

Cita: Braga-Pereira, R., Furtado, G., Sampaio, A. & Teques, P. Intrinsic Motivation and Enjoyment as Key-factors in the Link with the Perceived Quality of Fitness Coach Behaviour: Enhancing Exercise Adherence. *Cuadernos de Psicología del Deporte*, 25(2), 81-100

La Motivación Intrínseca y el Disfrute como Factores Clave en la Relación con la Calidad Percibida del Comportamiento del Instructor de Fitness: Potenciando la Adherencia al Ejercicio

Intrinsic Motivation and Enjoyment as Key-factors in the Link with the Perceived Quality of Fitness Coach Behaviour: Enhancing Exercise Adherence

Motivação Intrínseca e Divertimento como Factores-chave na Relação com a Qualidade Percibida do Comportamento do Instrutor de Fitness: Potenciando a Adesão ao Exercício Físico

Braga-Pereira, Ricardo¹, Furtado, Guilherme^{2,3,4}, Sampaio, António¹, Teques, Pedro^{1,5}

¹N2i, Research Centre of the Polytechnic Institute of Maia, Maia, Portugal; ²Polytechnic Institute of Coimbra, Coimbra, Portugal; ³Center for Studies on Natural Resources, Environment, and Society (CERNAS), Polytechnic Institute of Coimbra, Coimbra, Portugal; ⁴SPRINT – Sport Physical activity and health Research & INnovation cenTer, Polytechnic Institute of Coimbra, Coimbra, Portugal; ⁵Research Center in Sports Sciences, Health Sciences and Human Development (CIDESD), Vila Real, Portugal

RESUMEN

El objetivo de este trabajo fue: (1) identificar las relaciones entre la percepción del comportamiento de los instructores de fitness y la motivación intrínseca de los practicantes, (2) examinar las diferencias entre los practicantes atendiendo a las características sociodemográficas, (3) y identificar el potencial predictivo de las dimensiones de las dos escalas. Participaron en la investigación 220 individuos que realizaban ejercicio físico en un centro de fitness/club de salud. Los resultados indican correlaciones significativas entre la percepción del comportamiento del instructor de fitness y la motivación intrínseca de los practicantes, con diferencias en los aspectos sociodemográficos de los practicantes y en la capacidad predictiva de las distintas variables. Estos resultados subrayan la importancia de fomentar interacciones de alta calidad entre el instructor de fitness y los individuos que hacen ejercicio para mejorar la motivación intrínseca y la adherencia al ejercicio a largo plazo.

Palabras clave: Centros de fitness; Clima motivacional; Actividad física; Salud pública; Teoría de la autodeterminación.

ABSTRACT

The purpose of this study was to: (1) identify the relationship between the perceived behaviour of fitness instructors and the intrinsic motivation of exercisers, (2) examine the differences between exercisers according to socio-demographic characteristics, (3) and identify the predictive potential of the two scales' dimensions. The study included 220 exercisers in a fitness/health club. The results indicate significant correlations between the perception of the fitness instructor's behaviour and the intrinsic motivation of the exercisers, with differences in the socio-demographic aspects relating to the participants and in the predictive capacity of the different variables. These results emphasise the importance of promoting high-quality interactions between fitness instructors and exercisers in order to improve their intrinsic motivation and consequent long-term adherence to exercise.

Keywords: Fitness centers; Motivational climate; Physical activity; Public Health; Self-determination theory.

RESUMO

O objetivo deste estudo foi: (1) identificar as relações entre a percepção do comportamento dos instrutores de fitness e a motivação intrínseca dos praticantes de exercício físico, (2) examinar as diferenças entre os praticantes de exercício físico de acordo com as características sócio-demográficas, (3) e identificar o potencial preditivo das dimensões das duas escalas. Participaram no estudo 220 indivíduos que praticavam exercício físico num centro de fitness/clube de saúde. Os resultados indicam correlações significativas entre a percepção do comportamento do instrutor de fitness e a motivação intrínseca dos praticantes, com diferenças nos aspectos sócio-demográficos relativos aos praticantes e na capacidade preditiva das diferentes variáveis. Estes resultados sublinham a importância de promover interações de alta qualidade entre o instrutor de fitness e os praticantes de exercício físico para melhorar a sua motivação intrínseca e consequente adesão ao exercício a longo prazo.

Palavras chave: Centros de fitness; Clima motivacional; Atividade física; Saúde pública; Teoria da autodeterminação.

INTRODUCTION

Over the last few years, there has been a shift in the sports culture towards unregulated activities that prioritise health and recreation (Giulianotti, 2015). However, despite efforts, levels of physical activity continue to fall short (Mayo et al., 2019), making it one of the foremost public health challenges for the future (Guthold et al., 2018). Once fitness professionals are at the forefront of health (Howley & Thompson, 2016), and the fitness sector and its body of specialists can become a significant public health resource and a crucial component in implementing policy recommendations for reducing physical inactivity (Bull et al., 2020). The promotion of physical activity aligns harmoniously with the United Nations Sustainable Development Goals. In this regard, leveraging evidence-based knowledge and fostering cross-sectoral collaboration are crucial to maximizing the positive impact of physical activity on sustainable development (Salvo et al., 2021).

According to recent data, adherence to exercise or sport in Portugal is critically low, with more than 73% of individuals reporting that they never do it. In terms of exercising in fitness/health clubs in Portugal, the estimates currently stand at around 692 thousand exercisers (Franco et al., 2024). However, evidence indicates a significant loss of members after three months of practice, with approximately 50% of individuals dropping out of after six months (Rodrigues et al., 2019; Rodrigues et al., 2020a), which is what have been seen in the global scenario (Middelkamp, et al., 2017; Sperandei et al., 2016). Thus, the fitness coach's behaviour is a pertinent current research topic in the realm of exercise due to its known relevance in the satisfaction of exercisers (Glaveli et al., 2023) and fitness/health clubs quality (Ferreira-Barbosa et al., 2022), leading to conducive environments that promote long-term exercise commitment, as they possess the ability to enhance adherence (Rodrigues et al., 2018; 2020a; 2020b; 2021).

Exercisers' Intrinsic Motivation and Fitness Coaches' Behaviour

Also, understanding the motivational, emotional, and behavioural effects of physical activity can explain an individual's reasons to regularly engage in exercise (Ntoumanis et al., 2021), because intentions to exercise affects the attitude towards physical fitness and perceived behavioural control (Tsai et al., 2022). The Self-determination theory (SDT) (Deci & Ryan, 1985; 2000) posits that the motivation to participate in an activity can be distinguished based on whether it arises from autonomous or controlled motives. Autonomously motivated individuals engage in activities driven by their inherent interest, enjoyment, and satisfaction (intrinsic motivation), congruence with their personal values and beliefs (integrated regulation), or the pursuit of personally valued outcomes (identified regulation).

In contrast, those who have controlled motivation engage in activities to avoid internal conflict or to establish their self-worth based on external factors (introjected regulation), or in reaction to external pressures, punishments, or incentives (external regulation). Thus, intrinsic motivation (more self-determined) and extrinsic motivation (less self-determined) form a continuum that encompasses a lack of motivation (amotivation), various levels of extrinsic motivation, and ultimately, intrinsic motivation.

Fitness coaches play a crucial role in fostering an environment that promotes long-term exercise commitment by influencing the satisfaction or frustration of exercisers' basic psychological needs: autonomy, competence, and relatedness (Deci & Ryan, 2008; Ryan & Deci, 2017). According to SDT, the perception of coaches' interpersonal behaviors determines whether these needs are fulfilled or thwarted (Vansteenkiste & Ryan, 2013). Need-supportive behaviors (such as encouraging personal choice, providing constructive feedback, and offering emotional support) enhance need satisfaction, leading to autonomous motivation and greater adherence to exercise (Rodrigues et al., 2018, 2020b, 2021; Teixeira et al., 2018).

Conversely, need-thwarting behaviors (including exerting pressure, inducing guilt, and displaying detachment) contribute to need frustration, which is linked to controlled motivation, reduced persistence, and psychological distress. Prior research highlights that exercisers' perception of their coach's behaviour is a key factor in their motivation regulation, enjoyment, and training frequency (Bartholomew et al., 2009; Hernández et al., 2022). Therefore, understanding and optimizing interpersonal interactions in fitness settings is essential to fostering intrinsic motivation and long-term engagement in exercise.

Motivational variations can be observed according to variables such as gender and the type of modality practiced (Vuckovic & Duric, 2024), including considering enjoyment (Durán-Vinagre et al., 2024). Several investigations have established that intrinsic motivation is the primary factor influencing long-term adherence to exercise (Teixeira et al., 2012). Therefore, this research explored the relationships between intrinsic motivation and the fitness coaches' behaviour, given that one of the defining features of SDT is the assessment of contextual factors (Deci & Ryan, 2017).

