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Effects of a 7-month Exercise Intervention Programme on the Psychosocial Adjustment and Decrease of Anxiety Among Adolescents

Irina Kliziene ^{a,*}, Sarunas Klizas ^b, Ginas Cizauskas ^c, Saule Sipaviciene ^d

^a Department of Education Sciences, Kaunas University of Technology, Kaunas, Lithuania

^b Department of Health Psychology, Lithuanian University of Health Sciences, Kaunas, Lithuania

^c Department of Mechanical Engineering, Kaunas University of Technology, Kaunas, Lithuania

^d Department of Applied Biology and Rehabilitation, Lithuanian Sports University, Kaunas, Lithuania

Abstract

This study investigated the psychosocial adjustment and anxiety of adolescents during a 7-month exercise intervention programme. In addition, extensive research on the psychosocial adjustment of adolescents during intense physical activity was performed. The experimental group included adolescent girls (n=110) and boys (n=107) aged between 14 and 15 years while the control group included adolescent girls (n=99) and boys (n=112) of the same age group attending the same school. The girls and boys in the EG participated in modified physical education lessons two times a week. Once a month they received a theory class where they were taught about communication disorders of adolescents and ways of preventing them by means of physical activities. In practical classes, the girls and boys in the EG had sports and games (basketball, volleyball and football) as well as Pilates, enhancing physical abilities. The measurement of psychosocial adjustment included the modification method developed by Roger and Daimond. The measurement of anxiety, the methodology of Reynolds and Richmond. In summarising the results of the 7-month exercise intervention programme of enhancing psychosocial adjustment and its components (self-esteem, dominance, positive self-evaluation, emotional comfort, internality, and evaluation by others) and decrease in anxiety in physical education lessons, we can state that after the intervention there are certain tendencies towards improved psychosocial adjustment that assists in overcoming various critical situations.

Keywords: physical activity, psychosocial adjustment, anxiety, adolescent.

* Corresponding author

E-mail addresses: irina.kliziene@ktu.lt (I. Kliziene), ksarunas@yahoo.com (S. Klizas), ginas.cizauskas@ktu.lt (G. Cizauskas), saule.sipaviciene@lsu.lt (S. Sipaviciene)

1. Introduction

The positive effect of exercise intervention programme, physical activity (PA) on psychosocial adjustment and anxiety is a widely held and accepted belief among scholars and practitioners alike (Paluska, Schwenk, 2000). Several cross-sectional studies have supported the association between physical self-perception and self-reported levels of exercise (Fox, 2000). Although evidence of the positive effects of exercise and exercise training on depression and anxiety is growing, the clinical use—at least as an adjunct to established treatment approaches like psychotherapy—is still in its infancy (Strohle, 2009).

Although the many physical and psychological health benefits of PA are commonly recognised, participation in PA declines among girls and boys during adolescence with dramatic decreases shown for girls between the ages of 12 to 15 years (Nader et al., 2008). Regular PA during adolescence as well as leading an active lifestyle is associated with several physical and psychological benefits (Janz et al., 2006) including the likelihood of reducing health problems such as hypertension, osteoporosis, and the incidence of chronic diseases, including coronary heart disease and diabetes in later life (Warburton et al., 2006). PA and the positive effects of exercise are also associated with enhanced psychosocial adjustment (Klizas et al., 2012) and improved self-esteem and self-identity among adolescent girls (Fitzgerald et al., 2012). Adolescents' physical and socio-emotional competencies are developed through engagement in team sports with their peers as well as other physical and leisure activities (Salvy et al., 2008). Peer relationships and friendships developed through PA offer important opportunities for companionship, support and recreation. Peer victimisation and social isolation, on the other hand, may impose constraints on access to PA (Storch et al., 2006). Considering the potential role that peer and/or friend influences may have on adolescents' PA, further comprehensive understanding and synthesis of research carried out in this area is required (Fitzgerald et al., 2012). It has been established that PA has a significant impact on the psychosocial adjustment of adolescents. Psychosocial adjustment during adolescence may be interpreted as the striving of adolescents to discover their place and to alter it in order to adapt it to themselves. A review by Goldfield et al. (2011) indicated that effect of intensity of PA and psychological distress was observed whereby those who performed greater bouts of PA exhibited better psychosocial adjustment than adolescents engaging in mild to moderate intensity activity. Gender impacted the results as PA was associated with reduced depression but not anxiety in boys, and reduced anxiety but not depression in girls. The positive association between total volume of PA and psychological functioning in the overall sample was no longer significant when gender was considered, except for reduced anxiety in girls. However, most previous works have evaluated overall PA and not structured activity, which may have a different set of predictors. Total PA is a combination of structured (e.g. physical education classes, organised sports and activity lessons) and unstructured PA. Since many PA interventions for this age group are structured in nature, it is important to understand the correlates of structured physical activity.

