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The situational motivation scale in the exercise context: Construct validity, factor structure, and correlational analysis

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Abstract

The purpose of this study was to: a) translate and adapt the Situational Motivational Scale (SIMS) in a sample of Portuguese exercisers and examine the factor structure of the scale; and b) evaluate discriminant validity and internal consistency of the factors, as a way to determine multidimensionality. Additionally, we sought to determine the correlational validity of the scale by examining exerciser motivation on enjoyment and exercise participation. Participants were 264 Portuguese exercisers (female = 157) aged between 18 and 69 years, with a mean exercise experience of 5.73 years. Exercisers completed a multi-section survey assessing their situational motivation towards exercising. Several model specifications were tested, namely confirmatory and exploratory factor models. The results of this research support all three hypotheses: (i) that the translation and item adaptation were done correctly, and that the measurement model showed acceptable fit to the data; (ii) the discriminant validity of the factors as well as acceptable internal consistency; and (iii) the correlational validity of exercisers' motivation with enjoyment and exercise frequency.

Keywords Exercise · Situational motivation · Enjoyment · Scale validation

Introduction

Motivation is considered as a central determinant to exercise adherence. More specifically, motivation research, which has been used extensively to assess exercise persistence, has provided crucial insights into the reasons why some individuals demonstrate an enduring will to maintain physical exercise in the long-term and others not (Hagger & Chatzisarantis, 2008; Teixeira et al., 2012). However, to date, most of this research has been assessed at the contextual level and has not considered how exercisers' motivations are experienced during training sessions and why they are you currently engaged in physical activity. As stated by Vallerand and Rousseau (2001), research should lead to a greater understanding of the processes that underlie motivation in the sport and exercise context. Thus, more research is warranted concerned to the motivational processes related to exercising.

Till date, most of the measurement of motivation has been conducted at the contextual level (Rodrigues et al., 2018), meaning that there is still room to improvements on understanding why individuals engage in exercise and what drives them to continue doing it on the long-term. While Guay et al. (2000) developed the Situational Motivation Scale (SIMS) designed to assess an individual's situational motivation tapping on intrinsic motivation, extrinsic motivation, and amotivation, this scale has been used predominately in the educational context. Indeed, there seems to be no attempt on examining the factor structure of the SIMS in the exercise context, evaluating why individuals engage in exercise at the situational level. As stated by Vallerand (2001), the development of measures designed to assess multifaceted motivation at the various levels of generality is an important step if we are to examine the fundamental tenets of motivation in physical activity contexts. A greater understanding of exercisers' motivations has the potential to enhance our knowledge and understanding how these individuals regulate their behavior towards exercising. Furthermore, it is important to understand the link between exercisers' motivations and their experience of enjoyment and exercise adherence, to provide professionals

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with the necessary tools to adapt their behaviors according to why individuals are currently exercising as mean to promote continuous adherence.

Conceptual Framework

Self-Determination Theory (SDT; Ryan & Deci, 2017) is a contemporary motivational framework because it helps explain exercise motivation (Rodrigues et al., 2018). Specifically, why individuals engage in physical exercise and the underlying motives for participating in exercise. According to SDT, motivation assumes different forms (quality) of regulations depending on the degree of self-determined regulation (Deci & Ryan, 1985; Howard et al., 2017). At the far end of the motivational continuum is amotivation, representing the lack of intention to engage in a given behavior. As individuals progress along the motivational continuum, different extrinsic forms of motivation arise, characterized as those activities that yield specific outcomes in terms of rewards or avoiding self-imposed pressures. External regulation is defined by the behavior being controlled by external contingencies such as rewards and praise. Introjected regulation is characterized by the self-imposed pressures, such as shame or guilt. More self-determined, identified regulation explicitly recognizes the behavior as valued by the individual; that is, the person assumes the behavior as personally important. Next along the continuum is identified regulation, which is the most autonomous form of extrinsic motivation where the behavior is fully recognized into personal values and beliefs. Intrinsic motivation represents the prototype of self-determined behavior, being represented by inherent interest, enjoyment, and spontaneous pleasure enacting the behavior (Howard et al., 2017).

