

Development and validation of the Fitness Coaching Behavior Scale: Factor structure, validity and reliability

Desarrollo y validación de la Escala de Comportamiento del Instructor de Fitness: Estructura factorial, validez y fiabilidad

Desenvolvimento e validação da Escala de Comportamento do Instrutor de Fitness: Estrutura fatorial, validade e fiabilidade

*António Rodrigues Sampaio, *Nuno Pimenta, *Mafalda Machado, *, **Pedro Teques

* Instituto Politécnico da Maia (Portugal), **Universidade de Lisboa (Portugal)

Abstract. The purpose of the present research was to develop and provide initial validation of the Fitness Coaching Behavior Scale (FCBS-Fit) designed for assessing perceived the quality of instructor's behaviors in fitness group classes through the theoretical adaptation to the Coaching Model (Côté et al., 1995), originally derived from sports. In total, 618 participants of fitness group classes accepted to participate in this investigation. The purpose of the research was achieved in three phases: (1) development of the item pool and content validation of the preliminary version of the FCBS-Fit (27 items); preliminary examination of the factorial structure through exploratory factor analysis ($n_1 = 185$) that revealed a scale with 20 items distributed by 4 factors: Technical and Positive Rapport, Exercise Planning and Prescription, Negative Rapport, and Goal Setting; (2) confirmatory factor analysis to the 4-factor model indicated adequate fit model fit, reliability and convergent and discriminant validity. In addition, a multi-group CFA indicated measurement invariance of the factorial structure across samples ($n_2 = 210$); (3) structural equation model examined criterion validity through analysis of the relationships between the 4-factors of EPCI-Fit and enjoyment in exercise ($n_3 = 223$). Psychometric evidence suggests that the FCBS could be used as a reliable and valid measure to assess Portuguese participant's perceptions of the quality of instructor's behaviors in fitness group classes.

Keywords: confirmatory factor analysis, enjoyment, exploratory factor analysis, fitness, instructor, structural equation modeling

Resumen. El propósito del presente estudio fue desarrollar y validar preliminarmente la Escala de Percepción del Comportamiento del Instructor de Fitness (EPCI-Fit) cuyo objetivo es evaluar la calidad de los comportamientos de los instructores de fitness en clases de grupo, a través de la adaptación teórica al Coaching Model (Côté et al., 1995), original del entrenamiento deportivo. En total, participaron 618 practicantes de fitness en clases de grupo de diversas áreas del litoral de Portugal continental. El propósito del estudio fue alcanzado en tres fases: (1) desarrollo del banco de ítems y validación inicial del contenido de la versión inicial de EPCI-Fit (27 ítems); la evaluación preliminar de la estructura factorial a través de análisis factorial exploratorio ($n_1 = 185$) que resultó en una escala con 20 ítems distribuidos por 4 factores - Feedback técnico positivo, Feedback negativo, Formulación de objetivos, y Planificación y prescripción del ejercicio; (2) estimación del ajuste del modelo de 4-factores a través de análisis factorial confirmatorio, y análisis a la fiabilidad compuesta, y validez convergente y discriminante ($n_2 = 210$); evaluación de la invariancia métrica del modelo de 4-factores en dos muestras independientes ($n_1 = 185$; $n_2 = 210$); y (3) estimación de la validez de criterio a través del análisis a las relaciones entre los 4-factores de la EPCI-Fit y el disfrute en la práctica de ejercicio ($n_3 = 223$). En general, los resultados provenientes de las diferentes fases de análisis psicométrico a EPCI-Fit soportan la validez y la fiabilidad de los datos, indicando que esta escala podrá ser utilizada en el futuro para evaluar las percepciones de la calidad del comportamiento del instructor de fitness en clases de grupo.

Palabras clave: análisis de ecuaciones estructurales, análisis factorial exploratorio, análisis factorial confirmatorio, disfrute, fitness, instructor.

Resumo. O propósito do presente estudo foi desenvolver e validar preliminarmente a Escala de Perceção do Comportamento do Instrutor de Fitness (EPCI-Fit) cujo objetivo é avaliar a qualidade dos comportamentos dos instrutores de fitness em aulas de grupo, através da adaptação teórica ao Coaching Model (Côté et al., 1995), original do treino desportivo. No total, participaram 618 praticantes de fitness em aulas de grupo de várias zonas de Portugal continental. O propósito do estudo foi alcançado em três fases: (1) desenvolvimento da pool de itens e validação inicial do conteúdo da versão inicial da EPCI-Fit (27 itens); avaliação preliminar da estrutura fatorial através de análise fatorial exploratória ($n_1 = 185$) que resultou numa escala com 20 itens distribuídos por 4 fatores - Feedback técnico positivo, Feedback negativo, Formulação de objetivos, e Planificação e prescrição do exercício; (2) estimação do ajustamento do modelo de 4-fatores através de análise fatorial confirmatória, e análise à fiabilidade composta, e validade convergente e discriminante ($n_2 = 210$); avaliação da invariância métrica do modelo de 4-fatores em duas amostras independentes ($n_1 = 185$; $n_2 = 210$); e (3) examinação da validade de critério através da análise às relações entre os 4-fatores da EPCI-Fit e o divertimento na prática de exercício ($n_3 = 223$). No geral, os resultados oriundos das diferentes fases de análise psicométrica à EPCI-Fit suportam a validade e a fiabilidade dos dados, indicando que esta escala poderá ser utilizada futuramente para avaliar as perceções da qualidade do comportamento do instrutor de fitness em aulas de grupo.