It should be pointed out that adolescent health disorders and their psychosomatic troubles are on the increase with students complaining about different pains and sleep disorders. There is a general belief that physical activity and exercise have positive effects on anxiety and a great number of studies describe an association between physical activity and anxiety (Strohle, 2009). Klizas (2009) points to the most frequent difficulties of adolescents' psychosocial adjustment which include general anxiety that expresses the emotional state related to their entire school-life; experience of social stress due to interpersonal relationships with peers; fear of self-expression when negative emotions hinder exposure of oneself and one's abilities; the fear that their own results will not meet the expectations of others; and the emerging anxiety as a consequence of negative evaluations. A significant feature in the school context is the adolescent-teacher relationship, due to the essential role teachers play in the academic performance and psychosocial adjustment of adolescents in the classroom (Koth et al., 2008; Estévez et al., 2014). Anxiety has been identified as a potential barrier to physical exercise due to concerns over revealing one's physique to others despite the incentive that taking part in exercise is a means of decreasing anxiety through the development of a fitter and more attractive physique (Hausenblas et al., 2004). Intervention studies over five months (McAuley et al., 1995), ten weeks (Bartlewski et al., 1996), and six weeks (Williams, Cash, 2001) have demonstrated that exercise and circuit training may effectively reduce anxiety.

The aim of the study was to establish the effects of a 7-month exercise intervention programme on the psychosocial adjustment and decrease of anxiety among adolescent girls and boys.

Purpose of the research

Our study is the first time that an extensive investigation into the peculiarities of the components influencing the psychosocial adjustment and decrease of anxiety in adolescents during a 7-month exercise intervention programme has been recorded. In addition, extensive research on the psychosocial adjustment of students during intense PA was performed. In this research, the attitude of students towards the psychosocial adjustment expressed in scholarly sources was confirmed. The selected components of the construct of psychosocial adjustment: self-esteem, dominance, positive self-evaluation, emotional comfort, internality, and evaluation by others, revealed the novelty of this research as no literature was found dealing with the impact of a 7-month exercise intervention programme on the alteration of indices of the psychosocial adjustment of students of this age group.

2. Materials and Methods

Ethical considerations

The research protocol was discussed with and approved by the Kaunas Regional Biomedical Research Ethics Committee (Report Number BE-2-24). Before the investigation began, each subject read and signed a written informed consent form, and the study protocol was consistent with the principles outlined in the Declaration of Helsinki.

Research design

In the present research, a pre-test/post-test experimental design was used. This design was chosen because experimental design can encumber educational activities due to the random selection into groups. The experimental group was provided with 7-month exercise intervention programme aimed to strengthen psychosocial adaptation-related behaviours of adolescent girls and boys during physical education lessons. On the other hand, the control group was not provided with any treatment (girls and boys in the control group attended physical education lessons which were not modified). Each subjects read and signed a written informed consent form, we informed consent from the parents/guardians of the adolescents (below 16 years) involved in the study.

Participants

The participants consisted of non-physically active adolescent boys and girls. The adolescent students of both genders were selected for the experiment by applying a two-stage sampling strategy. First, the school was randomly selected from secondary schools (in Lithuania). Next, all students from eighth and ninth forms were tested (every second form was experimental). The experimental group (EG) included 14–15-year-old adolescent girls (n=110) and boys (n=107), and the control group (CG) included adolescent girls (n=99) and boys (n=112) from the same age group attending the same school. The age of the participants ranged from 14.7 ± 0.51 EG and CG groups. Mean weight, height, and BMI at pretest for girls in the EG and CG groups were 54.3 ± 12 (kg), 1.65 ± 11 (m), and 20.1 ± 1.72 (kg/m²); and for boys in both groups, 59.3 ± 11 (kg), 1.76 ± 14 (m) and 19.6 ± 2.41 (kg/m²) respectively.