Despite the extensive research investigating the motivation of exercisers, there has been limited research examining motivation at the situational level. That is, most of existing literature has focused on the context level, how individuals regulate their behavior towards exercising in an overall form (Rodrigues et al., 2018). Research on the motivational regulations of exercise is important because it helps fitness professionals to adapt accordingly to the experience exercisers are having during the training session at that specific moment. The climate fitness professionals create, in turn, shapes the quality of the exerciser's experience, including their intentions to continue training in the future (Rodrigues et al., 2019). Thus, self-determined motivation at the situational level can play an important role in how fitness professionals' function in exercise prescription settings.

The Measurement of Motivation

Measuring motivation within the lens of SDT and at the contextual level has long been investigated. However, at the situational levels, there is only one known and robust measure specific to assessing behavioral regulations. Guay et al. (2000) created the SIMS in the educational context, which was found to have both empirical and theoretical support.

For the development of the SIMS, Guay et al. (2000) asked a "*committee of experts (i.e., graduate students and teachers) to generate a pool of items in line with the conceptual definition of intrinsic motivation, identified regulation, external regulation, and amotivation and to word them so as to indicate the underlying reasons for participating in an activity*" (p. 182). After careful reviewing the proposed 50 items, 26 items were extracted and put to the test, since the other 20 items were deleted because they presented some conceptual ambiguities with the operational definition of the four behavioral regulations inherent in the questionnaire. After psychometric examination across two interrelated studies, Guay et al. (2000) stated support for the four-correlated factor structure of the 16-item SIMS final version. In sum, the 16 items of the SIMS measures four forms of motivation (amotivation, external, identified, and intrinsic motivation). Standage et al. (2003) latter reviewed the 16-item SIMS, showing that a 14-item solution better fitted the data, explaining that two items cross-loaded significantly and that given such cross-loadings violate the exclusive item association of questionnaire development, these two items were removed from further analysis. The new 14-item model solution provided acceptable fit, representing adequate construct validity. Lonsdale et al. (2011) support the 14-item model solution showing that the 14 items inherent in the SIMS provide adequate fit and that the factors displayed acceptable reliability. Additionally, nomological validity was established, displaying consistent associations among theoretical constructs such as behavioral intentions (Guay et al., 2000), and physical activity participation (Gao et al., 2013). Since the support for its validity and reliability, the SIMS has been used as a valid and reliable measure in other studies (Gao et al., 2013). Additionally, the SIMS has been psychometrically supported by translated versions (Gamboa et al., 2017; Martín-Albo et al., 2009; Østerlie et al., 2019), showing that this scale is robust in measuring motivation at the situational level. The research done with the SIMS highlights not only the importance of the scale for motivation research, but also the importance of translating the scale to different languages and adapting it to specific cultures in order to reflect the characteristics of the population more adequately being examined. For instance, the SIMS has been adapted to reflect the variations in the use of specific words pertaining to the academic context in Norwegians (Østerlie et al., 2019) and Spanish (Martín-Albo et al., 2009). However, to the best of our knowledge, this scale has not been psychometrically tested in other contexts such as the exercise domain.

Correlates of Motivation

Previous research in the exercise context considering SDT as the conceptual framework emphasizes the relationship between the degree of self-determined motivation (e.g., intrinsic motivation and identified regulation) and several positive behavioral outcomes, such as increased enjoyment (Teixeira et al., 2020), and higher levels of persistence and adherence (Rodrigues et al., 2020). On the contrary, less self-determined regulations (e.g., amotivation, external regulations) require external motivational sources to perform a specific behavior, making behavior withdrawal more likely to occur (Ryan & Deci, 2017).

Enjoyment has been described as the process of experiencing satisfaction, joy and pleasure during the performance of a particular behavior (Mullen et al., 2011). Considering previous literature, enjoyment has been associated in numerous studies with intrinsic motivation (Rodrigues et al., 2018). In fact, considering that intrinsically motivated individuals feel pleasure underlying a particular behavior, it is theoretically expected that these individuals would experience also great levels of enjoyment and positive emotional outcomes (Ryan & Deci, 2017). Thus, individuals who are more self-determined to engage in exercise, who feel that their actions are pursued solely due to the interest inherent in engaging in the behavior, it is expected to experience greater levels of enjoyment. Consequently, enjoyment has been considered to be a significant predictor of exercise practice (Rodrigues et al., 2019). As stated by Jekauc and Brand (2017) it is anticipated that behaviors (e.g., physical activity) individuals like and experience pleasure will be pursued with greater engagement and commitment than activities they do not like. In this regard, individuals who like exercising and feel enjoyment are those who intend to continue exercising in the future. While enjoyment seems to play a mediator role in the relationship between motivation and exercise adherence, most research is at the contextual level (Rodrigues et al., 2020), meaning that we cannot generalize previous literature to all levels of generality (Vallerand, 2001). Thus, more studies are warranted to examine the association among behavioral regulations, enjoyment, and the level of exercise adherence.

