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Original Article

COMPARISON OF AFFECTIVE RESPONSES DURING SCHOOL PHYSICAL EDUCATION CLASSES WITH DIFFERENT RECOVERY TIMES

COMPARAÇÃO DAS RESPOSTAS AFETIVAS DURANTE AULAS DE EDUCAÇÃO FÍSICA ESCOLAR COM DIFERENTES TEMPOS DE RECUPERAÇÃO

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RESUMO

O objetivo do estudo foi verificar o efeito do tempo de recuperação do exercício nas respostas afetivas durante um treinamento em circuito nas aulas de educação física. Quarenta e seis jovens adolescentes aparentemente saudáveis (vinte e uma meninas), com (12.85 ± 0.94 anos; 49.7 ± 8.93 kg; 1.59 ± 0.08 cm; 19.51 ± 3.28 kg/m^2), participaram do estudo. Os participantes foram submetidos a duas aulas de educação física escolar, baseados em modelo de circuitos de mesma intensidade, porém com tempos de recuperação diferentes (2 min e 1 min). O estudo foi realizado em duas fases: base e intervenção. Os dados de Afeto, Ativação e Percepção Subjetiva do Esforço, foram analisados através de testes t pareados, considerando um nível de significância de $p < 0,05$. A aula com maior tempo de descanso (2 min) proporcionou maior afeto ($t_{(45)} = 3.586$; $p < 0,001$) e menor esforço percebido ($t_{(45)} = 2.295$; $p = 0,026$). A estratégia de manipulação da intensidade foi efetiva para proporcionar respostas afetivas diferentes, em que a aula percebida como mais intensa resultou no declínio do afeto.

Palavras-chave: Respostas afetivas; intensidade do exercício; educação física escolar

ABSTRACT

This study aimed to verify the effect of exercise recovery time on the affective responses during a circuit training in physical education classes. Forty-six apparently healthy young adolescents (twenty-one girls) (12.85 ± 0.94 years; 49.7 ± 8.93 kg; 1.59 ± 0.08 cm; 19.51 ± 3.28 kg/m^2) participated in this study. Were submitted participants for two physical education classes, based on circuited model of the same intensity, but with different recovery times (2 min and 1 min). The study was carried out in two phases: baseline and intervention. Affect, Arousal, and Ratings of Perceived Exertion data were analyzed using paired t-tests, considering a significance level of $p < 0.05$. The class with longer rest time (2 min) provided greater affection ($t_{(45)} = 3.586$; $p < 0,001$) and less perceived effort ($t_{(45)} = 2.295$; $p = 0,026$). The intensity manipulation strategy was effective in providing different affective responses, in which classes perceived as more intense, resulting in the decline of affect.

Keywords: Affective responses; exercise intensity; school physical education

INTRODUCTION

In Brazil, 53.6% of the population with age between 15 and 17 years are practitioners of physical activities, exercises, and/or sports[1]. In contrast, these data also indicate that almost half of these young people does not engage in any type of physical activity, reinforcing the need for actions to increase the energy expenditure on this population and contribute to decrease in the onset of diseases[2]. The benefits of physical activities and exercises are wide established for youngest populations to improve health status and control some chronic diseases[3,4]. For children and adolescents, one of the most favorable environments for physical exercise is through physical education classes at school. However, traditional strategies used in school may not generate the necessary motivation to increase the levels of physical activity and reduce sedentary lifestyle among children and adolescents.

According Schwartz, Rhodes[5], combined strategies seem to be more effective in promoting changes in the physical activity levels of individuals, compared to isolated strategies. In other words, physical education classes should go beyond the practice of sports activities to promote positive experiences[6]. In fact, physical education classes should be a curricular

component that promotes physiological, social, and affective benefits. This agrees with the orientation of the National Curricular Parameters[7] for elementary school, when it points out that the lack of concern for pleasure can impact the exclusion of students and their absence from exercise practices.