Palavras-chave: análise de equações estruturais, análise fatorial exploratória, análise fatorial confirmatória, divertimento, fitness, instrutor.

Introduction

Instructors' capacity for effective pedagogical behaviors in fitness classes has been documented as one of the most

important variables affecting participants outcomes (e.g., Papadimitriou & Kasteroliotis, 2000; Theodorakis, Alexandris, Rodriguez, & Sarmiento, 2004; Wininger, 2002). Also, in last two decades, studies have demonstrated that fitness instructors differ in their instruction styles and these differences impact participants achievement motivation (e.g., Harju, Twiddy, Cope, Eppler, & McCammon, 2003; Puente & Anshel, 2010; Campos et al. 2019). The effective instruction

behaviors literature has also demonstrated that specific self-perceived instructor behaviors are often correlated with participants' perceptions of their instructor's behavior (e.g., Franco, Simões, Castañer, Rodrigues, & Anguera, 2013). Research in physical education settings has also demonstrated the importance of instructor's competence. Dudley, Okely, Pearson, and Cotton (2011) conducted a systematic review on the effectiveness of Physical Education in promoting skill proficiency and enjoyment, and found that the teacher's instructional skill were the most significant strategies. Accordingly, Catano and Harvey (2011) found that students identified competencies such as communication and availability as key factors to promote successful teaching. On the other hand, Resende, Póvoas, Moreira, and Albuquerque (2014) concluded that teacher's endeavor was the most significant behavior for students (Gharib et al., 2015; López-Herrero & Luis Arias-Estero, 2019). Resende, Santana, Santos, and Castro (2014) also found that Physical Education teachers believe that their own instructional and motivational competencies are extremely important for effective learning.

In fact, the specificity of fitness coaching demands ongoing cycles of planning, monitoring, implementing, and reviewing to respond to the dynamic nature of the fitness classes (Coulson, 2007). Therefore, assessing fitness instructors' behaviors should be done using multidimensional psychosocial analysis to better reflect their coaching practice. Unfortunately, despite the contribution of previous literature for better understanding fitness coaching practices (e.g., Franco et al., 2013; Harju et al., 2003; Theodorakis et al., 2004; Wininger, 2002; Boned et al. 2015), this research fails to consider a theoretical framework to underline the main variables affecting fitness instructors' work.

Using a qualitative methodology, Côté and colleagues (Côté, 1998; Côté, Salmela, Trudel, Baria, & Russell, 1995) developed a multidimensional model of the coaching process in sport. They suggested that the central themes of the coaching process are the coaches' behaviors in training, competition, and organizational settings. Influencing these variables are the coaches' personal characteristics, athletes' personal characteristics, and contextual factors. These components have been validated in several studies (e.g., Côté, Yardley, Hay, Sedgwick, & Baker, 1999; Gilbert & Trudel, 2004; Koh, Mallett, & Wang, 2009).

The literature suggests that the practice of coaching can provide positive experiences which are associated with many psychological benefits in athletes (e.g., Cronin & Allen, 2018). However, there are also negative aspects of the social environment provided by the coach that lead to negative outcomes, including coaching behaviors such as excessive control and intimidation (Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011). For example, athletes' negative experiential states (e.g., exhaustion, vitality) occur when individuals perceive their needs of competence, autonomy, and relatedness undermined by negative interaction with their coach (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011).

In line with the central themes of the theoretical model, Côté et al. (1999) developed the Coaching Behavior Scale for Sports (CBS-S). Constructs and items of the scale were based

on behaviors and strategies used by coaches in training, competition, and organizational settings (e.g., Côté & Salmela, 1996; Côté, Salmela, & Russell, 1995; Sedgwick, Côté, & Dowd, 1997). Exploratory factor analysis indicated a six-factor structure of the CBS-S. They were described as Technical Skills (i.e., coaching feedback, demonstrations, and cues); Goal setting (i.e., coach involvement in the identification, development, and monitoring goals); Mental Preparation (i.e., coach involvement in helping the athlete be tough, stay focused, and be confident); Personal Rapport (i.e., approachability, availability, and understanding of the coach); Physical Training and Planning (i.e., coach provision of physical training and planning for training and competition); and Negative Rapport (i.e., coach use of fear, yelling when angry, and disregarding the athlete's opinions).

After reviewing the literature on coaching, we realize the potential value of the coaching model (Côté 1998; Côté et al., 1995) that would help facilitate integration of principles and findings across disciplines in fitness coaching. Nevertheless, it is important to recognize that the performance emphasis is the main difference between sports coaching and fitness coaching. In the exercise context, neither youths nor adults prefer instructors to emphasize performance (Goudas, Biddle, Fox, & Underwood, 1995). The fitness coaching literature suggest that instructors would be wise to avoid strictly pressuring participants to perform but to instead be encouraging and focus on specific tasks (Harju et al., 2003). However, fitness coaching research lack of a theoretical framework to understand the main variables affecting instructors' work, and similar to the suggestions of the coaching model in sports (Côté 1998; Côté et al., 1995), the studies that have examined the instructor's interacting style (e.g., Wininger, 2002; Harju et al., 2003; Barrios et al. 2018) and instructor's behaviors (Franco et al., 2013) could be compared and integrated within a framework that provides dimensions of fitness coaching behaviors that have not yet been tapped with single items measures or systematic observation instruments. Thus, an adaptation of the coaching model (Côté 1998; Côté et al., 1995) will be used as basis under which variables that affect and represent fitness instructors' work will be outlined and defined.

