Sport Sciences for Health (2019) 15:329–336
https://doi.org/10.1007/s11332-018-0516-4

ORIGINAL ARTICLE

Translation, adaptation, and reproducibility of the Physical Activity Enjoyment Scale (PACES) and Feeling Scale to Brazilian Portuguese

Elaine Domingues Alves[1] · Valéria Leme Gonçalves Panissa[2] · Bruno José Barros[1] · Emerson Franchini[2] · Monica Yuri Takito[1]

Received: 25 September 2018 / Accepted: 19 November 2018 / Published online: 12 December 2018

Abstract

Purpose The goal of the present study was to translate and adapt the scale of enjoyment "Physical activity enjoyment scale" (PACES) and affect "Feeling scale" (FS) into Brazilian Portuguese, as well as to evaluate their reproducibility.

Method First, the instruments were translated and adapted to Brazilian Portuguese following the recommendations of previous studies. After translating the instruments, 75 subjects participated in two similar experimental sessions (test–re-test) in which they filled the scales. Intraclass correlation coefficient analyses were conducted to evaluate the reproducibility of the scales.

Results The results suggested that the translation was effective, the PACES presented almost perfect reproducibility (CCI = 0.910, 95% CI 0.858, 0.943) and FS high reproducibility (CCI = 0.644, 95% CI 0.425, 0.779).

Conclusion Translation and cultural adaptation to Brazilian Portuguese of the PACES and FS were effective to measure enjoyment and affect in response to an acute session of physical exercise. The data suggested that in a range of 7–14 days the PACES is reproducible. However, for FS, acquisition of baseline values may increase its reproducibility.

Keywords Pleasure · Physical exercise · Affect · Motivation

Introduction

Despite the increase in public policies to promote physical activity, the number of practitioners remains unchanged [1], even though studies indicate that the Brazilian population is aware of physical activity importance for growth, aging, and prevention and treatment of diseases [1, 2]. These results suggest that the adherence to a regular program of physical activity depends not only on a rational decision-making process, in other words, it does not depend exclusively on a collection and analysis of information [3].

Current behavioral theories that are applied to physical activity and physical exercise are based on the rational decision-making process, such as "theory of planned behavior"[4], "transtheoretical therapy" [5], and "social learning theory and the health belief model" [6]. These theories consider the adoption of physical exercise as one of the variables of health behavior, such as brushing teeth or safe sex [3]. However, the correlation of this behavior with other practices is almost non-existent, suggesting that the regulatory processes for adherence to physical exercise are distinct [7] and, for this reason, one should carefully look at the singularities of physical exercise [8]. A recurrent criticism of the rational approach is the absence of the affective or hedonic component [9], which are important determinants for future behavior related to physical activity [10]. This importance may be explained by the behavioral theory, using the concept of operant conditioning proposed by Skinner [11]: each action generates a consequence ("positive reinforcement", "negative reinforcement" or "punishment"), which determines whether the behavior is maintained or extinguished over time.

✉ Elaine Domingues Alves
elaine.alves@usp.br

[1] Department of Human Movement Pedagogy, School of Physical Education and Sport, University of Sao Paulo, Av. Prof. Mello Moraes, 65, Butantã, São Paulo, SP 05508-900, Brazil

[2] Department of Sport, School of Physical Education and Sport, University of Sao Paulo, Av. Prof. Mello Moraes, 65, Butantã, São Paulo, SP 05508-900, Brazil

It has been suggested that exercise-induced sensations exert the function of "reinforcement" or "punishment" [12]. In the literature, terms used for adherence are diverse, such as "fun", "pleasure", "energy" and "enthusiasm" (reinforcements); conversely, terms such as "fear", "pain", "boredom" and "discomfort" (punishments) are associated with disengagement [3]. Considering the great relevance of the affective component for adherence to physical activity, Hardy and Rejeski [13] proposed the "feeling scale" (FS) to evaluate affect in the context of physical exercise. Affect is characterized by the simpler valence response (e.g., good/bad, pleasure/displeasure) that we are able to feel. In other words, they are basic and primitive feelings that resemble reflex responses, since no cognitive elaboration is required for these, such as the immediate response to pain or a child's reaction to taking their toy (she cries for an immediate response of anguish and not for feeling sad) [14].