The role of teachers seems fundamental to achieve the goal of positive experiences[6]. Negative experiences may lead school withdrawal and decrease academic development[8]. Therefore, it seems relevant to understand how the affective stimuli can improve the adherence of children and adolescent during physical education classes. It is possible that factors such as the type, volume, and intensity of activities may generate unwanted responses. Previous studies demonstrate that youngest population is prone to be influenced by aspects related to exercise intensity [9-12], but not in the school context. Thus, providing approaches that result in pleasurable activities may contribute to increasing adherence to physical exercise[13,14].

Affective responses in physical exercise are continuously modulated by different cognitive functions including self-efficacy, self-representation, and interoceptive responses, which can be influenced by the variation in exercise intensity[15]. According to Ekkekakis[15], in activities of short duration and low intensity, there is a tendency to provide an increase in positive affective responses during and after execution. Additionally, in moderate to vigorous intensities, affective responses may remain positive, although with great possibility for individual variability. On the other hand, strenuous activities tend to promote negative affective responses and then returns to a more favorable condition when compared to the pre-activity moment. Although widely disseminated in studies with continuous aerobic exercises[16], intervals[17] and strength[18], to the best of our knowledge, no study has investigated the impact of exercise intensity on affective responses (pleasure/displeasure) during physical education classes.

The understanding of how the exercise intensity influences the affective responses, can offer a more appropriated approach to deal with the low levels of physical activity by children and adolescents. The main hypothesis of the study is based on the proposals of the dual-mode theory[15], which suggests that less intense activities will generate better pleasure responses and, consequently, better future adherence. Therefore, the aim of this study is to verify the effect of the recovery time (a well-known variable for modulating the intensity of activity) during a circuit training session on the patterns of affective responses in physical education classes.

Methods

Participants

Participated on the study 46 children and adolescents, aged 12.85 ± 0.94 (25 boys and 21 girls), apparently healthy, and regularly enrolled in the school. The participants were recruited for convenience from the College of Application of the Federal University of Pernambuco (PE, Brazil), after authorization from the board of directors. They were included to carry out the study with the permission of parents or guardians and voluntary acceptance. They have performed the interventions in the morning at the multi-sport court of the institution. Participants were included if met the following criteria: a) Children and adolescents aged between 11 and 15 years; b) Be enrolled adequately in elementary school; and c) Deliver the Informed Consent signed by the parents or guardians. Those who did not participated in the school physical education classes at the day of intervention were excluded. The sample size was estimated using the *G-Power* 3.0.10 software, considering the following parameters for *a priori* test for difference between two paired means one tailed: effect size dz of 0.5, α error of 0.05 and a 0.95 power (1 – β), resulting in a suggested number of 45 individuals. This research was approved by the internal Ethics Committee. Formal permission was obtained from school authorities and written informed consent was obtained from parents or legal guardians.

Study design

This research, characterized as experimental and crossover design, evaluated perceptual responses (affect, arousal, and ratings of perceived exertion) during circuit training activities on physical education classes. The study was carried out in two different phases: Baseline and Intervention phase.

Baseline. Initially, all procedures were clarified, and the informed consent form were assigned to those who volunteered to participate. After this stage, familiarization and anchoring procedures with the perceptual scales were performed, through explanations and practical examples. Lastly, anthropometric measurements were performed to characterize the sample.

Intervention. The students were randomized for two different classes physical education, with one week between them. Participants were allocated into two possible orders of intervention (A, B or B, A) according to randomization. Those classes containing the same activities and teaching method, differing only in the time of passive recovery between exercises (2 min vs. 1 min), implying sessions with different average intensities. A circuit training with five stages (sprint, hurdles, jumps, short sprint + jumps and zig zag run) was held in the classes. The students had a 3 min of warm-up before the exercise session, and 3 min of cool down after de intervention. All participants performed the two different protocols (2 min and 1 min). The exercise intensity of interventions was controlled based on RPE and also by the four-point intensity scale 4_{PIS}, in which '0' represents no effort and '4' a very heavy effort. The recovery time between each station on circuit followed as according to randomization (2 min or 1 min), with passive intensity of '0', according to 4_{PIS} scale. The details of the interventions proposed for the school physical education classes are described below in Table 1.