The Fitness Coaching Model (FCM)

Central to the FCM are the Interpersonal Style and Technical Guidance that represent the actual fitness coaching behavior. In addition, three variables affect the fitness coaching behavior: the instructors' personal characteristics, the participants' personal characteristics, and contextual

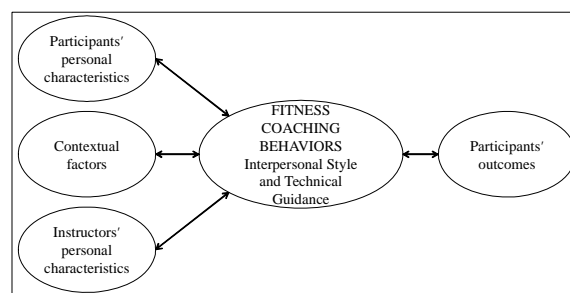


Figure 1. The fitness coaching model.

factors. The participants outcomes are defined as the ultimate goal of the fitness instructor, and according to the literature may be participants' satisfaction, motivational orientation, psychological needs, or exercise adherence (Figure 1).

The actions of the instructor in the Interpersonal Style and Technical Guidance of fitness coaching have a direct impact on the participants outcomes. The technical guidance involves applying one's knowledge towards establishing optimal conditions for structuring and coordinating the tasks inherent to the fitness instructor role. The task of organizing includes categories such as planning sessions, exercise prescription, or goal setting. The training component involves applying one's knowledge towards helping participants acquire and execute different skills in training. The type of communication style and the technical guidance of the tasks are examples of categories that characterize the training component.

There are three variables that affect fitness coaching behaviors: the instructor's personal characteristics, the participants' personal characteristics, and contextual factors. The instructor's personal characteristics involve any variables that are part of the instructor's coaching philosophy, perceptions, or beliefs that could influence the Interpersonal Style and Technical Guidance components. The participants personal characteristics involve any variables dealing with the participant stage of physical level, personal goals, or beliefs about exercise. Finally, contextual factors are defined as external aspects aside from the participants and the instructor, such as fitness center management, policies, or working conditions that could impact in the Interpersonal Style and Technical Guidance components.

Several participants outcomes have been demonstrated to be effectively enhanced by coach/instructors' behaviors. For example, satisfaction has been considered a focal aspect of psychological growth and development in sport. Training and instruction and positive feedback were the two dimensions of coaches' behavior that must affect participants' level of satisfaction (Chelladurai, 2007). In addition, psychological needs of competence, autonomy, and relatedness, motivational orientation, and exercise adherence, has been consistently demonstrated to be influenced by the type of leadership style that coach adopt and exhibit in practice (Rodrigues et al., 2018).

As an initial approach to test this theoretical model in the sport context, the present study will take into account only the variables concerning fitness coaching behaviors from the participants' perspective. Specifically, the current study examined the quality of fitness coaches' behaviors. In doing so, this study seeks to develop and validate a scale and contribute to a deeper understanding of the instructor practices in fitness group participants.

The present research

The purpose of the present study was to develop and validate a measure of participants perceptions of fitness instructor behavior. Thus, this research was completed through three phases. In the first phase, our goal was to create items for the new Fitness Coaching Behavior Scale (FCBS) and revising and adapting some of the statements contained in

the CBS-S (Côté et al., 1999) through expert review. For the second phase, the factor structure of the new scale was refined and assessed. An exploratory factor analysis was conducted to refine the item selection process in a first sample of fitness group participants ($n_1 = 185$). In addition, to evaluate construct validity, reliability, and invariance of the factor structure obtained by the exploratory factor analysis, a confirmatory factor analysis (CFA) and a multi-group CFA were performed in a second independent sample of fitness group participants ($n_2 = 210$). In the last phase, a structural model using maximum likelihood estimation was performed to assess predictive validity of the proposed scale on exercisers Enjoyment, in a third independent sample of fitness group participants ($n_3 = 223$).

Phase 1: Constructing the Fitness Coaching Behavior Scale (FCBS)

The construction of the preliminary version of the FCBS was accomplished by a three-stage process. The first stage involved generating items for the new scale based on the theoretical constructs of the Fitness Coaching Model (FCM) and revising and adapting to the fitness coaching context some of the statements contained in the Coaching Behavior Scale for Sports (CBS-S; Côté et al., 1999).

For the second stage, the content validity was assessed through a panel of experts for review (Worthington & Whittaker, 2006). Three established sport and exercise psychology experts (two academics with PhD and one practitioner with fitness settings) and a fitness instructor with experience in developing investigation in the fitness coaching area were selected to provide feedback about the items included in the pool of items. Each member of the panel of experts received an e-mail containing the purpose of this study, an explanation of the procedures, a description of the constructs, and the list of items proposed.

In the last stage, a focus group with eight fitness group participants evaluated the items' clarity, importance, terminology, comprehension and format. To facilitate access, all participants had their fitness classes in the same gym. They accepted to participate promptly. Participants were invited to ask questions and provide suggestions after completion of each measure to make items more clear and explicit. Therefore, where appropriate, changes in wording were made without altering their conceptual meanings. The final version of the preliminary version of the FCBS used in the study totalized 27 items. All items were responded to on 1 (*never*) to 6 (*always*) Likert-type scales.

