

## ORIGINAL SCIENTIFIC PAPER

# Association between Enjoyment in Physical Education Online Classes and Physical Activity Levels in Adolescents during the COVID-19 Pandemic

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## Abstract

Motivation, with special emphasis on intrinsic motivation is important factor that influences physical activity levels (PAL). The COVID-19 pandemic forced Physical education (PE) teachers to switch to online classes, which increased the problem of keeping students motivated to be physically active. This study aimed to determine the associations between enjoyment in online PE classes and PAL during the COVID-19 lockdown. 198 high-school students aged 14-19 years participated in this study. Variables included interest and enjoyment in PE classes assessed by the Intrinsic Motivation Inventory questionnaire and PAL assessed by Physical Activity Questionnaire for Adolescents. Pearson's correlation coefficient was calculated to evaluate the associations between variables. Independent samples T-test and  $\chi^2$  test were used for determining the gender differences in study variables. Significant correlation between PAL and interest/enjoyment in online PE classes was recorded ( $R=0.23$ ,  $p<0.05$ ). There were no significant differences between girls and boys in the total subset interest/enjoyment of intrinsic motivation. However, the difference was observed in the subset enjoyment ( $\chi^2(1, N=198)=9.53$ ), with boys showing more enjoyment. Because of the evidenced positive association between interest/enjoyment in PE classes and PAL, it is crucial to provide students fun and interesting PE online classes to maintain PAL during the pandemic and similar situations. The special emphasis should be placed on girls.

**Keywords:** distance learning, health crises, youth, motivation, exercise

## Introduction

Physical activity (PA) is defined as any movement of the human body performed by skeletal muscles, which requires energy expenditure (Caspersen, Powell, & Christenson, 1985). Even though regular and adequate PA has numerous benefits for health of children and adolescents, research has shown that 81% of adolescents worldwide do not meet the recommended guidelines of 60 minutes of moderate to high PA (Guthold, Stevens, Riley, & Bull, 2020). Of particular concern is the data from World Health Organization (WHO) from 2018, where it is shown that only 19% of Croatian 15-year-olds (25% of boys and 12% of girls) reach the recommended physical activity levels (PAL) (WHO, 2018). At the same time, 10-20%

of children and adolescents worldwide have mental disorders (WHO, 2020).

Physical Education (PE) classes are considered to be one of the most important factors in promoting lifelong PA and improving the health of young people, both in PE classes (Barkoukis, Chatzisarantis, & Hagger, 2021; Escriva-Boulley, Tessier, Ntoumanis, & Sarrazin, 2018), and in their free time (Wang & Chen, 2020). In Croatia, PE classes are carried out in a fund of 3 hours per week from the 1st to the 3rd grade of primary school, and 2 hours per week in secondary schools and at faculties. PE enables students to get to know their own body and its functioning, encourages harmonious growth and development of the organism, contributes to greater work abil-



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ities, learning success, personal and social development and develops awareness of the importance of PA and exercise for maintaining and improving health (Rasberry et al., 2011).

Motivation is an important factor influencing PAL. Motivation is defined as “a psychological construct that explains why people choose to behave in a certain way at a certain moment” (Barić, 2012). Engaging in PA is a consequence of a combination of intrinsic and extrinsic motivation (Ryan, Williams, Patrick, & Deci, 2009). Briefly, intrinsic motivation is one in which the need for activity arose from internal incentives, satisfaction arose from the activity itself and its meaning, and not from external stimuli such as rewards and acknowledgments which determine extrinsic motivation (Ntoumanis, 2001). In research, intrinsic motivation has been recognized as an important factor for exhibiting greater effort in activity and greater satisfaction with exercise during PA classes, and in sports (Brustad, Babkes & Smith 2001; Ntoumanis, 2001). When students are intrinsically motivated, they show interest and intention to participate in PA, experience enjoyment and feelings of competence, and are less likely to feel bored in PE classes (Ntoumanis, 2001).