Unlike the simplicity of affect, the enjoyment constructed in physical exercise is the subject of numerous definitions and discussions about its meaning, often without consensus among them [15]. Kendzierski and DeCarlo [16] proposed an instrument to evaluate this response in physical activity, after an extensive process that began searching in the literature terms related to adherence to exercise and enjoyment, followed by an analysis of three experts and thus the multi-item bipolar-scale, physical activity enjoyment scale (PACES) was created. This scale has shown to be valid to quantify enjoyment after physical activity.

Both instruments have been widely used in studies to assess affect and enjoyment in different types and intensities of physical exercise [17] and regular physical activity [18, 19]. A limiting factor to use these instruments is the language of origin, English. Therefore, it is necessary the translation and cultural adaptation of the terms used for application in the Brazilian Portuguese. Thus, the objective of this study was to translate and adapt the PACES and FS to the Brazilian Portuguese, to test the pre-final version and to evaluate its reproducibility.

Method

FS [13] is a bipolar scale of 11 items that measure the affective response to exercise. It ranges from +5 (very good) to −5 (very bad), with 0 being the neutral value; positive values represent pleasure, while negative values represent displeasure. The anchor used is "How do you feel right now?".

PACES [16] consists of 18 items, each item has two opposite poles (bipolar) that are separated by a 7-point scale (1 = "I enjoy it"; 7 = "I hate it", 4 = "neutral"). Values of each item are summed, the maximum score is 126 points and the minimum 18 points, resulting in a one-dimensional measure of enjoyment in physical activity; the higher the score, the greater the pleasure for the activity. This type of scale is based on the importance of language to express feelings. Some items in the scale should have their values reversed. Figure 1 illustrates which items should have their values reversed.

Translation and cultural adaptation

Translation and cultural adaptation followed the recommendations proposed by Beaton et al. [20]. In the first stage, the instruments were translated from the original language (English) into Brazilian Portuguese by two independent translators with different profiles: one knew the instrument prior to translation and the second did not. The second stage involved a third person who synthesized the two results obtained in the previous stage. This synthesis was translated back into English (third stage) by an English native-speaker with fluency in Brazilian Portuguese and domain of local popular culture. In the fourth stage, all materials collected in the previous stages were reviewed by the translators and researchers involved, and the pre-final version of the two scales was consolidated at this stage. In relation to the PACES, two questions were discussed, the duplicate of a term, which was revised and redefined, and the verbal tense was changed from the present perfect to the simple past, as adapted by Stork et al. [21].

The pre-final version was appreciated by five volunteers (fifth stage) who did not report difficulties of comprehension, but they have difficult to follow the lines of the 18 items. To solve this, we distributed the items in alternating stripes with two colors (gray and blank).

Finally, the translations and cultural adaptation of PACES and FS resulted in intelligible versions, resulting in the final versions of the scales (Figs. 1, 2). The subsequent step was to evaluate the reproducibility of the scales in two similar sessions of physical activity in an interval between 7 and 14 days. The design is presented below.

Subjects

To evaluate the reproducibility of the scales, 89 adults without restrictions for the practice of physical exercises were invited to the study. Eleven subjects were unable to complete the study because they could not perform the re-test within the allowed range and were considered lost to second evaluation. Three subjects that had difficulty to understand the bipolarity of PACES or reading the scale due to visual impairment were excluded from the final sample. Losses and exclusions did not present a significant difference concerning their descriptive characteristics compared to the final sample composed of 75 subjects. All participants agreed to participate after reading the informed consent form and