Table 1. Detailing intensity settings in interventions

Class	Warm-up	Intervention	Cool-down
a	3 min	5 x (3 min @ '3' 4_{PIS} / 2 min @ '0' 4_{PIS})	3 min
b	3 min	5 x (3 min @ '3' 4_{PIS} / 1 min @ '0' 4_{PIS})	3 min

Source: Authors

Procedures

Anthropometry. Body mass was evaluated with participants wearing light and barefoot clothing on a scale (Filizola, São Paulo, Brazil) to nearest 0.1 kg. Height was measured with children's head to the Frankfurt plane, using a stadiometer (Filizola, São Paulo, Brazil) with an accuracy of 0.5 cm. In addition, body mass index (BMI) was calculated (kg/m^2).

Affect. Affective response was measured using the Feeling Scale (FS)[19] to determine the affect valence (pleasure and displeasure). This scale consists of an 11-point, with single items, of double polarity, ranging between +5 (very good) and -5 (very bad). Participants received standardized instructions regarding the use of FS in the pre-experimental intervention and at the beginning of the experimental sessions. They have recorded the FS values at the final 15 seconds of each stimulus and recovery stage (before and end). Were used the following sentence to anchor the participants regarding FS: "*This is the Feeling Scale, which presents categories of positive, negative and neutral affect. When asked, you should point out on the scale your affective felling at the moment. There are no right or wrong answers. It is essential that you*

report exactly what you are feeling about your pleasure or displeasure in the activity". The FS already demonstrated high reproducibility in adaptation for Brazilian Portuguese[20], with Intraclass Correlation Coeficient (ICC) of 0.644.

Arousal. Felt Arousal Scale (FAS) was used to measure the degree of arousal during physical exercise, which consists of six items, ranging from 1 (little activated) to 6 (very activated)[21]. Standardized instructions were given to participants during the pre-experimental phase and before each experimental session with the following sentence: "*This is the Felt Arousal Scale, which presents categories ranging from low to high activation. When asked, you should point out on the scale your arousal sensation at the moment. There are no right or wrong answers. It is essential that you report exactly what you are feeling about your arousal in the activity*". The FAS values were recorded at the end of each stimulus and in the final 15 seconds of each recovery (before end). The FAS shows significant effect sizes (d) of 0.97 in comparison between pre and post exercise, indicating large differences in arousal after physical activities [22].

Ratings of Perceived Exertion. Perceived exertion was evaluated using the Eston-Parfitt (E-P) curvilinear Ratings of Perceived Exertion (RPE) Scale[23]. This scale represents a character at various levels of progressively increasing effort up to higher intensities. The E-P scale has verbal anchors 'very easy' (0), 'easy' (2), 'starting to get difficult' (4), 'very difficult' (7) 'so hard that I'll stop' (10). Participants received standardized instructions regarding the use of the scale in the pre-experimental intervention following this sentence "*This is a subjective perceived exertion scale, which presents categories ranging from very easy to very hard effort. When asked, you should point out on the scale your effort sensation at the moment. There are no right or wrong answers. It is essential that you report exactly what you are feeling about your effort in the activity*". The RPE values were recorded at the end of each stimulus and in the final 15 seconds of each recovery (before end). This scale presents individuals coefficients of determination (r^2) of 0.93 and 0.94 [23], suggesting that RPE significantly adjusts to the proposal.

Statistical analysis

After verifying normality through Shapiro-Wilk test, were performed paired t-tests to compare the means between the training strategies (2 min vs. 1 min) for each perceptual variable (FS, FAS, and RPE). In all analyses, a significance level ($p < 0.05$) was adopted. The analyses were conducted in GraphPad Prism 5.0 (v.5.0, GraphPad Software, San Diego, USA) and Microsoft Office Excel spreadsheets (Version 365, Microsoft Corporation, Washington, USA).

RESULTS

The general characteristics of the participants (n = 46) are represented in Table 2. Figure 1 shows the means of each session for the variables of affect, arousal, and RPE, in the comparison between the different training strategies. Significant differences were found to positive affective responses favoring to the training strategy with 2 minutes of recovery ($t_{(45)} = 3.586$; $p < 0.001$); however, no significant differences were found in the arousal responses ($t_{(45)} = 1.337$; $p = 0.187$). For RPE, greater perceived effort to the strategy with 1 minute of recovery were found ($t_{(45)} = 2.295$; $p = 0.026$).