Phase 2: Evaluating the Factor Structure of the FCBS

Participants and procedures

Fitness center managers were contacted and provided information about the study to obtain the permission to access their clients. With this approval, informed written consent was obtained. The participants were informed that the survey was voluntary and had the right to withdraw at any time from the study. The participants were also told that it was an anonymous survey, and that all of the information they provided would be absolutely confidential. It was further

explained that their fitness instructors would not be able to access their responses.

The participants for Phase 2 consisted of two independent samples of fitness group exercisers from the center littoral region of Portugal. Sample 1 consisted of 185 participants (102 females and 83 males) with an age ranged from 18 to 52 years ($M = 29.97$, $SD = 8.27$). Sample 2 included 210 participants (129 females and 81 males) aged between 18 and 66 years old ($M = 32.10$, $SD = 9.32$). On average, study participants had 3.04 years of experience in fitness group classes and practiced for approximately 3.19 hours per week.

Preliminary data analysis

An inspection to the data revealed that missing values covered 3.4% of cells in the raw data matrix, with no clear pattern of missing data. Therefore, missing data were handled using expectation maximization algorithm. Item-level descriptive statistics indicated no deviations from univariate normality in participants' responses (Kline, 2011; skewness ranged from -0.52 to 1.56; kurtosis ranged from -1.14 to 1.86).

Refinement of the scale (Sample 1)

Exploratory factor analysis (EFA) was conducted to refine the item selection process. Sample 1 was used in this phase of the research. An acceptable sampling adequacy statistic was observed ($KMO = .918$). A principal factors extraction with varimax rotation was performed on the 27 items of the preliminary version. The scree plot indicated that five eigenvalues exceeded 1.0. Seven items with loadings less than .40 on their relevant factor and/or cross-loadings greater than .35 were deleted. The final four-factor solution accounted for 66.79% of the variance (Table 1). Factor 1, labelled Technical and Positive Rapport, contained 7 items representing instructor's positive feedback, exercises guidance offering encouragement, active demonstrations, and acknowledgement of understanding or empathy, and accounted 41.92% of the variance. Factor 2 accounted for 12.61% of the total variance, contained 4 items reflecting the inductor's use of irony in the face of difficulties of the exerciser to perform certain exercises, show favoritism for certain exercisers, or make negative comments about the exercisers performance, and was labelled Negative Rapport. Factor 3

accounted for 7.22% of the variance, contained 4 items representing the instructor's involvement in the identification, development, and monitoring of goals, and was labelled Goal Setting. Finally, the Factor 4 accounted for 5.03% of variance, contained 4 items related to instructors' provision of challenging and motivating workout, and adapted to the needs of the exercisers, and was labelled Exercise Planning and Prescription.

Assessing the FCBS model (Sample 2)

To evaluate the accuracy of the four-factor structure of the 20 items obtained by the EFA, a confirmatory factor analysis (CFA) was performed with the Sample 2 using AMOS 23 with maximum likelihood estimation. In addition, a multi-group CFA was conducted to evaluate factor invariance between the Sample 1 and the Sample 2.

The appropriateness of the model was estimated through a variety of goodness-of-fit indexes. We used as guidance the cut off values (CFI and $TLI > .95$, $RMSEA < .06$, and $SRMR < .08$) recommended by Hair Black, Babin, and Anderson (2014). Internal consistency of the constructs was measured through composite reliability (Hair et al., 2010). The average variance extracted (AVE) was estimated to evaluate convergent validity and values greater than .50 were considered to demonstrate convergent validity. Discriminant validity was assumed when AVE of each construct was greater than the squared correlation between that construct and any other (Hair et al., 2014).

Measurement model. Mardia's coefficient for multivariate kurtosis (29.38) exceeded expected values for the assumption of multivariate normality (Byrne, 2010). Therefore, Bollen-Stine bootstrap on 2000 samples was employed for subsequent analysis (Nevitt & Hancock, 2001). The results from the analysis supported the four-factor solution model. All standard factor loadings were moderate to strong (Table 1), and each fit statistic met criteria for an acceptable fitting model [$\chi^2(164) = 316.26$, $B-S p < .001$, $CFI = .947$, $TLI = .939$, $RMSEA = .067$ ($CI = .056, .078$), $SRMR = .056$]. Each of the constructs demonstrated satisfactory levels of reliability, and AVE values revealed convergent validity. Evidence of discriminant validity was accepted since none of the squared correlations exceeded the AVE values for each associated construct (Table 2).

