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Perception of Exercise Behaviour and Stability of Psychological Factors: A Study across Time and Gender

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Abstract

This study observed the variables that predict the perception of current exercise frequency across two time points of exercise practice, and tested the stability of some psychological factors associated with exercise, controlling participants' gender differences. The study included 102 participants (70 females, 68.6%, and 32 males, 31.4%). All participants were evaluated in terms of personal and exercise information, perception of current exercise frequency, exercise attitudes, perceived behavioural control, behavioural regulation, satisfaction with body shape and physical appearance, and weight-related instructor pressure. The explained variance for the perception of current exercise frequency was relatively low, but similar across the two time points of data collection. The predictor variables were also stable across time. However, some dimensions varied across time, pointing out that exercise practice is less motivating and gratifying for women. This study confirmed and highlighted the difficulties to explain exercise behaviour (Mohiyeddini, Pauli, & Bauer, 2009; Sheeran, 2002), becoming necessary to integrate more variables in the explanation of factors related to exercise. The predictor variables for the perception of current exercise frequency do not change significantly across time. Moreover, gender differences become important when observing psychological changes in exercisers.

Key words: Perception of Current Exercise Frequency, Personal And Exercise Factors; Psychological Factors.

Introduction

Regular exercise is associated with several physical and psychological benefits (Biddle et al., 2004). However, the frequency of exercise is below the normative values in most industrialized countries (Dishman & Buckworth, 2001; Hui & Morrow, 2001) and, even more disturbing, there is a significant amount of dropout among people who start doing exercise. For example, Dishman (1991) estimated that almost half of the people who initiate exercise programs quit within the first six months.

Therefore, it is not surprising that in the last few years researchers become more interested in understand the factors associated with the beginning and maintenance of exercise. For example, in a relevant literature review, Hagger et al. (2002) concluded that the theory of planned behaviour (TPB; Ajzen, 1991) contributes to explain approximately 45% of the statistical variance concerning the intention to exercise, and 27% of the variance related to exercise behaviour.

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Although these percentages of variance are relevant, several authors have claimed that integrating the contributions of different theoretical models and other significant constructs is necessary in order to improve the understanding of the factors involved in exercise behaviour (Biddle & Fuchs, 2009; Hamilton & White, 2008; Li & Chan, 2008). This lack of relation between the intention of doing exercise and the objective behaviour of exercise, is described as the "intention-behaviour gap" (Mohiyeddini et al., 2009; Sheeran, 2002), becoming necessary to integrate more variables in the explanation of the factors involved in exercise, in order to reduce this gap.

Considering the need to respond to the "intention-behaviour gap", this study introduced several variables derived from the TPB model in order to explain the perception of exercise frequency, and also variables from the self-determination theory (Deci & Ryan, 2000), and from aspects related to body satisfaction and instructor-exerciser relationship (Blowers et al., 2003; Sinton & Birch, 2005). Those variables were selected because there is evidence about their impact on exercise and sport behaviours (Gomes et al., 2011; Hagger & Chatzisarantis, 2007). However, there are no indications concerning their specific contribute to explain the exercise behaviour beyond what is explained by the TPB model. So, another important question related to exercise practice is whether the factors that can explain this behaviour are stable across time and similar between genders. Again, there are no many indications from the literature about this topic and for that reason the question was target of analysis in this study. Considering all these aspects, this study has two main research objectives. First, it was tested the predictor value of two sets of variables in explaining the participants' perception of exercise frequency, across two time points of data collection. Second, it was tested the changes in psychological variables over time, considering participants' gender differences.

Before explaining in more detail each research objective, it should be mentioned that we chose to predict in the first objective of this study the participants' perception of current exercise frequency. This indicator was obtained by asking each participant to rate their specific frequency of exercise per week, being named as the "perception of current exercise frequency" (PCEF). By selecting this variable, the study did not predict the intention of doing exercise, which is a more commonly measure used to express the factors that explain exercise behaviour. This option is based on the possibility that, unlike the PCEF, intention of doing exercise is not objective and proximal measure of this behaviour. For example, it is common to evaluate intention of doing exercise by asking participants to indicate their intention to do exercise, for a specific period of time, frequency, and duration (e.g., 30 minutes of exercise, three times per week for the next three months) (Ajzen, 2002). Imposing a specific frequency and duration of exercise (that may not be accurate for all exercisers), and estimating the practice of exercise over relatively long periods of time, can decrease the accuracy of predictions about this behaviour. Thus, the alternative selected, for this study, was to use the PCEF, which is presumably a more proximal measure of effective exercise behaviour, from the participants' perspective, instead of using measures of exercise intention, that can decrease the precision of predictions about this behaviour.