The Present Study

Empirical studies exploring the factor structure of the SIMS in the exercise context are virtually inexistent. Indeed, to the best of our knowledge, no study has ever tested the SIMS examining exercisers' motivation during training sessions at the situational level. While previous research has supported the psychometric proprieties of the SIMS in different context such as the sport and school domain (Guay et al., 2000; Lonsdale et al., 2011; Martín-Albo et al., 2009), no research has ever tested this scale in exercisers participating in regular physical activity in gym and health clubs. When it comes to the measurement of motivation, Ryan (1995) explains the need to use context validated scales to measure constructs inherent to the SDT framework. In this regard, important methodological limitations associated with non-adaptation of questionnaires could compromise results displayed in previous and future studies (Chen, 2008). The use of the SIMS in without proper translation and adaptation in Portuguese exercisers would present unreliable results and thus, interventions to promote self-determined motivation could be compromised. Hence, the purpose of this study was twofold; a) translate and adapt the SIMS in a sample of Portuguese exercisers and explore the factor structure of the scale; and b) examine discriminant validity and internal consistency of the factors, as a way to determine the multidimensionality of the SIMS. We hypothesized that the measurement model would show acceptable fit to the data, as it was reported by the original authors of the SIMS (Guay et al., 2000), and other translated and validated scales (Martín-Albo et al., 2009; Østerlie et al., 2019). In addition, we hypothesized that the model would propose a four-correlated factor solution, showing acceptable internal consistency as displayed in previous studies (Gao et al., 2013; Lonsdale et al., 2011).

A third aim of the study was to determine the concurrent validity of exercisers motivation on enjoyment and exercise participation. Indeed, to the best of our knowledge, few studies have addressed the importance of examining exercisers' motivation, how their motivation at the situational level influence their experience of enjoyment, and how this translated into exercise participation (Gao et al., 2013). Thus, the direction of understanding exerciser's adherence to regular physical activity should start at analyzing the motivational aspects towards their behavioral regulation and levels of enjoyment during exercise participation. Hence, we test the following hypotheses based on previous literature (Gao et al., 2013; Rodrigues et al., 2020): a) intrinsic motivation would be positively associated with enjoyment; b) external regulation and amotivation would be negatively associated with enjoyment; c) enjoyment would consequently be positively associated with exercise frequency; and d) intrinsic motivation would have a positive indirect association with exercise frequency via enjoyment.

Method

Participants

Participants were 264 Portuguese exercisers (female = 157; male = 107) aged between 18 and 69 years ($M = 32.28$, $SD = 10.86$), with a mean exercise experience of 5.73 years ($SD = 3.19$). Exercise frequency ranged from 1 to 10 sessions per week ($M = 3.80$, $SD = 1.26$). For inclusion, we considered

those who meet the following inclusion criteria: i) age 18 or older; ii) provide informed consent to participate; and iii) had more than six months of regular exercise practice.

Measures

The SIMS (Lonsdale et al., 2011) was used to capture exercisers' situational motivation towards exercising. The stem "*Why are you currently engaged in this activity?* was adapted to the exercise context "*Why are you currently engaged in exercise?*" The items were adapted to the context of exercise, to reflect reliably the motivation exercisers have to train, namely: amotivation (4 items; e.g. "*I exercise, but I am not sure it is a good thing to continue doing it*"); external regulation (3 items: e.g., "*Because I feel that I have to do it*"); identified regulation (3 items: e.g., "*Because I believe that exercising is important for me*"); and intrinsic motivation (4 items: e.g., "*Because I think that exercising is interesting*"). Participants were asked to rate the extent to which they experienced each behavioral regulation on a likert-type scale ranging from 1 ("*totally disagree*") to 7 ("*totally agree*").