Por favor, avalie como você se sentiu durante o exercício que acabou de realizar

* Eu adorei	1	2	3	4	5	6	7	Eu odiei
Eu me senti entediado(a)	1	2	3	4	5	6	7	Eu me senti interessado(a)
Eu não gostei	1	2	3	4	5	6	7	Eu gostei
* Eu achei prazeroso	1	2	3	4	5	6	7	Eu não achei prazeroso
* Eu estava engajado(a) nessa atividade	1	2	3	4	5	6	7	Eu não estava nem um pouco engajado(a) nessa atividade
Isso não foi nem um pouco divertido	1	2	3	4	5	6	7	Isso foi muito divertido
* Eu achei energizante	1	2	3	4	5	6	7	Eu achei cansativo
Isso me deixou deprimido	1	2	3	4	5	6	7	Isso me deixou feliz
* Foi muito agradável	1	2	3	4	5	6	7	Foi muito desagradável
* Eu me senti bem fisicamente enquanto fazia essa atividade	1	2	3	4	5	6	7	Eu me senti mal fisicamente enquanto fazia essa atividade
* Foi muito revigorante	1	2	3	4	5	6	7	Não foi nem um pouco revigorante
Eu estou muito frustrado(a) por isso	1	2	3	4	5	6	7	Eu não estou nem um pouco frustrado(a) por isso
* Isso foi muito gratificante	1	2	3	4	5	6	7	Isso não foi nem um pouco gratificante
* Isso foi muito excitante	1	2	3	4	5	6	7	Isso não foi nem um pouco excitante
Isso não foi nem um pouco estimulante	1	2	3	4	5	6	7	Isso foi muito estimulante
* Isso me deu uma forte sensação de realização	1	2	3	4	5	6	7	Isso não me deu uma forte sensação de realização
* Isso foi muito revitalizante	1	2	3	4	5	6	7	Isso não foi nem um pouco revitalizante
Eu me senti como se houvesse outras coisas em que eu preferisse estar fazendo	1	2	3	4	5	6	7	Eu me senti como se não houvesse nada mais que eu preferisse estar fazendo

Fig. 1 Translation and cultural adaptation of the physical activity enjoyment scale (PACES). Asterisk denotes reversal when scoring

Como você está se sentindo agora?

+5	Muito bem
+4	
+3	Bem
+2	
+1	Razoavelmente bem
0	Neutro
-1	Razoavelmente mal
-2	
-3	Mal
-4	
-5	Muito mal

Fig. 2 Translation and cultural adaptation of the feeling scale (FS)

all procedures were approved by the local ethics committee (CAAE: 64507416.2.0000.5391).

Study design

In the first session, all participants signed the informed consent form and self-reported their level of physical activity, body mass and height. Sequentially, they performed a steady-state activity at self-selected rhythm for 20 min. After 7–14 days from the first session, all participants performed again for 20 min at self-selected rhythm (Fig. 3). Subjects were asked to keep pace as in the first session.

Experimental protocol

All participants completed a 20-min activity of walk/run at self-selected pace (after 2 min of warm-up and 1 min of cool-down) (Fig. 3) on a suggested course at the university campus which ended in a track, where the participants kept the activity until the end of the proposed time. In this way, it was possible to determine the total distance covered. Prior

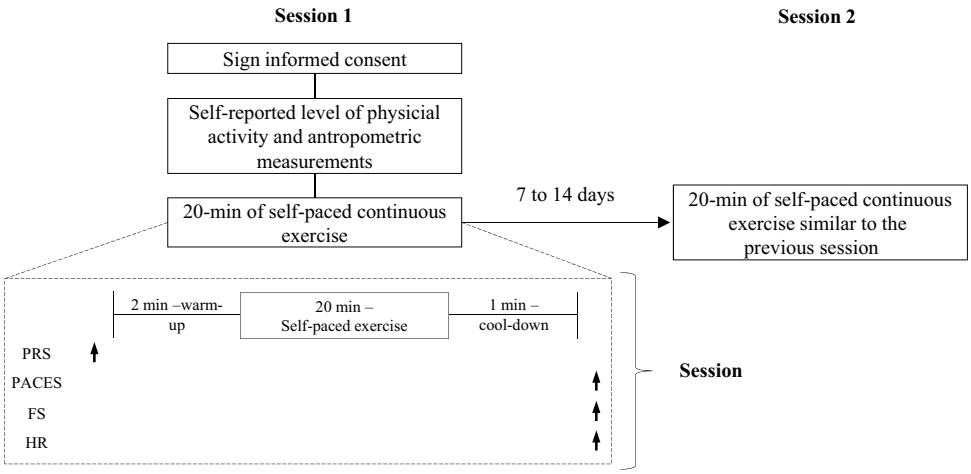

Fig. 3 Study design. *PRS* perceived recovery status scale, *PACES* physical activity enjoyment scale, *FS* feeling scale, *HR* heart hate