The pandemic of the new disease COVID-19 was declared in March 2020 (Cucinotta & Vanelli, 2020). The main method for controlling the COVID-19 pandemic was the implementation of social distancing measures that included the closure of schools, universities, cafes, restaurants, sports and recreational facilities and clubs, and other places for social gatherings (Bedford et al., 2020). Research has regularly reported a decrease in PAL worldwide as a result of imposed social distancing measures during a pandemic (Stockwell et al., 2021), and a decrease in PAL has also been reported in adolescents from Croatia and Bosnia and Herzegovina (Sekulić, Blažević, Gilić, Kvesić, & Zenić, 2020; Gilić, Ostojić, Čorluka, Volarić, & Sekulić, 2020; Karuc, Sorić, Radman, & Mišigoj-Duraković, 2020). At the same time, the appearance of COVID-19 disease has significantly changed the usual way and approach of teaching PE and expected teachers to introduce modern technology and implementation of distance PE teaching. This posed a significant challenge for PE teachers to motivate their students to remain active and to create applicable online PE classes.

Regarding the lack of studies that directly examined the relationship between enjoyment in distance learning PE and PAL, the aim of this study was to determine the association of distance learning PE with PAL and to determine whether there are gender differences. We hypothesized that the enjoyment in distance learning PE will be positively associated with PAL, i.e., that students who enjoy distance learning PE will be more physically active. Also, we hypothesized that a significant difference will be found regarding gender; precisely, that boys will enjoy distance learning PE more than girls.

## Methods

### Participants

This research included 198 high school students (141 female, 57 male) from Osijek - Baranja County (Croatia), aged 14 to 19 years. Students were of good health (i.e., not injured or ill) during the study duration. The informed consent was signed by the parents or legal guardians before the study initiation for students aged less than 18 years. The study was approved by the ethical board University of Zagreb, Faculty of Kinesiology.

### Study design and procedures

The data used in this research was collected during April 2021. At the very beginning, the participants were explained the purpose of the research, it was pointed out that there are no correct or incorrect answers and that they answer questions according to personal evaluation of the current situation. Data collection was organized through an online survey system (Survey Monkey, San Mateo, California, USA). Participants were asked to enter their code so that anonymity would be guaranteed and that the data could be linked in case of a repeated measurement.

### Variables

The variables in this study included the gender (male, female), age of participants (14-19 years) and questionnaires for assessing the interest/enjoyment in PE classes and PAL.

The Croatian version of the questionnaire of intrinsic motivation (Intrinsic Motivation Inventory - IMI) was used to assess the enjoyment in PE online lessons (McAuley, Duncan, & Tammen, 1989; Barić, Cecić-Erpič & Babić, 2002). IMI is a measuring instrument where the total level of intrinsic motivation is estimated as a result of four corresponding dimensions (interest/enjoyment; perceived competence; effort/importance; tension/pressure). The questionnaire consists of 18 items; for the purposes of this research, the interest/enjoyment dimension was used, which consists of 5 items through which it is determined to what extent the assessed activity is considered interesting and enjoyable. The task of the participants when filling out this questionnaire is to indicate the degree of agreement with the 5 offered statements: (1) “I really enjoy distance learning physical education” – IMI 1; (2) “It’s fun to practice distance learning physical education” – IMI 7; (3) “The contents we learn in distance learning physical education are very interesting to me” – IMI 8; (4) “I think it’s great for me while I’m in distance learning physical education classes” – IMI 13; (5) “The contents of distance learning physical education classes can not hold my attention” – IMI 17. The answers were evaluated on a 5-point Likert scale, marked as 1-strongly disagree, 2-mostly disagree, 3-neither agree nor disagree, 4-mostly agree, 5-completely agree. The results of each participant are expressed as the average value of their responses. For this study, the parts of the questionnaire were terminologically adapted to assess the enjoyment in PE distance learning classes, based on the previously tested Croatian version of the questionnaire used to assess the motivation of athletes (Barić et al., 2002).