Table 1
Factor loadings of the Fitness Coaching Behavior Scale

Factors/Items	EFA (Sample 1)				CFA (Sample 2)
	1	2	3	4	
Technical and Positive Rapport					
Provides me with advice while I'm performing an exercise	.77				.79
Gives me specific feedback for correcting technical errors	.79				.79
Gives me reinforcement when I correctly execute a skill	.71				.80
Encourages me to constantly improve	.69				.86
Show me how a skill should be done	.80				.84
Makes sure I understand the techniques and strategies (...)	.68				.77
Leads me to trust in their instructions	.71				.72
Negative Rapport					
Yells me when angry		.80			.79
Show favoritism toward others		.81			.78
Ironizes with my inability to do a certain action		.84			.84
Tells negative comments when I cannot perform a certain action		.83			.82
Goal setting					
Helps me set short-term goals		.81			.83
Helps me set long-term goals		.76			.77
Helps me identify target dates for attaining my goals		.65			.75
Provides support to attain my goals		.61			.75
Exercise Planning and Prescription					
Provides me with a physical conditioning program (...)		.68			.74
Provides me with a physical challenging conditioning program		.72			.71
Provides me with a detailed physical conditioning program		.65			.82
Provides me with structured training sessions		.71			.79
Provides me with a physical conditioning program adapted (...)		.64			.80
Eigenvalue	8.52	2.16	1.61	1.13	

Note. EFA = Exploratory factor analysis; CFA = Confirmatory factor analysis

Table 2
Means, standard deviations, internal reliabilities, squared correlations, convergent and discriminant validity among study variables (Sample 2)

Factors	1	2	3	4
1 Technical and Positive Rapport	(.91)			?
2 Negative Rapport	-.03*	(.84)		?
3 Goal Setting	.52*	-.10*	(.85)	?
4 Exercise Planning and Prescription	.53*	-.06*	.52*	(.88)
<i>M</i>	4.15	1.71	4.13	4.17
<i>SD</i>	1.07	.82	.96	.94
<i>AVE</i>	.67	.66	.63	.61

Note. Correlations are reported below the diagonal. Internal consistencies of the scales (Composite reliability) are reported in parentheses along the diagonal. AVE = Average Variance Extracted. Within each of the pairs of constructs, squared correlation observed is lower than the average of their AVEs, indicating discriminant validity.

* $p < .01$

Measurement invariance. A multi-group CFA was conducted with the Sample 1 ($n = 185$) and the Sample 2 ($n = 210$). Invariance between models was accessed with χ^2 significance tests and CFI difference ($\llcorner CFI$) values (Cheung & Rensvold, 2002). If χ^2 for model comparison is not statistically significant ($p > .05$), then the hypotheses of

invariance is retained; however, Cheung and Rensvold (2002) have acknowledged that χ^2 is influenced by sample size. Based on a simulation analysis of goodness-of-fit indices performance, they proposed using changes in the «CFI of greater than .01 as an alternate criterion for evaluating multiple-group measurement invariance. The assessment of invariance between the two groups continued by sequentially testing a series of nested models in the following order: model 1, unconstrained; model 2, factor loadings; and model 3, factor variances-covariances.

The fit of the unconstrained model [Model 1: $\chi^2(328) = 690.11$, B-S $p < .001$, TLI = .920, CFI = .931, RMSEA = .053] was acceptable, as well as for the models with constrained factor loadings [Model 2: $\chi^2(344) = 698.97$, B-S $p < .001$, TLI = .925, CFI = .932, RMSEA = .051], and constrained factor variances-covariances [Model 3: $\chi^2(354) = 707.97$, B-S $p < .000$, TLI = .928, CFI = .933, RMSEA = .050]. The chi-square difference tests (χ^2) and CFI difference («CFI d») did not show significant differences between Model 1 and Model 2 [$\chi^2(16) = 10.12$; $p = .860$; «CFI d» .01], or Model 1 and Model 3 [$\chi^2(26) = 19.43$; $p = .818$; «CFI d» .01]. Thus, the results demonstrated the model's invariance in both samples indicating that the factorial structure of the proposed model was stable in two independent samples (Byrne, 2010).

Phase 3: Examining the predictive validity of the FCBS (Sample 3)

Fitness coaching research contends that participants' perceptions about the fitness instructor behavior influence enjoyment in physical exercise classes (e.g., Puente & Anshel, 2010; Wininger, 2002). Therefore, a structural equation model was examined to test the extent to which the perceptions of fitness coaching behaviors were associated with enjoyment of participants in fitness group classes ($n_3 = 223$).

Participants and procedures

The data collection procedures of Phase 3 were the same to those used in Phase 2. Participants for this phase were from the north littoral region of Portugal. Sample 3 consisted of 223 participants (167 females and 56 males) with an age ranged from 18 to 58 years ($M = 30.16$, $SD = 8.01$). On average, Sample 3 participants had 2.95 years of experience in fitness group classes and practiced for approximately 3.02 hours per week.

Measures

Fitness instructor behavior. To evaluate the predictive validity of the FCBS on the Enjoyment in exercise, the version of the FCBS derived from the CFA completed in the Phase 2 was used in this Phase 3.

Enjoyment. Enjoyment in exercise was measured with the Portuguese version of the uni-dimensional 8-item form of the Physical Activity Enjoyment Scale (PACES; Mullen et al., 2011; Teques, Calmeiro, Borrego, & Silva, 2017). Respondents were asked to rate «how you feel at the moment about the physical activity you have been doing» using a 7-point bipolar rating scale. Two items are reversed coded and were inverted prior to analysis. Higher PACES scores reflect greater levels of enjoyment.