Table 2. Sample characteristics (n = 46)

Variables	Mean ± SD
Age (yrs)	12.85 ± 0.94
Weight (kg)	49.70 ± 8.93
Height (m)	1.59 ± 0.08
BMI (kg/m²)	19.51 ± 3.28

Note: SD = Standard Deviation; BMI = Body Mass Index
Source: Authors

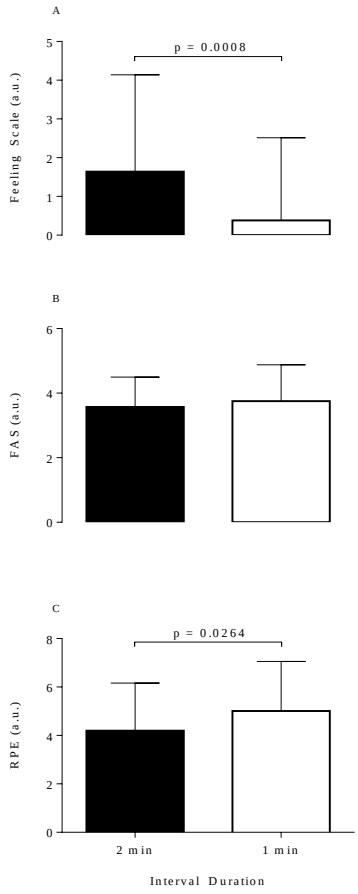

Figure 1. Responses of Feeling Scale (panel A), FAS (Felt Arousal Scale, panel B) and RPE (Ratings of Perceived Exertion, panel C) on each session

Note: a.u. = arbitrary units.
Source: Authors

Figure 2 presents the graphical representation of the circumplex model that associates the data obtained by the Feeling Scale (FS) and the Felt Arousal Scale (FAS). Despite being a schematic representation that makes statistical analyses impossible for hypothesis testing, is observed a large dispersion of the data, with a higher grouping of red dots (1 min) on the left and blue (2 min) on the right. This distribution indicates high levels of arousal in both sessions, with decreases in affect regarding the class perceived as more intense (1 min).

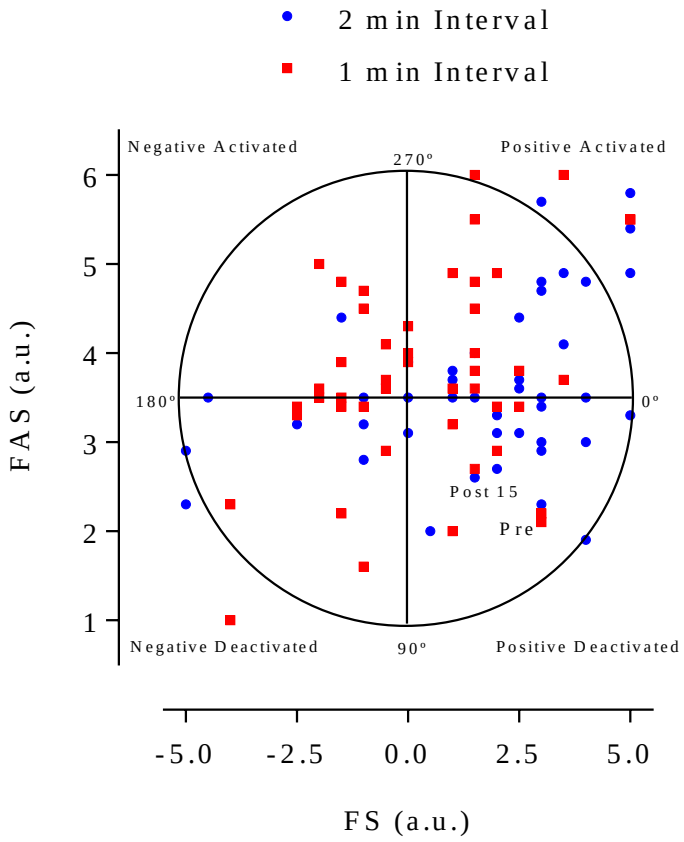

Figure 2. Circumplex model of perceptual responses

Note: FAS = Felt Arousal Scale; FS = Feeling Scale; a.u. = arbitrary units.
Source: Authors

Discussion

The aim of this study was to verify the effect of recovery time during a circuit training sessions on affective responses in physical education classes. Our findings demonstrate a decline in the affective responses during sessions perceived as more intense (1 min). The present study also indicates that the increase of intensity negatively impacts affective responses in physical education classes. It is suggested that the participants experienced greater sensations of pleasure on sessions with longer recovery time (2 min).