Individuals that possess a more intrinsic motivation tend to display more successful behaviours, such as increased adherence, and experience higher levels of health and psychological well-being (Deci & Ryan, 2017). The instructor's coaching style has an impact on participants' motivation (Ntoumanis et al., 2017). The perception that the fitness coach has a supportive interaction style can favourably influence intrinsic motivation (Edmunds et al., 2006) and exercise outcomes (Wilson & Rodgers, 2007). Thus, fitness coaches can play a vital role in fostering elevated levels of intrinsic motivation and efficacy to overcome barriers (Thøgersen-Ntoumani et al., 2006). In contrast, controlled motivation has been associated with reduced participation (Ingledew & Markland, 2008).

The fitness coaches should strive towards creating supportive environments, increasing the likelihood of being acknowledge as individuals who provide the necessary support to those engaged in exercise routines (Puente & Anshel, 2010; Ntoumanis et al., 2018; Puente & Anshel, 2010; Rodrigues et al., 2021). By accomplishing this, exercisers would meet raised levels of intrinsic motivation and higher rates of future attendance at fitness/health clubs (Rodrigues et al., 2018). Conversely, when individuals experience thwarting behaviours and the resulting frustration (e.g., coaches treat the exerciser solely as a monetary end or exploit them without regard for their well-being) they tend to manifest less self-determined actions, due to low levels of satisfaction and/or high levels of frustration (Warburton et al., 2020).

Although previous research has explored the influence of fitness coaches on exercisers' motivation, less attention has been given to how specific dimensions of fitness coaching behavior could impact exercisers' intrinsic motivation. Thus, this study aims to address these gaps by (1) investigating the specific behavioural dimensions of fitness coaching that correlates with exercisers' intrinsic motivation extent, (2) examining potential differences between participants in terms of sociodemographic characteristics (i.e., exercise expertise and weekly frequency), and (3) the predictive ability of the fitness coaches' behaviour and exercisers' intrinsic motivation dimensions.

Considering the scientific evidence in this area (e.g., Ng et al., 2012; Ntoumanis et al., 2021; Riseth et al., 2019; Rodrigues et al., 2018; Teixeira et al., 2012), it is expected that there is a significant relationship between the perception of the fitness coach's behaviour and the exercisers' intrinsic motivation (Hypothesis 1), as well as that there are differences between groups regarding sociodemographic characteristics (Hypothesis 2), and between the predictive capacity of the different dimensions of the two variables (Hypothesis 3).

MATERIALS AND METHODS

Study Design

This study follows a cross-sectional methodology (Ato et al., 2013) to identify the relationships between the fitness coaches' behaviour perception and the exercisers' intrinsic motivation, to examine differences between participants considering sociodemographic characteristics, and to identify predictive potentials. The present investigation was carried out in accordance with Helsinki Declaration, and the Ethical Standards in Sport and Exercise Science Research (Harriss et al., 2019).

Participants

The sample size calculations were carried out a priori by using the G*Power version 3.1.9.7 (Faul et al., 2007) for statistical power analysis. The purpose of this procedure was to ensure that the study had sufficient power to identify significant effects taking into account the specific characteristics of the research. The analysis settings specified a medium effect size, corresponding to bivariate correlation and difference between two independent means ($d = 0.5$), and multiple linear regression ($f^2 = 0.15$).

This was established based on data acquired from literature reviews on these subjects, indicating small to medium magnitudes (Manninen et al., 2022; Ntoumanis et al., 2021). The significance level (α) was defined at 0.05, which acts as the cutoff point for rejecting the null hypothesis. The required statistical power ($1 - \beta$) was set at 0.80, suggesting an 80 per cent likelihood of identifying a real effect.

Considering bivariate correlation analysis, the data indicated a minimum required sample size of 29 individuals. The two-sample t-test suggested a sample size of 64 participants in each group, whereas the multiple linear regression analysis with four predictors recommended that 85 individuals were needed.

The study was conducted among Portuguese exercisers in the fitness/health club milieu. The participants were selected by convenience from an available population of potential relevance to the study (i.e., individuals were selected based on availability and willingness to take part). Participants were 220 individuals of various age groups and genders that volunteered for the study. The sample comprises 85 males (38.6%) and 135 females (61.4%), ranging between 18 and 88 years old ($M_{\text{age}} = 36.36$; $SD = 12.39$). On average, they had 7.40 years of expertise ($SD = 8.79$) and attended an average of 3.51 training sessions per week ($SD = 1.34$).

Instruments

The present study employed the Fitness Coaching Behaviour Scale - FCBS-Fit (Sampaio et al., 2020) and the Intrinsic Motivation Inventory (IMI_p) (Fonseca & de Paula Brito, 2001) to assess the perception of fitness coach

Exercisers' Intrinsic Motivation and Fitness Coaches' Behaviour

behavior and exercisers' intrinsic motivation, respectively. While the Behavioral Regulation in Exercise Questionnaire - BREQ-3 (Cid et al., 2018) is a widely used measure grounded SDT, the IMIp was chosen for its well-established ability to assess intrinsic motivation, a key component of SDT, by examining factors such as enjoyment, competence, effort, and pressure. Moreover, the FCBS-Fit was selected due to its specificity in evaluating fitness coaching behaviours, which directly impact exercisers' motivation and adherence. Although the BREQ-3 provides a structured assessment of motivation along the SDT continuum, the present study aimed to capture intrinsic motivation in particular, allowing this construct's capture through a multidimensional perspective.

Sociodemographic variables. The analysis of sociodemographic characteristics was carried out to investigate whether any differences could be noticed in relation to the fitness coaches' behaviour perception and the intrinsic motivation of exercisers. The exercisers were classified according to the central tendency values utilised (median) to split them into two groups: more experienced (> four years) and less experienced (< four years). With relation to weekly frequency, highest frequency (> three days a week) and lowest frequency (< three days a week). The pertinence of adopting the median is accepted in the literature as a robust criterion regardless of its limitations (Iacobucci et al., 2015).

Fitness Coach Behaviour. The FCBS-Fit (Sampaio et al., 2020) attempts to assess the quality of fitness coaches' behaviours by theoretically adopting the Coaching Model (Côté et al., 1995), primarily used in sports training. This measure is a set of 22 items about the fitness coach distributed over four dimensions: 1) Technical and positive rapport: demonstration and instruction about the exercises, corrective feedback, positive reinforcement, encouragement of ongoing improvement along with promoting trust in the instructions provided; 2) Goal setting: help to establish and define short- and long-term goals and offer support for accomplishing them; 3) Exercise planning and prescription: Provide tailored, challenging, organised and detailed fitness programmes for training sessions; 4) Negative rapport: behaviours such as yelling favoritism toward others, ironic comments regarding inability and negative comments during exercise. The frequency of the event is stated on a six-point Likert scale, including 1 (never does it), 2 (rarely), 3 (occasionally), 4 (many times), 5 (nearly usually) and 6 (always does it).

Overall, the results from the different phases of psychometric analysis of the FCBS-Fit support the validity and reliability of the data. In this study, the scale revealed the following internal consistency values: Cronbach's α was 0.94 for technical and positive rapport; 0.76 for goal setting; 0.85 for exercise planning and prescription; and 0.89 for negative rapport.

Exerciser's Intrinsic Motivation. Considering that intrinsic motivation is the primary factor influencing long-term exercise adherence (Teixeira et al., 2012), the Portuguese version of the Intrinsic Motivation Inventory (Fonseca & de Paula Brito, 2001) was used to evaluate the intensity of exercisers' intrinsic motivation in fit-ness/health clubs environments. The scale consists of 18 items grouped into four subscales: Enjoyment (e.g., "I absolutely enjoy doing activities in the gym"); Competence (e.g., "I'm pleased with my performance in gym activities"); Effort (e.g., "I work hard in the gym"); and Pressure (e.g., "I feel under pressure while doing activities at the gym"). Participants express their motivation to practice one or more activities by agreeing or disagreeing with each of the statements, answered on a five-point Likert scale (1 = Strongly disagree to 5 = Strongly agree).

This instrument has been widely employed primarily due to the evidence of its reliability and construct validity. In this study, the scale revealed the following internal consistency values: Cronbach's α was 0.84 for Enjoyment; 0.78 for Competence; 0.87 for Effort, and 0.81 for Pressure.

Procedures

Firstly, concomitantly to the direct contact established with potential participants in the study, owners/managers of fitness/health clubs, schools and professionals in the field were approached in order to widen the scope of recruitment. All the study's information and purposes were communicated to everyone who was engaged. Then,

individuals who expressed an interest in taking part in the study were advised of their anonymity and confidentiality, and a contact channel was offered for any further explanations.

The participants were then requested to fill out a multi-section online survey. The informed, free and enlightened consent to participate was included in the questionnaire. Participants could only access the core of the questionnaire if they approved to their participation, and were entitled to withdraw at any moment afterwards. This study was approved by the Polytechnic Institute of Maia Research Centre Ethics Committee (Ref. No. 003/06/22).

Data Analysis

Once the data had been collected, it was processed and the results retrieved. Statistical analysis was then carried out utilising the IBM SPSS Statistics 28.0 software. To assess the descriptive statistics, data was obtained on sociodemographic aspects (mean, minimum, maximum and standard deviation). Pearson's correlation coefficient (r) was used for correlational analysis. The data from the results that are brought for analysis and discussion refer to those that fell within a moderate or greater correlation magnitude, or that displayed statistical significance.

