b013e3181b8d5c1

Chen, A. (2013). Motor skills matter to physical activity – at least for children. *Journal of Sport and Health Science*, *2*(1), 58–59. Retrieved from http://www.sciencedirect.com/science/article/pii/S2095254613000045

Fisher, A., Reilly, J. J., Kelly, L. A., Montgomery, C., Williamson, A., Paton, J. Y., & Grant, S. (2005). Fundamental movement skills and habitual physical activity in young children. *Medicine and Science in Sports and Exercise*, *37*(4), 684–688. doi: 10.1249/01.MSS.0000159138.48107.7D

Fjørtoft, I., Pedersen, A. V., Sigmundsson, H., & Vereijken, B. (2011).Measuring physical fitness in children who are 5 to 12 years old with a test battery that is functional and easy to administer. *Physical Therapy*, *91*(7), 1087–1095. https://doi.org/10.2522/ptj.20090350

Golle, K., Muehlbauer, T., Wick, D., & Granacher, U. (2015). Physical fitness percentiles of German children aged 9–12 years: Findings from a longitudinal study. *PloSone*, *10*(11), e0142393. https://doi.org/10.1371/journal.pone.0142393

Haga, M. (2009). Physical fitness in children with high motor competence is different from that in children with low motor competence. *Physical Therapy*, *89*(10), 1089–1097. https://doi.org/10.2522/ptj.20090052

Hallal, P. C., Wells, J. C., Reichert, F. F., Anselmi, L., & Victora, C. G. (2006). Early determinants of physical activity in adolescence: Prospective birth cohort study. *British Medical Journal*, *332*(7548), 1002–1007. https://doi.org/10.1136/bmj.38776.434560.7C

Henderson, S. E., & Barnett, A. L. (1992). *Movement assessment battery for children*. London: Psychological Corporation.

Kjønniksen, L., Fjørtoft, I., & Wold, B. (2009). Attitude to physical education and participation in organized youth sports during adolescence related to physical activity in young adulthood: A 10-year longitudinal study. *European Physical Education Review*, *15*(2) 139–154. http://dx.doi.org/10.1177%2F1356336X09345231

Okely, A. D., Booth, M. L., & Patterson, J. W. (2001). Relationship of physical activity to fundamental movement skills among adolescents. *Medicine and Science in Sports and Exercise*, *33*(11), 1899–1904.

Ortega, F. B., Ruiz, J. R., Castillo, M. J., & Sjöström, M. (2008). Physical fitness in childhood and adolescence: A powerful marker of health. *International Journal of Obesity*, *32*(1), 1–11. https://doi.org/10.1038/sj.ijo.0803774

Stodden, D. F., Goodway, J. D., Langendorfer, S. J., Roberton, M. A., Rudisill, M. E., Garcia, C., & Garcia, L. E. (2008). A developmental perspective on the role of motor skill competence in physical activity: An emergent relationship. *Quest*, *60*(2), 290–306. http://dx.doi.org/10.1080/00336297.2008.10483582

Vedul-Kjelsås, V., Sigmundsson, H., Stensdotter, A. K., & Haga, M. (2012). The relationship between motor competence, physical fitness and self-perception in children. *Child: Care, Health and Development*, *38*(3), 394–402.

Williams, H. G., Pfeiffer, K. A., O'neill, J. R., Dowda, M., McIver, K. L., Brown, W. H., & Pate, R. R. (2008). Motor skill performance and physical activity in preschool children. *Obesity*, *16*(6), 1421–1426. http://dx.doi.org/10.1038/oby.2008.214

Wrotniak, B. H., Epstein, L. H., Dorn, J. M., Jones, K. E., & Kondilis, V. A. (2006). The relationship between motor proficiency and physical activity in children. *Pediatrics*, *118*(6), e1758–e1765. https://doi.org/10.1542/peds.2006-0742

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Corresponding author **Vida Janina Česnaitienė**
Lithuanian Sports University
Sporto str. 6, Kaunas LT-44221
Lithuania
Tel. +370 37 302638
Email vida.cesnaitiene@lsu.lt

EXAMINATION OF THE LEISURE ATTITUDES OF INDIVIDUALS LIVING IN TURKEY FROM AN EAST TO WEST PERSPECTIVE

Süleyman Munusturlar
Anadolu University, Eskisehir, Turkey

ABSTRACT

Background. This study aims at examining the leisure attitudes of individuals by comparing eastern and western cities. The study cinvolved 469 individuals who were living within the borders of İstanbul, Ankara, Eskişehir, Van, Tunceli and Hakkari and were selected through convenience sampling. While 257 participants were female, 212 of them were male.

Methods. In the study, Independent Samples *t*-test, which is a parametric test, One Way Variance Analysis (ANOVA) and Kruskal Wallis, which is a non-parametric test, were used in order to determine the independent variables affecting the dependent variable of leisure attitude and its sub-dimensions.

Results. The statistical analyses carried out revealed that the city of residence, the region of residence and education had impact on the leisure attitudes. Individuals living in eastern cities had lower leisure attitude scores than those living in western cities, educational status also was an important variable affecting the leisure attitude in eastern cities.

Conclusion. In conclusion, leisure attitudes of individuals were affected positively and negatively by many variables within the context of limitations and opportunities that principally the geographical region brings along.

Keywords: leisure, eastern and western cities, leisure participation.

INTRODUCTION

Human behaviour is one of the main topics that has been the focus of academic studies for many years. Especially within the social sciences, the concepts of motivation and attitude have been called upon to explain how human behaviour emerged and how it developed with other parts of life such as workplace, school, family, health, sports and socialization. Also, the number of studies on leisure attitudes is increasing, with the concept of attitude attracting the interest of scientists. When such studies first emerged, attitude was considered as a psychological process. However, in the following years, the view that this psychological process is completed by a motor harmony became dominant (Allport, 1967). Human behaviour and attitude have always been associated. Attitude refers to a positive or negative assessment statement about objects, people or events (Robbins, 1994). Attitude is an individual's tendencies towards any object, article or idea (Iso-Ahola, 1980; Uzun & Sağlam, 2006). Attitude is a psychological structure which has cognitive, affective and behavioural dimensions and appears in the form of acceptance or rejection of a certain person, group, institution or idea (Anderson, 1988). In other words, although there are differing opinions, it is a widely accepted approach that attitude has affective, cognitive and behavioural components (Huang, Chiu, & Hong, 2016). Attitude to behavior relates to the degree of an individual's positive or negative assessment of behavior/planned behavior (Gonen & Griberg, 2016; Hilgard & Atkinson, 1979). In comprehending the concept of attitude, knowing what is not important is as valuable as

knowing what is. Inappropriately, attitude has been defined as a good or bad feeling or emotion. Rather, it is a sentiment about the goodness or badness of something. It is the behavioural tendency that the individual adopts until the existing opinion changes (Eiser & van der Pligt, 1988). Although various theoreticians term it differently, attitudes have four functions in social psychology: providing information, adaptation, self-expression and ego protection (Hogg & Vaughan, 1995). According to social psychology, a direct and simple relation exists between attitude and behaviour. Although attitude and behaviour are mixed in this relation, attitude is essentially different from behaviour and serves to estimate the intention concerning the behaviour (Augostinos, Walker, & Donaghue, 2006). The main factors affecting leisure attitude are leisure partners, family and past experiences (Siegenthaler & O'Dell, 2000).

Leisure attitude is a concept which researchers use to explain leisure participation and leisure behaviours, providing information about an individual's willingness and tendency to take part in leisure activities (Ragheb & Tate, 1993). Attitude consists of three elements, which are cognitive, affective and behavioral (Bagozzi, 1978; Ostrom, 1969). The cognitive element is constituted by the belief, information and experience that a person has towards surrounding stimulants. The affective element consists of positive and negative sentiments that a person has towards the surrounding stimulants and shape the behaviour response of the person towards these stimulants. The behavioural element is related to actions taken by people in line with their sentiments and knowledge (Kraiger, Ford, & Salas, 1993). In the leisure attitude, the cognitive element contains information and beliefs on such issues related to leisure as health, happiness, making friends, renewal and relaxation. The affective element of leisure is associated with values attributed to and emotions felt about leisure activities as well as feelings experienced following participation in leisure activity, while the behavioural element contains the expression of views and feelings after the participation as well as its impacts on the subsequent participation in leisure activities (Ragheb & Beard, 1982).

Ragheb and Beard (1982) reported a very weak relationship between cognitive, affective and behavioural leisure attitude and age, sex, income, education and demographic variables. Ragheb and Tate (1993) stated particularly that affective and cognitive leisure attitude had an impact on increasing leisure participation and leisure attitude. Likewise, Mannell and Kleiber (1997) reported that attitudes, beliefs and values concerning leisure affected leisure participation and the outcome obtained from the leisure experience. Teixeira and Freire (2013) stated that leisure attitude is a personal concept containing cognitive, affective and behavioural elements, which increase leisure estimation and subjective wellbeing (happiness). Kim, Sung, Park and Dittmore (2015) reported that positive leisure attitude increased leisure estimation and self-respect while reducing stress and loneliness. In many studies, which have attempted to explain leisure participation in the last 40 years (Davis, Jackson, Kronenfeld, & Blair, 1984; Hagger, Chatzisarantis, & Biddle, 2001; Iso-Ahola, 1980), the most important factor affecting leisure behaviour was leisure motivation. Deng, Walker, and Swinnerton (2005) showed that there was a significant relation between leisure motivation and cognitive leisure attitude. Ellis and Witt (1994) reported that leisure attitude was affected by the sentiments of competence and control which were closely associated with the feeling of freedom felt in leisure. We believe that there is a need for research which examines leisure attitude from the perspectives of Western and Eastern cities due to social-cultural inequality by Turkish community. Therefore, this study aims to explore leisure attitudes of individuals living in Eastern and Western regions of Turkey.

METHODS

Research sample. After excluding the missing data and extreme values from the initial 522 participants surveyed in the study, the sample consisted of 469 people who were selected using a convenience sampling method. 291 of the participants were living in eastern cities and 177 of them were living in western cities. Although there are seven geographical regions in Turkey, the study was restricted to the eastern cities of Van, Hakkari and Tunceli from the eastern and southeastern regions and the western cities of İstanbul, Ankara and Eskişehir from Marmara and Central Anatolia regions in order to obtain a homogeneous sample.

Data collection tools. Two different data collection tools were used. The first was the personal information form developed in order to acquire the demographic information of the participants. The other data collection tool was the *Leisure Attitude*

Scale (LAS), which was developed by Ragheb and Beard in 1982 in order to assess leisure attitudes of the participants and was adapted into Turkish by Akgül and Gürbüz (2010). The LAS is a 5-point Likert-type scale and consists of 3 dimensions: cognitive (12 items), affective (12 items) and behavioural (12 items), amounting to 36 items in total. In the study carried out by Akgül and Gürbüz, in adapting the scale into Turkish, Cronbach's Alpha reliability coefficient (α) of the scale was found as .97 while those of the cognitive, affective and behavioural dimensions were found to be .81, .92 and .91, respectively. Within the scope of this study, the Cronbach's Alpha reliability coefficient of the scale was .82, while those of the cognitive, affective and behavioural dimensions were .79, .72 and .83, respectively. Alpar (2010) stated that the scales with Cronbach's Alpha coefficients ranging between .60 and .79 could be accepted as "quite reliable" and those with Cronbach's Alpha coefficients between .80 and 1.00 could be regarded as "highly reliable". In the light of this information, the *Leisure Attitude Scale* used in the present study was a reliable data collection tool.