According to a recent conceptual model of physical literacy, positive emotional feelings must be considered to provide more efficient approaches, since, only physical aspects like motor performance may be insufficient to promote positive experiences[24]. It has been demonstrated in previous studies that modulation of affect can influence adherence to exercise[11,12,25]. Thus, such aspects need to be considered, especially to maximize positive affective experiences aiming to increase future active behaviour [26,27].

It is possible that a higher intensity caused by low recovery time (1 min), may have determined the reduction in affect, corroborating with Dual-Mode Theory, which emphasizes that increasing the intensity beyond a threshold limit will generate the decline of affective responses[15]. In this perspective, physical education teachers need to be aware of such aspects of classes, with a view to controlling the intensity and avoiding possible negative effects on affective responses.

Arousal can also be related to the scenario of modulation by physical exercise, in which significant increases are accompanied by a reduction in affective valences[9,11,28]. The circumplex model shows that feelings of pleasure have decreased in classes perceived as more intense (higher RPE and FAS), and this can be useful to present the dynamics changes of exercise at different intensities[11]. Our findings do not indicate significant differences in recovery time on arousal. Some studies investigating affective responses in conjunction with activation responses demonstrate similar results [11,29].

For Oliveira, Slama[30], activities with great anaerobic predominance naturally generate negative affective responses and high levels of arousal. Although the negativation of affect be seen as a potential concern for disengagement, it is possible that high levels of arousal indicate greater sustained attention in the activity, suggesting greater cognitive demand[30]. Another possibility discussed by Malik, Williams[31], is that high-intensity exercises are marked by a decrease in affective responses accompanied by increases in arousal, and this is possibly due to mixed feelings impacted by the dynamic characteristics of some activities, in our case circuit training.

The present study presents limitations that need to be highlighted in the interpretation of the results. First, no physiological measures (heart rate, oxygen consumption, or metabolic thresholds) were used to characterize the participants, prescribing, and monitoring the activities, such as no other intervenient variables. However, although extremely relevant, these measures could impact the practical applicability, external and ecological validity found in the real context of physical education classes. A second limitation it is on adopted strategy to modulate the intensity of the physical education classes. Although it showed to be effective in providing adequate rest between stimuli, that way to control the intensity could result in negative consequences for educational experiences. In addition, the present study can serve as an indication for teachers to act in the structuring of an environment that ensures students' motivation and pleasure in participating in classes, using a variety of strategies with specific objectives aimed at building positive psychological responses[32]. Future studies in this line should improve the monitoring of physiological measures during activities and promote follow-up in a chronic way.

Conclusion

Our data show that the intensity of exercise influences the perception of affective responses of the students. The effect of recovery time causes an impact on RPE and on affective responses, resulting and classes perceived as more intense and less pleasurable (1 min) than others (2 min). Thus, school physical education teachers should pay attention to the adequate control of the intensity of their interventions to prevent negative affective responses and your impact on the practice of physical activities.

References

1.IBGE. Pesquisa Nacional por Amostra de Domicílios. In: Estatística IBdGe, Esporte Md, Gestão MdPDe, editors. Rio de Janeiro - Brasil,2017[cited on April, 28, 2022]. p. 81. Available from: https://www.ibge.gov.br/estatisticas/sociais/educacao/9127-pesquisa-nacional-por-amostra-de-domicilios.html?=&t=destaques

2.Battistini NC, Poli M, Malavolti M, Dugoni M, Pietrobelli A. Healthy status and energy balance in pediatrics. Acta bio-medica : Atenei Parmensis. 2006[cited on April, 28, 2022]; 77 Suppl 1:7-13. Available from: https://iris.unimore.it/retrieve/handle/11380/583740/1482/battistini2006.pdf