The two sample t-test was employed for comparisons between groups of independent samples. Lastly, for a predictive analysis, multiple linear regression was performed, with the purpose of examining a collection of predictor independent variables (i.e., technical and positive rapport; goal setting; exercise planning and prescription; negative rapport; enjoyment; competence; effort; pressure) capable of predicting the dependent variables (i.e., fitness coach behaviour; exerciser intrinsic motivation)

RESULTS

Relationship Between Fitness Coach's Behaviour Perception and the Exerciser's Intrinsic Motivation

This analysis presents the results of the bivariate correlation between the different dimensions of the fitness coach's behaviour (i.e., technical and positive rapport, goal setting, exercise planning and prescription and negative rapport) and the exerciser's intrinsic motivation (i.e., enjoyment, competence, effort and pressure). As demonstrated in Table 1, the results given for discussion reveal only positive, weak and moderate correlations (range from $r = 0.15$ to $r = 0.49$), with nearly 85 per cent of them being statistically significant ($p < 0.01$).

Concomitantly with the a priori analysis of statistical power, a post hoc analysis was carried out. Overall, the achieved statistical power of the data points out to a significant effect given the sample size ($n = 220$), significance level (i.e., $\alpha = 0.05$) and observed effect sizes.

Bivariate correlations results showed a power of 0.99 (technical and positive rapport - enjoyment), 0.98 (technical and positive rapport - competence), 0.98 (technical and positive rapport - effort), 0.77 (technical and positive rapport - pressure), 0.99 (goal setting - enjoyment), 0.88 (goal setting - competence), 0.93 (goal setting - effort), 0.66 (goal setting - pressure), 0.99 (exercise planning and prescription - enjoyment), 0.98 (exercise planning and prescription - competence), 0.88 (exercise planning and prescription - effort), 0.61 (negative rapport - competence), 0.96 (negative rapport - effort), and 0.99 (negative rapport - pressure).

Exerciser's Expertise and Weekly Frequency Differences

To enrich the coaches' practice with more detailed information, several analyses that were regarded relevant were carried out. The purpose was to determine whether there were differences in the perception of the fitness coach's behaviour and intrinsic motivation of the exercisers according to the participants' sociodemographic characteristics (i.e., exercise expertise and weekly frequency). To accomplish this, a two sample t-test was utilised (Table 2 and 3).

Considering exercise expertise, the less experienced group corresponds to the first two quartiles (< 4 years) and the more experienced group corresponds to the latter two quartiles (> 4 years). There were statistically

Exercisers' Intrinsic Motivation and Fitness Coaches' Behaviour

significant differences in the means of three domains: technical and positive rapport [$t(218) = 2.901$; $p < 0.01$, $d = 0.42$]; exercise planning and prescription [$t(125.264) = 2.669$; $p < 0.01$; $d = 0.40$]; negative rapport [$t(213.276) = 2.611$; $p < 0.01$; $d = 0.29$]. These data reveal that less experienced exercisers, on average, perceive that they are provided with greater technical and positive rapport, have better exercise planning and prescription, and receive more negative rapport.

Table 1
Bivariate correlations between FCBS-Fit and IMIp dimensions.

| | EJ | | C | | E | | P | |
|------------|----------|----------------|----------|----------------|----------|----------------|----------|----------------|
| | <i>r</i> | (1 - β) | <i>r</i> | (1 - β) | <i>r</i> | (1 - β) | <i>r</i> | (1 - β) |
| TPR | 0.41** | 0.99 | 0.27** | 0.98 | 0.26** | 0.98 | 0.18** | 0.77 |
| GS | 0.34** | 0.99 | 0.21** | 0.88 | 0.23** | 0.93 | 0.16** | 0.66 |
| EPP | 0.39** | 0.99 | 0.26** | 0.98 | 0.21** | 0.88 | 0.11 | |
| NR | -0.03 | | 0.15* | 0.61 | 0.25** | 0.96 | 0.49** | 0.99 |

Note: *. $p < 0.05$; **. $p < 0.01$; r = correlation coefficient; (1 - β) = statistical power; TPR = technical and positive rapport; GS = goal setting; EPP = exercise planning and prescription; NR = negative rapport; EJ = enjoyment; C = competence; E = effort; P = pressure.

Table 2
Statistics of the different dimensions in relation to the difference between groups of exercise expertise and weekly frequency.

| Sociodemographic characteristics | | | | | | | | | |
|----------------------------------|-----|-----|-------------|----|-------------|------------------|-------------|-----|-------------|
| Exercise Expertise | | | | | | Weekly Frequency | | | |
| < 4 years | | | | | | ≥ 4 years | | | |
| < 3 sessions | | | | | | ≥ 3 sessions | | | |
| | | n | M ± SD | n | M ± SD | n | M ± SD | n | M ± SD |
| FCBS-FIT | TPR | 150 | 4.52 ± 1.61 | 70 | 3.83 ± 1.65 | 117 | 4.07 ± 1.71 | 103 | 4.56 ± 1.55 |
| | GS | 150 | 3.89 ± 1.72 | 70 | 3.44 ± 1.78 | 117 | 3.51 ± 1.75 | 103 | 4.03 ± 1.72 |
| | EPP | 150 | 4.47 ± 1.70 | 70 | 3.77 ± 1.85 | 117 | 3.99 ± 1.84 | 103 | 4.55 ± 1.65 |
| | NR | 150 | 1.43 ± 0.89 | 70 | 1.21 ± 0.35 | 117 | 1.32 ± 0.75 | 103 | 1.40 ± 0.80 |
| IMIp | EJ | 150 | 4.04 ± 0.86 | 70 | 3.91 ± 0.87 | 117 | 3.86 ± 0.93 | 103 | 4.16 ± 0.75 |
| | C | 150 | 3.22 ± 0.65 | 70 | 3.01 ± 0.62 | 117 | 3.03 ± 0.64 | 103 | 3.30 ± 0.61 |
| | E | 150 | 3.13 ± 0.59 | 70 | 3.02 ± 0.59 | 117 | 3.05 ± 0.57 | 103 | 3.16 ± 0.61 |
| | P | 150 | 2.42 ± 0.75 | 70 | 2.20 ± 0.48 | 117 | 2.31 ± 0.66 | 103 | 2.38 ± 0.70 |

Note: n = sample size; M = mean; SD = standard deviation; FCBS-Fit = Fitness Coach Behaviour Scale; IMIp = Intrinsic Motivation Inventory; TPR = technical and positive rapport; GS = goal setting; EPP = exercise planning and prescription; NR = negative rapport; EJ = enjoyment; C = competence; E = effort; P = pressure.

The similar procedure was carried out for the exerciser's intrinsic motivation dimensions. There were statistically significant differences in the means of two domains: competence [$t(218) = 2.155$; $p < 0.05$; $d = 0.27$] and pressure

$[t(197.615) = 2.614; p < 0.01; d = 0.32]$. These statistics suggests that less experienced exercisers, on average, tend to feel more competent and under more pressure.

Regarding weekly frequency, the same analysis was carried out for both the perception of the coach's behaviour and the exerciser's intrinsic motivation. Thus, the exercisers with the lowest frequency of training correspond to those in the first two quartiles (< three sessions week) and those with the highest frequency are in the last two quartiles (> three sessions week).

Statistically significant differences were observed in the means of three dimensions: technical and positive rapport $[t(218) = -2.257; p < 0.05; d = 0.31]$; goal setting $[t(218) = -2.216; p < 0.05; d = 0.30]$, and exercise planning and prescription $[t(217.941) = -2.382; p < 0.05; d = 0.32]$. These findings lead us to the belief that participants with higher weekly attendance, on average, perceive that they are supplied with superior technical and positive rapport, have their objectives better defined with an exercise planning and prescription that is in accord.

In the same vein, statistically significant differences were identified in the means of two domains: enjoyment $[t(216.342) = -2.683; p < 0.05; d = 0.36]$ and competence $[t(218) = -3.146; p < 0.05; d = 0.42]$. These statistics imply that exercisers with more weekly attendance, on average, seem to enjoy and feel more competent with exercise.

Regarding to the difference between two independent group means, data relating to exercise expertise have demonstrated an obtained power of 0.82 (technical and positive rapport), 0.79 (exercise planning and prescription), 0.51 (negative rapport), 0.46 (competence), and 0.60 (pressure). Concerning to the weekly frequency, we observed a power of 0.63 (technical and positive rapport), 0.60 (goal setting), 0.65 (exercise planning and prescription), 0.76 (enjoyment), and 0.87 (competence).