The Physical Activity Questionnaire for Adolescents (PAQ-A; Janz, Lutuchy, Wenthe, & Levy, 2008) was used to assess PAL. The PAQ-A is a questionnaire about the last seven days of the activity that the participants fill out independently, and it is used to measure the level of PA in adolescents aged 14 to 19 years. The reliability and validity of the PAQ-A questionnaire was proven in a sample of adolescents from Croatia and Bosnia and Herzegovina (Miljanović Damjanović, Obradović Salcin, Zenić, Foretić & Liposek, 2019). This questionnaire consists of 9 items; first 8 items assess PA during leisure-time, during PE classes, during lunch, after school, during evenings, during week-ends, and regular weekly PA, while 9th item assesses whether student was ill or injured during the last 7 days. The first 8 items are scored on a scale from 1 to 5, with 1 representing low level of activity and 5 representing a high level of

activity. The final PAQ-A score was calculated as the arithmetic mean of the scores from all 8 particles (Kowalski, Crocker, & Donen, 2004).

**Statistics reporting**

The program Statistica 13.5. (Tibco Inc., Palo Alto, CA, USA) was used for statistical data processing. Basic descriptive indicators were calculated for the whole sample and separately for gender. The Shapiro-Wilk W test was used to analyze the normal distribution of the data. Pearson's correlation coefficient was used to check the correlation between the variables. Frequencies were calculated for each individual item. A Chi-

square test was used to determine the differences by gender in each item of interest/enjoyment. An independent sample t-test was used to determine gender differences for PAQ-A and dimension of interest/enjoyment.

**Results**

Descriptive statistics for total sample and separately for boys and girls are shown in the Table 1. The results of the PAQ-A are 2.53±0.71 for total sample, while boys have higher PAQ-A score (2.74±0.82) than girls (2.45±0.64). Also, boys have higher scores than girls for the interest/enjoyment (3.86±0.79 and 3.77±0.80, respectively).

**Table 1.** Descriptive statistics for the results of PAQ-A and subset interest/enjoyment of intrinsic motivation

Variables	Total (N=198)	Boys (N=57)	Girls (N=141)
	Mean±St.Dev.	Mean±St.Dev.	Mean±St.Dev.
PAQ-A	2.53±0.71	2.74±0.82	2.45±0.64
IMI 1	3.96±0.96	4.26±0.84	3.84±0.99
IMI 7	3.95±0.94	4.02±0.94	3.93±0.95
IMI 8	3.74±1.03	3.66±1.01	3.77±1.04
IMI 13	3.66±1.12	3.86±1.14	3.59±1.10
IMI 17	3.67±1.15	3.53±1.26	3.7 ±1.11
interest/enjoyment	3.80±0.80	3.86±0.79	3.77±0.80

Legend: PAQ-A - Physical Activity Questionnaire for Adolescents; IMI - Intrinsic Motivation Inventory; St.Dev. - Standard deviation

Chi-square independent test showed significant difference between boys and girls in the item IMI 1 ( $\chi^2(1, N=198)=9.53, p=0.04$ ) (A), with boys showing higher enjoyment than girls at PE classes. Test did not show significant differences between

boys and girls in the items IMI 7 ( $\chi^2(1, N=198)=1.61$  (B),  $p=0.81$ ), IMI 8 ( $\chi^2(1, N=198)=1.61, p=0.81$ ) (C), IMI 13 ( $\chi^2(1, N=198)=5.01, p=0.29$ ) (D), and IMI 17 ( $\chi^2(1, N=198)=2.5, p=0.64$ ) (E) (Figure 1).