3.Absil H, Baudet L, Robert A, Lysy PA. Benefits of physical activity in children and adolescents with type 1 diabetes: A systematic review. Diabetes Res Clin Pract 2019;156:107810. Doi: https://doi.org/10.1016/j.diabres.2019.107810

4.Martin A, Booth JN, Laird Y, Sproule J, Reilly JJ, Saunders DH. Physical activity, diet and other behavioural interventions for improving cognition and school achievement in children and adolescents with obesity or overweight. The Cochrane Database of Syst Rev 2018;1(1):Cd009728. Doi: https://doi.org/10.1002/14651858.CD009728.pub3
5.Schwartz J, Rhodes R, Bredin SSD, Oh P, Warburton DER. Effectiveness of Approaches to Increase Physical Activity Behavior to Prevent Chronic Disease in Adults: A Brief Commentary. J Clin Med 2019;8(3). Doi: https://doi.org/10.3390/jcm8030295
6.Niek P, Margaret EW, Elizabeth JD-M. Physical Literacy From Philosophy to Practice. J Teach Phys Educ 2018;37(3):246-51. Doi: https://doi.org/10.1123/jtpe.2018-0133
7.Brasil. Parâmetros Curriculares Nacionais (PCNs). Introdução. Ensino Fundamental. . Brasília: MEC/SEF. 1998[cited on April, 28, 2022]. Available from: http://portal.mec.gov.br/seb/arquivos/pdf/introducao.pdf
8.Harrison N. The impact of negative experiences, dissatisfaction and attachment on first year undergraduate withdrawal. J Furth High Educ 2006;30(4):377-91. Doi: https://doi.org/10.1080/03098770600965383
9.Sheppard KE, Parfitt G. Acute affective responses to prescribed and self-selected exercise intensities in young adolescent boys and girls. Pediatr Exerc Sci 2008;20(2):129-41. Doi: https://doi.org/10.1123/pes.20.2.129
10.Schneider M, Dunn A, Cooper D. Affect, exercise, and physical activity among healthy adolescents. J Sport Exerc Psychol. 2009;31(6):706-23. Doi: https://doi.org/10.1123/jsep.31.6.706
11.Benjamin CC, Rowlands A, Parfitt G. Patterning of affective responses during a graded exercise test in children and adolescents. Pediatr Exerc Sci 2012;24(2):275-88. Doi: https://doi.org/10.1123/pes.24.2.275
12.Hamlyn-Williams CC, Freeman P, Parfitt G. Acute affective responses to prescribed and self-selected exercise sessions in adolescent girls: an observational study. BMC Sports Sci Med Rehabil 2014; 6:35. Doi: https://doi.org/10.1186/2052-1847-6-35
13.Ekkekakis P, Parfitt G, Petruzzello SJ. The pleasure and displeasure people feel when they exercise at different intensities: decennial update and progress towards a tripartite rationale for exercise intensity prescription. Sports med 2011;41(8):641-71. Doi: https://doi.org/10.2165/11590680-000000000-00000
14.Rhodes RE, Kates A. Can the Affective Response to Exercise Predict Future Motives and Physical Activity Behavior? A Systematic Review of Published Evidence. Annals of behavioral medicine : a publication of the Society of Behavioral Medicine 2015;49(5):715-31. Doi: https://doi.org/10.1007/s12160-015-9704-5
15.Ekkekakis P. Pleasure and displeasure from the body: Perspectives from exercise. Cogn Emot. 2003;17(2):213-39. Doi: https://doi.org/10.1080/02699930302292
16.Ekkekakis P. Let them roam free? Physiological and psychological evidence for the potential of self-selected exercise intensity in public health. Sports Med 2009;39(10):857-88. Doi: https://doi.org/10.2165/11315210-000000000-00000
17.Oliveira BRR, Santos TM, Kilpatrick M, Pires FO, Deslandes AC. Affective and enjoyment responses in high intensity interval training and continuous training: A systematic review and meta-analysis. PloS one 2018;13(6):e0197124. Doi: https://doi.org/10.1371/journal.pone.0197124
18.Elsangedy HM, Machado D, Krinski K, Duarte DONPH, GT DEAO, Santos TM, et al. Let the Pleasure Guide Your Resistance Training Intensity. Med Sci Sports Exerc 2018;50(7):1472-9. Doi: https://doi.org/10.1249/MMS.0000000000001573
19.Hardy CJ, Rejeski WJ. Not What, but How One Feels: The Measurement of Affect during Exercise. J Sport Exerc Psychol 1989;11(3):304-17. Doi: https://doi.org/10.1123/jsep.11.3.304
20.Alves ED, Panissa VLG, Barros BJ, Franchini E, Takito MY. Translation, adaptation, and reproducibility of the Physical Activity Enjoyment Scale (PACES) and Feeling Scale to Brazilian Portuguese. Sport Sci Health 2019;15(2):329-36. Doi: https://doi.org/10.1007/s11332-018-0516-4
21.Svebak S, Murgatroyd S. Metamotivational dominance: A multimethod validation of reversal theory constructs. J Pers Soc Psychol 1985;48(1):107-16. Doi: https://doi.org/10.1037/0022-3514.48.1.107
22.Ekkekakis P, Hall EE, VanLanduyt LM, Petruzzello SJ. Walking in (affective) circles: can short walks enhance affect? J Behav Med 2000;23(3):245-75. Doi: https://doi.org/10.1023/a:1005558025163
23.Eston RG, Lambrick DM, Rowlands AV. The perceptual response to exercise of progressively increasing intensity in children aged 7-8 years: validation of a pictorial curvilinear ratings of perceived exertion scale. Psychophysiology. 2009;46(4):843-51. Doi: https://doi.org/10.1111/j.1469-8986.2009.00826.x
24.Cairney J, Dudley D, Kwan M, Bulten R, Kriellaars D. Physical literacy, physical activity and health: Toward an evidence-informed conceptual model. Sports Med 2019;49(3):371-83. Doi: https://doi.org/10.1007/s40279-019-01063-3
25.Schneider M, Dunn A, Cooper D. Affect, exercise, and physical activity among healthy adolescents. Sport Exerc Psychol 2009;31(6):706-23. Doi: https://doi.org/10.1123/jsep.31.6.706
26.Hamlyn-Williams CC, Freeman P, Parfitt G. Acute affective responses to prescribed and self-selected exercise sessions in adolescent girls: an observational study. BMC Sports Sci Med Rehabil 2014;6(1):35. Doi: https://doi.org/10.1186/2052-1847-6-35