to the activity, all participants reported their state of recovery through the perceived recovery status scale (PRS) [22], aiming to compare whether the two sessions were started in a similar recovery status. Immediately after 20 min of self-select pace, the participants were asked to assess their heart rate; the measure of the heart rate was made by radial artery palpation for 15 s and values multiplied by 4. After the cool-down, the subjects filled the PACES, FS and the number of laps performed on the track. During training sessions, the subjects regularly measured their own heart rate. Trained physical education undergraduate students measured heart rate when the subject answered that they could not make the measurement or have some difficulty to measure. A reduced replica of the track was printed for volunteers to mark where they were at the end of the task, which allowed us to calculate the distance covered.

Statistical analysis

Descriptive analyses were conducted using SPSS version 23.0. Data are presented as mean ± standard deviation. An unpaired Student *t* test was performed with the dependent variable (PACES and FS at the first session) to identify differences between groups (as sex and level of physical activity). This analysis was performed to assure that we could compare reproducibility in a sample with different characteristics (sex and physical activity level). To compare variables in both sessions, a paired Student *t* test was used. Intraclass coefficient correlation (ICC), typical error (TE) and coefficient of variation (CV = standard deviation/average × 100) were calculated to verify the reproducibility of the variables measured, considering the classification proposed by Hopkins et al. [23]. Smallest worthwhile change (SWC) was also calculated to verify the usefulness (0.2, 0.6 and 1.2 multiplied by the standard deviation between subjects and based in effect size as small, medium and large respectively, with a typical error of each one) [23]. Comparison between TE and SWC allows evaluating variables as marginal when TE is superior to SWC, medium when they are similar and good when TE is inferior to SWC, according to the test to detect small (0.2), medium (0.6) and large (1.2) differences. Another variable calculated was the minimal detectable change (MDC) that could indicate a true change in the variables [24]. Confidence limits and probabilities related to threshold magnitudes can be derived readily via Hopkins spreadsheet [23]. To verify the relationship between the investigated variables, the Pearson correlation coefficient was used. The significance level was set at $p < 0.05$.

Results

The sample composed of 75 adults (33 men and 42 women), between 19 and 63 years, included 88% physically active individuals (≥ 150 min/week), and 59% overweight/obese individuals. Regarding differences in the first session between subjects, there was no difference in first PACES evaluation ($t_{75} = -0.302$; $p = 0.769$, $d = 0.12$) between active (95.3 ± 21.7 a.u.) and non-active subjects (97.8 ± 23.0 a.u.) or between men (92.9 ± 16.5 a.u.) and women (95.4 ± 24.2 a.u.) ($t_{75} = 0.530$; $p = 0.597$, $d = -0.11$). The results were similar for the first FS evaluation, i.e., there was no difference ($t_{71} = -0.038$; $p = 0.971$, $d = -0.01$) considering between active (3.33 ± 1.41 a.u.) and non-active (2.89 ± 1.96 a.u.) or between men (3.28 ± 1.65 a.u.) and women (3.27 ± 1.45 a.u.) (t_{70}: −0.017; $p = 0.987$, $d = 0.00$).

Regarding differences between first and second sessions, there were no significant differences for PACES ($t_{74} = 0.185$; $p = 0.854$, $d = 0.01$), FS ($t_{68} = 0.077$; $p = 0.939$, $d = 0.01$), PRS ($t_{71} = 0.057$; $p = 0.954$, $d = 0.01$), heart rate ($t_{71} = -1.122$; $p = 0.266$, $d = -0.13$), and total distance covered ($t_{74} = 0.525$; $p = 0.601$, $d = 0.03$); the mean and standard deviation values are shown in Table 1.