Instruments

Two questionnaires, namely the Rogers and Dymond's (1954) questionnaire (Klizas et al., 2012) and Reynolds and Richmond's Anxiety Scale (1994), were used. The Rogers and Dymond's questionnaire was chosen for the evaluation of psychosocial adjustment (Klizas et al., 2012) and had been translated into Lithuanian and validated in early studies with Lithuanian adolescents (Klizas, 2009). This questionnaire consists of 101 items with psychosocial adjustment rated on a 7-point scale. The respondents were asked to choose one answer out of the seven possible variants:

'This is definitely not about me,' = a score of 0;

'This does not look like me,' = a score of 1;

'I doubt that this could be applied to me,' = a score of 2;

'I do not dare to apply it to me,' = a score of 3;

'This is similar to me, but I am not sure,' = a score of 4;

'This is similar to me,' = a score of 5; and

'This is definitely about me,' = a score of 6.

The main subscale that best reveals the nature of psychosocial adjustment is an adjustment subscale (the internal validity of this subscale [Cronbach α] was 0.76). The subscale includes 67 items of the questionnaire. Besides the psychosocial adjustment subscale, other subscales (self-esteem, dominance, emotional comfort, internality and evaluation by others) were analyzed as well, which helped reveal the individual's psychosocial adjustment. The self-esteem subscale consisted of 18 items. Cronbach α of the self-esteem subscale was 0.72 for the present sample. The subscale 'dominance' consisted of nine items with a Cronbach α of 0.72 for the present sample.

In order to evaluate adolescent girls' and boys' anxiety, the methodology of Reynolds and Richmond (1994) was used (Dewaraja et al. 2006; Klizas, 2009). The Revised Children's Manifest Anxiety Scale (RCMAS) contains 37 items with 28 items used to measure anxiety and an additional nine items that present an index of the child's level of defensiveness. For our study, we were only concerned with the factor analysis of anxiety; therefore, only those 28 items used to measure anxiety were used in this factorial analysis. The RCMAS consists of three factors, 1) somatic anxiety consisting of 12 items, 2) personality anxiety consisting of eight items, and 3) social anxiety consisting of eight items.

The results are estimated as follows: 1) somatic anxiety (up to 6.0 points – high somatic level, from 5.9 to 4.5 points – average somatic level, from 4.4 to 1.0 point – low somatic level); 2) personality anxiety (from 2.0 to 2.5 points – low personality anxiety level, from 2.6 to 3.5 points – average personality anxiety level, from 3.6 to 4.5 points – high personality anxiety level); and 3) social anxiety (to 5.5 points – high social anxiety level, from 5.4 to 4.5 points – average social anxiety level, from 4.4 to 3.3 points – low social anxiety level). Cronbach's alpha coefficient for subscales ranged from 0.72–0.73

Procedure

Both adolescent girls and boys in the CG attended physical education lessons which were not modified and took place twice a week (Klizas, 2009; Klizas et al., 2012). The girls and boys in the EG participated in modified physical education lessons two times a week. Once a month they received a theory class where they were taught about communication disorders of adolescents and ways of preventing them by means of physical activities. In practical classes, the girls and boys in the EG had sports and games (basketball, volleyball and football) as well as Pilates, enhancing physical abilities (Klizas, 2009; Klizas et al., 2012). The exercise intervention programme aimed to strengthen psychosocial adaptation-related behaviours of adolescent girls and boys during physical education lessons and adaptation of personality psychological features of this age group.

Adolescent girls and boys in both the experimental and control groups filled in questionnaires in the presence of a teacher and researcher (who monitored the course work and instructed the respondents). The survey lasted 30–35 minutes. Physical education lessons for both groups (experimental and control) were conducted by the same teacher, the author of this research. The study followed the principles of prior informed consent and voluntary participation. Hence the aim of the research was explained to the students and those who refused to participate were able to leave the study. The adolescents were also informed about the anonymity of the research.