27.Schneider M, Cooper DM. Enjoyment of exercise moderates the impact of a school-based physical activity intervention. Int J Behav Nutr Phys Act. 2011;8(1):1-8. Doi: https://doi.org/10.1186/1479-5868-8-64
28.Malik AA, Williams CA, Weston KL, Barker AR. Perceptual Responses to High- and Moderate-Intensity Interval Exercise in Adolescents. Med Sci Sports Exerc 2018;50(5):1021-30. Doi: https://doi.org/10.1249/MSS.0000000000001508
29. Sheppard KE, Parfitt G. Patterning of physiological and affective responses during a graded exercise test in sedentary men and boys. J Exerc Sci Fit 2008[cited on April, 28, 2022];6(2):121-9. Available from: https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.574.3863&rep=rep1&type=pdf
30.Oliveira BR, Slama FA, Deslandes AC, Furtado ES, Santos TM. Continuous and high-intensity interval training: which promotes higher pleasure? PloS one 2013;8(11):e79965. Doi: https://doi.org/10.1371/journal.pone.0079965
31. Malik AA, Williams CA, Weston KL, Barker AR. Perceptual and Cardiorespiratory Responses to High-Intensity Interval Exercise in Adolescents: Does Work Intensity Matter? Med Sci Sports Exerc 2019[cited on April, 28, 2022];18(1):1-12. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6370969/pdf/jssm-18-1.pdf
32. Stych K, Parfitt G. Exploring affective responses to different exercise intensities in low-active young adolescents. J Sport Exerc Psychol 2011;33(4):548-68. Doi: https://doi.org/10.1123/jsep.33.4.548

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