Table 1 Measures of reproducibility and usefulness of psychological, physiological and metric responses

	PACES (a.u.)		FS (a.u.)		PRS (a.u.)		HR (bpm)		Distance (m)	
	Session		Session		Session		Session		Session	
	1	2	1	2	1	2	1	2	1	2
Mean	94.3	94.1	3.3	3.3	6.5	6.4	110	113	2209	2187
±SD	±21.1	±21.3	±1.5	±1.5	±2.4	±2.4	±27	±26	±746	±693
ICC	0.910		0.644		0.774		0.716		0.938	
($CI_{95\%}$)	(0.858; 0.943)		(0.425; 0.779)		(0.638; 0.858)		(0.546; 0.822)		(0.899; 0.960)	
Means difference	−0.3		0.0		0.0		3		−21	
($CI_{95\%}$)	(−3.1; 2.5)		(−0.4; 0.4)		(−0.5; 0.5)		(−3; 9)		(−103; 60)	
Typical error	8.6		1.1		1.5		18		250	
($CI_{95\%}$)	(7.4; 10.3)		(0.94 1.3)		(1.3; 1.7)		(15; 21)		(215; 298)	
CV (%)	7.43%		24.40%		21.75%		12.69%		8.04%	
SWC										
0.2	4.2		0.3		0.5		5		144	
0.6	12.7		0.9		1.4		15		432	
1.2	25.4		1.8		2.8		31		811	
MDC	23.9		3.1		4.0		49		692	

PACES physical activity enjoyment scale, *FS* feeling scale, *PRS* perceived recovery status scale, *HR* heart rate, *SD* standard deviation, *ICC* intraclass correlation coefficient, *CI* confidence interval, *TE* typical error, *CV* coefficient of variation, *SWC* smallest worthwhile change, *MDC* minimum detectable change

Table 1 presents the reproducibility measurements as ICC and the usefulness of PACES and FS, as well as indicators of exercise conditions as distance covered, physiological response (heart rate), and recovery before exercise. For PACES, ICC was classified as almost perfect, TE was nine points in a range of 108 points and CV was 7%. For FS, ICC was classified as large, the TE was 1 point in a range of 11 points, and CV was 24%. Figure 4 presents the data dispersion in the test and re-test, as well as the difference between them.

There were no significant correlations between PACES delta and variation in recovery ($r = -0.057$, $p = 0.636$), and total distance covered ($r = 0.141$; $p = 0.228$). Variation between test and re-test showed a positive correlation between PACES and FS ($r = 0.326$; $p = 0.006$, moderate).

In the first session, there was a positive correlation between PACES and FS ($r = 0.558$; $p < 0.001$, large) and there was a negative correlation with total distance covered ($r = -0.254$; $p = 0.028$, small). FS did not show significant correlation ($p > 0.05$) with other variables. There was a positive correlation between total distance covered and heart rate ($r = 0.421$; $p < 0.001$, moderate).

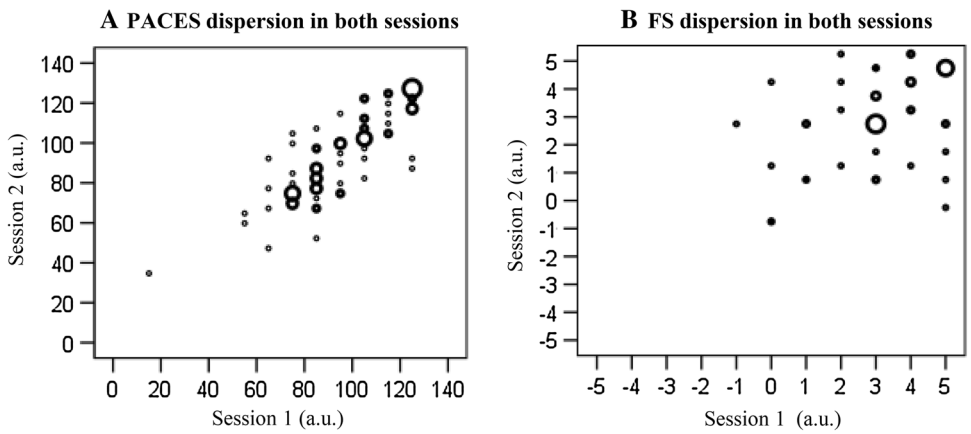

Fig. 4 Grapichal representation of the dispersion of the physical activity enjoyment scale (PACES) in the panel (**A**), and feeling scale (FS) in the panel (**B**), in the two exercise sessions

Discussion

The methodology used for translation and adaptation of the scales for the Brazilian Portuguese versions resulted in understandable text for both scales, with great reproducibility value for FS and almost perfect for PACES.