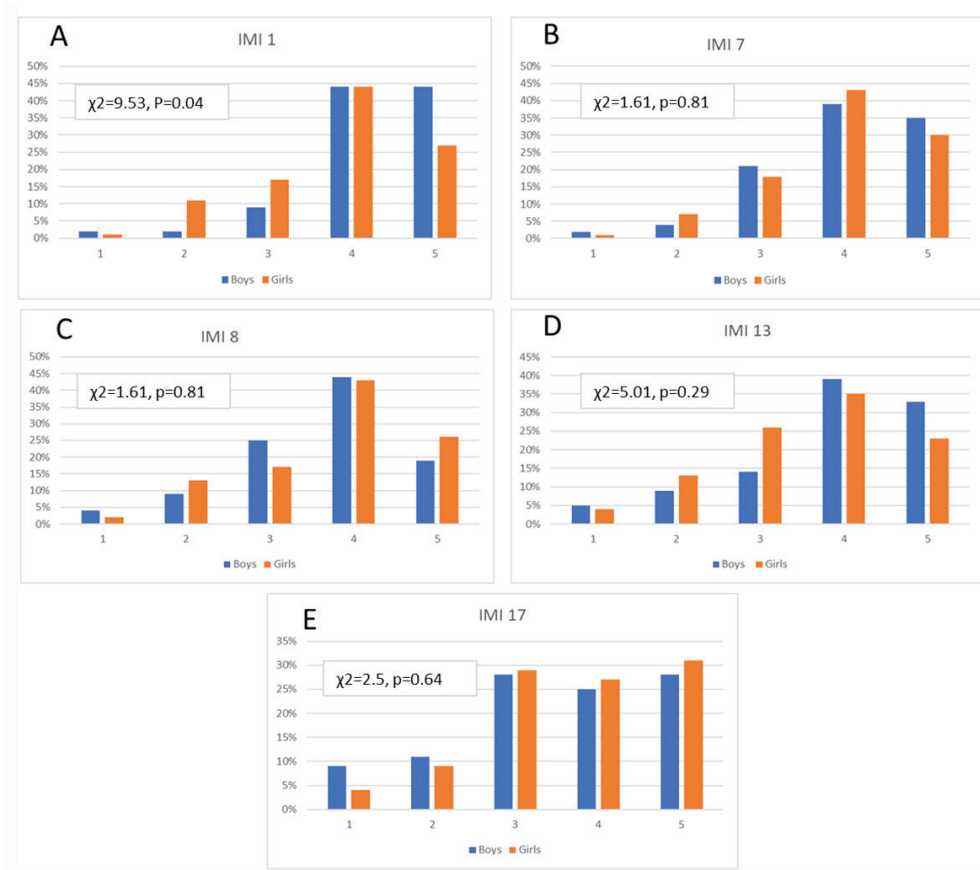


FIGURE 1. Chi-square test for gender differences for items IMI 1 (A), IMI 7 (B), IMI 8 (C), IMI 13 (D), IMI 17 (E)

T-test evidenced a significant difference between boys and girls for PAQ-A ( $t=7.70$ ,  $p=0.00$ ). No significant difference was recorded for the interest/enjoyment of intrinsic motivation.

Pearson's correlation coefficient showed a significant association between PAQ-A and subset interest/enjoyment of intrinsic motivation ( $R= 0.23$ ,  $p<0.05$ ) (Table 2).

**Table 2.** Differences between boys and girls the PAQ-A and subset interest/enjoyment of intrinsic motivation and Pearson's corelation coefficient between PAQ-A and subset interest/enjoyment of intrinsic motivation

Variables	T-test		Pearson's R	
	t	p	PAQ-A	interest/enjoyment
PAQ-A	2.70	0.00	/	0.23
interest/enjoyment	0.76	0.45	0.23	/

**Discussion**

The primary goal of this study was to determine the association of enjoyment in distance learning PE with students' PA, assuming that students who enjoy PE classes will be more physically active. The obtained results confirm a positive association between PA and the dimension of interest/enjoyment in distance learning PE. Furthermore, the results confirm differences by gender in PA, i.e., male students are more physically active than female students.