Predictive validity

The goodness-of-fit indices computed to assess the measurement model [$\chi^2(314) = 855.73$, B-S $p < .001$, CFI = .931, TLI = .923, RMSEA = .066 (CI = .061, .072), SRMR = .046] and the structural model [$\chi^2(340) = 919.83$, B-S $p < .001$, CFI = .928, TLI = .912, RMSEA = .066 (CI = .060, .072), SRMR = .045] indicated an acceptable fit to the data. Composite reliability values for the Enjoyment scale (.84) indicated good internal consistency, and convergent validity was accepted with AVE = .72. In addition, the AVE of the Enjoyment scale was greater than the square correlation between them, indicating discriminant validity. An inspection of the path coefficients reveals that Exercise Planning and Prescription ($\hat{\beta} = .33$, $p < .01$), and Positive Technical Feedback ($\hat{\beta} = .20$, $p < .05$) were significantly associated with Enjoyment, whereas Goal setting and Negative Rapport showed no significant effects. These variables accounted for 74% of the variance on Enjoyment in fitness group classes.

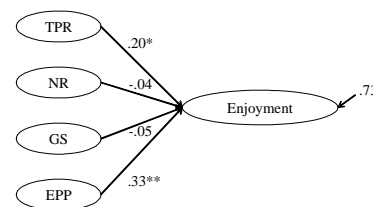


Figure 2. The proposed model of interrelationships between perceived fitness coaching behaviors, and exercisers' enjoyment in fitness group classes. Note. TPR = Technical and Positive Rapport, NR = Negative Rapport, GS = Goal Setting, EPP = Exercise Planning and Prescription. All variances were significant ($p < .01$). * $p < .05$, ** $p < .01$

General discussion

The purpose of the present investigation was to develop and validate a questionnaire measure (FCBS) purposely designed for assessing the quality of instructors coaching behaviors in fitness classes within the Fitness Coaching Model, conceptually adapted from the original coaching model developed by Côté and colleagues (Côté, 1998; Côté et al., 1995). A series of phases of psychometrical evaluation provided support for the validity and reliability of the scores derived from the scores of the FCBS. The FCBS measures four correlated, but distinctive, factors: Technical and Positive Rapport, Exercise Planning and Prescription, Goal Setting, and Negative Rapport. In general, the findings from the present research suggested that the FCBS was a reliable and valid instrument that could be used for measuring the perceptions of the quality of instructor's behaviors in fitness group classes in further investigations.

An initial list of 27 statements was generated and refined via principal component analysis (PCA) in accordance with the dimensions of the FCM. The PCA yielded four scales on which items loaded at least .40 with no cross-loadings greater than .35: A 7-item Technical and Positive Rapport scale; a five-item Exercise Planning and Prescription; a four-item Negative Rapport scale; and four-item Goal Setting scale. A confirmatory factor analysis (CFA) performed on these 20 items indicated that a four-factor structure provided an acceptable fit to an independent data. Further, the present results indicated that all constructs had good internal consistency, convergent validity, and discriminant validity. Additionally, there are two other important findings in this

study highlighting the FCBS psychometric properties. First, the model's invariance in two independent samples was supported. Second, the predictive efficacy of the model was also supported by the statistically significant amount of variance explained on participants' enjoyment. These are important steps when evaluating psychometric scales and support the conclusion that the proposed FCBS is a valid and reliable instrument to measure perceptions of instructor's coaching behavior in fitness classes.

Predictive validity was evaluated by examining the relationships between fitness coaching behaviors and enjoyment. Findings showed that Exercise Planning and Prescription, and Positive Technical Feedback were significantly associated with Enjoyment, whereas Goal setting and Negative Rapport showed no significant effects. According to the literature, coach's technical components and positive feedback are assumed to directly influence participants' satisfaction (Chelladurai, 2007). Also, Wininger (2002) demonstrated that instructor's ability to communicate instruction was an important factor to predict participants' enjoyment in fitness classes. However, fitness instructors that are more controlling and autocratic in nature has been linked to low levels of participants' intrinsic motivation (Rodrigues et al., 2018). Future studies should be developed to clarify the relationship between negative instructor behaviors and enjoyment.

The present study fills the gap in the literature in which no fitness specific measure of perceived instructor's behaviors based on a theoretical framework has been previously developed. We believe that the new FCBS may be advantageous in several ways for the future research. First, the development of a domain specific FCBS makes it possible to directly assess participants' perceptions of instructor's behaviors and allows consistent investigation about the relationships between the fitness instructor's behavior and participants' outcomes. Second, compared with other measures used in previous studies (e.g., Franco et al., 2013), the FCBS was purposely designed to reflect a theoretical framework with a wide range of contributions for the investigation in sport and physical activity. According to Côté and Gilbert (2009), the coaching research lack of a theoretical framework to understand the main variables affecting coaches' work. In fact, this is somewhat similar within fitness coaching investigation. The central components of the model, Interpersonal Style and Technical Guidance were the main features that distinguished it from other traditional models that have been used to investigate coaching behaviors (e.g., Cumming, Smith, & Smoll, 2006). In addition, the peripheral components, composed by the instructor's personal characteristics, the participants' personal characteristics, and the contextual factors, distinguished from instructional styles (Harju et al., 2003; Puente & Anshel, 2010) and systematic observational behaviors (Franco et al., 2013). Third, the utilization of the reliable and valid FCBS in future investigations allows researchers to directly correlate the findings with other methods of investigation, such as observational and qualitative methodologies.