The reproducibility of FS was observed and discussed by Unick et al. [25] in a study with inactive obese women, who performed three experimental sessions on a treadmill using the same intensity. FS was measured at seven moments (pre-exercise, during exercise every 5 min, and after exercise), and the ICC was used to analyze the reproducibility of all moments (0.60, 0.72, 0.77, 0.69, 0.81, 0.85, 0.85, 0.76, respectively). The authors also assessed the consistency of affect change during exercise across all three sessions, adjusted to the pre-exercise affect score (ICC = 0.72) and using the response to exercise (ICC = 0.60). These results showed the importance of controlling the affect prior to exercise, suggesting that the affective response at the end of the exercise session is not able to predict how the affective responses will be to the same exercise performed subsequently since affect is influenced by external and internal factors [26]. For this reason, the authors warn that additional care should be taken when using this scale, such as familiarization and always measuring the baseline value to use as a control for analysis.

The present study did not take these precautions, which can be considered one of its limitations and could explain why our post-exercise reproducibility was inferior to that found by Unick et al. [25]. Another limitation could be uncontrolled variables. Despite the recommendation to the participants to perform at a similar intensity, other external variations may have influenced the results, such as temperature variation that oscillated up to 12 degrees for some subjects. On the other hand, the lack of familiarization did not prove to be a problem for the translated version of the PACES, which presented a high reproducibility, as well as in its original version [16] (ICC = 0.93) for the jogging situation in minitrampoline ($n = 21$). However, in a cycle ergometer exercise ($n = 16$), in a sample composed of adults (14 women and 23 men), the reproducibility was lower (ICC = 0.60). According to the authors, this difference may have occurred due to the lack of information to the participants that they would perform the activity with similar intensity. However, it is not possible to confirm this hypothesis, since there was no record of the intensity performed, differently from the present study.

The scale proposed by Kendzierski and DeCarlo [16] was initially developed to measure pleasure in relation to exercise but was modified to the practice of regular physical activity. In this way, some adaptations of the scale were performed by Motl et al. [19], who reduced the scale to 16 items, eliminated the bipolar characteristic and modified the anchors "When I am active I …/When I am in physical education class…". This new version was evaluated in German by Jekauc et al. [27], presenting an ICC equal to 0.76 in a sample composed of 109 boys and 87 girls.

Mullen et al. [28] created a reduced version of the PACES, with eight items. This version was validated to evaluate the variation of enjoyment over a year of regular physical activity by elderly individuals. A translation of this version was validated in Portuguese athletes and did not present differences between sports and gender [29]. Despite reduced adaptation of the scale, the anchor prior to its completion remained the same as the original scale "Please rate how you feel at the moment about the physical activity you have been doing".

Both aforementioned studies used the PACES to evaluate the enjoyment resulting from the regular practice of physical exercise, which differs from its application in studies that aimed to evaluate enjoyment in a single session of exercise. This was the case of Jung et al. [17] who, to reach this goal, adapted the anchor, which asked the participants at the time of filling the scale to think about the exercise they had completed that day and then to classify the pleasure according to this memory. These authors proposed an additional question to quantify how much enjoyment the subjects had felt in the exercise they had just completed. In this new question, the verbal time in the past was used, as in the adaptation carried out in the present study, where there was a directing of the application of the PACES to this specific situation (an acute session of physical exercise) and not the regular practice of physical activity.

Backhouse et al. [30], discussing the current paradox between the sensations provoked by the exercise, warn that we must observe carefully how the affective responses behave throughout the exercise because often there is a contradiction between the sensations during and after the exercise. According to Rachlin [31], human nature tends to prefer immediate reinforcements over delayed reinforcements, although the sense of this delay varies among subjects. Thus, the present PACES adaptation to Brazilian Portuguese can be used to quantify enjoyment, as well as FS to quantify pleasure, in response to an exercise session. Thus, these scales can be used to recall the immediate sensations related to exercise performed.