To adapt and translate the SIMS from its original language (English) into Portuguese in the exercise context, we followed methodological procedures suggested by Brislin (1980). More specifically, we applied the committee approach translation methodology (see Brislin, 1980), consisting of a five-step process: a) preliminary translation was conducted by four experts with higher education in English-Portuguese language; b) afterwards, four specialists in different scientific expertise (English-Portuguese teacher, physical education teacher, sport psychologist, and researcher in sports science) reviewed the first version of the scale generating the second version of the scale by incorporating their suggested modifications; c) the second version of the scale was reviewed by four other specialists (physical education teacher, psychologist, student psychologist, and researcher in sports science), who, together with the first board of specialists came to a consensual judgement of the content of the new version. In this stage, items had already been translated and adapted to Portuguese; d) the third version of the scale was administered to bilingual college students in the field of sports science with experience for psychometric testing; and e) final revisions in which two Portuguese teachers reviewed the fourth version (i.e., syntax, spelling, and grammar) were made resulting in the final Portuguese version of the SIMS.

The Physical Activity Enjoyment Scale (PACES) Portuguese version was used to measure the degree of enjoyment during exercising. This 8-item (e.g., "*It is very stimulating*") scale assesses the level of agreement on enjoyment when exercising using a 7-point scale ranging from 1 ("*totally disagree*") to 7 ("*totally agree*"). Internal consistency was above acceptable (CR = 0.80).

For measuring exercise frequency, participants were asked to report their weekly frequency over the last weeks. Weekly frequency was questioned with the following statement: "*How mean days per week do you think you have exercised over the last weeks?*"

Procedures

Data collection procedures were conducted in accordance with the Declaration of Helsinki and its later amendments, was well as with the approval of the Institutional Research Ethics Committee (ref: UID04045/2020). Following approval gym and health centers by convenience were contacted. Objectives and data collection procedures were explained individually to gym and health center managers. Prior to data collection, potential participants were first informed about the main objective and the topics of the study. Individuals who agreed to participate, had to check a box within the survey, before moving on to the completing the questionnaires. Time taken to complete the multi-section survey was approximately 17 min ($SD = 3.12$).

Statistical Analysis

The examination of the SIMS was conducted in two phases in Mplus version 7.3 (Múthen & Múthen, 2010). In the first one, two alternative models were tested and compared, namely a four-correlated factor Confirmatory Factor Analysis (CFA) and an Exploratory Structural Equation Modelling (ESEM). In the CFA model, items were loaded on predefined factor and no cross-loadings were allowed (Hair et al., 2019). In the ESEM model specifications, following previous applications (Marsh et al., 2014; Morin, Arens, & Marsh, 2016), the model was specified with target rotation procedures (Browne, 2010). In the second phase, the four-correlated factor CFA and ESEM models of the SIMS were examined for factor loadings, internal consistency, and convergent and discriminant validity.

Measurement model evaluation was carried out following the traditional and incremental indexes: Comparative Fit Index (CFI), Tucker Lewis Index (TLI), Standardized Root Mean Square Residual (SRMR), Root Mean Square Error of Approximation (RMSEA) and its respective 95% Confidence Interval (CI95%). The qui-square test (χ^2) and the degrees of freedom will be reported for visualization purposes, as they are both affected by the complexity of the model and sample size (Hair et al., 2019). Considering traditional cutoffs (Hair et al., 2019; Marsh et al., 2004), CFI and TLI were considered adequate with values over or equal 0.90, while values below or equal 0.80 were indicative of good fit for SRMR and RMSEA.

The Average Variance Extracted (AVE) was used to investigate discriminant validity. AVE is an established approach to

test discriminant validity (Fornell & Larcker, 1981). Constructs are identified as distinct when the square root of each AVE value is larger than the correlation between the two constructs and when the AVE for each construct is above 0.50 (Fornell & Larcker, 1981). We analyzed internal consistency through composite reliability (CR) and calculated it by Raykov (1997) formula, adopting .70 as the cutoff value (Hair et al., 2019).