The study was carried out in several stages. The adolescents in both EG and CG underwent initial testing of their psychosocial adjustment (baseline measurements) after which the girls and boys in the EG experienced experimental impact (7-month exercise intervention programme of enhancing psychosocial adjustment in the lessons of physical education). After the experiment all subjects in both EG and CG were tested again.

Statistical analysis

Data analysis was performed using the Statistical Package for Social Sciences (SPSS) version 21. Descriptive statistics (M, SD and SEM) were calculated. Teams were compared by means of a one-way Analysis of Variance (ANOVA), followed by the Least-Significant-Difference *post hoc* procedure. Statistical significance was set at $p \leq 0.05$.

3. Findings

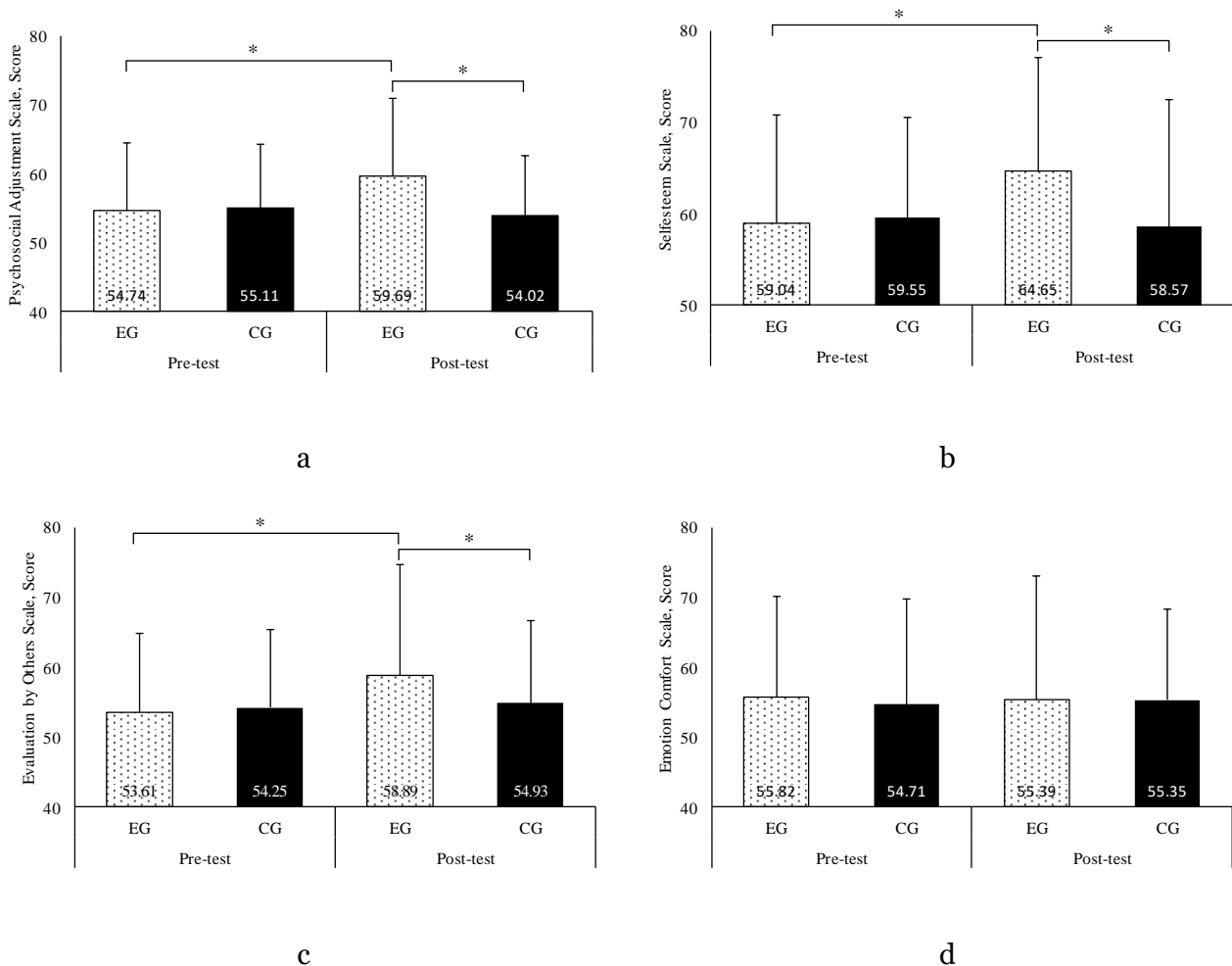
Table 1 reports the between-group (EG and CG) comparisons for psychosocial adjustment before pretest and post-test. Fig. 1 illustrates the differences between the respective groups.