Conclusion

The findings of this study allow us to conclude that PACES and FS adaptation and translation into Brazilian Portuguese were effective to measure enjoyment and affect in an acute session of physical exercise in men and women, including both physically active and non-active subjects. Additionally,

PACES data are reproducible in an interval of 7–14 days. However, to increase FS reproducibility, baseline values must be obtained prior to exercise.

Acknowledgements Elaine Alves was supported by Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq 133949/2017-6), Valeria Panissa was supported by Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP 2015/11302-3 and 2017/07304-6), Emerson Franchini was supported by FAPESP (2017/08167-2), and CNPq (302242/2014-7) and Monica Takito was supported by FAPESP (2017/19280-4).

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest relating to the publication of this manuscript.

Ethical approval All procedures were approved by institutional ethic review of the School of Physical Education and Sport, University of São Paulo, Brazil (CAAE: 64507416.2.0000.5391) and was performed according to the 1964 Declaration of Helsinki amendment in 2013.

Informed consent All participants agreed to participate after reading the informed consent form with their written consent.

References

1. Sallis JF, Bull F, Guthold R, Heath GW, Inoue S, Kelly P, Oyeyemi AL, Perez LG, Richards J, Hallal PC (2016) Progress in physical activity over the Olympic quadrennium. Lancet 388:1325–1336. https://doi.org/10.1016/S0140-6736(16)30581-5
2. Domingues MR, Araújo CLP (2004) Conhecimento e percepção sobre exercício físico em uma população adulta urbana do sul do Brasil. Cadernos de Saúde Pública 20:204–215. https://doi.org/10.1590/S0102-311X2004000100037
3. Ekkekakis P, Dafermos M (2012) Exercise is a many-splendored thing, but for some it does not feel so splendid: staging a resurgence of hedonistic ideas in the quest to understand exercise behavior. Oxford University Press, Oxford
4. Ajzen I (1991) The theory of planned behavior. Organ Behav Hum Decis Process 50:179–211. https://doi.org/10.1016/0749-5978(91)90020-T
5. Prochaska JO, Di Clemente CC (1982) Transtheoretical therapy: Toward a more integrative model of change. Psychotherapy 19:276–288. https://doi.org/10.1037/h0088437
6. Rosenstock IM, Strecher VJ, Becker MH (1988) Social learning theory and the health belief model. Health Educ Q 15:175–183. https://doi.org/10.1177/109019818801500203
7. Newsom JT, McFarland BH, Kaplan MS, Huguet N, Zani B (2005) The health consciousness myth: Implications of the near independence of major health behaviors in the North American population. Soc Sci Med 60:433–437. https://doi.org/10.1016/j.socscimed.2004.05.015
8. Rhodes RE, Nigg CR (2011) Advancing physical activity theory: a review and future directions. Exerc Sport Sci Rev 39:113–119. https://doi.org/10.1097/JES.0b013e31821b94c8
9. van der Pligt J, Zeelenberg M, van Dijk WW, de Vries NK, Richard R (1997) Affect, attitudes and decisions: let's be more specific. Eur Rev Soc Psychol 8:33–66. https://doi.org/10.1080/14792779643000074
10. Bryan A, Hutchison KE, Seals DR, Allen DL (2007) Psychological correlates of voluntary exercise. Health Psychol 26:30–39
11. Skinner BF (1953) Science and human behavior. The Free Press, New York
12. Annesi JJ (2005) Relationship between before-to-after-exercise feeling state changes and exercise session attendance over 14 weeks: testing principles of operant conditioning. Eur J Sport Sci 5:159–163. https://doi.org/10.1080/17461390500387056
13. Hardy C, Rejeski W (1989) Not what, but how one feels: the measurement of affect during exercise. J Sport Exerc Psychol 11:304–317. https://doi.org/10.1123/jsep.11.3.304