Although our findings provided promising evidence for the psychometric properties of the scores derived from the FCBS, the procedure of validation is an ongoing process,

and further development and validation of the scale are needed. First, it should be noted that scores on the FCBS scales measure perceived the quality of instructor's behaviors. As such, the self-report measures are potentially subject to deliberate or inadvertent distortion and bias. Despite versions of self-perceived and perceived fitness coaching behaviors are often correlated (e.g., Franco et al., 2013), the extent to which FCBS scores correlate with self-perceived instructor behavior or observational data is a question that needs to be addressed. Second, we examined validity of the FCBS through a cross-sectional design. Longitudinal or experimental designs are suggested to be used to further examine validity of this scale. Third, only relationships between fitness coaching behaviors and one consequent variable (enjoyment) were examined. Future research is encouraged to investigate the relationships between fitness coaching behaviors, and both of their peripheral variables (e.g., instructor's philosophy, coaching beliefs, personality) and consequent variables (e.g., satisfaction, enjoyment). Finally, the measure was developed in the Portuguese language (Portugal); future studies are expected to validate the measure in other languages.

References

- Barrios Vergara, M., Ocaranza Ozimica, J., Llach Fernandez, L., Osorio Fuentealba, C., Giner Costagliola, V., & Sacomori, C. (2018). VO2 Indirect maximum and fitness age of sedentary and non-sedentary. *Revista Internacional de Medicina y Ciencias de la Actividad Física y del Deporte*, 18(71), 493-505.
- Bartholomew, K. J., Ntoumanis, N., Ryan, R. M., & Thøgersen-Ntoumani, C. (2011). Psychological need thwarting in the sport context: Assessing the darker side of athletic experience. *Journal of Sport and Exercise Psychology*, 33(1), 75-102.
- Bartholomew, K. J., Ntoumanis, N., Ryan, R. M., Bosch, J. A., & Thøgersen-Ntoumani, C. (2011). Self-Determination Theory and Diminished Functioning: The Role of Interpersonal Control and Psychological Need Thwarting. *Personality and Social Psychology Bulletin*, 37(11), 1459-1473.
- Boned, C. J., Felipe, J. L., Barranco, D., Grimaldi-Puyana, M., & Crovetto, M. (2015). Professional profile of workers in Spanish fitness clubs. *Revista Internacional de Medicina y Ciencias de la Actividad Física y del Deporte*, 15(58), 195-210.
- Byrne, B. M. (2010). *Structural equation modeling with AMOS: Basic concepts, applications, and programming (2nd Ed.)*. New York, NY: Taylor & Francis Group.
- Campos, F., González-Víllora, S., González-Gómez, D., & Martins, F. M. L. (2019). Benefits of 8-week fitness programs in health and fitness parameters. *Retos: Nuevas Perspectivas de Educación Física, Deporte y Recreación*, (35), 224-228.
- Catano, V. M., & Harvey, S. (2011). Student perception of teaching effectiveness: Development and validation of the Evaluation of Teaching Competencies Scale (ETCS). *Assessment & Evaluation in Higher Education*, 36(6), 701-717.
- Chelladurai, P. (2007). Leadership in sports. In G. Tenenbaum & R.C. Eklund (Eds.), *Handbook of Sport Psychology* (3rd ed., pp. 113-135). New Jersey: John Wiley & Sons.
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indices for testing measurement invariance. *Structural Equation Modeling*, 9(2), 233-255.
- Côté, J. (1998). Coaching research and intervention: An introduction to the special issue. *Avante*, 4, 1-15.