Data collection and analysis. Data were collected from the participants who were selected through convenience sampling method on voluntary basis and were living in İstanbul, Ankara, Eskişehir, Van, Tunceli and Hakkari between February and April, 2016. Missing data and extreme values were excluded from the data set in order to make the research data ready for analysis.

The results of the Levene test for making a decision on the use of parametric and non-parametric tests prior to difference statistics revealed that the variances were homogeneous ($p > .05$), and the results of Kolmogorov-Smirnov test showed that the groups displayed normal distribution ($p > .05$). Therefore, a parametric Independent Samples *t*-test and One Way Analysis of Variance (ANOVA) were used to question whether dependent variables differed according to independent variables. Because education, as an independent variable, had both homogeneity and normal distribution problems, a Kruskal Wallis variance analysis test, which is a nonparametric test, was used for this variable.

RESULTS

As seen in Table 1, 257 of 469 participants were female (54.8%) and 212 of them were male (45.2%). Sixty participants (12.8%) were aged 19 and below, 144 (30.7%) were aged 20–22, 110 (23.5%) were aged 23–25, 50 (10.7%) were aged 26–30 and 105 (22.4%) were aged 31 and above. Five of the participants (1.1%) were illiterate, 27 (5.8%) were primary school graduates, 37 (7.9%) were secondary school graduates, 78 (16.6%) were high school graduates and 322 (68.7%) were university graduates. The number of residents of the eastern cities of Hakkari, Tunceli and Van were 172 (36.8%), 92 (19.6%) and 27 (5.8%), respectively, while 99 participants (21.1%) lived in Eskişehir, 37 (7.9%) in İstanbul and 41 (8.8%) in Ankara in the west.

Table 1. **Demographic features of the sample**

Variable	*f*	%	Variable	*f*	%
Gender			**Educational Status**		
Female	257	54.8	Illeterate	5	1.1
Male	212	45.2	Primary school	27	5.8
			Secondary school	37	7.9
			High school	78	16.6
			University	23	4.4
Age			**City of residence**		
19 years and below	60	12.8	Hakkari	172	36.8
20–22 years	144	30.7	Tunceli	92	19.6
23–25 years	110	23.5	Van	27	5.8
26–-30 years	50	10.7	Ankara	41	8.8
31 years and above	105	22.4	İstanbul	37	7.9
			Eskişehir	99	21.1

Table 2 shows the arithmetic means and standard deviation values of the participants in the leisure attitude (3.78, *SD* = 0.64) as well as those of the cognitive (3.92, *SD* = 0.69), affective (3.84, *SD* = 0.71) and behavioural (3.56, *SD* = 0.77) attitude dimensions. When means concerning the leisure attitude were evaluated, the cognitive attitude had a considerably higher score than the other attitude dimensions.

An Independent Samples *t*-test was carried out to determine whether the scores of the participants in the leisure attitude dimensions differed by gender, but a statistically significant difference could not be found between the groups.

While the ANOVA was conducted in order to detect whether the scores of the participants in the leisure attitude and leisure attitude dimensions differed by age, a Tukey Post Hoc test was employed to determine the groups among which there were differences (Table 3). Statistically significant differences were detected among the groups by the variable of age in the total leisure attitude score ($F_{(4, 464)} = 4.015$; $p < .01$) as well as in the cognitive attitude ($F_{(4, 464)} = 3.095$; $p < .01$), affective attitude ($F_{(4, 464)} = 4.419$; $p < .05$) and behavioural attitude ($F_{(4, 464)} = 2.784$; $p < .01$) dimensions.

The differences in the means concerning the leisure attitude were among group 5 and groups 2 and 3. The leisure attitude scores of the participants aged 20–22 (group 2) and 23–25 (group 3) were higher than those of the participants at the age of 31 and above (group 5). The significant difference in the cognitive attitude scores could be attributed to higher means of the individuals aged 20–22 (group 2) when compared to the individuals at the age of 31 and above (group 5). In the affective attitude dimension, a statistically significant difference resulting from the lower means of the individuals at the age of 31 and above when compared to both individuals at the age of 20–22 (group 2) and 23–25 (group 3) was observed. Likewise, in the behavioural dimension, the significant difference originated from lower means of the individuals aged 31 and above (group 5) than those of the individuals aged 20–22 (group 2) and 19 and below (group 1). The means of the individuals aged 31 and above are lower than the means of the other age groups in all leisure attitude dimensions. This results can be interpreted as individuals aged 31 and above have neither enough cognitive information on leisure and lack of emotional interaction on leisure nor participation in leisure activities compared with other age groups.

The Kruskal-Wallis test was employed in order to detect whether the scores of the participants in the leisure attitude and leisure attitude dimensions by the variable of education since parametric test conditions were met. The analysis revealed statistically significant differences among the groups by the variable of education in the total

Table 2. **Leisure attitude levels of the participants**

Levels	Points	*SD*
Leisure attitude	3.78	0.64
Cognitive	3.92	0.69
Affective	3.84	0.71
Behavioural	3.56	0.77
n = 458; 1 = Strongly disagree, 5 = Strongly agree		

Table 3. **Leisure Attitude Levels of the Participants by the Variable of Age**

	19 age and below (Group 1)		20–22 age (Group 2)		23–25 age (Group 3)		26–30 age (Group 4)		31 age and above (Group 5)			
		sd		*sd*		*sd*		*sd*		*sd*	*F*	*p*
Leisure attitude	3.77	.65	3.87	.53	3.86	.61	3.74	.70	3.57	.73	4.015	.01*
Cognitive	3.92	.62	4.03	.53	3.99	.63	3.80	.77	3.75	.78	3,095	.00**
Affective	3.79	.73	3.97	.62	3.93	.67	3.83	.72	3.62	.80	4.419	.02*
Behavioural	3.60	.80	3.61	.67	3.67	.74	3.61	.85	3.35	.86	2.784	.00**

Note. * $p < .05$, ** $p < .01$.

leisure attitude score ($F_{(4, 464)} = 4.015$; $p < .01$) as well as in the cognitive attitude ($F_{(4, 464)} = 3.095$; $p < .01$), affective attitude ($F_{(4, 464)} = 4.419$; $p < .05$) and behavioural attitude ($F_{(4, 464)} = 2.784$; $p < .01$) dimensions. Bonferroni Correction was used in order to determine the groups among which these significant differences existed (Table 4).

When the differences between the scores in the leisure attitude and its dimensions according to the educational status were examined, a statistically significant difference was detected in the total leisure attitude scores among the university graduates and the graduates of primary schools, secondary schools and high schools in favour of those having had university education. Similarly, there were significant differences in the cognitive attitude scores among the university graduates and primary school graduates, in the affective attitude scores among the university graduates and graduates of primary and secondary schools, and in the behavioral attitude scores among the university graduates and illiterate individuals and primary school graduates in favor of the university graduates. In this study, higher education, at the university level in particular, positively affected the leisure attitude.

An Independent Samples *t*-test was carried out to detect whether the scores of the participants in the leisure attitude and its dimensions differed by the variable of the region of residence (east-west) with significant differences observed among the groups. These significant differences were in favour of the individuals living in the western cities in the total leisure attitude scores ($t = –7.940$, $p = .00$) as well as in the cognitive ($t = –7.695$, $p = .00$), affective ($t = –6.494$, $p = .00$) and behavioural ($t = –6.579$, $p = .00$) attitude scores (Table 5). This results can be interpreted as individuals who live in the Eastern region of Turkey have neither enough cognitive information on leisure and lack of emotional

Table 4. **Leisure attitude levels of the participants by the variable of educational status**

	Illeterate Group 1)			Primary School (Group 2)			Secondary School (Group 3)			High School (Group 4)			University (Group 5)				
	Med	**Min Max**		**Med**	**Min Max**		**Med**	**Min Max**		**Med**	**Min Max**		**Med**	**Min Max**		**X²**	***p***
Leisure attitude	3.91	2.75 4.75	3.83	3.61	1.61 5.00	3.44	3.55	1.75 4.64	3.53	3.66	1.92 4.75	3.55	3.91	2.06 5.00	3.89	4.015	.01*
Cognitive	3.58	1.92 5.00	3.63	3.83	1.50 4.32	3.77	3.66	2.25 5.00	3.70	3.91	1.50 5.00	3.74	4.08	1.50 5.00	3.98	3.095	.01*
Affective	3.66	2.50 5.00	3.81	3.66	1.42 5.00	3.44	3.58	1.25 4.83	3.53	3.70	1.92 5.00	3.62	4.00	1.83 5.00	3.68	4.419	.02*
Behavioural	4.50	2.42 5,00	4.05	3.46	1.50 5,00	3.12	3.41	1.08 4,67	3.35	3.33	1.75 4,75	3.30	3.70	1.33 5,00	3.89	2.784	.01*

Note. *$p < .05$, **$p < .01$.

Table 5. **Leisure attitude levels of the participants by the variable of the region of residence (East-West)**

Dependent Variable	Region of Residence	*n*		*SD*	*t*	*p*
Leisure Attitude	East	292	3.6	0.64	–7.94	.00**
	West	177	4.06	0.53		
Cognitive	East	292	3.74	0.72	–7.7	.00**
	West	177	4.22	0.53		
Affective	East	292	3.68	0.07	–6.49	.00**
	West	177	4.11	0.59		
Behavioural	East	292	3.39	0.79	–6.58	.00**
	West	177	3.85	0.65		

Note. *$p < .05$, **$p < .01$.

interaction on leisure nor participation in leisure activities when compared with individuals who live in the Western region of Turkey.

According to the results of the One Way Variance Analysis (ANOVA) which was used to determine whether the scores of the participants in the leisure attitude and its dimensions by the variable of the city of residence. there were statistically significant differences among the groups by the variable of the city of residence in terms of both total leisure attitude score ($F_{(5, 463)}$ = 22.989, $p < .01$) and cognitive attitude ($F_{(5, 463)}$ = 19.640, $p < .01$). affective attitude ($F_{(5, 463)}$ = 16.507, $p < .05$) and behavioural attitude (($F_{(5, 463)}$= 15.889, $p < .01$) dimensions. The results of the Post Hoc (Tukey) test revealed that there was a significant difference between the leisure attitude. cognitive attitude. affective attitude and behavioural attitude score means of the residents of Hakkari and those of the residents of Tunceli, Eskişehir, İstanbul and Ankara against the former. Additionally, a significant difference was detected between Van and İstanbul in terms of leisure attitude while the behavioral attitude scores differed significantly between the residents of Van and İstanbul once again, Van and Ankara and Van and Eskişehir against the residents of Van. In other words, leisure attitudes of those living in Hakkari are lower than those of the residents of western cities as well as Tunceli, whereas leisure attitudes of the residents of Van are lower than those of the individuals living in western cities (Table 6).