Research objective 1: Predicting the Participants' Perceptions of Exercise Behaviour over Time

In order to predict the PCEF, it was selected as predictor variables some personal, athletic, and psychological characteristics of the participants. By includeing variables with a different nature, this study observes the contributions of each one to explain the perception of exercise behaviour, and therefore analyses the possibility to reduce the gap between the perception of current exercise behaviour and the exercise behaviour.

The first set of variables used to predict the PCEF consisted of personal (e.g., gender, age, BMI, and desire for ideal weight), and athletic (e.g., attraction toward exercise and self-reported past exercise behaviour) characteristics of the participants. These variables were chosen because of their impact on the practice of exercise (Armitage, 2005; Mohiyeddini et al., 2009; Nigg et al., 2009; Rhodes et al., 2008). However, their contributions toward the explanation of PCEF over time are less evident.

The second set of variables used to predict the PCEF, consisted of psychological constructs derived from both, the TPB model and the self-determination theory, and also from aspects related to body satisfaction and instructor-exerciser relationship. As mentioned before, the TPB model presents a better capacity to explain intention to do exercise than to explain the effective exercise behaviour. In this way, it becomes necessary to analyse the contribution of other variables in the prediction of exercise behaviour (in our case, represented by PCEF variable), in order to reduce the "intention-behaviour gap". Considering this need, it was observed in this study the specific contribution of variables derived from the self-determination theory, body satisfaction, and instructor-exerciser relationship in order to explain the perception of exercise frequency, beyond what can be explained by the variables of TPB model. That is, how much more variance could these variables explain of the PCEF variable, beyond what is explained by the TPB variables. That's the question to answer in this part of the study.

Regarding in more detail these sets of psychological variables, for the TPB model we selected the exercise attitudes and the perceived behavioural control because they represent important constructs of this conceptual proposal. The model suggests that the intention to assume certain behaviour and the perceived behavioural control are direct predictors of behaviour. The TPB also proposes that behavioural intention is determined by an individual's attitude (i.e., overall evaluations regarding assuming a specific behaviour), a subjective norm (i.e., expectations of others toward the target behaviour), and perceived behavioural control (i.e., an individual's ability to translate a certain goal into an observable behaviour) (Armitage & Conner, 2000; Wallston & Armstrong, 2002). It should be mentioned that the evaluation of subjective norms was not included in this study due to empirical evidence that individual attitudes and perceptions of behavioural control are more significant in determining intentions to exercise and exercise behaviour, than perceptions of pressure from others (Armitage & Conner, 2001; Hagger et al., 2002).

In what concerns the behavioural regulation dimension, it is a construct based in the self-determination theory (Deci & Ryan, 2000). This theory proposes that behaviour can be regulated by different forms of motivation that are either autonomous (e.g., intrinsic motivation) or controlled (e.g., extrinsic motivation). These two orientations (and their absences) were measured in this study using five dimensions of the Behavioural Regulation in Exercise Questionnaire (Markland & Tobin, 2004): (a) external regulation: the individual becomes involved in an activity to satisfy external pressures, achieve externally imposed rewards, or avoid coercion from others; (b) introjected regulation: the individual engages in an activity because the internalization of external controls, which are then applied through self-imposed pressure in order to avoid guilt or to maintain self-esteem, self-worth, and pride; (c) identified regulation: the individual is involved in an activity because accepts the behaviour as being important to achieve personally valued outcomes; (d) intrinsic regulation: the individual is involved in an activity for the enjoyment and satisfaction inherent in engaging in the behaviour itself; and, (e) amotivation: the individual is not motivated to engage in the target behaviour and assumes a state of lacking any intention to engage in that behaviour. The first three dimensions represent distinct forms of extrinsic motivation, the fourth represents intrinsic motivation, and the fifth represents the absence of motivation (Markland &

Tobin, 2004). Due to the interest in studying various forms of behavioural regulation and some empirical evidence about the impact of behavioural regulation on exercise behaviour (Harwood et al., 2003; Kilpatrick et al., 2003), this study observes their capacity to predict the PCEF.