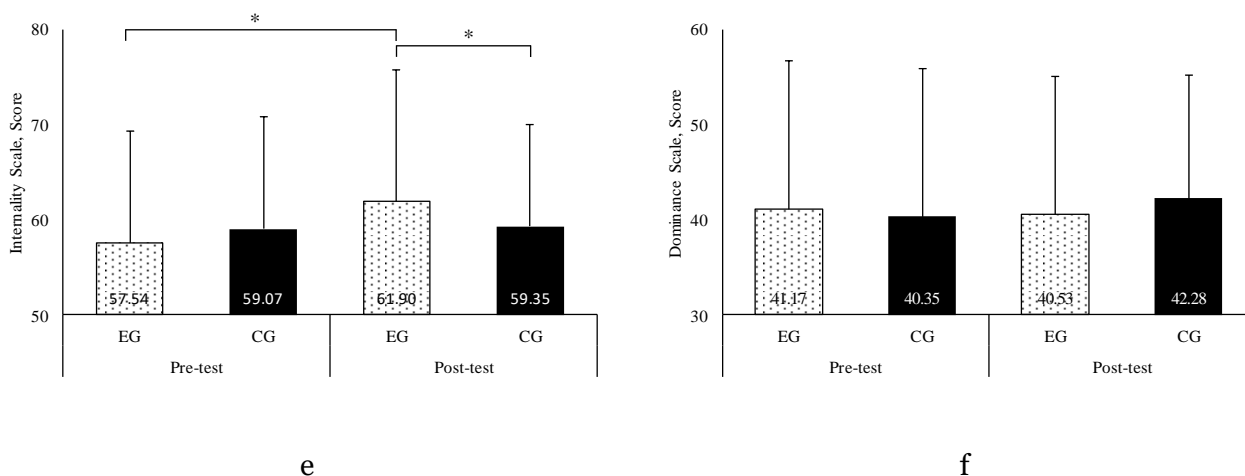
The results of the alteration of the levels of the psychosocial adjustment of the adolescents (girls and boys) in the experimental and control groups were compared before and after the

intervention programme. Before the experiment (pretest), there was no significant difference in the score of the psychosocial adjustment scale comparing both the groups EG and CG (54.74 ± 9.85 vs. 55.11 ± 9.27 ; $F=0.174$; $p>0.05$; $P=0.065$). The analysis of the data demonstrated that when comparing the psychosocial adjustment of the adolescents (girls and boys) in the experimental group pretest and post-test, a significant difference in the psychosocial adjustment score was observed (54.74 ± 9.85 vs. 59.69 ± 11.20 ; $F=21.99$; $p<0.05$; $P=0.792$), although this cannot be said about the results of the psychosocial adjustment in the control group (Fig. 1a).

Analysis of the self-esteem scale showed that the results of the experimental and control groups before the intervention programme were similar: there was no significant difference in the score comparing the experimental and control groups (59.04 ± 11.76 vs. 59.55 ± 11.00 ; $F=1.768$; $p>0.05$; $P=0.258$). Post-test showed that the results of the experimental group after the intervention programme changed significantly in comparison with those before the experiment (59.04 ± 11.76 vs. 64.65 ± 12.45 ; $F=13.715$; $p<0.05$; $P=0.884$) (Fig. 1b).

Fig. 1c shows that evaluation by others of the adolescent pretest showed there was no significant difference in the score comparing both the groups EG and CG (53.61 ± 11.25 vs. 54.25 ± 11.32 ; $F=0.428$; $p>0.05$; $P=0.095$). The analysis of the data demonstrated that when comparing the evaluation by others of the adolescents (girls and boys) in the experimental group pre-test and post-test, there was a significant difference (53.61 ± 11.25 vs. 58.89 ± 15.87 ; $F=56.081$; $p<0.05$; $P=1.000$), although this cannot be said about the results of the evaluation by others in the control group.