Table 3

Two sample t-test data of fitness coaches' behaviour and exercisers' intrinsic motivation dimensions.

| Sociodemographic characteristics | | | | | | | | | | | | | |
|----------------------------------|-----|----------|----------|----------|----------------|----------|------------------|----------|----------|----------|----------------|----------|-------|
| Exercise Expertise | | | | | | | Weekly Frequency | | | | | | |
| | | <i>t</i> | <i>p</i> | <i>d</i> | (1 - β) | CI (95%) | | <i>t</i> | <i>p</i> | <i>d</i> | (1 - β) | CI (95%) | |
| | | | | | | Inf | Sup | | | | | Inf | Sup |
| FCBS-FIT | TPR | 2.90 | 0.00** | 0.42 | 0.82 | 0.22 | 1.14 | -2.26 | 0.03* | 0.31 | 0.63 | -0.93 | -0.63 |
| | GS | 1.80 | 0.07 | | | -0.04 | 0.95 | -2.22 | 0.03* | 0.30 | 0.60 | -0.98 | -0.06 |
| | EPP | 2.67 | 0.01** | 0.40 | 0.79 | 0.18 | 1.21 | -2.38 | 0.02* | 0.32 | 0.65 | -1.03 | -0.10 |
| | NR | 2.61 | 0.01** | 0.29 | 0.51 | 0.05 | 0.39 | -0.76 | 0.45 | | | -0.28 | 0.13 |
| IMIp | EJ | 1 | 0.32 | | | -0.12 | 0.37 | -2.68 | 0.01** | 0.36 | 0.76 | -0.53 | -0.08 |
| | C | 2,16 | 0.03* | 0.27 | 0.46 | 0.02 | 0.38 | -3.15 | 0.00** | 0.42 | 0.87 | -0.44 | -0.10 |
| | E | 1.31 | 0.19 | | | -0.06 | 0.28 | -1.32 | 0.19 | | | -0.26 | 0.05 |
| | P | 2.61 | 0.01** | 0.32 | 0.60 | 0.05 | 0.38 | -0.78 | 0.44 | | | -0.25 | 0.11 |

Note: *. $p < 0.05$; **. $p < 0.01$; t = t-value; p = p-value; d = effect size; (1 - β) = statistical power; CI = confidence interval; Inf = inferior; Sup = superior; FCBS-Fit = Fitness Coach Behaviour Scale; IMIp = Intrinsic Motivation Inventory; TPR = technical and positive rapport; GS = goal setting; EPP = exercise planning and prescription; NR = negative rapport; EJ = enjoyment; C = competence; E = effort; P = pressure.

Predictive ability of the Fitness Coach's Behaviour and Exerciser's Intrinsic Motivation Dimensions

A multiple linear regression was employed to determine whether the dimensions of the fitness coach's behaviour would be able to predict the intrinsic motivation of the exerciser. Thus, the dependent variable is intrinsic motivation and the independent variables are technical and positive rapport, goal setting, exercise planning and

Exercisers' Intrinsic Motivation and Fitness Coaches' Behaviour

prescription, and negative rapport. Through analysis of variance, the results demonstrated a statistically significant model [$F(4.215) = 12.932$; $p < 0.001$; $R^2 = 0.194$] (Table 4).

The independent variables technical and positive rapport ($\beta = 0.275$; $t = 2.871$; $p < 0.05$), goal setting ($\beta = -0.010$; $t = -0.105$; $p > 0.05$), exercise planning and prescription ($\beta = 0.122$; $t = 1.304$; $p > 0.05$) and negative rapport ($\beta = 0.243$; $t = 3.923$; $p < 0.01$) are predictors of exercisers' intrinsic motivation. The technical and positive rapport is the strongest predictor of exercisers' intrinsic motivation.

The same approach was carried out in order to determine if enjoyment, competence, effort and pressure are able to predict the perception of fitness coach behaviour. Therefore, the dependent variable is the perception of fitness coach behaviour and the independent variables are: enjoyment, competence, effort and pressure. Through analysis of variance, the results demonstrated a statistically significant model [$F(4.215) = 13.149$; $p < 0.001$; $R^2 = 0.197$].

The independent variables enjoyment ($\beta = 0.410$; $t = 4.845$; $p < 0.01$), competence ($\beta = -0.072$; $t = -0.743$; $p > 0.05$), effort ($\beta = 0.028$; $t = 0.303$; $p > 0.05$) and pressure ($\beta = 0.167$; $t = 2.178$; $p < 0.05$) are predictive of perceived fitness coach behaviour. Enjoyment is the strongest predictor.

Relating to multiple linear regression, the data revealed a statistical power of 0.99 to both fitness coach's behaviour and exerciser's intrinsic motivation.

Table 4
Multiple linear regression results for both variables.

| | R^2 | F | p | $(1 - \beta)$ | | β | t | p |
|-----------------|-------|-------|--------|---------------|------------|---------|-------|--------|
| FCBS-FIT | 0.19 | 12.93 | 0.00** | 0.99 | TPR | 0.28 | 2.87 | 0.01** |
| | | | | | GS | -0.01 | -0.11 | 0.92 |
| | | | | | EPP | 0.12 | 1.30 | 0.19 |
| | | | | | NR | 0.24 | 3.92 | 0.00** |
| IMip | 0.20 | 13.15 | 0.00** | 0.99 | EJ | 0.41 | 4.85 | 0.00** |
| | | | | | C | -0.07 | -0.74 | 0.46 |
| | | | | | E | 0.03 | 0.30 | 0.76 |
| | | | | | P | 0.17 | 2.18 | 0.03* |

Note: *. $p < 0.05$; **. $p < 0.01$; R^2 = explained variance; F = F-value; β = standardised beta coefficient; t = t-value; p = p-value; $(1 - \beta)$ = statistical power; FCBS-Fit = Fitness Coach Behaviour Scale; IMip = Intrinsic Motivation Inventory; TPR = technical and positive rapport; GS = goal setting; EPP = exercise planning and prescription; NR = negative rapport; EJ = enjoyment; C = competence; E = effort; P = pressure.

DISCUSSION

In this manuscript we aimed (1) to identify the relationships between the fitness coaches' behaviour perception and the exercisers' intrinsic motivation, (2) to examine differences between participants in terms of sociodemographic characteristics, and (3) to identify predictive potential of the two scales' dimensions. The main findings supported the primary hypothesis and indicated that the perception of the fitness coach's behaviour seems to be correlated with the exercisers' intrinsic motivation, as well as that there are differences between groups regarding sociodemographic characteristics and between the predictive capacity of the different dimensions of the two variables.

The Fitness Coach's Behaviour Perception and the Exerciser's Intrinsic Motivation

Technical instruction (i.e., the attention paid by the professionals to the exercisers' execution, correcting whenever necessary in an appropriate and correct way) is one of the most important characteristics of the pedagogical quality of the fitness coach's behaviour professionals, and the exercise planning and prescription (i.e., the organisation and method in the planning by the professionals, according to the individuality of the exercisers) is one of the most important characteristics of the technical quality (Campos et al., 2017).

Good technical instruction is crucial and points out the relevance of fitness coaches (Campos et al., 2021). Similarly, the instructor's personal skills in technical instruction, exercise planning and prescription, and the instructor's ability to communicate instructions is one of the most important factors to feature in the model of other investigations (e.g., Sampaio et al., 2020; Wininger et al., 2002), with the exercisers' perception of the instructor being the most important characteristic related to enjoyment.

Within the exercise context, enjoyment represents a positive approach and is one of the most important factors in the practice commitment (Williams et al., 2006), presenting itself as a key factor in understanding and explaining the motivation and experiences of exercisers (Ayotte et al., 2010; Bauman et al., 2012; Choi et al., 2017). Enjoyment is associated to a range of psychological and behavioural factors in individuals, including intrinsic motivation (Teques et al., 2020), commitment, persistence and well-being (Vallerand & Young, 2014).

The demand for competence is something that has accompanied human beings since childhood, because there is a need to realise that there is mastery over the surroundings. Achieving competence boosts feelings of enjoyment, and both are related to exercise adherence (Richard et al., 1997). In this approach, it might be characterised as an intrinsic motivation to control the environment (Anshel, 2005). Competence is one of the three essential aspects of basic psychological needs (i.e., competence, autonomy and relatedness) and is important for the development of intrinsic motivation (Deci & Ryan, 2000; Ryan & Deci, 2017).

Consequently, will determine the regulation of an individual's behaviour in relation to the tendency to participate in structured physical activities more often (Kopp et al., 2020). Therefore, it can be a realistic strategy to improve the experience of exercisers. In contrast, when this need is not addressed, behaviour tends to be regulated by external factors, with dropout or low levels of adherence being the most likely outcome (Rodrigues et al., 2018; 2020b; 2021).

Goal setting serves the objective of helping professionals focus their efforts on tasks that will lead to desirable results (Anshel, 2005). Exercise involvement with goal orientations seems to be related with perceived competence and intrinsic motivation (Papaioannou et al., 2006). The proximity of exercise outcomes hint to play a key effect when fostering intrinsic motivation (Evans et al., 2014; Wooley & Fishbach, 2018). It seems evident that the way exercisers manage their accomplishment goals, as well as the way they perceive interpersonal behaviour, will promote more self-determined forms of behaviour (Ntoumanis et al., 2017; Puente & Anshel, 2010; Rodrigues & Macedo, 2021).