The leisure attitude scores and dimension scores of the participants living in eastern and western cities also were examined separately. Statistical analyses showed that the cognitive, affective, behavioural attitude and leisure attitude scores of the residents of eastern cities were not affected by the independent variables of sex, education and age. However, the leisure attitude and dimension scores of the individuals living in eastern cities differed significantly by the city of residence (Table 7).

Table 6. **Leisure Attitude Levels of the Participants by the Variable of the City of Residence**

	Hakkari (Group 1)		**Tunceli (Group 2)**		**Eskişehir (Group 3)**		**Van (Group 4)**		**İstanbul (Group 5)**		**Ankara (Group 6)**			
		SD		***SD***		***SD***		***SD***		***SD***		***SD***	***F***	***p***
Leisure attitude	3.43	.67	3.92	.48	4.02	.56	3.67	.43	4.25	.49	4.18	.50	22.989	.00**
Cognitive	3.56	.75	4.02	.59	4.20	.56	3.90	.50	4.07	.47	4.33	.49	19.640	.00**
Affective	3.50	.76	4.00	.59	4.08	.61	3.82	.55	3.82	.57	4.20	.56	16.507	.00**
Behavioural	3.22	.84	3.73	.62	3.79	.70	3.29	.55	4.02	.54	4.02	.63	15,889	.00**

Note. *$p < .05$, **$p < .01$.

Table 7. **Leisure attitude levels of ındividuals living in eastern cities by the variable of the city of residence**

	Hakkari (Group 1)		**Tunceli Group 2)**		**Van (Group 3)**			
		sd		***sd***		***sd***	***F***	***p***
Leisure attitude	3.43	.67	3.92	.48	4.02	.56	20.138	.00**
Cognitive	3.56	.75	4.02	.59	4.20	.56	6.748	.00**
Affective	3.50	.76	4.00	.59	4.08	.61	7.911	.00**
Behavioural	3.22	.84	3.73	.62	3.79	.70	13.837	.00**

Note. *$p < .05$, **$p < .01$.

The results of the Post Hoc (Tukey) test showed that the residents of Tunceli had higher means in the leisure attitude and affective attitude scores than the residents of Hakkari, while residents of both Van and Tunceli had higher means in the cognitive and behavioural attitude scores when compared to the residents of Hakkari (Table 7).

As a result of the statistical analyses, it was observed that cognitive, affective, behavioral and total attitude scores of participants who lived in western provinces were not affected by the independent variables of gender and province. On the other hand, it was observed that the scores obtained by individuals who lived in western provinces from the leisure attitude and its lower dimensions were significantly different according to the variables of educational background (Table 8) and age (Table 9).

The Kruskal-Wallis test was used in order to determine whether the scores of the participants living in western cities in the leisure attitude and its dimension differed by the variable of education since parametric test conditions were not met. At the end of the statistical analysis, statistically significant differences were observed among the groups in the cognitive attitude ($F_{(4,\ 173)} = 3.095$, $p < .01$) and affective attitude ($F_{(4,\ 173)} = 4.419$, $p < .05$) dimension scores by the variable of education. Bonferroni Correction was used in order to detect the groups among which significant differences existed (Table 8).

When the differences between the leisure attitude scores and dimension scores of the participants living in western cities by the variable of education were examined, significant differences were observed between university graduates and graduates of primary and secondary schools and between graduates of primary schools and graduates of secondary schools in the cognitive and affective attitude scores. The cognitive and affective attitude scores decreased as the level of education decreased (Table 8).

The ANOVA was carried out to determine whether the scores of the participants living in western cities related to leisure attitude and its dimensions differed by the variable of age while Tukey Post Hoc test was made to detect the groups among which differences existed (Table 9). Statistically significant differences were observed among the groups by the variable of age in the total leisure time score ($F_{(4,\ 173)} = 4.691$, $p < .01$), cognitive attitude dimension ($F_{(4,\ 173)} = 2{,}224$, $p < .01$), affective attitude dimension ($F_{(4,\ 173)} = 5.029$, $p < .05$) and behavioural attitude dimension ($F_{(4,\ 173)} = 4.481$, $p < .01$).

The differences in the means concerning the leisure attitude are among group 5, group 2 and group 3. The study showed that the leisure attitude scores of the individuals aged 20–22 (group 2) and 23–25 (group 3) are higher than those of the individuals at the age of 31 and above (group 5). In the behavioural attitude dimension, significant difference results from the fact that individuals aged 31 and above (group 5) have lower mean values than the individuals aged 20–22 (group 2) and 23–25 (group 3). In the behavioural attitude dimension, the significant difference stems from the mean values of the individuals aged 31 and above

Table 8. **Leisure attitude levels of the individuals living in western cities by the variable of educational status**

	Illeterate (Group 1)			**Primary School (Group 2)**			**Secondary School (Group 3)**			**High School (Group 4)**				
	Med	**Min max**		**Med**	**Min max**		**Med**	**Min max**		**Med**	**Min max**		**X²**	***p***
Leisure Attitude	3.59	1.61 4.22	3.32	3.55	3.56 4.47	3.86	3.88	3.00 4.53	3.82	4.05	2.72 5.00	4.11	3.029	.47
Cognitive	3.87	1.50 4.25	3.58	4.41	4.42 5.00	4.61	3.83	3.50 4.58	3.98	4.25	3.00 5.00	4.25	2.098	.01*
Affective	3.50	1.83 4.08	3.25	3.25	3.25 4.67	3.72	3.91	3.00 4.92	3.79	4.08	2.67 5.00	4.17	4.856	.01*
Behavioural	3.41	1.50 4,33	3.13	3.00	3.00 3,75	3.25	3.91	2.50 4,75	3.69	4.08	2.33 5,00	3.90	1.998	.13

Note. *$p < .05$, **$p < .01$.

Table 9. **Leisure attitude levels of ındividuals living in western cities by the variable of age**

	19 age and below (Group 1)		20–22 age (Group 2)		23–25 age (Group 3)		26–30 age (Group 4)		31 age and above (Group 5)			
		sd		*sd*		*sd*		*sd*		*sd*	*F*	*p*
Leisure attitude	4.20	.60	4.08	.41	4.11	.52	4.11	.57	3.50	.69	4.691	.01*
Cognitive	4.32	.51	4.23	.46	4.25	.49	4.20	.53	3.83	.81	2,224	.06
Affective	4.20	.67	4.17	.51	4.13	.56	4.20	.53	3.46	.69	5.029	.00**
Behavioural	4.08	.75	3.84	.51	3.94	.66	3.85	.70	3.22	.82	4.481	.00**

Note. *$p < .05$, **$p < .01$.

(group 5) being lower than the mean values of the individuals aged 23–25 (group 3), 20–22 (group 2) and 19 and below (group 1). In all leisure attitude dimensions, leisure attitude mean scores of the individuals at the age of 31 and above from western cities are lower than those of the individuals of the other age groups.

DISCUSSION

When the results of the study are considered, the first point to be examined and emphasized is certainly that leisure attitude differs by the region of residence. The scores of the individuals living in western cities regarding leisure attitude and its dimensions are higher than those of the individuals living in the eastern cities. Many studies, which have been carried out so far, emphasize that geographical region is an important variable affecting the leisure attitude. Individuals living in the American continent have higher cognitive, affective and behavioural attitude scores than those living in the Asian continent (Deng et al., 2005; Walker, Jackson, & Deng, 2007a; Walker, Deng, & Chapman, 2007b). On the other hand, Akgül (2011) reported that whether people living in Ankara and London reside in rural, urban or metropolitan regions have not affected their leisure attitudes but mass media might have influenced them. The results of the present study show that the city of residence has caused differentiation in the leisure attitudes even among the individuals living in different eastern cities. While leisure attitude scores do not differ from one city to another in the western cities, the scores of the residents of Tunceli and Van are clearly higher than those of the individuals living in Hakkari. This finding can be attributed to the differing educational successes of the cities. According to the data of the Turkish Statistical Institution for the year 2016 (TUIK, 2016), Hakkari ranks last in education while Tunceli ranks first. This finding can also be the reason of differentiation of leisure attitude scores both in the general evaluation and separate evaluations on western and eastern cities. The results of the present study show that groups with higher levels of education have higher leisure attitude scores when compared to those with lower levels of education. On the other hand, bearing in mind that availability of geographical conditions of East region cities for outdoor sports, individuals living in East can be motivated to do outdoor recreational activities which proofed social and physical benefits such as such as orienteering (Güzel, Yıldız, Çetinöz, & Beşikçi, 2016), rock climbing (Gallotta & Emerenziani, 2015), skiing (Müller et al., 2011) and kayaking (Loomis, 2016). In this way favored aspects of region can be used to increase leisure attitude.

Another striking finding of this study is that the age of individuals affects leisure attitudes. When two regions are considered together and western cities are taken as basis, age affects leisure attitude. On the other hand, age is not a variable affecting leisure attitudes of the individuals living in eastern cities.

This study shows that individuals aged 31 and above have lower leisure attitude scores. Beggs, Kleparski, Elkins, and Hurd (2014) reported that individuals at the age of 18–24, who take advantage of leisure participation especially for personal development, have high motivation levels while the individuals aged 25–34, who exert effort in various aspects of life, have low motivation levels, and

leisure attitudes of these groups are affected by this situation.

In this study, it was concluded from both general analysis and the analysis on the regions that leisure attitudes were not affected by sex. However, the study conducted by Ragheb and Beard (1982) on leisure attitude indicates that men have higher leisure attitude scores. On the other hand, some studies demonstrate that women have higher leisure motivation than men (Beggs et al., 2014; Fortier, Vallerand, Briere, & Provencher,1995). In agreement with these findings, Pala, Biner, Öncen, and Kargün (2015) expressed in their study that leisure attitude was not affected by sex, while Karunaanithy and Karunanithy (2014) reported that the impact of sex on leisure participation and leisure attitude cannot be ignored.

Most of the findings of this research can be explained on the basis of the leisure constraints. The evaluation of two regions together contributed to the finding that education level, city of residence and region of residence affected the leisure attitude. The leisure attitude is affected by education and age in western cities, while the city of residence affects the leisure attitude in eastern cities. Godbey, Crawford and Shen (2010) consider age and education as internal constraints and reports that the geographical region of residence should be regarded as an external constraint. External constraints are the factors affecting leisure participation and behaviour even though the internal constraints are overcome (Kim & Trail, 2010; Kim, 2009). In other words, even though such obstacles as financial difficulties or educational status are eliminated in eastern cities, structural constraints like opportunities and diversity that the region creates can influence the leisure attitudes of the individuals. Many studies conducted so far (Demirel & Harmandar, 2009; Gratton, 2000; Juniu, 2009; Kim, 2009) have revealed that socio-economic factors directly affect leisure behaviour.

Chiu and Kayat (2010) reported that motivation has a strong direct impact on leisure attitude and participation in physical leisure activities. Other studies conducted on leisure motivation and leisure attitude (Chih Mou Hsieh, 1998; Chiu, 2009; Ragheb & Tate, 1993; Watson; 1996) also revealed that leisure motivation is a variable affecting the leisure attitude.