The results did not establish differences by gender in the interest and enjoyment dimension of intrinsic motivation between male and female students. Thus, it can be said that male and female students similarly enjoy distance learning PE. However, the analysis of individual items of the interest and enjoyment dimension found that male and female students differ significantly in the IMI item 1 ("I really enjoy distance learning physical education"). Specifically, 88% of boys and 71% of girls state that they enjoy PE classes. This is probably because boys are more physically active in their free time than girls (Guthold et al., 2020), and distance learning PE allows them to practice PE in their free time when and where it suits them best. Unlike the usual PE classes, which are held according to a pre-planned and time-limited schedule, distance PE classes are planned differently, i.e., they offer more freedom to both teachers and students in the implementation and organization of the classes. Namely, during distance learning PE, students would receive assignments and activities from their teachers according to the planned schedule, but they did not always have to do assignments in real-time but could do them at a time that suits them best, respecting the agreed deadlines for sending feedback information on completed tasks and activities.

There were no significant differences by gender in the remaining four items of the interest and enjoyment dimensions (IMI 7, IMI 8, IMI 13, and IMI 17); boys and girls stated that the content and practicing online PE classes was equally fun. However, it is interesting that only 19% of boys and 13% of girls stated that the content of distance PE classes can keep their attention even though it is interesting to them. In the author's opinion, this is especially important because distance learning PE is a new concept and students' attention is extremely important to achieve the goals and objectives of the teaching itself. Attention and concentration are two aspects of cognitive function that have a special importance during development because they are key elements in the learning process (Zervas & Stambulova, 1999). It has been shown that even short periods of exercise can contribute to improved attention and concentration (Budde, Voelcker-Rehage, Pietraszyk-Kendziorra, Ribeiro, & Tidow 2008). Therefore, PE classes can be helpful to children and young people to concentrate while learning and

can improve cognitive capacities (Gallotta et al., 2012).

The reasons for students' lack of attention in the distance teaching PE could be found in the fact that students need to learn more independently during distance learning as they do not have the direct support and contact of the teacher. Particularly, in live and regular teaching, the student can get the teacher's answers to all his questions immediately and get additional encouragement, while in distance teaching, this is much harder to achieve as there is no direct contact (Jeong & So, 2020). If distance-learning is held in real-time, it can be effective in classrooms with a smaller number of students, however, in classrooms with 25 or more students; such teaching is difficult and inefficient. In addition, in distance learning, students need significantly more time to master the subject content on their own, resulting in a lack of attention/concentration and losing motivation.

When we talk about the specifics of distance learning PE, it should be aimed at developing students' awareness and importance of their PA in the future, it should encourage students to learn independently and develop their competencies. Specifically, students' attitude towards independent learning is one of the important factors and prerequisites for the effectiveness of distance learning PE (Jeong & So, 2020). Also, teachers should develop strategies for distance learning through which students will form a positive attitude to independent learning, and the evaluation in such teaching should be more flexible (Jeong & So, 2020).

The value/result of the intensity and enjoyment dimension of high school students in this study is 3.80. This is slightly more than the value of the interest and enjoyment dimension obtained in research by Cvenić and Barić (2015), who researched the student population in which this dimension was 3.64. This is probably because by completing high school education, young people become less physically active, less enjoy exercise, put in less effort, and feel less competent to exercise. A study on 2,000 American adolescent girls found that increased enjoyment resulted in increased PA among adolescent girls (Dishman et al., 2005), and a positive association between enjoyment and PA was confirmed in this study as well. However, it should be said that the relationship between the variables is numerically relatively small, and further research should additionally investigate this issue.

**Conclusion**

This research found that girls are generally less physically active than boys and that enjoy distance learning PE less than boys. Therefore, the question arises which content or ways of distance teaching PE would meet students' basic needs, make their classes interesting, and motivate them to be more involved in classes and PA in their free time. Thus, PE teachers



and other educational authorities should develop a distance education program that will be acceptable and interesting to students. Indeed, uninteresting teaching of PE can potentially lead to a decrease in intrinsic motivation in students and a decrease in interest and enjoyment of activities which can ultimately result in a decrease in PA of students. The introduc-

tion of modern technology in the teaching of PE and the more interesting and fun content can increase students' involvement in the teaching process and increase their participation in PA. Therefore, future studies should more detail examine various distance teaching methods in order to develop the most appropriate one for increasing PA of adolescents.

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#### Conflict of Interest

The authors declare that there is no conflict of interest.

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