Positive feelings of accomplishment are substantially connected with perceptions of being more competent, expending more effort, and feeling less pressure in the exercise programme. The persistent application of effort is inherently linked to intrinsic motivation to exercise. When individuals perceive that their effort leads to personal progress and goal achievement, intrinsic motivation is boosted (Oman & McAuley, 1993). For many individuals, it is unlikely that the activity in and of itself is sufficiently interesting initially to sustain continuous engagement. After all, exercising includes time commitment, effort, persistence, and tolerance of discomfort and pain in the initial stages of adaptation (McAuley et al., 1991).

Overcoming challenges while exercising, such as exceeding personal limits, can result in a sense of fulfilment, generating intrinsic motivation. However, it is vital to strike a balance, since individuals differ in the effort intensity of exercise they enjoy (Ekkekakis et al., 2005; 2011). Given that intensity has an important relationship with enjoyment (Ekkekakis et al., 2011), striving for a satisfying and enjoyable endeavor has been suggested as a

Exercisers' Intrinsic Motivation and Fitness Coaches' Behaviour

significant factor influencing the intention to engage in exercise routines, sustained commitment, and ongoing dedication (Calder et al., 2020; Rhodes & Kates, 2015).

It is important that the fitness coach adopts supportive interpersonal behaviours, and motivational climate with task involvement (i.e., emphasis on the task and on individual growth). In this case, researchers (e.g., Amorose & Smith, 2003; Koka & Hein, 2005) underline the role of feedback due to its link to mastery of an activity and effort, and also refer to the recommendation to apply positive feedback and the exerciser's awareness of their performance. In addition, combined with verbal aspects, the non-verbal communication represents a continuous channel of information observed by exercisers, the interpretation of which can directly influence the participants' motivation.

Concerning pressure, some research emphasising on instructor styles (e.g., Haerens et al., 2015; Reeve et al., 2014) indicate that utilising a style that minimises pressure on the exerciser, compared to more controlling styles, is positively associated with self-determined ways of motivation. When notice supportive interpersonal behaviours (e.g., fitness coaches provide effective feedback and create emotional and real connections), exercisers tend to demonstrate positive emotional responses (Ntoumanis et al., 2018).

Conversely, when individuals understand and experience a controlling style and thwarting behaviours (e.g., coaches treat the exerciser as a monetary end or manipulate the exerciser without concern for the exerciser's well-being; coaches investing time and resources in social recognition and commercial growth), they tend to manifest less self-determined actions, due to low levels of satisfaction and/or high levels of frustration (Warburton et al., 2020).

Since a motivated exerciser feels compelled to engage in a task that has a purpose and is meaningful, it is crucial to understand the direction of the exerciser's motivation towards their own desires in the activity. It is consequently of vital importance to recognise the individual's motives for engage in exercise programmes (Anshel, 2005). Social support is a good predictor of adherence (Ayotte et al., 2010; Jekauc et al., 2015). Praise and other forms of motivating encouragement, mentorship, comradeship and instruction are all sources of social support. It consequently seems crucial that individuals don't feel that they are undertaking a journey alone, otherwise it would seem doubtful that there would be long-term commitment to the practice, thereby compromising its sustainability (Anshel, 2005).

Differences Related to Exerciser's Weekly Frequency and Expertise

Those with a higher weekly frequency seem to be more competent and enjoy it more, perceive that they are offered better technical and positive rapport, are better supported in defining their goals and have better exercise planning and prescription. Therefore, according to our rationale, this data may be explained by the fact that these exercisers have more engagement with the practice and therefore more contact with the coaches, which means that they benefit more from their capabilities than those who attend less. As a result, in a snowball effect, they will feel more competent (e.g., as they exercise more regularly, they will tend to perceive a higher mastery of their environment) and, subsequently, they will enjoy exercising more.

About exercising frequency, the data obtained seem to contribute to the discussion of discrepancies in the literature. On one hand, there is research (e.g., Kilpatrick et al., 2015; Teques et al., 2020) that supports decreased levels of enjoyment when exercisers engage more throughout the week. On the other hand, it has been shown that more regular exercisers seem to report more enjoyment compared to nonregular exercisers (Gjestvang et al., 2020; 2021; Molanorouzi et al., 2015). However, the present study seems to contribute something unique in terms of data that shows dissonances between distinct weekly frequencies associated to the perception of the quality of the fitness coach's behaviour and the exerciser's intrinsic motivation.

The same seem true for disparities in exercising expertise. In the less experienced exercisers' scenario, they apparently to feel more competent and pressured, report that they are provided with greater technical and positive rapport, have better exercise planning and prescription, and receive more negative rapport. Bearing in mind that because they are less experienced (and potentially less trained), individuals may undergo favorable adaptations more often and hence feel more competent.

It is likely that exercisers link these events not only to their efforts, but also to the coach's involvement in their developmental process, thereby comprehending that the prescription and instruction they receive is meaningful. With regard to the idea that they receive more negative rapport, this may have to do with the fact that they are more "sensitive" (i.e., because they are less experienced, they could perceive a more assertive and incisive kind of verbal or non-verbal communication as negative).

Finally, the fact that they feel more pressure might be explained by the duty they have to exhibit results (to themselves or to others), given they have been in the process for less time. It is an empirical based rationale of this data relating to the exercise expertise topic, where we seek to discover some plausible explanation for the results which, as far as we know, have no match in the current literature. Further research into these areas will consequently be essential in order to draw stronger inferences.

Predictive ability of the Fitness Coach's Behaviour and Exerciser's Intrinsic Motivation

All the dimensions of the fitness coach's behaviour (i.e., technical and positive rapport, goal setting, exercise planning and prescription, and negative rapport) were predictive of the exerciser's intrinsic motivation. However, the dimensions that emerged from the results as having the greatest predictive capacity were technical and positive rapport, and negative rapport. This data is supported by the relevance presented by these dimensions in other studies (e.g., Campos et al., 2017; Wininger, 2002), where the role of the technical instruction was the most mentioned. Regarding the negative rapport, the findings are aligned with some research (e.g., Amorose & Smith, 2003; Anshel, 2005; Koka & Heinm 2005; Rodrigues et al., 2020a) which highlights the relevance of a positive attitude towards this aspect.

Similarly, every single dimensions connected to the exerciser's intrinsic motivation (i.e., enjoyment, competence, effort and pressure) were predictive of the fitness coach's behaviour perception. However, the dimension that emerged from the results as having the greatest predictive capacity was enjoyment. This has been supported by current literature (e.g., Ayotte et al., 2010; Bauman et al., 2012; Choi et al., 2017; Kaushal & Rhodes, 2015; Williams et al., 2006) which indicates that enjoyment is portrayed as a positive attitude towards exercise and constitutes a pivotal element. The exercisers' perception of the instructor is the most essential feature associated to enjoyment (Wininger, 2002).

Study Limitations and Perspectives for Future Research

Our study contributes valuable insights to the field through delving into how specific dimensions of fitness coach behaviour is associated with intrinsic motivation of the exercisers, thus enriching our understanding of this critical dynamic within the realm of fitness and health club settings.

However, this study does have its limitations. The use of a cross-sectional design provides a static view of the relationships at a specific moment, thus restricting our ability to capture changes or developments over time and limiting our capacity to establish causal relationships conclusively. Future research in this field could benefit from several promising avenues. Longitudinal studies may track changes in fitness coach behaviour and intrinsic motivation over time, providing insights into causality and intervention impact. Intervention studies could evaluate strategies to improve fitness coach behaviour and intrinsic motivation in practical settings.

Qualitative research, including in-depth interviews and focus groups, could provide a deeper understanding of the experiences and perceptions of fitness coaches and exercisers, complementing quantitative findings. These research directions have the potential to enhance our understanding of the complex links between fitness coach behaviour and intrinsic motivation of the exerciser, and inform effective strategies for promoting long-term commitment. Also, future research should consider mixed-method approaches, such as observational studies and experimental designs, to capture more objective indicators of coaching behaviours and their effects on motivation.

Although the sample size was deemed sufficient for statistical power, a larger and more diverse sample could improve the generalisation of the findings, particularly across different fitness modalities and demographic groups. Also, the study relied on self-report measures, which are susceptible to social desirability bias and subjective

Exercisers' Intrinsic Motivation and Fitness Coaches' Behaviour

interpretation. Finally, this research focused on intrinsic motivation. Additionally, approaches to the SDT continuum will be appreciated, potentially encompassing the basic psychological needs. Also, The employment of the BREQ-3 (Cid et al., 2018), which is specifically designed for exercise motivation assessment, could provide additional insights into the regulatory processes underlying exercisers' motivation along the SDT continuum.

CONCLUSIONS

This research yields some encouraging findings that have the potential to enhance the daily routines of fitness coaches. Around 85% of the discovered relationships between the behaviour of fitness coaches and the intrinsic motivation of exercisers were found to be statistically significant. The data suggests that less experienced exercisers refer to experiencing higher levels of technical and positive rapport, improved exercise planning and prescription, increased negative rapport, a larger sense of competence, and heightened pressure.