When the results obtained from the LAS are examined, the cognitive attitude scores stand out while the behavioural dimension has a lower score than the other attitude dimensions. The study conducted by Ashby, Kottmari, and DeGraff (1999) on university students presented similar findings and shows parallelism with the findings of the present study. In the study carried out by Siegenthaler and O'Dell (2000), the mean score concerning the behavioural attitudes of the university students was lower than the mean scores of the other attitude dimensions. The affective dimension had the highest attitude score instead of the cognitive dimension. This finding can be interpreted to mean that although people have awareness concerning leisure and its use, this awareness is not transformed into leisure behaviour to the same extent.

CONCLUSION

As a conclusion, the findings of the present study, which examined the leisure attitude from the perspective of individuals living in eastern and western cities, shows that the region of residence has an impact on the leisure attitude. It also indicates that, along with the region of residence, such related variables as the city of residence and education status affect the leisure attitude. Therefore, the leisure attitude is influenced by the region of residence, city of residence, education and age. In the light of such results, it can be stated that individuals live in East region of Turkey have leisure inequality which caused by economic, social and cultural differences of region when they are compared with individuals live in East region of Turkey. This determination is a conclusion of very high concern which should be considered by government, voluntary organizations and market system service providers.

Limitations and Recommendations. This study is restricted to the individuals who live in İstanbul, Ankara, Eskişehir, Van, Tunceli and Hakkari and were selected through convenience sampling method. Also, regional division was made only on the basis of west and east. In future studies, a broader sample, constituted through probabilistic sampling methods and with the potential of representing the seven geographical regions, is recommended. It is recommended that population distribution should be considered according cities because it is one of the limitation of this study. It is also recommended that the relations of the leisure attitude to different independent variables are considered and tested using structural models to be developed.

REFERENCES

Akgül, B. (2011). *Farklı kültürlerdeki bireylerin boş zaman aktivitelerine yönelik tutumlarının değerlendirilmesi: Ankara- Londra örneği*, Gazi Üniversitesi, Sağlık Bilimleri Enstitüsü Beden Eğitimi ve Spor Anabilim Dalı, Yayınlanmamış Doktora Tezi, Ankara.

Akgül, B. M., & ve Gürbüz, B. (2010). *Boş Zaman Tutum Ölçeği: Geçerlik ve Güvenirlik Çalışması*. 11. Uluslar arası Spor Bilimleri Kongresi, Antalya.

Allport, G. (1967). Attitudes. In M. Fishebin (Ed.), *Readings in attitude theory and measurement*. New York: John Wiley and Sons.

Alpar, R. (2010). *Uygulamalı çok değişkenli istatistiksel yöntemler*. Detay Yayıncılık, Ankara.

Anderson, L. W. (1988). Attitudes and their measurement. In J. P. Keeves (Ed.), *Educational research, methodology and measurement: An international handbook.* New York: Pergamon Press.

Ashby, J. S., Kottmari, T., & DeGraaf, D. (1999). Leisure satisfaction and attitudes of perfectionists: implications for therapeutic recreation professionals. *Therapeutic Recreation Journal*, *2*, 142–151.

Augostinos, M., Walker, I. & Donaghue, N. (2006*). Social cognition*. Sage: London.

Bagozzi, R. P. (1978). The construct validity of the affective, behavioral, and cognitive components of attitude by analysis of covariance structures. *Multivariate Behavioral Research*, *13*(1), 9–31.

Beggs, B., Kleparski, T., Elkins, D., & Hurd, A. (2014). Leisure motivation of older adults in relation to other adult life stages. *Activities, Adaptation & Aging*, *38*(3), 175–187.

Chih-Mou Hsieh. (1998). *Leisure attitudes, motivation, participation, and satisfaction: Test on a model of leisure behaviour*. Unpublished doctoral thesis, Indiana University.

Chiu, L. K., & Kayat, K. (2010). Psychological determinants of leisure time physical activity participation among public university students in Malaysia. *Ajtlhe, 2*(2), 33–45.

Chiu, L. K. (2009). University students' attitude, self-efficacy and motivation regarding leisure time physical participation. *Jurnal Pendidik dan Pendidikan*, *Jil. 24*, 1–15.

Davis, K. E., Jackson, K. L., Kronenfeld, J. J., & Blair, S. N. (1984). Intent to participation in worksite health promotion activities: A model of risk factors and psycholosocial variables. *Health Education Quarterly*, *11*, 361–377.

Demirel, M., & Harmandar, D. (2009). Üniversite öğrencilerinin rekreasyonel etkinliklere katılımlarında engel oluşturabilecek faktörlerin belirlenmesi. *Uluslararası İnsan Bilimleri Dergisi*, *6*(1), 839–846.

Deng, J., Walker, G. J., & Swinnerton, G. (2005). Leisure attitudes: A comparison between Chinese in Canada and Anglo-Canadians. *Leisure/Loisir, 29*, 239–273.

Eiser, J. R., & van der Pligt, J. (1988). Attitudes and decisions. In P. Herriot (Ed.), *New essential psychology*. New York: Routledge.

Ellis, G. D., & Witt, P. A. (1994). Perceived freedom in leisure and satisfaction: Exploring the factor structure of the perceived freedom components of the leisure diagnostic battery. *Leisure Sciences*, *16*, 259–270.

Fortier, M. S., Vallerand, R. J., Briere, N. M., & Provencher, P. J. (1995). Competitive and recreational sport structures and gender: a test of their relationship with sport motivation. *International Journal of Sport Psychology*, *26*, 24–39.

Gallotta, M. C. & Emerenziani, C. P. (2015). Psychophysical benefits of rock-climbing activity. *Perceptual & Motor Skills: Exercise & Sport, 121,* 3, 675–689.

Godbey, G., Crawford, D., & Shen, S. (2010). Assessing hierarchical leisure constraints theory after two decades. *Journal of Leisure Research*, *42*(1), 111–134.

Gonen, A., & Griberg, K. (2016). Academic students' attitudes toward students with learning disabilities. *Journal of Education and Training Studies, 4*(9), 240–246.

Gratton, C. (2000). *Economics of sport and recreation*. London, U. K.: Sport Press.

Güzel, P., Yıldız, K., Çetinöz, F. & Beşikçi, T. (2016). *Investigating The Impact of Outdoor Camp on Athletes: Orienteering Example*. 14th International Sport Sciences Congress, 01st–04th November, Belek-Antalya (p. 298).

Hagger, M. S., Chatzisarantis, N., & Biddle, S. J. H. (2001). The influence of self efficacy and past behaviour on the physical activity intentions of young people. *Journal of Sport Science*, *19*, 711–725. doi: 10.1007/s10212-012-0118-5

Hilgard, E. R., & Atkinson, R. C. (1979). *Introduction to psychology*. Australia: Harcourt Publishers Group Pty. Ltd.

Hogg, M. A., & Vaughan, G. M. (1995). *Social psychology: An introduction*. London: Prentice Hall/ Harvester Wheatsheaf.

Huang, N. T. N., Chiu, L. J., & Hong, J. C. (2016). Relationship among students' problem-solving attitude, perceived value, behavioral attitude, and ıntention to participate in a science and technology contest. *International Journal of Science and Mathematic Education*, 14:1419–1435. doı:10.1007/s10763-015-9665-y

Iso-Ahola, S. E. (1980). *The social psychology of leisure and recreation*. Dubuque, IA: Brown.

Juniu, S. (2009). The transformation of leisure. *Leisure/ Loisir*, *33*(2), 463–478.

Karunaanithy K, & Karunanithy M. (2014). Leisure activities and attitudes of advanced level students: a study based on urban schools in Trincomalee District. *European Journal of Business and Management*, *6*(7).

Kim, J. (2009). Three-factor model and pyramid model of leisure constraints. *Journal of Travel and Tourism Research*, 123–138.

Kim, S., Sung, J., Park, J., & Dıttmore, S. W. (2015). The relationship among leisure attitude, satisfaction, and psychological wellbeing for college students. *Journal of Physical Education and Sport*, *15*(1), 70–76.

Kim, Y. K., & Trail, G. (2010). Constraints and motivators: A new model to explain sport consumer behavior. *Journal of Sport Management*, *24*, 190–210.

Kraiger, K., Ford, J. K., & Salas, E. (1993). Application of cognitive, skill-based, and affective theories of learning outcomes to new methods of training evaluation. *Journal of Applied Psychology*, *78*(2), 311–328.

Loomis, J. (2016). The role of economic benefit measures in recreation planning and management. *Journal of Park and Recreation Administration, Winter, 34*(4), 106–108.

Mannell, R. C., & Kleiber, D. A. (1997). *A social psychology of leisure*. State College, PA: Venture.

Müller, E., Gimpl, M. Poetzelsberger, B. Finkenzeller, T., & Scheiber P. (2011). Salzburg Skiing for the Elderly Study: study design and intervention – health benefit of alpine skiing for elderly. *Scandinavian Journal of Medicine and Science in Sports*, *21 (Suppl. 1)*, 1–8.

Ostrom, T. M. (1969). The relationship between the affective, behavioral, and cognitive components of attitude. *Journal of Experimental Social Psychology*, *5*(1), 13–30.

Pala A., Biner M., Öncen S., & Kargün M. (2015). Analysis of the leisure attitudes of the football tennis players. *International Sports, Exercise and Training Journal*, *1*(2), 77–82.

Ragheb, M. G., & Beard, J. G. (1982). Measuring leisure attitude. *Journal of Leisure Research, 2,* 155–167.

Ragheb, M. G., & Tate, R. L. (1993). A behavioural model of leisure participation, based on leisure attitude, motivation and satisfaction. *Leisure Studies*, *12*, 61–70.

Robbins, S. (1994). Örgütsel davranışın temelleri (Çev: Sevgi Ayşe Öztürk) Eskişehir ETAM Basım Yayın.

Siegenthaler, K. L. & O'Dell, I. (2000). Leisure attitude, leisure satisfaction, and perceived freedom in leisure within family dyads. *Leisure Sciences*, *22*, 281–296.

Teixeira, A., & Freire, T. (2013). The leisure attitude scale: psychometric properties of a short version for adolescents and young adults. *Leisure/Loisir*, *37*(1), 57–67.

Türkiye İstatistik Kurumu (TUİK). (2016). 2015–2016 *yıllarına ilişkin, illere göre yaşam endeksi istatistikleri.* Retrieved from http://www.tuik.gov.tr/PreHaberBultenleri.do?id=24561

Uzun, N., & Sağlam, N. (2006). Orta öğretim öğrencileri için çevresel tutum ölçeği geliştirme ve geçerliliği. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi* (H.U. Journal of Education), *30*, 240–250.

Walker, G. J., Deng, J., & Chapman, R. (2007b). Leisure attitudes: A follow-up study comparing Canadians, Chinese in Canada, and Mainland Chinese. *World Leisure Journal, 49*, 207–215.

Walker, G. J., Jackson, E. L., & Deng, J. (2007a). Culture and leisure constraints: A comparison of Canadian and Mainland Chinese university students. *Journal of Leisure Research, 39*, 567–590.

Watson, J. F. (1996). *The impact of leisure attitude and motivation on the physical recreation/leisure participation of college students*. Unpublished doctoral thesis, Purdue University.