Concurrent validity analysis was performed considering enjoyment as a mediator between motivational regulation as exercise frequency. Structural Equation Modelling (SEM) were conducted, following the same rules of thumb for model acceptability. Direct and indirect effects of each behavioral regulation were analyzed according to standardized coefficients and its respective 95% CI (CI95%). Regression paths were considered significant if CI95% would not include zero (Worthington, & Whittaker, 2006).

Results

The four-correlated factor CFA model showed adequate fit to the data according to all the goodness-of-fit indexes. However, the corresponding four-correlated factor ESEM model did not fit data satisfactorily given that the TLI value was marginally lower than .90 and indicated that there were some problems with the model (see Table 1). However, since it was close to achieving acceptable values CFI and was above and SRMR and RMSEA were below previous reported guidelines cutoffs (Hair et al., 2019; Marsh et al., 2004), the four-correlated factor ESEM model was retained for further analyses.

Analyses on the four-correlated factor CFA and ESEM models revealed that item loadings on the target factor were greater than 0.50 and loaded significantly lower than $p < 0.001$, explaining at least 25% variance. Only item 11 (intrinsic motivation) in the four-correlated factor ESEM solution displayed a factor loading of 0.45, however, the item loaded significantly lower than $p < 0.001$ in the corresponding latent factor. In addition, the removal of item 11 did not improve model fit. Thus, considering its significance to the model, and to maintain parsimony to the corresponding four-correlated factor CFA, item 11 was therefore retained.

According to the factor loadings of the four-correlated factor ESEM model in the Table 2, several items loaded significantly onto non-target factors. However, their factor loading to non-target factors were not substantial and most of them were next to the target factor (e.g., Item 6). Thus, the observed factor loadings to the non-target factors were reasonable from a theoretical perspective. It was considered that these items might be related to the non-acceptable fit of the ESEM model.

Internal consistency was achieved as all factors within the four-correlated factor CFA and ESEM model had composite reliability coefficient scores above 0.70. Only identified regulation in the ESEM specification did not achieve internal consistency but was close (0.69) to displaying acceptable composite reliability. Nonetheless, considering that all targeted items significantly loaded the identified regulation factor, items were retained. For detailed information see the Table 2.

Based on the results of the factor structure analysis, convergent and discriminant validity, and correlations were examined using the both the CFA and ESEM models. Convergent validity was achieved as the AVE scores were above acceptable, except for intrinsic motivation in both measurement models, and identified in the ESEM model solution, as seen in Table 3. According to the squared correlations and AVE scores in Table 3, all factors demonstrated adequate discriminant validity in the four-correlated factor CFA and ESEM model. The correlations of the six-correlated factor ESEM model showed significant associations as theoretically expected. However, external regulation did not display

Table 1 Summary of Goodness-of-Fit indexes for the tested models

Model	$\chi 2$	df	CFI	TLI	SRMR	RMSEA	90% CI
1. Four-correlated factor CFA	124.949*	71	.932	.912	.051	.054	.038, .069
2. Four-correlated factor ESEM	80.944*	41	.949	.888	.030	.061	.041, .080
3. SEM model (SIMS → PACES → EF)	224.357*	125	.925	.908	.052	.055	.043, .066

CFI = Comparative Fit Index; TLI = Tucker Lewis Index; SRMR = Standardized Root Mean Square Residual; RMSEA = Root Mean Square Error of Approximation; EF = Exercise Frequency; * $p < 0.001$

Table 2 Factor loadings, uniqueness, and composite reliability coefficients of the four-correlated models

	CFA		ESEM				
	λ	δ	AMOλ	EXTλ	IDEλ	IMOλ	δ
Amotivation	*.83*		*.80*				
Item 4	**.69****	.52	**.74****	.06	−.09*	−.06	.24
Item 8	**.77****	.40	**.78****	.00	−.10*	−.17**	.20
Item 10	**.79****	.38	**.70****	.02	−.20	−.22**	.32
Item 14	**.71****	.50	**.59****	−.02	−.22	−.25**	.21
External Regulation	*.84*			*.83*			
Item 3	**.73****	.47	.02	**.72****	.06	.07	.36
Item 7	**.90****	.19	.03	**.89****	.05	.09	.29
Item 13	**.77****	.41	.00	**.75****	.11	.08	.31
Identified Regulation	*.74*				*.69*		
Item 2	**.68****	.54	−.31**	.18*	**.65****	.37**	.41
Item 6	**.77****	.41	−.38**	.13*	**.67****	.53**	.40
Item 12	**.65****	.58	−.17	.07	**.63****	.12	.35
Intrinsic Motivation	*.76*					*.71*	
Item 1	**.61****	.63	−.20**	.16*	.13	**.51****	.54
Item 5	**.78****	.37	−.20**	.06	.13	**.83****	.31
Item 9	**.71****	.49	−.14*	.10	.19	**.64****	.24
Item 11	**.53****	.72	−.34**	.02	.24	**.45****	.42