Additionally, data indicates that individuals with higher weekly attendance report experiencing higher levels of technical and positive rapport. They also have their exercise goals outlined more clearly and receive greater exercise planning and prescription. Furthermore, these individuals tend to enjoy exercise more and feel more competent with exercise. The fitness coaches' technical and positive rapport is the most significant factor influencing exercisers' intrinsic motivation, and the level of enjoyment experienced by exercisers is the most influential factor in determining how exercisers perceive the fitness coach's behaviour.

The findings of this study appear to be crucial for informing interventions and implementing a methodologically grounded and suitable programmes. Also, underlines that the perceived quality of the fitness coach's behaviour might fulfil an important role in the exerciser's intrinsic motivation. It is argued that fitness coaches can have a considerable influence on the exercisers' experience, increasing the likelihood of exercise adherence, which in turn can contribute to public health, quality of life, and overall well-being.

PRACTICAL APPLICATIONS

This study emphasises the importance of fitness coach behaviour in enhancing exercisers' intrinsic motivation (Kopp et al., 2020; Ntoumanis et al., 2021; Teixeira et al., 2012). It suggests that training programmes for fitness coaches should focus on technical and positive rapport, goal setting, exercise planning and prescription, and avoiding negative rapport and pressure. Additionally, fitness and health clubs can design programmes that promote enjoyment and competence while minimising pressure, fostering a supportive community that encourages commitment and adherence to exercise routines (Puente & Anshel, 2010; Wininger, 2002).

The study's findings underscore the importance of fitness coaches' behaviour in promoting exercisers' intrinsic motivation, offering valuable insights for training programmes in the fitness industry (Chatzisarantis & Hagger, 2009). Fitness centers and organizations can leverage this knowledge to design comprehensive training initiatives that prioritize key dimensions within fitness coach behaviour (Fortier et al., 2012). These programs can better prepare fitness coaches to create an environment conducive to exercisers' intrinsic motivation (Ntoumanis et al., 2021).

Moreover, the research highlights the significance of programme design in the context of intrinsic motivation. Fitness and health clubs can optimize their programs by tailoring them to foster enjoyment and competence while minimising feelings of pressure (Williams et al., 2006). A deep understanding of the role of intrinsic motivation allows for the creation of exercise routines and activities that align with the psychological needs of exercisers, thus increasing their commitment and adherence (Rodrigues et al., 2018; 2021; Rodrigues & Macedo, 2021). This approach enhances the overall exercising experiences and may ultimately lead to improved long-term commitment among exercisers, benefitting both the individuals and the fitness industry as a whole

ACKNOWLEDGEMENTS

The authors would like to thank all participants involved.

REFERENCES

1. Amorose, A. J., & Smith, P. J. (2003). Feedback as a source of physical competence information: Effects of age, experience and type of feedback. *Journal of Sport and Exercise Psychology*, 25(3), 341-359. <https://doi.org/10.1123/jsep.25.3.341>
2. Anshel, M. H. (2005). *Applied exercise psychology: A practitioner's guide to improving client health and fitness*. Springer Publishing Company.
3. Ato, M., Lopez, J. J., & Benavente, A. (2013). A classification system for research designs in psychology. *Anales de psicología*, 29(3), 1038-1059. <https://doi.org/10.6018/analesps.29.3.178511>
4. Ayotte, B. J., Margrett, J. A., & Hicks-Patrick, J. (2010). Physical activity in middle-aged and young-old adults: the roles of self-efficacy, barriers, outcome expectancies, self-regulatory behaviors and social support. *Journal of Health Psychology*, 15(2), 173-185. <https://doi.org/10.1177/1359105309342283>
5. Barbosa, H. F., Barbosa, J., Sabino, B., & Loureiro, V. (2022). Determinants of service quality influencing customer satisfaction in fitness centers: A systematic review. *European Journal Of Human Movement*, 49. doi.org/10.21134/eurjhm.2022.49.3
6. Bartholomew, K. J., Ntoumanis, N., & Thgersen-Ntoumani, C. (2009). A review of controlling motivational strategies from a self-determination theory perspective: Implications for sports coaches. *International Review of Sport and Exercise Psychology*, 2(2), 215-233. <https://doi.org/10.1080/17509840903235330>
7. Bauman, A. E., Reis, R. S., Sallis, J. F., Wells, J. C., Loos, R. J., & Martin, B. W. (2012). Correlates of physical activity: why are some people physically active and others not? *Lancet*, 380(9838), 258-271. [https://doi.org/10.1016/S0140-6736\(12\)60735-1](https://doi.org/10.1016/S0140-6736(12)60735-1)
8. Bull, F. C., Al-Ansari, S. S., Biddle, S., Borodulin, K., Buman, M. P., Cardon, G., Carty, C., Chaput, J. P., Chastin, S., Chou, R., Dempsey, P. C., DiPietro, L., Ekelund, U., Firth, J., Friedenreich, C. M., Garcia, L., Gichu, M., Jago, R., Katzmarzyk, P. T., Lambert, E., ... Willumsen, J. F. (2020). World Health Organization 2020 guidelines on physical activity and sedentary behaviour. *British Journal of Sports Medicine*, 54(24), 1451-1462. <https://doi.org/10.1136/bjsports-2020-102955>
9. Calder, A. J., Hargreaves, E. A., & Hodge, K. (2020). Great Expectations: A Qualitative Analysis of the Factors That Influence Affective Forecasts for Exercise. *International Journal of Environmental Research and Public Health*, 17(2), 551. <https://doi.org/10.3390/ijerph17020551>
10. Campos, F. J. A., da Costa Simões, V. A., & Franco, S. (2017). Qualidade do comportamento do instrutor em atividades de grupo de fitness. *Revista Iberoamericana de Psicología del Ejercicio y el Deporte*, 12(2), 249-259.
11. Campos, F., ML Martins, F., Gomes, R., Zylberberg, T., Mendes, S., & Damásio, A. S. (2021). Importância atribuída no fitness segundo o rendimento líquido mensal dos praticantes. *Retos*, 40, 336-343. <https://doi.org/10.47197/retos.v1i40.81957>
12. Chatzisarantis, N. L., & Hagger, M. S. (2009). Effects of an intervention based on self-determination theory on self-reported leisure-time physical activity participation. *Psychology & Health*, 24(1), 29-48. <https://doi.org/10.1080/08870440701809533>
13. Choi, J., Lee, M., Lee, J. K., Kang, D., & Choi, J. Y. (2017). Correlates associated with participation in physical activity among adults: a systematic review of reviews and update. *BMC Public Health*, 17(1), 356. <https://doi.org/10.1186/s12889-017-4255-2>
14. Cid, L., Monteiro, D., Teixeira, D., Teques, P., Alves, S., Moutão, J., Silva, M., & Palmeira, A. (2018). The Behavioral Regulation in Exercise Questionnaire (BREQ-3) Portuguese-Version: Evidence of Reliability, Validity and Invariance Across Gender. *Frontiers in Psychology*, 9, 1940. <https://doi.org/10.3389/fpsyg.2018.01940>