14. Ekkekakis P, Petruzzello SJ (2000) Analysis of the affect measurement conundrum in exercise psychology I. Fundam Issues 1:71–88
15. Kimiecik JC, Harris AT (1996) What is enjoyment ? A conceptual/definitional analysis with implications for sport and exercise psychology. J Sport Exerc Psychol 18:247–263. https://doi.org/10.1123/jsep.20.3.247
16. Kendzierski D, DeCarlo KJ (1991) Physical activity enjoyment scale: two validation studies. J Sport Exerc Psychol 13:50–64
17. Jung ME, Bourne JE, Little JP (2014) Where does HIT fit? An examination of the affective response to high-intensity intervals in comparison to continuous moderate and continuous vigorous-intensity exercise in the exercise intensity-affect continuum. PLoS One 9:1–18. https://doi.org/10.1371/journal.pone.0114541
18. Williams DM (2012) Exercise, affect, and adherence: an integrated model and a case for self-paced exercise. J Sport Exerc Psychol 30:1–26. https://doi.org/10.1007/s10955-011-0269-9. Quantifying
19. Motl RW, Dishman RK, Saunders R, Dowda M, Felton G, Pate RR (2001) Measuring enjoyment of physical activity in adolescent girls. Am J Prev Med 21:110–117. https://doi.org/10.1016/S0749-3797(01)00326-9
20. Beaton D, Bombardier C, Guillemin F, Ferraz MB (2007) Recommendations for the cross-cultural adaptation of the DASH & QuickDASH outcome measures. Am Acad Orthop Surg Inst Work Health 1:1–45
21. Stork MJ, Kwan MYW, Gibala MJ, Martin Ginis KA (2015) Music enhances performance and perceived enjoyment of sprint interval exercise. Med Sci Sports Exerc 47:1052–1060. https://doi.org/10.1249/MSS.0000000000000494
22. Laurent CM, Green JM, Bishop PA, Sjökvist J, Schumacker RE, Richardson MT, Curtner-Smith M (2011) A practical approach to monitoring recovery: development of a perceived recovery status scale. J Strength Cond Res 25:620–628. https://doi.org/10.1519/JSC.0b013e3181c69ec6
23. Hopkins WG (2000) Measures of reliability in sports medicine and science. Sports Med 30:375–381. https://doi.org/10.2165/00007256-200030050-00006
24. Weir JP (2005) Quantifying test-retest reliability using the intraclass correlation coefficient and the SEM. J Strength Cond Res 19:231–240. https://doi.org/10.1519/15184.1
25. Unick JL, Strohacker K, Papandonatos GD, Williams D, O'Leary KC, Dorfman L (2015) Examination of the consistency in affective response to acute exercise in overweight and obese women. J Sport Exerc Psychol 37:534–546. https://doi.org/10.1123/jsep.2015-0104
26. Rejeski WJ (1985) Perceived exertion: an active or passive process? J Sport Psychol 7:371–378. https://doi.org/10.1123/jsp.7.4.371
27. Jekauc D, Voelkle M, Wagner MO, Mewes N, Woll A (2013) Reliability, validity, and measurement invariance of the german version of the physical activity enjoyment scale. J Pediatr Psychol 38:104–115. https://doi.org/10.1093/jpepsy/jss088
28. Mullen SP, Olson EA, Phillips SM, Szabo AN, Wójcicki TR, Mailey EL, Gothe NP, Fanning JT, Kramer AF, McAuley E

(2011) Measuring enjoyment of physical activity in older adults: invariance of the physical activity enjoyment scale (paces) across groups and time. Int J Behav Nutr Phys Act 8:103. https://doi.org/10.1186/1479-5868-8-103

29. Monteiro D, Nunes G, Marinho DA, Couto N, Antunes R, Moutão J, Cid L (2017) Translation and adaptation of the physical activity enjoyment scale (PACES) in a sample of Portuguese athletes, invariance across genders nature sports and swimming. Rev Bras Cineantropom Desempenho Hum 19:631–643. https://doi.org/10.5007/1980-0037.2017v19n6p631
30. Backhouse SH, Ekkekakis P, Biddle SJH, Foskett A, Williams C (2007) Exercise makes people feel better but people are inactive: paradox or artifact? J Sport Exerc Psychol 29:498–517. https://doi.org/10.1123/jsep.29.4.498
31. Rachlin H (1989) Judgment, decision, and choice: a cognitive/behavioral synthesis. WH Freeman & Co, New York