Amotivation; EXT = External; IDE = Identified; IMO = Intrinsic Motivation; λ = standardized factor loadings; target loadings are in bold; composite reliability coefficients are in italic; * $p < 0.05$; ** $p < 0.001$

significant correlation with amotivation in both CFA and ESEM solutions.

The SEM model provided acceptable fit to the data as seen in Table 1. Thus, me moved forward on examining the direct and indirect effects between behavioral regulations, enjoyment, and exercise frequency. The findings of this study provided further support for the earlier research using this scale. In overall: a) intrinsic motivation was positively associated with enjoyment; b) external regulation and amotivation were negatively associated with enjoyment; and c) enjoyment displayed a positive and significant association with exercise frequency. Regarding indirect effect, the SEM model provided further support to the literature since intrinsic motivation displayed a positive and significant indirect association with exercise frequency via enjoyment. For more details see Table 4.

Table 3 Average Variance Extracted and latent correlations of the four-correlated factor models

	CFA					ESEM				
	AVE	1.	2.	3.	4.	AVE	1.	2.	3.	4.
1. Amotivation	.55	1	.00	.45	.29	.50	1	.00	.28	.23
2. External Regulation	.65	.00	1	.05	.08	.62	−.01	1	.05	.04
3. Identified Regulation	.50	−.67**	.22**	1	.42	.42	−.53**	.23**	1	.37
4. Intrinsic Motivation	.44	−.54**	.28**	.65**	1	.39	−.48**	.19**	.61**	1

AVE = Average Variance Extracted; below de diagonal line = latent correlations; above the diagonal line = squared correlations; * $p < 0.05$; ** $p < 0.001$

Table 4 Regression paths

	β	SE	IC95%	
			LB	UB
Direct Effect				
Amotivation → Enjoyment	−.21	.10	−.38	−.05
External Regulation → Enjoyment	−.12	.06	−.22	−.02
Identified Regulation → Enjoyment	.04	.19	−.28	.35
Intrinsic Motivation → Enjoyment	.96	.15	.71	1.02
Enjoyment → Exercise Frequency	.18	.06	.08	.28
Indirect Effect				
Amotivation → Exercise Frequency	.04	.02	−.01	.08
External Regulation → Exercise Frequency	−.02	.01	−.04	.00
Identified Regulation → Exercise Frequency	.01	.01	−.05	.06
Intrinsic Motivation → Exercise Frequency	.17	.04	.06	.28

β = standardized regression coefficient; SE = Standardized Error; CI95% = 95% Confidence Internal; LB = Lower Bound; UB = Upper Bound

Discussion

The present study analyzed the construct validity and factor structure of the SIMS in Portuguese exercisers. Specifically, the authors tested a measure of the situational motivation exercisers experience during training session. The results of this research support all three hypotheses: (i) that the translation and item adaptation were done correctly, and that the measurement model showed acceptable fit to the data; (ii) the discriminant validity of the factors as well as acceptable internal consistency; and (iii) the correlational validity of exercisers' motivation with enjoyment and exercise frequency.

Current results suggest that the data from the exercisers fit the 14-item measurement model of the SIMS for the four-correlated factor CFA solution assessing four behavioral regulations based on the SDT framework (Ryan & Deci, 2017). These results support the validated original scale (Guay et al., 2000), as well as other versions (Lonsdale et al., 2011; Østerlie et al., 2019; Standage et al., 2003). We further tested an ESEM model solution, which has not been done in previous research, examining the four-correlated factor solution in maximizing construct relevant information captured by these factors and minimizing bias in the estimation of factor loadings and latent factor correlations. In addition, the application of target rotation in ESEM allows for models to be confirmatory in nature by targeting cross-loadings to be as close to zero as possible and imprisoning deviation from zero by reducing model fit (Marsh et al., 2014). The four-correlated factor ESEM model provided acceptable fit to the data, suggesting that the four-factor model is in fact the best option assessing behavioral regulations based on the motivational continuum.