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Corresponding author **Süleyman Munusturlar**
Anadolu Universitesi
Spor Bilimleri Fakultesi
Iki Eylul Kampusu, 26555, Tepebasi, Eskisehir
Turkey
Tel. 0090 536 736 17 31
Email suleymanmunusturlar@anadolu.edu.tr
suleyman.munusturlar@gmail.com

EFFECT OF 2-DAY VERY LOW-CALORIE DIET ON PERCEIVED STRESS, COGNITIVE FUNCTIONS AND MOOD IN OVERWEIGHT AND OBESE MEN

Rima Solianik, Artūras Sujeta, Agnė Čekanauskaitė, Mantė Januševičiūtė
Lithuanian Sports University, Kaunas, Lithuania

ABSTRACT

Background. It is well established that intermittent long-term fasting, during which a very low-calorie diet is allowed 2-days a week, improves weight loss, mood and cognitive functions. However, we are not aware of any previous studies on the effect of a 2-day very low-calorie diet on brain functioning. Thus, the purpose of this study was to determine the effect of 2-day very low-calorie diet on perceived stress, cognitive functions and mood in overweight and obese men.

Methods. Nine young adult men (body mass index (BMI) from 26.7 to 32.1 kg/m^2) completed a 2-days very low-calorie diet (536 kcal) and 2-day usual diet program in a randomized order. Perceived stress (subjective stress rating and cardiovascular response), cognitive performance, and mood were evaluated before and after both diets.

Results. A subjective stress rating in relation to the very low-calorie diet condition was 37.4 ± 18.7. There were no detectable effects of acute calorie restriction on cardiovascular response (heart rate and blood pressure) and on any aspect of cognitive performance. Meanwhile, sense of vigor increased ($p < .05$) and negatively correlated with BMI ($r = -.780$, $p < .05$).

Conclusions. The two-day very low-calorie diet evoked a mild stress, which did not affect sympathetic nervous system response and cognitive performance in overweight and obese men. Furthermore, very low-calorie diet increased vigor, which was strongly associated with decreased body mass index.

Keywords: adiposity, cognitive performance, body mass index, fasting, heart rate.

INTRODUCTION

According to the World Health Organization (WHO, 2016), the obesity epidemic has more than doubled since 1980. In 2014, approximately 13% of the world's adult population were obese. Over 1.9 billion adults (18+ years) were overweight, with more than 600 million being obese (WHO, 2016).

With the increasing obesity epidemic, the need for effective and safe approaches to weight loss occurs. One of the examples is widely known 5:2 intermittent fasting, in the case of which a very low-calorie diet is allowed 2 days a week and "normal" eating is resumed on non-diet days (Johnstone, 2015). It is well known that long-term fasting improves health, reduces risks of many chronic diseases, cognitive functions and mood (Longo & Mattson, 2014. However, we are not aware of any previous studies on the effect of a 2-day very low-calorie diet on cognitive functions and mood in overweight and obese men.

It was observed that low-calorie dieting increases the cortisol level and perceived stress (Tomiyama et al., 2010); therefore, a critical transition period of 3–6 weeks during which brain adapts to intermittent fasting is needed (Longo & Mattson, 2014). Thus, it can be expected that acute calorie restriction during first two days will lead to stress which will adversely affect cognitive functions and mood. Therefore, the aim of this study was to estimate the effect of 2-day very low-calorie diet on perceived stress, cognitive functions and mood in overweight and obese men.

METHODS

Research participants. Ten men were assessed for eligibility. The inclusion criteria were as follows: young (aged 18–35 years), overweight or mildly obese (body mass index (BMI) 25–34.9 kg/m^2) men. Participants were excluded if they were in a weight-loss program, smokers, regularly used medications, had a history of acute or chronic diseases, eating disorders, and those who had previously suffered a head trauma. In total, 9 men aged 28.7 ± 5.1 years met the inclusion criteria and agreed to participate in this study. Their physical characteristics are presented in Table 1. Written informed consent was obtained from all participants. All procedures were conducted according to the principles of the Declaration of Helsinki.

Procedures. Four days before the experiment, the participants were familiarized with the laboratory setting and with the experimental procedures used for cognitive function evaluation. During familiarization, the participants were instructed to refrain from ingesting alcoholic beverages, caffeine, and from intense physical and mental work for at least 48 h before the experimental measurements.

During the second and third visits, participants underwent either an experimental 2-day very low calorie diet (536 kcal/day) or a control usual diet in a randomized order, at least 2 weeks apart. Both experiments began at 8:00 a.m. The participants arrived at the laboratory after overnight fasting (8–12 h) to complete baseline measurements. On arrival at the laboratory, anthropometric measurements were performed. Then the participants were asked to rest in a sitting position for 10 min in a quiet room. Subsequently, control measurements of resting heart rate (HR), blood pressure (BP) and glucose level were performed, and the participants rated their mood. Then, the participants took their seats at a table in a well-lit room, and cognitive functions were evaluated. Afterwards, the participants rested 1 day before starting the 2-day very low-calorie diet or 2-day usual diet. During usual diet participants were requested to make no changes in their daily diet. Meanwhile, during the very low-calorie diet they were given two sachets per day of instant oatmeal porridge of strawberries taste ACTIVUS (Kauno grūdai, Lithuania) and unlimited amounts of water. Each oatmeal porridge contained 268 kilocalories: 48 g carbohydrates, 9.7 g sugars, 7.6 g protein, 6.1 g fat, 5.4 g dietary fibers, 1.6 g saturated fatty acids, and 0.57 g salt. Both diets were followed by the performance of experimental measurements in the same order as described before dieting. In addition, the participants rated their stress level in relation to the diet.

Measurements. *Anthropometric evaluation.* The participant's weight (TBF-300 body composition scale, Tanita, UK) and height (Leicester Height Meter, Invicta Plastics, UK) were estimated while the subjects were wearing only underwear and barefoot. BMI was calculated as body weight divided by squared height.

Evaluation of stress level. Subjective stress rating in relation to calorie restriction was assessed on a visual analog scale ranging from 0 ("no stress") to 100 ("the highest stress imaginable") on a 10 cm long horizontal line.

Resting HR was recorded while seated using a HR monitor (S-625X, Polar Electro, Finland) affixed to the chest. In addition, indirect arterial BP measurement was taken from the upper arm using a sphygmomanometer (Sanaphon, Germany) and a standard-size arm cuff.

Evaluation of glucose level. The blood glucose level was determined in capillary blood samples using a validated CardioCheck PA analyzer (Polymer Technology Systems Inc, USA) via finger-prick test (Panz, Raal, Paiker, & Immelman, 2005).

Evaluation of mood state. The Brunel Mood Scale was used to assess current mood state (Terry, Lane, & Fogarty, 2003). This questionnaire contains of 24 items divided into six subscales: anger, confusion, depression, fatigue, tension, and vigor. The items are answered on a five-point scale ranging from 0 ("not at all") to 4 ("extremely"), and each subscale, with four relevant items, are summed to produce a raw score in the range of 0 to 16.

Evaluation of cognitive function. The computerized automated neuropsychological assessment metric Version 4 (ANAM-4; Vista Life Sciences, USA) was used to assess simple motor reaction time (*Simple Reaction Time Task*) (Woodhouse et al., 2013; Reeves, Winter, Bleiberg, & Kane, 2007), mental flexibility (*Two-Choice Reaction Time Task*) (Solianik, Sujeta, Terentjevienė, & Skurvydas, 2016; Reeves, Winter, Bleiberg, & Kane, 2007), inhibitory control (Go/No-Go Task) (Diamond, 2013), verbal working memory (*Memory Search Task*) (Reeves, Winter,

Bleiberg, & Kane, 2007), and spatial processing and visuospatial working memory (*Matching to Sample Task*) (Vincent, Roebuck-Spencer, Gilliland, & Schlegel, 2012). During Simple Reaction Time Task, simple stimulus "*" was presented on the screen and the participant was instructed to respond as quickly as possible by pressing the designated button each time the stimuli was presented. During *Two-Choice Reaction Time Task*, one of two stimuli was presented on the screen ("*" or "o") and the participant was instructed to respond as quickly as possible by pressing the designated button for each stimulus. During *Go/No-Go Task*, the participant was instructed to respond as quickly as possible to an "x" on the screen by pressing the designated button each time the stimulus appeared; when an "o" appeared, the participant was required to withhold his response. During *Memory Search Task*, a string of six letters was presented for memorization. The participant was instructed to press the designated button once he had memorized the letter string; then, it disappeared from view and individual letters were presented one at a time. The participant was instructed to indicate as quickly as possible if the letter belongs to the memorized set and press designated button for memory set letters and another designated button for letters not included in the memory set. During *Matching to Sample Task*, a pattern produced by eight shaded cells in a 4 × 4 sample grid was presented for 2 s and then disappeared. After 5 s, two patterns are presented side-by-side and the participant was instructed to indicate as quickly as possible by pressing the designated button for the grid that matches the previously shown sample.

Statistical analyses. Data are reported as means ± standard deviations. The data were tested for normal distribution using the Kolmogorov–Smirnov test, and all data were found to be normally distributed. To assess the effects of diets on variables measured (i.e. anthropometric characteristics, HR, BP, glucose level, mood and cognitive functions), and compare data between the usual diet results with those of the very low-calorie diet, the parametric paired-sample t-tests were performed. The magnitudes of the 2-day very low-calorie diet evoked changes were estimated by Cohen's d effect sizes. Pearson correlation coefficients (r) were used to identify relationships between changes (Δ = value before the very low-calorie diet – value after this type of diet) in mood and anthropometric measurements. The level of significance was set at $p < .05$. If a significant time effect was found, the statistical power (SP) was calculated. All statistical analyses were performed using SPSS (version 21.0; IBM Corp., USA).

RESULTS

Effect of a very low-calorie diet on anthropometric measurements. The anthropometric characteristics of the participants in this study are presented in Table 1. The very low-calorie diet decreased weight ($p = .001$, SP = 99.3%, ES = 0.156) and BMI ($p < .001$, SP = 100.0%, ES = 0.248). As expected, the usual diet did not induce any changes in anthropometric characteristics. Lower weight ($p = .003$) and lower BMI ($p = .002$) were observed after very low-calorie diet compared with the usual diet.

Effect of a very low-calorie diet on stress-related measurements. A subjective stress rating in relation to the very low-calorie diet condition was 37.4 ± 18.7. As presented in Table 2, the very low-calorie diet had no effect on HR and BP. Comparison of the diets showed no significant differences in stress-related markers.

Effect of a very low-calorie diet on glucose level. As presented in the Figure, the very low-calorie diet had no effect on glucose level. Comparison of the diets showed no significant differences in glucose level.

Table 1. **Effect of a 2-day very low-calorie diet on anthropometric characteristics of the participants**

	Usual diet		Very low-calorie diet	
	Before	After	Before	After
Mass (kg)	98.4 (12.5)	98.1 (12.4)	97.2 (12.0)	95.3 (11.4)*#
BMI (kg/m$^{2)}$	28.3 (2.3)	28.2 (2.2)	28.0 (2.2)	27.4 (2.1)*#

Notes. Data are presented as mean (standard deviation). BMI, body mass index; *$p < .05$, compared with before; #$p < .05$, compared with usual diet.