Exercisers' Intrinsic Motivation and Fitness Coaches' Behaviour

15. Coté, J., Saimela, J., Trudel, P., Baria, A., & Russell, S. (1995). The coaching model: A grounded assessment of expert gymnastic coaches' knowledge. *Journal of Sport and Exercise Psychology*, 17(1), 1-17. <https://doi.org/10.1123/jsep.17.1.1>.
16. Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11(4), 227-268. https://doi.org/10.1207/s15327965pli1104_01
17. Deci, E. L., & Ryan, R. M. (2008). Self-determination theory: A macrotheory of human motivation, development, and health. *Canadian Psychology / Psychologie Canadienne*, 49(3), 182-185. <https://doi.org/10.1037/a0012801>
18. Durán-Vinagre, M.Á., Feu, S., & Sánchez-Herrera, S. (2024). Motives for engaging in physical activity and psycho-educational variables of university students. *Cuadernos de Psicología del Deporte*, 24(2), 35-54. <http://doi.org/10.6018/cpd.588281>
19. Edmunds, J., Ntoumanis, N., & Duda, J. L. (2006). A test of self-determination theory in the exercise domain. *Journal of Applied Social Psychology*, 36(9), 2240-2265. <https://doi.org/10.1111/j.0021-9029.2006.00102.x>
20. Ekkekakis, P., Hall, E. E., & Petruzzello, S. J. (2005). Some like it vigorous: Measuring individual differences in the preference for and tolerance of exercise intensity. *Journal of Sport and Exercise Psychology*, 27(3), 350-374. <https://doi.org/10.1123/jsep.27.3.350>
21. Ekkekakis, P., Parfitt, G., & Petruzzello, S. J. (2011). The pleasure and displeasure people feel when they exercise at different intensities: decennial update and progress towards a tripartite rationale for exercise intensity prescription. *Sports Medicine*, 41, 641-671. <https://doi.org/10.2165/11590680-000000000-00000>
22. Evans, M. B., Cooke, L. M., Murray, R. A., & Wilson, A. E. (2014). The sooner, the better: exercise outcome proximity and intrinsic motivation. *Applied Psychology: Health and Well-Being*, 6(3), 347-361. <https://doi.org/10.1111/aphw.12032>
23. Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39(2), 175-191. <https://doi.org/10.3758/bf03193146>
24. Fonseca, A. M., & de Paula Brito, A. (2001). Propriedades psicométricas da versão portuguesa do Intrinsic Motivation Inventory (IMI) em contextos de actividade física e desportiva. *Análise Psicológica*, 19(1), 59-76.
25. Fortier, M. S., Duda, J. L., Guerin, E., & Teixeira, P. J. (2012). Promoting physical activity: development and testing of self-determination theory-based interventions. *International Journal of Behavioral Nutrition and Physical Activity*, 9(1), 1-14. <https://doi.org/10.1186/1479-5868-9-20>
26. Franco, S., Simões, V., Santos-Rocha, R., Vieira, I., Ramalho, F., & Ramos, L. (2024). Tendencias de Fitness en Portugal para 2024 (Fitness Trends in Portugal for 2024). *Retos*, 57, 88-100. <https://doi.org/10.47197/retos.v57.105198>
27. Giulianotti, R. (2015). *Sport: A critical sociology*. John Wiley & Sons.
28. Gjestvang, C., Abrahamsen, F., Stensrud, T., & Haakstad, L. A. H. (2020). Motives and barriers to initiation and sustained exercise adherence in a fitness club setting-A one-year follow-up study. *Scandinavian Journal of Medicine & Science in Sports*, 30(9), 1796-1805. <https://doi.org/10.1111/sms.13736>
29. Gjestvang, C., Abrahamsen, F., Stensrud, T., & Haakstad, L. A. H. (2021). What Makes Individuals Stick to Their Exercise Regime? A One-Year Follow-Up Study Among Novice Exercisers in a Fitness Club Setting. *Frontiers in Psychology*, 12, 638928. <https://doi.org/10.3389/fpsyg.2021.638928>
30. Glaveli, N., Papadimitriou, D., Karagiorgos, T., & Alexandris, K. (2023). Exploring the role of fitness instructors' interaction quality skills in building customer trust in the service provider and customer satisfaction. *European Sport Management Quarterly*, 23(3), 767-788. <https://doi.org/10.1080/16184742.2021.1928256>
31. Guthold, R., Stevens, G. A., Riley, L. M., & Bull, F. C. (2018). Worldwide trends in insufficient physical activity from 2001 to 2016: a pooled analysis of 358 population-based surveys with 1·9 million participants. *The Lancet. Global health*, 6(10), e1077-e1086. [https://doi.org/10.1016/S2214-109X\(18\)30357-7](https://doi.org/10.1016/S2214-109X(18)30357-7)
32. Haerens, L., Aelterman, N., Vansteenkiste, M., Soenens, B., & Van Petegem, S. (2015). Do perceived autonomy-supportive and controlling teaching relate to physical education students' motivational experiences

- through unique pathways? Distinguishing between the bright and dark side of motivation. *Psychology of Sport and Exercise*, 16, 26-36. <https://doi.org/10.1016/j.psychsport.2014.08.013>
33. Harriss, D. J., MacSween, A., & Atkinson, G. (2019). Ethical Standards in Sport and Exercise Science Research: 2020 Update. *International Journal of Sports Medicine*, 40(13), 813-817. <https://doi.org/10.1055/a-1015-3123>
 34. Hernández, E. H., Lozano-Jiménez, J. E., de Roba Noguera, J. M., & Moreno-Murcia, J. A. (2022). Relationships among instructor autonomy support, and university students' learning approaches, perceived professional competence, and life satisfaction. *PloS One*, 17(4), e0266039. <https://doi.org/10.1371/journal.pone.0266039>
 35. Howley, E. T., & Thompson, D. L. (2022). Fitness professional's handbook. Human Kinetics.
 36. Iacobucci, D., Posavac, S. S., Kardes, F. R., Schneider, M. J., & Popovich, D. L. (2015). The median split: Robust, refined, and revived. *Journal of Consumer Psychology*, 25(4), 690-704. <https://doi.org/10.1016/j.jcps.2015.06.014>
 37. Ingledew, D. K., & Markland, D. (2008). The role of motives in exercise participation. *Psychology and Health*, 23(7), 807-828. <https://doi.org/10.1080/08870440701405704>
 38. Jekauc, D., Völkle, M., Wagner, M. O., Mess, F., Reiner, M., & Renner, B. (2015). Prediction of attendance at fitness center: a comparison between the theory of planned behavior, the social cognitive theory, and the physical activity maintenance theory. *Frontiers in Psychology*, 6, 121. <https://doi.org/10.3389/fpsyg.2015.00121>
 39. Kaushal, N., & Rhodes, R. E. (2015). Exercise habit formation in new gym members: a longitudinal study. *Journal of Behavioral Medicine*, 38(4), 652-663. <https://doi.org/10.1007/s10865-015-9640-7>
 40. Kilpatrick, M. W., Greeley, S. J., & Collins, L. H. (2015). The impact of continuous and interval cycle exercise on affect and enjoyment. *Research Quarterly for Exercise and Sport*, 86(3), 244-251. <https://doi.org/10.1080/02701367.2015.1015673>
 41. Koka, A., & Hein, V. (2005). The effect of perceived teacher feedback on intrinsic motivation in physical education. *International Journal of Sport Psychology*, 36(2), 91. <https://doi.org/10.5040/9781718206632.ch-008>
 42. Kopp, P. M., Senner, V., Kehr, H. M., & Groepel, P. (2020). Achievement motive, autonomous motivation, and attendance at fitness center: A longitudinal prospective study. *Psychology of Sport and Exercise*, 51, 101758. <https://doi.org/10.1016/j.psychsport.2020.101758>
 43. Manninen, M., Dishman, R., Hwang, Y., Magrum, E., Deng, Y., & Yli-Piipari, S. (2022). Self-determination theory based instructional interventions and motivational regulations in organized physical activity: A systematic review and multivariate meta-analysis. *Psychology of Sport and Exercise*, 62, 102248. <https://doi.org/10.1016/j.psychsport.2022.102248>
 44. Mayo, X., Liguori, G., Iglesias-Soler, E., Copeland, R. J., Clavel San Emeterio, I., Lowe, A., Del Villar, F., & Jimenez, A. (2019). The active living gender's gap challenge: 2013-2017 Eurobarometers physical inactivity data show constant higher prevalence in women with no progress towards global reduction goals. *BMC Public Health*, 19(1), 1677. <https://doi.org/10.1186/s12889-019-8039-8>
 45. McAuley, E., Wraith, S., & Duncan, T. E. (1991). Self-Efficacy, Perceptions of Success, and Intrinsic Motivation for Exercise. *Journal of Applied Social Psychology*, 21(2), 139-155. <https://doi.org/10.1111/j.1559-1816.1991.tb00493.x>
 46. Middelkamp, J., van Rooijen, M., Wolfhagen, P., & Steenbergen, B. (2017). The Effects of a Self-Efficacy Intervention on Exercise Behavior of Fitness Club Members in 52 Weeks and Long-Term Relationships of Transtheoretical Model Constructs. *Journal of Sports Science & Medicine*, 16(2), 163-171.
 47. Molanorouzi, K., Khoo, S., & Morris, T. (2015). Motives for adult participation in physical activity: type of activity, age, and gender. *BMC Public Health*, 15, 66. <https://doi.org/10.1186/s12889-015-1429-7>
 48. Ng, J. Y., Ntoumanis, N., Thøgersen-Ntoumani, C., Deci, E. L., Ryan, R. M., Duda, J. L., & Williams, G. C. (2012). Self-Determination Theory Applied to Health Contexts: A Meta-Analysis. *Perspectives on Psychological Science: a Journal of the Association for Psychological Science*, 7(4), 325-340. <https://doi.org/10.1177/1745691612447309>