All items loaded significantly onto their predefined factor in the CFA solution, as well as on the freely estimated ESEM model specification. While some cross-loadings emerged in the four-correlated factor, differences were below 0.15, suggesting that the item should be retained in the original predefined factor (Hair et al., 2019). In addition, as seen in Table 2, existing cross-loadings were found between the target factor and the most proximal non-target factor next to the target factor (e.g., Item 6, identified regulation and intrinsic motivation). Hence, as theoretically expected, items could share some variance among factors and the closest ones. In this case, identified regulation and intrinsic motivation are both related to autonomous regulations, as proposed by Ryan and Deci (2017), suggesting that exercisers could be experiencing self-determined motivation during that specific training session, having some difficulties distinguishing between different autonomous regulations. Furthermore, acceptable internal consistency scores in both analyzed CFA and ESEM model specifications were found. Thus, composite coefficients were similar to the ones found in other studies using the SIMS (Guay et al., 2000; Lonsdale et al., 2011; Østerlie et al., 2019; Standage et al., 2003). Only identified regulation displayed a coefficient somewhat below recommended in the ESEM model specification. It is worth to mention that the coefficient score was close to the cutoff of 0.70 as proposed by Raykov et al. (2015), hence moving on to examine discriminant validity.

Based on the results of the factor structure analysis, discriminant validity was achieved as the AVE scores were above acceptable, as seen in Table 3. Only intrinsic motivation in both CFA and ESEM solutions and identified regulation in the ESEM model displayed AVE scores somewhat below the cutoff. However, this is reasonable from a theoretical perspective since factors may share some variance with the most proximal factor (Ryan & Deci, 2017). According to the squared correlations and AVE scores in Table 3, factors demonstrated adequate discriminant validity in both CFA and ESEM model. These results provide further support for the factor structure validity of the SIMS, tested in other contexts and populations (Guay et al., 2000; Lonsdale et al., 2011; Standage et al., 2003).

The SEM model showed good fit to the data and provided support for the concurrent validity analysis between behavioral regulations, enjoyment, and exercise frequency. Significant predictions were found between factors under analysis in all constructs as hypothesized earlier.

Intrinsic motivation displayed a positive and significant association with enjoyment, as theoretically expectable (Ryan & Deci, 2017). Intrinsic motivation is evident when actions are pursued solely due to the enjoyment and interest inherent in engaging in the behavior, thus explaining that higher levels of intrinsic motivation are related to greater experience of enjoyment. This is true in the exercise context,

since previous studies have found significant association between the variables (Gao et al., 2013; Rodrigues et al., 2020). Negative associations were found between external regulation and amotivation and enjoyment. Considering that external regulation describes behaviors which are encouraged through rewards (e.g., incentives) and external contingencies, and amotivation described as a lack of intention to enact a behavior (Ryan & Deci, 2017), current results support these assumptions since higher levels of external contingencies and the lack of understanding behind one's reason for acting on exercising is associated with lower experiences of positive emotional outcomes such as enjoyment. For example, when fitness professionals use controlling behaviors and impose actions during training session, it is expected that the exerciser would present less intention to continue exercising and even experience maladaptive results (Rodrigues et al., 2020).

Last, intrinsic motivation displayed a positive and significant indirect association with exercise frequency, considering enjoyment as mediator in this relationship. These results support previous assumptions (Rodrigues et al., 2018), were higher levels of enjoyment lead to greater amount of exercise adherence. Hence, an individual driven by purely intrinsic motives enjoys exercising and finds it pleasant is more prone to exercise in the near future, if the levels of intrinsic motivation are maintained. Behavior driven by intrinsic motives are likely to be maintained over a longer time frame than external regulation and amotivation, given the more internalized nature of the rewards (e.g., well-being, physical fitness, mental health) being pursued as described by Ryan and Deci (2017). Current results are also similar to those reported by Gao et al. (2013), in which children's intrinsic motivation at the situational level was positively associated with enjoyment and participation in active dance video games. In this regard, results from this study support theoretical and empirical evidence related to the association between behavioral regulations and emotional and behavioral outcomes.