- Côté, J., & Gilbert, W. (2009). An integrative definition of coaching effectiveness and expertise. *International Journal of Sports Science and Coaching*, 4(3), 307-323.
- Côté, J., & Salmela, J. H. (1996). The organizational tasks of high-performance gymnastic coaches. *The Sport Psychologist*, 3(10), 247-260.
- Côté, J., Salmela, J. H., & Russell, S. (1995). The knowledge of high-performance gymnastic coaches: Methodological framework. *The Sport Psychologist*, 9(1), 65-75.
- Côté, J., Salmela, J. H., Trudel, P., Baria, A. and Russell, S. (1995). The coaching model: A grounded assessment of expert gymnastic coaches' knowledge. *Journal of Sport and Exercise Psychology*, 17(1), 1-17.
- Côté, J., Yardley, J., Hay, J., Sedgwick, W., & Baker, J. (1999). An exploratory examination of the Coaching Behavior Scale for Sport. *Avante*, 5(3), 82-92.
- Côté, P., Cassidy, J. D., & Carroll, L. (1998). The Saskatchewan health and back pain survey: the prevalence of neck pain and related disability in Saskatchewan adults. *Spine*, 1(23), 1689-1698.
- Coulson, M. (2007). *Fitness instructor's handbook: A professional's complete guide to health and fitness*. Buffalo, NY: Firefly Books.
- Cronin, L. D., & Allen, J. (2018). Examining the relationships among the coaching climate, life skills development and well-being in sport. *International Journal of Sports Science and Coaching*, 13(6), 815-827.
- Cumming, S. P., Smith, R. E., & Smoll, F. L. (2006). Athlete-perceived coaching behaviors: Relating two measurement traditions. *Journal of Sport and Exercise Psychology*, 28(2), 205-213.
- Dudley, D., Okely, A., Pearson, P., & Cotton, W. (2011). A systematic review of the effectiveness of physical education and school sport interventions targeting physical activity, movement skills and enjoyment of physical activity. *European Physical Education Review*, 17(3), 353-378.
- Franco, S. C. A., Simões, V. A. C., Castañer, M., Rodrigues, J. J. F., & Anguera, M. T. (2013). La conducta de los instructores de fitness: Triangulación entre la percepción de los practicantes, auto-percepción de los instructores y conducta observada. *Revista de Psicología del Deporte*, 22(2), 321-329.
- Gharib, H., Galaviz, K. I., Lee, R. E., Safdie, M., Tolentino, L., Barquera, S., & Lévesque, L. (2015). The Influence of Physical Education Lesson Context and Teacher Behaviour on Student Physical Activity in Mexico. *Retos: Nuevas Perspectivas de Educación Física, Deporte y Recreación*, (28), 160-164.
- Gilbert, W. & Trudel, P. (2004). Role of the Coach: How model youth team sport coaches frame their roles. *The Sport Psychologist*, 18(1), 21-43.
- Gilbert, W., Côté, J. & Mallett, C. (2006). Developmental pathways and activities of successful sport coaches. *International Journal of Sports Science and Coaching*, 1(1), 69-76.
- Goudas, M., Biddle, S., Fox, K., & Underwood, M. (1995). It ain't what you do, it's the way that you do it! Teaching style affects children's motivation in track and field lessons. *The Sport Psychologist*, 9(3), 254-264.
- Hair, J. F., Black, W.C., Babin, B J., & Anderson, R. E. (2014). *Multivariate data analysis: A global perspective* (7th ed.). Upper Saddle River, NJ: Pearson.
- Harju, B. L., & Reed, J. M. (2003). Potential clinical implications of implicit and explicit attitudes within possible exercise selves schemata: A pilot study. *Journal of Clinical Psychology in Medical Settings*, 10(3), 201-208.
- Harju, B. L., Twiddy, S. E., Cope, J. G., Eppler, M. E., & McCammon, M. (2003). Relations of women exercisers' mastery and performance goals to traits, fitness, and preferred styles of instructors. *Perceptual and Motor Skills*, 97(1), 939-950.
- Koh, K. T., Mallett, C., & Wang, C. J. (2009). Examining the ecological validity of the coaching behavior scale (sports) for basketball. *International Journal of Sports Science & Coaching*, 4(2), 261-272.
- López-Herrero, F., & Luis Arias-Estero, J. (2019). Effect of game form (5vs.5 and 3vs.3) on motor and psychological behaviours in under-11 basketball. *Retos: Nuevas Perspectivas de Educación Física, Deporte y Recreación* (36), 354-361.
- Mullen, S. P., Olson, E. R., Phillips, S. M., Szabo, A. N., Wójcicki, T. R., Mailey, E. L., ... McAuley, E. (2011). Measuring enjoyment of physical activity in older adults: Invariance of the physical activity enjoyment scale (PACES) across groups and time. *International Journal of Behavioral Nutrition and Physical Activity*, 8(1), 103. doi: 10.1186/1479-5868-8-103.
- Ne vitt, J., & Hancock, G.R. (2001). Performance of bootstrapping approaches to model test statistics and parameter standard error estimation in structural equation modeling. *Structural Equation Modeling*, 8(3), 353-377.
- Papadimitriou, D. A. & Karteroliotis, K. (2000). The service quality expectations in private sport and fitness centers: A reexamination of the factor structure. *Sport Marketing Quarterly*, 9(3), 157-164.
- Puente, R. & Anshel, M. H. (2010). Exercisers' perceptions of their fitness instructor's interacting style, perceived competence, and autonomy as a function of self-determined regulation to exercise, enjoyment, affect, and exercise frequency. *Scandinavian Journal of Psychology*, 51(1), 38-45.
- Resende, R., Póvoas, S., Moreira, J., & Albuquerque, A. (2014). *Representação dos alunos sobre o que pensam ser um bom professor de Educação Física* (A. Albuquerque, C. Pinheiro, & R. Resende Eds.). Maia: Eduções ISMAI.
- Resende, R., Santana, P., Santos, A., & Castro, J. (2014). Percepção dos professores de Educação Física sobre a Sua intervenção na escola. *Revista da Sociedade Científica de Pedagogia do Desporto*, 1(15), 61-67.
- Rodrigues, F., Bento, T., Cid, L., Neiva, H. P., Teixeira, D., Moutão, J., ... Monteiro, D. (2018). Can interpersonal behavior influence the persistence and adherence to physical exercise practice in adults? A systematic review. *Frontiers in Psychology*, 6(9), 2141
- Sedgwick, A., Côté, J., & Dowd, J. (1997). Confidence building strategies used by Canadian high-level rowing coaches. *Avante*, 3(3), 80-92.
- Teques, P., Silva, C., Borrego, C., & Calmeiro, L. (2017). Validation and adaptation of the Physical Activity Enjoyment Scale (PACES) in fitness group exercisers. *Journal of Sport and Health Science*. Manuscript accepted for publication. <https://doi.org/10.1016/j.jshs.2017.09.010>
- Theodorakis, N., Alexandris, K., Rodríguez, P. & Sarmiento, P. J. (2004). Measuring customer satisfaction in the context of health clubs in Portugal. *International Sports Journal*, 8(1), 44-53.
- Wingler, S. R. (2002). Instructors' and classroom characteristics associated with exercise enjoyment by females. *Perceptual and Motor Skills*, 94(2), 395-398.
- Worthington, R. L., & Whittaker, T. A. (2006). Scale development research: A content analysis and recommendations for best practices. *The Counseling Psychologist*, 34(6), 806-838.