Effect of a very low-calorie diet on mood. The mood state of the participants is presented in Table 3. The very low-calorie diet significantly increased vigor (p = .041, SP = 92.6%, ES = 0.931), whereas other mood states were not affected. The vigor negatively correlated with BMI (r = −0.780, p = .023) and tended to negatively correlate with the body weight (r = −0.685, p = .061). As expected, the usual diet did not induce any changes in the mood of the participants. Comparison of the diets showed greater baseline vigor (p = .007) before the usual diet.

Effect of a very low-calorie diet on cognitive performance. As presented in Table 4, the very low-calorie diet had no effect on cognitive performance. Comparison of the diets showed no significant differences in cognitive performance.

	Usual diet		Very low-calorie diet	
	Before	After	Before	After
Heart rate (bpm)	64.0 (4.3)	64.9 (4.9)	71.0 (9.5)	65.7 (7.6)
Systolic BP (mmHg)	115.7 (5.6)	112.9 (3.6)	117.9 (7.0)	113.6 (6.9)
Diastolic BP (mmHg)	71.4 (5.8)	70.7 (5.6)	72.1 (3.6)	69.3 (4.2)

Table 2. **Effect of a 2-day very low-calorie diet on heart rate and blood pressure**

Note. Data are presented as mean (standard deviation). HR, heart rate; BP, blood pressure.

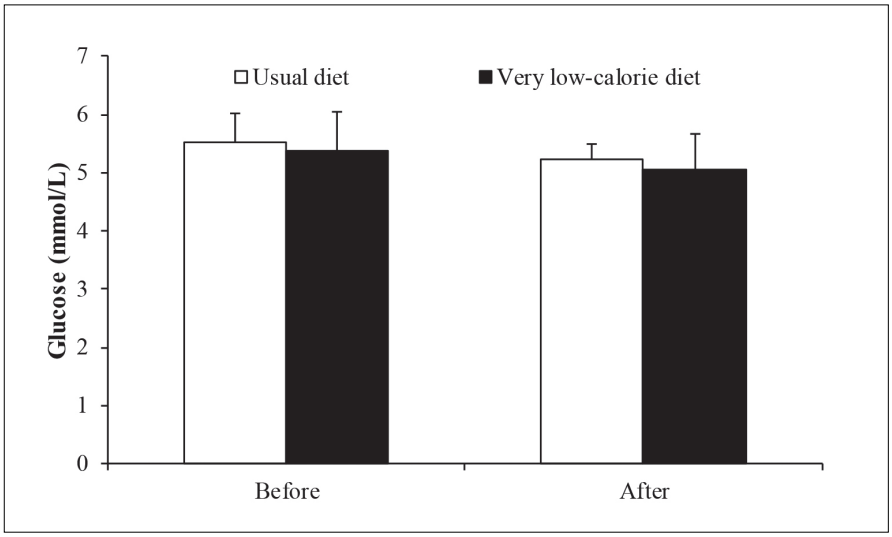

Figure. **Effect of a 2-day very low-calorie diet on glucose levels**

	Usual diet		Very low-calorie diet	
	Before	After	Before	After
Anger	0.3 (0.2)	0.6 (0.9)	1.4 (2.0)	1.4 (1.4)
Confusion	1.9 (2.4)	0.6 (0.7)	1.9 (2.8)	0.7 (1.2)
Depression	1.4 (3.1)	0.1 (0.3)	2.3 (3.1)	1.4 (1.7)
Fatigue	3.6 (2.1)	4.6 (3.3)	5.9 (3.9)	3.7 (2.9)
Tension	2.1 (1.8)	1.7 (1.3)	1.9 (1.5)	2.1 (2.2)
Vigor	10.2 (1.9)	9.0 (1.1)	6.3 (3.2)$^{\#}$	9.4 (3.5)*

Table 3. **Effect of a 2-day very low-calorie diet on moo**

Notes. Data are presented as mean (standard deviation). *p < .05, compared with before; $^{\#}p$ < .05, compared with usual diet.

Table 4. **Effect of a 2-day very low-calorie diet on cognitive performance**

	Usual diet		Very low-calorie diet	
	Before	**After**	**Before**	**After**
Simple Reaction Time Task				
Reaction time (ms)	291.7 (13.5)	286.3 (11.1)	296.2 (23.9)	281.6 (24.8)
Two-Choice Reaction Time Task				
Reaction time (ms) Accuracy (%)	453.4 (37.7) 93.7 (6.8)	448.3 (37.5) 95.5 (2.7)	464.0 (79.7) 94.6 (3.1)	444.9 (46.2) 94.0 (4.0)
Go/No-Go Task				
Reaction time (ms) Accuracy (%)	335.2 (18.3) 95.7 (1.9)	335.7 (20.1) 95.8 (2.1)	333.3 (9.5) 95.7 (2.8)	331.3 (10.7) 95.5 (2.0)
Memory Search Task				
Reaction time (ms) Accuracy (%)	1030.9 (183.9) 88.9 (8.3)	903.4 (124.8) 96.3 (2.7)	849.0 (129.4) 92.8 (11.7)	944.4 (134.7) 93.8 (4/2)
Matching to Sample Task				
Reaction time (ms) Accuracy (%)	1572.1 (363.8) 95.6 (4.2)	1570.0 (383.9) 95.5 (4.1)	1527.3 (308.4) 95.1 (4.6)	1652.5 (476.9) 98.8 (2.3)

Note. Data are presented as mean (standard deviation).

DISCUSSION

The aim of the present study was to determine the effect of 2-day very low-calorie diet on perceived stress, cognitive functions and mood in overweight and obese men. The participants indicated that they sensed mild stress with no effect on sympathetic nervous system markers (HR and BP) and cognitive performance. The 2-day very low-calorie diet improved mood, specifically this improvement was observed in sensing higher vigor, which was associated with decreased BMI.

The very low-calorie diet evoked a mild stress, which was not severe enough to affect physiological stress markers in overweight and obese men. In contrast to complete fasting (Andersson, Wallin, Hedner, Ahlberg, & Andersson, 1988; Solianik, Sujeta, Terentjevienė, & Skurvydas, 2016), the 2-day very low-calorie diet did not affect HR and BP responses. Under conditions of complete fasting, ketones are produced in response to a low glucose level (Cunnane, et al., 2011) and may affect the sympathetic nervous system response (Kimura et al., 2011). It is worth mentioning that under conditions of this study, in contrast to complete (Solianik, Sujeta, Terentjevienė, & Skurvydas, 2016) or near complete calorie restriction (Lieberman et al., 2008), in the current study glucose level was not changed in overweight and obese men.

In contrast to our expectations, the very low-calorie diet did not affect cognitive performance in overweight and obese men. It is well established that glucose level (Mergenthaler, Lindauer, Dienel, & Meisel, 2013) and perceived stress (Sandi, 2013) play an important role in brain functioning. However, as previously mentioned, the glucose level was not affected, and only a mild stress not affecting any sympathetic response was induced.

Contrary to our expectations, we observed that the very low calorie-diet increased the sense of vigor in overweight and obese men. Lieberman et al. (2008) reported that mood was not affected in healthy humans by a 2-day near complete (313

kcal) calorie restriction, meanwhile a complete calorie restriction deteriorated the mood (Solianik, Sujeta, Terentjevienė, & Skurvydas, 2016; Uher, Treasure, Heining, Brammer, & Campbell, 2006). Interestingly, a strong negative relationship was observed between BMI and vigor, and a tendency of moderate negative relationship between weight and vigor was observed as well. It is well established that weight loss has significant effect on positive changes in mood, which is related with active participation in a weight loss program (Wing, Epstein, Marcus, & Kupfer, 1984). Lieberman et al. (2008) suggested that the double-blind, placebo-controlled procedures can prevent subjective expectations and changes in mood. It might be suggested that the expectations about very low-calorie diet increased the sense of vigor; thus, in future the double-blind and placebo-controlled procedures should be carried out.

It is important to note that differences between men and women may exist (Solianik, Sujeta, Terentjevienė, & Skurvydas, 2016), thus, our results can only be generalized to men. It remains to be established whether the conclusions of this study also pertain to overweight and obese women.

CONCLUSIONS

To our knowledge, this is the first study to examine the effect of a 2-day very low-calorie diet on perceived stress, cognitive functions and mood in overweight and obese men. Our study showed that a short-term very low-calorie diet resulted in a mild stress, which did not affect sympathetic nervous system response and cognitive response. Furthermore, the increased vigor occurring alongside decreased body mass index was established.

Competing interests. The authors declare that they have no competing interests.

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REFERENCES

Andersson, B., Wallin, G., Hedner, T., Ahlberg, A.-C., & Andersson, O. (1988). Acute effects of short-term fasting on blood pressure, circulating noradrenaline and efferent sympathetic nerve activity. *Acta Medica Scandinavica, 223*(6), 485–490. doi:10.1111/j.0954-6820.1988.tb17685.x

Cunnane, S., Nugent, S., Roy, M., Courchesne-Loyer, A., Croteau, E., Tremblay, S., . . . Rapoport, S. (2011). Brain fuel metabolism, aging and Alzheimers disease. *Nutrition, 27*(1), 3–20. doi:10.1016/j.nut.2010.07.021

Diamond, A. (2013). Executive Functions. *Annual Review of Psychology, 64*, 135–168. doi:10.1146/annurev-psych-113011-143750

Johnstone, A. (2015). Fasting for weight loss: An effective strategy or latest dieting trend? *International Journal of Obesity, 39*(5), 727–733. doi:10.1038/ijo.2014.214

Kimura, I., Inoue, D., Maeda, T., Hara, T., Ichimura, A., Miyauchi, S., . . . Tsujimoto, G. (2011). Short-chain fatty acids and ketones directly regulate sympathetic nervous system via G protein-coupled receptor 41 (GPR41). *Proceedings of the National Academy of Sciences of the United States of America, 108*(19), 8030–8035. doi:10.1073/pnas.1016088108

Lieberman, H., Caruso, C., Niro, P., Adam, G., Kellogg, M., Nindl, B., & Kramer, F. (2008). A double-blind, placebo-controlled test of 2D of calorie deprivation: Effects on cognition, activity, sleep, and interstitial glucose concentrations. *The American Journal of Clinical Nutrition, 88*(3), 667–676.

Longo, V., & Mattson, M. (2014). Fasting: Molecular mechanisms and clinical applications. *Cell Metabolism, 19*(2), 181–192. doi:10.1016/j.cmet.2013.12.008

Mergenthaler, P., Lindauer, U., Dienel, G., & Meisel, A. (2013). Sugar for the brain: The role of glucose in physiological and pathological brain function. *Trends in Neurosciences, 36*(10), 587–597. doi:10.1016/j.tins.2013.07.001

Panz, V., Raal, F., Paiker, J., & Immelman, R. M. (2005). Performance of the CardioChek PA and Cholestech LDX point-of-care analysers compared to clinical diagnostic laboratory methods for the measurement of lipids. *Cardiovascular Journal of Africa, 16*(2), 112–111.