Limitations and Future Research

Some limitations of the current study should be acknowledged when interpreting the results. This was the first study to validate the scale in the exercise context, away from the traditional use of this scale in the academic contexts. Thus, more empirical studies should be conducted to support its validity in the exercise context, as well as replicate current measure in other cultures to assess its generalizability. While the sample was relatively large, the heterogeneous fitness activities of each exerciser could have influenced the current results. For example, weightlifting, fitness group classes or even personal training sessions may have its effect on the measurement of exercisers' situational motivation, and thus, forthcoming studies should explore this possible mediator. In addition, future research in physical activity contexts should ascertain whether there is gender invariance in the SIMS. In this study, the researchers were unable to conduct multigroup analysis based on two issues: sample sizes and sample size discrepancy. First, to conduct multigroup analysis we would need at minimum ratio of 5:1 (5 participants - 1 parameter) according to Hair et al. (2019). Regarding model complexity, we would need at a minimum of 200 participants in each sample to conduct measurement invariance analysis. Since male and female samples are below the 200 thresholds, we were unable to employ this analysis. Second, samples are heterogenous (female = 157; male = 107) and thus, the tendency to obtain greater variance is possible. For these reasons we did not perform MA, described this limitation, and proposed future research to address this analysis.

Nonetheless, the study employed all crucial methods for scale validity and reliability such as: model fit; factor analysis; correlational analysis between factors; internal consistency analysis; convergent and discriminant validity analysis, and structural equation model considering motivation factors as independent variables, enjoyment as mediator, and exercise frequency as dependent variable.

Finally, even though results displayed robust associations between behavioral regulations and interpersonal behavior styles, there are other motivational determinants that could emerge as possible predictors. For instance, Rocchi and Pelletier (2017) have shown sport coaches' basic psychological needs satisfaction to positively predict autonomous motivation, having influence on the perception of need-supportive behaviors. In contrast, need-frustration has been associated with controlled forms of motivation, leading to higher levels of perceived need-thwarting behaviors. Hence, future studies are paramount to examine the associations among motivational factors in fitness instructors, an under-researched group of professionals. Fitness instructors create the motivational climate for exercisers to sustain their engagement to benefit from exercise; so, it is important that a program of research that examines the motivations of their leaders is developed to inform policy and practice in the exercise industry.

Conclusion

Current study supported the factor structure of the SIMS and its application in the exercise context in a sample of Portuguese exercisers. The behavioral regulations were identified again as distinct constructs representing the motivational continuum proposed by Ryan and Deci (2017). Additionally, this scale presented itself as a reliable 14-item measure on assessing how exercisers regulate their behavior in the gym and health club context during training sessions. The reported results provide support for the use of the SIMS in exercisers, adding evidence of the factor structure of this instrument in a physical activity context from previous studies.

Presented evidence will promote more research examining the stability of the SIMS four-correlated factor structure across a range of physical activity settings and in various cultures. The validation of this scale will help future scholars to examine the multidimensionality of situational motivation among exercisers during training sessions. In practical terms, Portuguese fitness professionals are recommended to use current instrument in assessing exercisers' motivation as a way to understand how exercisers are regulating their behavior during training sessions. Hence, Portuguese fitness professionals will be able to adapt their behaviors to a more supportive manner, helping individuals to internalize exercise as a health-related behavior. Finally, measuring Portuguese exercisers' situational motivation in advance could provide fitness professionals the required tools to assist on creating enjoyable environments which could lead to exercise adherence on the long-term.

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Data Availability Due to issues of participant consent, data will not be shared publicly. Interested researchers may contact the board from the Research Center (omitted for review) associated in this study.

Declarations Data collection procedures were conducted in accordance with the Declaration of Helsinki and its later amendments, was well as with the approval of the Institutional Research Ethics Committee of the Research Center in Sports, Health and Human Development (ref: UID04045/2020).

Conflict of Interest None to declare.

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