* Significant difference ($p < 0.05$)

Fig. 1. The level of adolescents' psychosocial adjustment: (a) self-esteem, (b) evaluation by others, (c) emotional comfort, (d) internality, (e) dominance, (f) at pre-test and post-test.

Analysis of the emotional comfort scale showed that the results of the experimental and control groups before the intervention programme were similar: there was no significant difference in the score comparing the experimental and control groups (55.82 ± 14.27 vs. 54.71 ± 15.02 ; $F = 0.616$; $p > 0.05$; $P = 0.118$). Post-test showed that the results of the experimental group after the intervention programme changed significantly in comparison with those before the experiment (55.82 ± 14.27 vs. 55.39 ± 17.79 ; $F = 0.228$; $p > 0.05$; $P = 0.072$) (Fig. 1d).

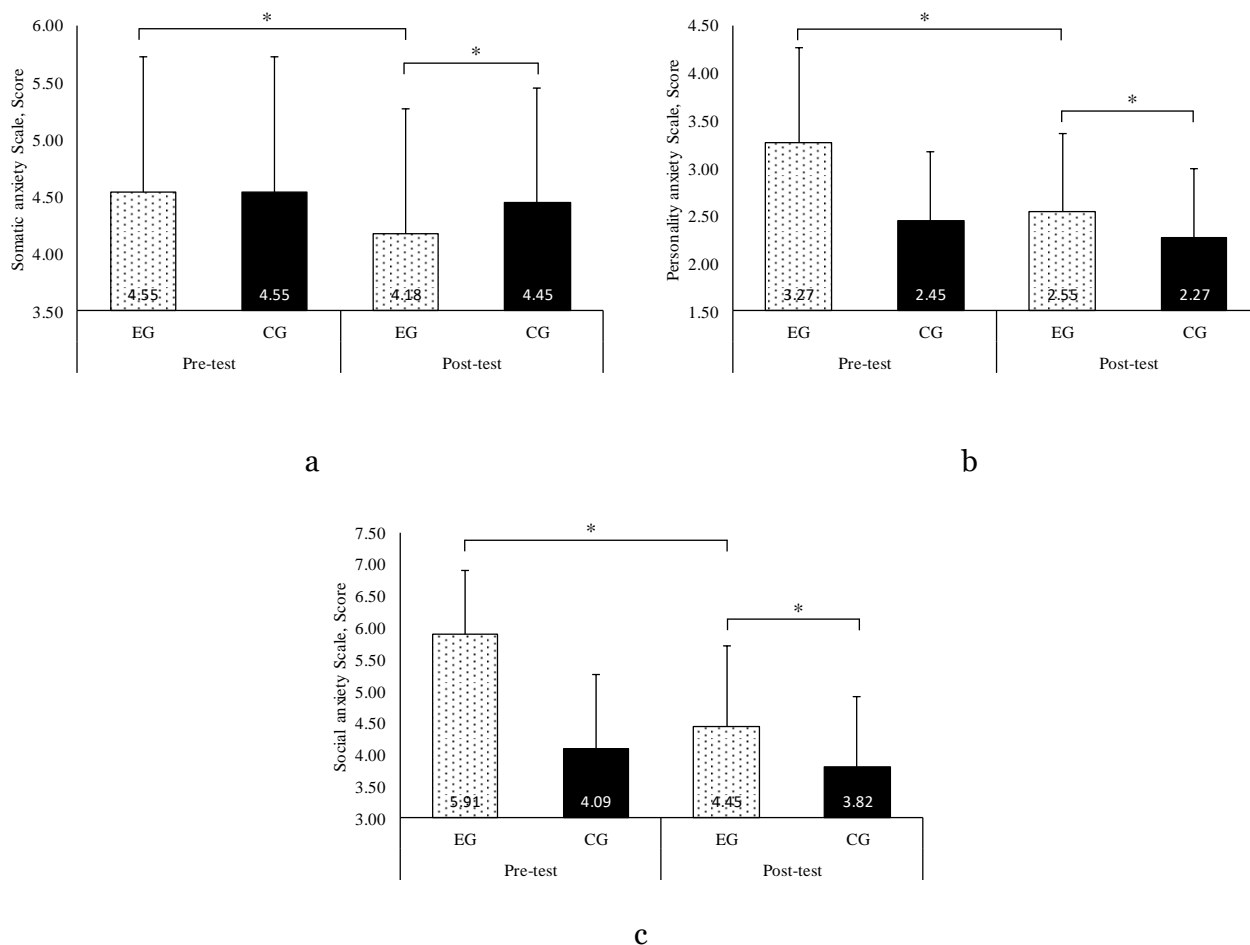
Figure 1e shows that internality of the adolescent pre-test showed there was no significant difference in the score comparing both groups EG and CG (57.54 ± 11.84 vs. 59.07 ± 11.83 ; $F = 2.099$; $p > 0.05$; $P = 0.298$). The analysis of the data demonstrated that when comparing the internality of the adolescents (girls and boys) in the experimental group pre-test and post-test, there was no significant difference (57.54 ± 11.84 vs. 61.90 ± 13.91 ; $F = 11.896$; $p > 0.05$; $P = 0.884$).