Reeves, D., Winter, K., Bleiberg, J., & Kane, R. (2007). ANAM® Genogram: Historical perspectives, description, and current endeavors. *Archives of Clinical Neuropsychology, 22*(Suppl. 1), 15–37. doi:10.1016/j.acn.2006.10.013

Sandi, C. (2013). Stress and cognition. *Wiley Interdisciplinary Reviews: Cognitive Science, 4*(3), 245–261. doi:10.1002/wcs.1222

Solianik, R., Sujeta, A., Terentjevienė, A., & Skurvydas, A. (2016). Effect of 48 h fasting on autonomic function, brain activity, cognition, and mood in amateur weight lifters. *BioMed Research International,* 1503956. doi:10.1155/2016/1503956

Terry, P., Lane, A., & Fogarty, G. (2003). Construct validity of the Profile of Mood States – Adolescents for use with adults. *Psychology of Sport and Exercise, 4*(2), 125–139. doi:0.1016/S1469-0292(01)00035-8

Tomiyama, A., Mann, T., Vinas, D., Hunger, J., DeJager, J., & Taylor, S. (2010). Low calorie dieting increases cortisol. *Psychosomatic Medicine, 72*(4), 357–364. doi:10.1097/PSY.0b013e3181d9523c

Uher, R., Treasure, J., Heining, M., Brammer, M., & Campbell, I. (2006). Cerebral processing of food-related stimuli: Effects of fasting and gender. *Behavioural Brain Research, 169*(1), 111–119. doi:10.1016/j.bbr.2005.12.008

Vincent, A., Roebuck-Spencer, T., Gilliland, K., & Schlegel, R. (2012). Automated Neuropsychological Assessment Metrics (v4) Traumatic Brain Injury Battery: Military normative data. *Military Medicine, 177*(3), 256–269. doi:10.7205/MILMED-D-11-00289

Wing, R., Epstein, L., Marcus, M., & Kupfer, D. (1984). Mood changes in behavioral weight loss programs. *Journal of Psychosomatic Research, 28*(3), 189–196. doi:10.1016/0022-3999(84)90019-9

Woodhouse, J., Heyanka, D., Scott, J., Vincent, A., Roebuck-Spencer, T., Domboski-Davidson, K., . . . Adams, R. (2013). Efficacy of the ANAM General Neuropsychological Screening Battery (ANAM GNS) for detecting neurocognitive impairment in a mixed clinical sample. *Clinical Neuropsychologist, 27*(3), 376–385. doi:10.1080/13854046.2012.762427

World Health Organization. (2016). *Obesity and overweight fact sheet.* Retrieved from http://www.who.int/mediacentre/factsheets/fs311/en/

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Corresponding author **Rima Solianik**
Institute of Sports Science and Innovations
Lithuanian Sports University
Sporto str. 6, Kaunas LT-44221
Lithuania
Email rima.solianik@lsu.lt

INVESTIGATION OF CONSUMER ATTITUDES FROM THE PERSPECTIVE OF CONSUMER BASED BRAND EQUITY ON TRACKSUIT BRANDS

Yavuz Yıldız, Alper Kinden
Celal Bayar University, Manisa, Turkey

ABSTRACT

Background. Brand equity has a positive impact on consumers' selection of products and services, their perception, purchasing intentions, their willingness to pay more for brands. Brand equity is designed to reflect the real value from the perspective of consumer that a brand name holds for the products and services. Measuring brand equity is important because brands are believed to be strong influencers of business outcomes, such as sales and market share. The aim of this study was to describe the brand equity of tracksuits and investigate the purchasing behaviours of the tracksuit consumers.

Methods. The research sample consisted of 250 athletes who were selected via random sampling method. "Consumer-Based Brand Equity Scale", developed by Vazquez, del Rio, and Iglesias (2002), was implemented in order to measure consumer-based brand equity with regard to tracksuit brands.

Results. Results of the study showed that the consumer based brand equity did not differ by gender, age, tracksuit usage purpose, tracksuit buying timing. However, it was found that the consumer based brand equity was significantly different in the number of tracksuits owned and the amount of payment.

Conclusion. High brand equity brings the willingness to pay more for that brand. Consequently, it can be suggested that high level of consumer based brand equity enhances the amount of purchases and willingness to pay more. Although there are many studies on the brand equity in sports, such as shoes and teams, we have found no research on tracksuits. This research focuses on tracksuits' brand equity. The results of this research contribute to sports marketing literature.

Keywords: sport, sports marketing, brand equity, tracksuit.

INTRODUCTION

Differences among products have diminished significantly and almost become non-existent due to the repercussions of fierce competitive environment. Thus, brands and branding studies have come to the fore since product-related features have lost their significance in marketing practices. In the same vein, brand management has been in the limelight as a result of endeavours to enhance efficiency and profitability (Aktuğlu, 2008).

Brands are appreciable assets which contribute to the reputation of products and enterprises while ensuring customer satisfaction, competitive advantage and willingness to pay more if managed effectively. According to Tek and Özgül (2005), brands bring concrete benefits to enterprises such as legal protection, differentiation from rivals and publicity of products. Moreover, brands allow products to take on identity, increase competitive power and prevent price competition. Farquhar (1989) defines products as concrete assets with functional benefits such as toothpaste, insurance policy or a car. Brand is a name, symbol, design or sign increasing the value of a product beyond its functional benefits. From this perspective, a brand has added value for its enterprise, for the

customers in commercial terms. Therefore, brands are potent assets which require vigilant handling and management (Kotler, Wong, Saunders, & Armstrong, 2005). Successful brands provide a very strong link between the rational and emotional needs of consumers and what they offer as brand values (de Chernatony & Riley, 1998). Successful brands offer ease of operation through brand and line extension. Consumers transfer their positive image and experience of a specific brand to other products of the same brand through brand and line extension (Ambler & Styles, 1996).

Brand equity is one of the most popular topics in marketing. Creating strong brand equity has been mandatory for many enterprises as it brings about many marketing superiorities and reinforces competitive power. Brand equity entails the value that emerges when a product bearing a brand name is compared with an equivalent product without a brand name (Aaker, 1991). Brand equity can be evaluated in two ways as financial-based and consumer-based. Brand equity can be taken as attitudes, awareness, image and knowledge from the perspective of consumers or as price, market share, revenue and cash flow from the financial window (Ailawadi, Lehmann & Neslin, 1991). Brand equity indicates what a brand signifies for a company. Consumer-based brand value depends on brand owners (or potential owners) in different ways because different owners may attain more or less of the potential value of the brand depending on their varying capabilities to strengthen brand equity. The market value of a brand is the sale or replacement value of a brand and is under the strong influence of consumer-based brand equity. Besides, consumer-based brand equity plays more of a positive role in brand acceptance (Raggio & Leone, 2007). Even though dimensions of brand equity are handled in different ways, other dimensions such as brand awareness, associations, perceived quality, brand loyalty, reputation and brand power are also taken into heed. Brand equity is the culmination of the interplay between these dimensions, hence proves to be valid both for the company and the customers. Moreover, equity created for customers has a direct contribution to the company (Yoo, Donthu, & Lee, 2000).

According to Keller (1993), who conceptualizes consumer-based brand equity as brand knowledge, brand knowledge has two components which are brand awareness and brand image. Brand awareness pertains to recognition and recall of a brand whereas brand image has to do with associations of customers on a particular brand, their attitudes and benefits of the brand (functional, experimental and symbolic). When it comes to Vazquez et al. (2002), they defined consumer-based brand equity as the entirety of benefits including functional and symbolic ones that could accrue as a result of using a particular brand. For the marketing perspective, functional experimental and symbolic benefits are important for creating the brand equity. Hence, this research focuses on the consumer based brand equity in order to describe the consumer's attitudes towards tracksuit brands.

Literature offers a diversity of studies with regard to brand equity in consumer goods such as studies on detergents by Kamakura and Russel (1993), Leuthesser (1995), studies on toothpaste and mouthwash by Park and Srinavasan (1994), studies on cars and TVs by Pappu, Quester & Cooksey (2005). One can encounter studies on training shoes in sports products (Buil, de Chernatony & Martinez, 2008; Koçak, Abimbola & Özer, 2007; Netemeyer et al., 2004; Tong & Hawley, 2009a; Vazquez et al., 2002; Yoo & Donthu, 2001). Studies on sportswear and training shoes (Tong & Hawley, 2009b) abound, however one cannot come across any studies regarding brand equity in tracksuit brands. Within this framework, the objective of this study was to measure brand equity in tracksuit brands, to contribute to literature by analysing purchasing behaviour of consumers in tracksuit category and to offer suggestions to sports marketers.

METHODS

Research Model. In this study, quantitative research method was used. Correlational design and prediction design was selected because this is a powerful statistical procedure that can estimate the collective as well as the individual contributions of all predictor variables.

Participants and Instruments. A total of 250 undergraduate students, studying at the Celal Bayar University, Faculty of Sport Sciences, were selected for research using random sampling strategy: 32% of the study group were engaged in football, 23% – in basketball, 20% – in volleyball, 11% – in handball and 14% – in swimming, tennis, gymnastics, far-east sports and other branches. "Consumer-Based Brand Equity Scale (CBBE)" was implemented and developed by Vazquez

et al. (2002). The validity and reliability of the Turkish form were confirmed by Koçak et al. (2007) in order to measure consumer-based brand equity with regards to tracksuit brands through demographic questions. The Turkish form of the CBBE is a 5-point Likert type measurement tool and it consists of 16 items. Data gathering was completed by face to face interviews.

Data Analysis. Data were analysed by utilizing descriptive statistics, student's *t* test, one-way analysis of variance and logistic regression analysis. In this study, the Cronbach alpha value of the scale was found as .87 as a result of reliability analysis. Nunnally & Bernstein (1994) suggested that the cut-off value for reliability was accepted as .70. Fitting the normal distribution was analysed to determine the differentiation test. Skewness values were – .64– .15 and Kurtosis values were .33– .30. Kolmogorov-Smirnov test was used to test the normality. According to D'Agostino (1971), data was normally distributed (test statistic = .02, p = .17).

RESULTS

In this study, explanatory and confirmatory factor analysis was used in order to test the validity of the scale. As a result of explanatory factor analysis (EFA), factor loadings were checked and found to vary between .56 and .76 and the average variance extracted (AVE) was found to be 67%. The calculated AVE value should be greater than 0.50 (Fornell & Larcker, 1981). According to confirmatory factor analysis (CFA) results, the following has been observed: *CFI* = .97, *GFI* = .91, *RMSEA* = .06, Chi-Square/*df* (193.56/97) = 1.99. Factor loadings of items were between .50 and .71 and all factor loadings were greater than 0.50 (Hair et al., 1998) with meaningful *t*-values. It can be suggested that the scale meets all criteria depending on these findings (Schermelleh-Engel & Moosbrugger, 2003). Consequently, the measurement tool can be said to be valid and reliable.

Among the research participants, 63.6% of the athletes who participated in the research were men whereas 36.4% were women, and the average age was 22. Most preferred tracksuit brands in the light of study results were as follows: Adidas (56%), Nike (25.6%), Puma (4.4%), Reebok (4.4%), Kinetix (2.8%) and Slazenger (0.8%). The ranking according to consumer-based brand equity was as follows: Adidas (M = 4.00), Reebok (M = 3.91), Kinetix (M = 3.90), Nike (M = 3.88), Slazenger (M = 3.68), Puma (M = 3.64).