Exercisers' Intrinsic Motivation and Fitness Coaches' Behaviour

49. Ntoumanis, N., Ng, J. Y. Y., Prestwich, A., Quested, E., Hancox, J. E., Thøgersen-Ntoumani, C., Deci, E. L., Ryan, R. M., Lonsdale, C., & Williams, G. C. (2021). A meta-analysis of self-determination theory-informed intervention studies in the health domain: effects on motivation, health behavior, physical, and psychological health. *Health Psychology Review*, 15(2), 214-244. <https://doi.org/10.1080/17437199.2020.1718529>
50. Ntoumanis, N., Quested, E., Reeve, J., & Cheon, S. H. (2017). Need-supportive communication: Implications for motivation in sport, exercise, and physical activity. In *Persuasion and Communication in Sport, Exercise, and Physical Activity* (pp. 155-169). Routledge. <https://doi.org/10.4324/9781315624365-10>
51. Ntoumanis, N., Thøgersen-Ntoumani, C., Quested, E., & Hancox, J. (2017). The effects of training group exercise class instructors to adopt a motivationally adaptive communication style. *Scandinavian Journal of Medicine & Science in Sports*, 27(9), 1026-1034. <https://doi.org/10.1111/sms.12713>
52. Oman, R., & McAuley, E. (1993). Intrinsic motivation and exercise behavior. *Journal of Health Education*, 24(4), 232-238. <https://doi.org/10.1080/10556699.1993.10610052>
53. Papaioannou, A., Bebetos, E., Theodorakis, Y., Christodoulidis, T., & Kouli, O. (2006). Causal relationships of sport and exercise involvement with goal orientations, perceived competence and intrinsic motivation in physical education: A longitudinal study. *Journal of Sports Sciences*, 24(4), 367-382. <https://doi.org/10.1080/02640410400022060>
54. 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. <https://doi.org/10.1111/j.1467-9450.2009.00723.x>
55. Reeve, J., Vansteenkiste, M., Assor, A., Ahmad, I., Cheon, S. H., Jang, H., ... & Wang, C. J. (2014). The beliefs that underlie autonomy-supportive and controlling teaching: A multinational investigation. *Motivation and Emotion*, 38, 93-110. <https://doi.org/10.1007/s11031-013-9367-0>
56. Rhodes, R. E., & Kates, A. (2015). Can the Affective Response to Exercise Predict Future Motives and Physical Activity Behavior? A Systematic Review of Published Evidence. *Annals of Behavioral Medicine: A Publication of the Society of Behavioral Medicine*, 49(5), 715-731. <https://doi.org/10.1007/s12160-015-9704-5>
57. Richard, M., Christina, M. F., Deborah, L. S., Rubio, N., & Kennon, M. S. (1997). Intrinsic motivation and exercise adherence. *International Journal Sport Psychol*, 28(4), 335-354.
58. Riseth, L., Nøst, T. H., Nilsen, T. I., & Steinsbekk, A. (2019). Long-term members' use of fitness centers: A qualitative study. *BMC Sports Science, Medicine and Rehabilitation*, 11, 1-9. <https://doi.org/10.1186/s13102-019-0114-z>
59. Rodrigues, F., & Macedo, R. (2021). Exercise promotion: reviewing the importance of health professionals' interpersonal behaviors on exercisers' basic psychological needs. *Perceptual and Motor Skills*, 128(2), 800-812. <https://doi.org/10.1177/0031512520983078>
60. Rodrigues, F., Bento, T., Cid, L., Pereira Neiva, H., Teixeira, D., Moutão, J., Almeida Marinho, D., & Monteiro, D. (2018). Can Interpersonal Behavior Influence the Persistence and Adherence to Physical Exercise Practice in Adults? A Systematic Review. *Frontiers in Psychology*, 9, 2141. <https://doi.org/10.3389/fpsyg.2018.02141>
61. Rodrigues, F., Pelletier, L. G., Rocchi, M., Neiva, H. P., Teixeira, D. S., Cid, L., ... & Monteiro, D. (2021). Trainer-exerciser relationship: The congruency effect on exerciser psychological needs using response surface analysis. *Scandinavian Journal of Medicine & Science in Sports*, 31(1), 226-241. <https://doi.org/10.1111/sms.13825>
62. Rodrigues, F., Teixeira, D. S., Neiva, H. P., Cid, L., & Monteiro, D. (2020a). The bright and dark sides of motivation as predictors of enjoyment, intention, and exercise persistence. *Scandinavian Journal of Medicine & Science in Sports*, 30(4), 787-800. <https://doi.org/10.1111/sms.13617>
63. Rodrigues, F., Teixeira, D. S., Neiva, H. P., Cid, L., & Monteiro, D. (2020b). Understanding exercise adherence: The predictability of past experience and motivational determinants. *Brain Sciences*, 10(2), 98. <https://doi.org/10.3390/brainsci10020098>

64. Rodrigues, F., Teixeira, D., Cid, L., & Monteiro, D. (2019). Have you been exercising lately? Testing the role of past behavior on exercise adherence. *Journal of Health Psychology*, 26(10), 1482-1493. <https://doi.org/10.1177/1359105319878243>
65. Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford publications. <https://doi.org/10.1521/978.14625/28806>
66. Sallis R. E. (2009). Exercise is medicine and physicians need to prescribe it!. *British Journal of Sports Medicine*, 43(1), 3-4. <https://doi.org/10.1136/bjsm.2008.054825>
67. Salvo, D., Garcia, L., Reis, R. S., Stankov, I., Goel, R., Schipperijn, J., Hallal, P. C., Ding, D., & Pratt, M. (2021). Physical Activity Promotion and the United Nations Sustainable Development Goals: Building Synergies to Maximize Impact. *Journal of Physical Activity & Health*, 18(10), 1163-1180. <https://doi.org/10.1123/jpah.2021-0413>
68. Sampaio, A. R., Pimenta, N. J., Machado, M., & Teques, P. (2020). Development and validation of the Fitness Coaching Behavior Scale: Factor structure, validity and reliability. *Retos: Nuevas Tendencias en Educación Física, Deporte y Recreación*, 37, 687-693. <https://doi.org/10.47197/retos.v37i37.74344>
69. Sperandei, S., Vieira, M. C., & Reis, A. C. (2016). Adherence to physical activity in an unsupervised setting: Explanatory variables for high attrition rates among fitness center members. *Journal of Science and Medicine in Sport*, 19(11), 916-920. <https://doi.org/10.1016/j.jsams.2015.12.522>
70. Teixeira, D. S., Silva, M. N., & Palmeira, A. L. (2018). How does frustration make you feel? A motivational analysis in exercise context. *Motivation and Emotion*, 42(3), 419-428. <https://doi.org/10.1007/s11031-018-9690-6>
71. Teixeira, P. J., Carraça, E. V., Markland, D., Silva, M. N., & Ryan, R. M. (2012). Exercise, physical activity, and self-determination theory: a systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, 9(1), 1-30. <https://doi.org/10.1186/1479-5868-9-78>
72. Teques, P., Calmeiro, L., Silva, C., & Borrego, C. (2020). Validation and adaptation of the Physical Activity Enjoyment Scale (PACES) in fitness group exercisers. *Journal of Sport and Health Science*, 9(4), 352-357. <https://doi.org/10.1016/j.jshs.2017.09.010>
73. Thøgersen-Ntoumani, C., & Ntoumanis, N. (2006). The role of self-determined motivation in the understanding of exercise-related behaviours, cognitions and physical self-evaluations. *Journal of Sports Sciences*, 24(4), 393-404. <https://doi.org/10.1080/02640410500131670>
74. Tsai, T.-H., Wong, A. M., Lee, H.-F., & Tseng, K. C. (2022). A Study on the Motivation of Older Adults to Participate in Exercise or Physical Fitness Activities. *Sustainability*, 14(10), 6355. <https://doi.org/10.3390/su14106355>
75. Vallerand, J. R., & Young, B. W. (2014). Are adult sportspersons and exercisers that different? Exploring how motives predict commitment and lapses. *International Journal of Sport and Exercise Psychology*, 12(4), 339-356. <https://doi.org/10.1080/1612197x.2014.932823>
76. Vansteenkiste, M., & Ryan, R. M. (2013). On psychological growth and vulnerability: Basic psychological need satisfaction and need frustration as a unifying principle. *Journal of Psychotherapy Integration*, 23(3), 263. <https://doi.org/10.1037/a0032359>
77. Vuckovic, V., & Duric, S. (2024). Motivational variations in fitness: a population study of exercise modalities, gender and relationship status. *Frontiers in Psychology*, 15, 1377947. <https://doi.org/10.3389/fpsyg.2024.1377947>
78. Warburton, V. E., Wang, J. C., Bartholomew, K. J., Tuff, R. L., & Bishop, K. C. (2020). Need satisfaction and need frustration as distinct and potentially co-occurring constructs: Need profiles examined in physical education and sport. *Motivation and Emotion*, 44, 54-66. <https://doi.org/10.1007/s11031-019-09798-2>
79. Williams, D. M., Papandonatos, G. D., Napolitano, M. A., Lewis, B. A., Whiteley, J. A., & Marcus, B. H. (2006). Perceived enjoyment moderates the efficacy of an individually tailored physical activity intervention. *Journal of Sport and Exercise Psychology*, 28(3), 300-309. <https://doi.org/10.1123/jsep.28.3.300>
80. Wilson, P.M., & Rodgers, W.M. (2007). Self-determination theory, exercise, and well-being. In M. Hagger & N. Chatzisarantis (Eds.), *Intrinsic motivation and self-determination in exercise and sport* (pp. 101-112). Human Kinetics.

Exercisers' Intrinsic Motivation and Fitness Coaches' Behaviour

81. Wininger S. R. (2002). Instructors' and classroom characteristics associated with exercise enjoyment by females. *Perceptual and Motor Skills*, 94(2), 395-398. <https://doi.org/10.2466/pms.2002.94.2.395>
82. Woolley, K., & Fishbach, A. (2018). It's about time: Earlier rewards increase intrinsic motivation. *Journal of Personality and Social Psychology*, 114(6), 877. <https://doi.org/10.1037/pspa0000116>