Figure 1f shows that dominance of the adolescents' pretest no significant difference in the score comparing both the groups EG and CG (41.17 ± 15.61 vs. 40.53 ± 14.57 ; $F = 7.955$; $p > 0.05$; $P = 0.070$). The analysis of the data demonstrated that when comparing the dominance of the adolescents (girls and boys) in the experimental group pretest and post-test, there was no significant difference (41.17 ± 15.61 vs. 40.35 ± 15.53 ; $F = 0.313$; $p > 0.05$; $P = 0.082$).

The research performed at the beginning of the experiment showed that at pre-test, the level of somatic anxiety of the adolescents in CG (girls and boys) was average (4.55 ± 1.18 points). When exploring the results of the somatic anxiety in EG (4.55 ± 1.18 points) before the experiment and after it, we established that after the intervention programme, a somatic anxiety in EG was established (4.18 ± 1.09 points). This demonstrates lower levels of depression, seclusion, somatic complaints, aggression and delinquent behaviour ($F = 4.195$; $p < 0.05$; $P = 0.510$) (Fig. 2a).

When dealing with the results of the anxiety of personality, we established that pre-test and post-test, the results of CG students were not statistically significantly different (2.45 ± 0.73 points and 2.27 ± 0.73 points correspondingly) ($F = 0.127$; $p > 0.05$; $P = 0.047$). When analysing EG personality anxiety results pre-test and post-test we established that after the intervention programme, EG personality anxiety results decreased (3.27 ± 1.00 points and 2.55 ± 0.82 points correspondingly) ($F = 5.501$; $p < 0.05$; $P = 0.684$) (Fig. 2b).

At the pre-test the level of social anxiety CG showed was 4.09 ± 1.18 points. The post-test CG result was statistically significantly lower (3.82 ± 1.09 points) ($F = 3.845$; $p < 0.05$; $P = 0.687$). When analysing the levels of the social anxiety of EG pre-test and post-test results decreased after the intervention programme (5.91 ± 1.00 points and 4.45 ± 1.27 points correspondingly) and were significantly different ($F = 7.086$; $p < 0.05$; $P = 0.702$) (Fig. 2c).



* Significant difference ($p < 0.05$)

Fig. 2. The level of adolescents' somatic anxiety (a) personality anxiety, (b) social anxiety, (c) at pre-test and post-test.

4. Discussion

The purpose of this study was to establish the effects of a 7-month exercise intervention programme on the psychosocial adjustment and anxiety among adolescent girls and boys. It was established that psychosocial adjustment of adolescent girls and boys in the EG and the components of this construct (self-esteem, evaluation by others, emotional comfort, internality and dominance) were higher after the 7-month exercise intervention programme compared to those of the EG before the experiment, and those of the CG before and after the experiment. In accordance with the hypothesis, overall the results support the positive effects of a 7-month exercise intervention programme in enhancing psychosocial adjustment through the lessons of physical education on psychosocial adjustment and decrease of anxiety, with the EG showing a positive, or more positive, change in psychosocial adjustment, and a decrease of anxiety compared to the control group where the changes were less positive.