As shown in Table 2, there were no statistically significant differences among consumer-based brand equities of tracksuit brands based on gender, age, purpose of usage and time to purchase a new tracksuit. Nevertheless, significant differences were observed in terms of the money paid for

Table 1. **Reliability and validity of the scale (EFA)**

Variables	Sub-dimensions	Items	Cronbach α	AVE	Factor loadings
Product utility	Comfort	I1	.71	50.18	.76
		I2			.75
	Safety	I3			.46
		I4			.64
		I5			.68
		I6			.69
Brand name utility	Guarantee	I7	.84	17.29	.56
		I8			.62
		I9			.65
	Social identification	I10			.63
		I11			.87
		I12			.80
	Status	I13			.70
		I14			.63
	Personal identification	I15			.70
		I16			.69
Scale			.87	67.48	

Table 2. **Results of the consumer based brand equity by demographic variables**

Demographic variables	*n*	Mean	*sd*	*t*	*p*
Gender					
Female	91	3.95	.55	.85	.39
Male	159	3.89	.53		
Age					
Under 20 years	54	3.80	.52	–1.73	.08
21 years and more	196	3.94	.54		
Usage purpose					
Sport	91	3.96	.57	1.15	.24
Convenience	159	3.88	.52		
Payment					
Under $ 45	172	3.82	.58	–4.97	.00
$ 46 and more	76	4.12	.34		
Number of tracksuits					
1–2 pieces	42	3.75	.58	–2.19	.02
3–4 pieces	128	3.95	.52		
Buying frequency					
Less than 6 months	125	3.95	.55	.90	.40
6–12 months	97	3.90	.54		
1 year or more	28	3.80	.45		

each tracksuit brand and the number of tracksuits owned. The perception of consumer-based brand equity of those who paid $ 46 and more and more for tracksuit brands and who owned 3–4 tracksuits was different than that of the others.

Table 3. **Results of the logistic regression analysis**

Variables	*B*	*SE B*	*p*	*βp*
Gender	–.56	.29	.058	.57
Age	.51	.31	.10	1.67
Purpose of usage	–.22	.28	.43	.80
Number of tracksuit	.47	.34	.17	1.60
Payment	1.32	.36	.00	3.77
Buying frequency = 1	–.27	.44	.52	.75
Buying frequency = 2	–.12	.45	.78	.88

It was also found that consumer-based brand equity had an impact on the money paid for the tracksuit which was an input as model-dependent variable ($\beta = 1.32, p = .00$, Exp. $\beta p = 3.77$). According to this finding, all variables being constant, a rise of 1 unit in the perception of brand equity of a tracksuit brand increased the money to be paid for that tracksuit by 3.77 times, which demonstrates the fact that a surge in brand equity enhances the willingness to pay more for a tracksuit brand.

DISCUSSION

The brand equity of tracksuits did not alter depending on gender, the reason of which could be that the quality and convenience of tracksuits were the same both in men and women. The sportspeople were of similar age, thus there was no difference in brand equity in terms of age variable. Sportspeople were found to wear tracksuits both to work out and to wear comfortably. Even though there were no perceived differences among brand equities for consumers buying tracksuits in terms of time to purchase a tracksuit (every 6 months, every 6–12 months, every 12–18 months), it was observed that brand equity score average diminished as the interval got longer. This finding attests to the fact that customers adhere to their particular brand and tend to be more loyal since they perceive their particular brand to have higher equity. Brand equity differs in conjunction with the number of tracksuits owned by sportspeople.

Those having three and more tracksuits were observed to consider their brand to have higher brand equity compared to those having 1 or 2 tracksuits, which is a testimony to the fact that consumers who assumed their brand to have higher brand equity were inclined to purchase more from that brand (Ailawadi et al., 2003; Raggio & Leone, 2007). In parallel to this, customers who paid more for tracksuit brands reckoned that their particular brand had higher brand equity compared to those who paid less. Consumers who deemed their brand to have higher equity were evidently more willing to pay more for that particular brand.

Another finding of the study reveals that the rise in brand equity of tracksuits renders customers more eager to pay more, which runs similar to studies (Homburg, Koschate, & Hoyer, 2005; Koschate-Fisher, Diamantopoulos, & Oldenkotte, 2012; Raggio & Leone, 2007; Yıldız, 2012; Zeithaml, Berry, & Parasuraman, 1996) laying bare the fact that high brand equity and its components (brand satisfaction, trust in brand, brand associations) boost willingness to pay more. One can infer that high brand equity diminishes price sensitivity, therefore encourages one to pay more.

CONCLUSIONS

There are two limitations of this study. The first is related to the nature of sample. Because our sample involves Turkish youth, research questions should be tested in different countries and cultures in order to generalize and validate the results. Consumer-based brand equity and consumers' behaviours can be checked via international comparative studies. The second is related to the research variables. Measuring consumer-based brand equity concentrates on the attributes of sport shoes, such as comfort, guarantee, and safety. Further research can investigate other outcome variables such as brand trust, brand satisfaction, switching behaviour, by word of mouth recommendation. In this way, consumer responses towards the tangible attributes of sport shoes can be more clearly explained. Consumers who have higher brand equity are willing to pay more to their favourite brand. It was found that social identification was a most important factor for consumers' choice of sport shoe brand. Sports marketers should attractively and strongly use the social marketing and media tools to gain success on social identification building and positioning.

REFERENCES

Aaker, D. A. (1991). *Managing brand equity*. New York, NY: The Free Press.

Ailawadi, K. L., Lehmann, D. R., & Neslin, S. A. (2003). Revenue premium as an outcome measure of brand equity. *Journal of Marketing*, *67*, 1–17. Retrieved form http://www.jstor.org/stable/30040546

Ambler, T., & Styles, C. (1996). Brand development versus new product development: Toward a process model of extension decisions. *Marketing Intelligence & Planning*, *14(7)*, 10–19.

Aktuğlu, K. I. (2008). *Brand management: Basic principles for strong and successful brands*, İletişim Publishing (2nd ed.): İstanbul.

Buil, I., de Chernatony, L., & Martinez, E. (2008). A cross-national validation of the consumer-based brand equity scale. *Journal of Product & Brand Management, 17(6)*, 384–392. http://dx.doi.org/10.1108/10610420810904121

D' Agostino, R. B. (1971). An omnibus test of normality for moderate and larger size samples. *Biometrica*, *58*(2), 341–358.

de Chernatony, L., & Riley, F. D. (1998). Defining a "Brand": Beyond the literature with experts' interpretations. *Journal of Marketing Management*, *14*, 417–443.

Farquhar, P. H. (1989). Managing brand equity. *Marketing Research, 1*(3), 24–33.

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate Data Analysis* (*5th ed.)*. Englewood Cliffs, NJ: Prentice-Hall: 612.

Homburg, C., Koschate, N., & Hoyer, W. D. (2005). Do satisfied customers really pay more? A study of the relationship between customer satisfaction and willingness to pay. *Journal of Marketing*, *69*(2), 84–96. doi: 10.1509/jmkg.69.2.84.60760

Kamakura, W., & Russell, G. (1993). Measuring brand value with scanner data. *International Journal of Research in Marketing*, *10*, 9–22.

Keller, K. L. (1993). Conceptualizing, measuring, and managing customer-based brand equity. *Journal of Marketing*, *57*(1), 1–22.

Koçak, A., Abimbola, T., & Özer, A. (2007). Consumer brand equity in a cross cultural replication: An evaluation of a scale. *Journal of Marketing Management, 23*(1–2), 157–173. http://dx.doi.org/10.1362/026725707X178611

Koschate-Fischer, N., Diamantopoulos, A., & Oldenkotte, K. (2012). Are consumers really willing to pay more for a favorable country image? A study of country-of-origin effects on willingness to pay. *Journal*

of International Marketing, *20*(1), 19–41. https://journals.ama.org/doi/abs/10.1509/jim.10.0140

Kotler, P., Wong, V., Saunders, J., & Armstrong, G. (2005). *Principles of Marketing*. Pearson Education Limited: Fourth European Edition.

Leuthesser, L. (1988). *Defining, measuring and managing brand equity: A conference summary.* Cambridge, MA: Marketing Science Institute.

Netemeyer, R. G., Krishnan B., Pullig, C., Wang, G., Yağci M., Dean D., … Wirth, F. (2004). Developing and validating measures of facets of customer-based brand equity. *Journal of Business Research*, *57*, 209–224. Retrieved from http://econpapers.repec.org/RePEc:eee:jbrese:v:57:y:2004:i:2:p:209–224

Nunnally, J. C., & Bernstein, I. R. (1994). *Psychometric Theory (3rd ed.)*. New York: McCraw-Hill.

Pappu, R., Quester, P. G., & Cooksey, R. W. (2005). Consumer-based brand equity: Improving the measurement-empirical evidence. *The Journal of Product and Brand Management*, 14*(2/3)*, 143–154. http://dx.doi.org/10.1108/10610420510601012

Park, C. S., & Srinavasan, V. (1994). A survey-based method for measuring and understanding brand equity and its extendibility. *Journal of Marketing Research*, *XXXI*, 271–288.

Raggio, R. D., & Leone, L. P. (2007). The theoretical separation of brand equity and brand value: Managerial implications for strategic planning. *Journal of Brand Management, 14*, 380–395. Retrieved from https://pdfs.semanticscholar.org/.../7da260c1ac7deb3476405ac03b

Schermelleh-Engel, K., & Moosbrugger, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research Online*, *8*(2), 23–74.

Tek, Ö. B., & Özgül, E. (2005). *Modern Marketing Principles.* İzmir: Birleşik Publishing.

Tong, X., & Hawley, J. M. (2009a). Measuring customer-based brand equity: Empirical evidence from the sportswear market in China. *Journal of Product & Brand Management*, *18*(4), 262–271. doi: 10.1108/10610420910972783

Tong, X., & Hawley, J. M. (2009b). Creating brand equity in the Chinese clothing market. *Journal of Fashion Marketing and Management: An International Journal*, *13*(4), 566–581. doi: 10.1108/13612020910991411

Vazquez, R., del Rio, A. B., & Iglesias, V. (2002). Consumer-based brand equity: Development and validation of a measurement instrument. *Journal of Marketing Management*, *18*, 27–48. http://dx.doi.org/10.1362/0267257022775882

Yoo, B., & Donthu, N. (2001). Developing and validating a multidimensional consumer-based brand equity scale. *Journal of Business Research*, *52*, 1–14. doi: 10.1016/S0148-2963(99)00098-3 ·

Yoo, B., Donthu, N., & Lee, S. (2000). An examination of selected marketing mix elements and brand equity. *Academy of Marketing Science*, *28*(2), 195–211. doi: 10.1177/0092070300282002

Yıldız, Y. (2012). Investigation of the effect of the customer satisfaction on the customer loyalty in fitness centers. *Selçuk University Journal of Physical Education and Sport Science*, *14*(2), 217–222.

Zeithaml, V. A., Berry, L. L. & Parasuraman, A. (1996). The behavioral consequences of service quality. *The Journal of Marketing*, *60*(2), 31–46

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Corresponding author **Yavuz Yıldız**
Faculty of Sport Sciences
Celal Bayar University
45040 Manisa
Turkey
Email yavyildiz@hotmail.com

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