Moreover, these results corroborate some previous intervention studies, namely that PA and exercise have positive effects on the psychosocial adjustment of middle school-aged students. Due to multiple reasons, the lessons of physical education are an excellent opportunity to get children interested in intense physical activities (Malinauskas et al., 2008). Research shows that during physical education lessons, students strive for improvement and satisfaction in vigorous PA; thus, physical education acquires a pedagogical meaning and value (Bobrova, 2009). As physical education and exercise intervention programmes are linked to many personal qualities, such as morality, self-confidence, self-actualisation and self-esteem, it helps enhance psychosocial adjustment for school children (Klizas et al., 2012). After a 6-month exercise intervention

programme, researchers established that no significant improvement in physical self-perception profile subdomains, but lower social physique anxiety scale scores for the intervention group, compared to the control group. The changes in physical self-perception profile and social physique anxiety scale scores were not linked to changes in physiological variables (Lindwall, Lindgren, 2005). Regular exercise (a 12-week programme) was found to be an impacting variable in improving self-esteem and decreasing the hopelessness level of females (Yigiter, 2014). Klizas et al., (2012) established that after the educational experiment for adolescent girls, the index of the psychosocial adjustment in the EG improved statistically significantly as well as the values of the three structural components of the psychosocial adjustment: self-esteem, dominance and life satisfaction. Blauzdys & Vilkas (2007) carried out the pedagogical experiment in five third-form students in one gymnasium of Vilnius. For five months, 58 girls and 35 boys were analysed. At the beginning and the end of the experiment, the subjects were interviewed in writing, and their PA was fixed by five tests. Besides offering the usual physical education curriculum during lessons, four theoretical lessons were added and conducted at two forms of the experimental impact. During the first two lessons, the history and classification of basketball and volleyball were analysed, during the other two – of gymnastics sport branches – information on the educational mission of motions, their bio-mechanical structure, and the importance of social assignments was provided, as well as their benefit for students discussed. Scientists determined that after the pedagogical experiment some indicators of PA and exercise training improved, during the experimental period the need for information on the promotion of the students' health, emotional comfort and the formation of an attractive body increased statistically reliably ($p < 0.05$) (Blauzdys, Vilkas, 2007).

It should be noted that disorders of adolescents' health and their psychosomatic troubles continue to increase; students complain about different pains and sleep disorders. Anxiety disorders are one of the most common psychiatric disorders among children and adolescents (James et al., 2013). Point prevalence estimates of anxiety disorders suggest a prevalence of 2.27–4.55 %. Anxiety that occurs during childhood has a moderate-to- high impact on functioning and could lead to severe disability which, if left untreated, continues into early adulthood (Rapee et al., 2009). Having summarised the results of our 7-month exercise intervention programme on anxiety research, it is evident that, although the period of applied educational influence was relatively long, certain tendencies of the change in the adolescents' anxiety level were observed in the EG. At the beginning of the experiment, the performed research showed that the level of *somatic anxiety* of the EG students was average before the experiment. It was determined that 40.82 % of the group experienced average anxiety levels, while 31.54 % (i.e. every third child) experience high anxiety levels (Grigaitė et al., 2009). It was identified that the prevalence of somatic anxiety among students is characteristic from 10 to 23 % (Bertsson et al., 2001). According to Caciopo et al. (2006), who summarised the data of most adolescent researches, children of this age felt great stress related to unhappiness, fear of isolation, remoteness from parents and relatives as well as contemporaries, experiencing it as a sad state and rejection by contemporaries. Physical exercise appears to improve depressive symptoms in adolescents; higher methodological quality and lowered statistical heterogeneity suggests that exercise may be a useful treatment strategy for depression and anxiety (Carter et al., 2016).

5. Conclusions

It was established that the properly construed and purposefully applied complex of the 7-month exercise intervention programme of enhancing psychosocial adjustment and its components (self-esteem, evaluation by others, internality) caused the statistically significant changes in the dependent variables: increased psychosocial adjustment and decreased anxiety.

On a practical level, the findings have implications for the development and implementation of exercise intervention programmes for adolescents. The present study offered important information that can be used by educators, parents and policymakers to enhance psychosocial adjustment among adolescents because the findings suggest that existing exercise-based intervention programmes may have a positive influence on psychosocial adjustment and decrease anxiety. It would be worthwhile to implement exercise-based intervention not only on 14–15-year-old adolescents but also students of other age groups.

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