The last variables included as possible predictors of the PCEF, were aspects related to body satisfaction and instructor-exerciser relationship (e.g., satisfaction with body shape and physical appearance, and weight-related instructor pressure). The satisfaction with body shape and physical appearance, was selected due to empirical evidence from exercise contexts that relate body image with the individual's willingness to lose weight (Blowers et al., 2003), the risk of dieting, and the tendency to engage in unhealthy weight control behaviours (Sinton & Birch, 2005). The second one, weight-related instructor pressure, has also a relation with aspects concerning body shape and physical appearance, and it was included in this study due to empirical evidence showing that an exercise program leader (e.g., instructor) can change the participants' psychological experiences in exercise (see Bray & Cowan, 2004). Despite the potential predictive values of these two dimensions, little is known about their relationship with the tendency to exercise.

Taking into consideration these two sets of variables (e.g., personal /athletic variables and psychological variables), it was analysed their capacity to predict not the intention of doing exercise but the PCEF, responding to the need of introducing more variables to reduce the "intention-behaviour gap". Nevertheless, this analysis was done taking into consideration two time points of data collection. For that, all participants answered to the evaluation protocol in two different moments during the same year of exercise practice. This option allowed the possibility to observe the stability of the predictor variables over time. This aspect seems important because the involvement in exercise changes across the length of time over which an individual exercises regularly. So, it becomes crucial to understand whether the factors that are associated with exercise behaviour vary with the length of exercise practice. Using again the example of the TPB, there is empirical evidence indicating that the theory constructs are not sufficient for predicting the temporal stability of the intention to exercise (Conner et al., 2000; Sheeran & Abraham, 2003; Sheeran et al., 1999). Being so, by using the two sets of variables described previously (e.g., personal and athletic factors, as well as psychological factors), it was observed the stability of these factors in the prediction of the PCEF across two time points of data collection. To assess the stability of these factors, four regression models were defined to predict the PCEF. The first two were based on data collected at the first time point, and the last two were based on data from the second time point. In this way, temporal changes in the predictor variables for the PCEF were tested.

Research objective 2: Analysing the Changes on the Psychological Variables across Time and Gender

Due to the importance of observing temporal stability of the factors associated with the exercise behaviour, the second research objective of this study was to analyse the stability of the psychological factors over time, taking into consideration participants' gender differences. In this case, we investigated differences in the psychological dimensions (e.g., exercise attitudes, perceived behavioural control, and behavioural regulation, satisfaction with body shape and physical appearance, and weight-related instructor pressure), between the same two time points that were mentioned in the first research objective of this study. Because we used the same sample for both time points, it was possible to observe whether changes in psychological variables occurred over time, and whether observed differences were due to gender differences. Gender distinction was selected because there is evidence that women and men differ in their tendencies to exercise (for a review see Biddle & Mutrie, 2008; Buckworth & Dishman, 2002).

Taking these two research questions into consideration, three specific research questions were established for this study:

(a) Predicting the PCEF from two sets of variables (i.e., personal and athletic factors, as well as psychological factors);
(b) Observing the stability of predictor variables (e.g., personal, athletic, and psychological factors), in terms of their ability to explain the PCEF across two time points of exercise practice;
(c) Observing the stability of the psychological factors over time, taking into consideration gender differences.

Method

Participants

The sample was a convenience one, being all participants from the same exercise academy. The study involved 102 participants from an academy in the north of Portugal, being 70 females (68.6%) and 32 males (31.4%), who were between the ages of 16 and 67 years old (M= 38.11; SD= 12.53). The majority of the participants were of normal weight (time point 1: n= 73, 76.8%; time point 2: n= 75, 75%; BMI = 18.6-24.9), the second-largest group was composed of overweight participants (time point 1: n= 19, 20%; time point 2: n= 19, 19%; BMI $\geq$ 25), and the smallest group was composed of underweight participants (time point 1: n= 3, 3.2%; time point 2: n= 6, 6%; BMI 18.5).

The analysis about desire for ideal weight among participants revealed that the majority of the sample reported a desire to remain the same weight (time point 1: n= 54, 52.9%; time point 2: n= 56, 55.4%), followed by the group of participants who reported a desire to weigh, less than their current weight (time point 1: n = 43, 42.2%; time point 2: n= 40, 39.6%), and by the group of participants who reported a desire for an ideal weight, greater than their current one (time point 1: n = 5, 4.9%; time point 2: n= 5, 5%).

The majority of the sample reported low-to-moderate attraction toward exercise (time point 1: n= 54, 54%; time point 2: n= 52, 52%), followed by the group of participants who reported high attraction toward exercise (time point 1: n= 46, 46%; time point 2: n= 48, 48%).

The reported rates about the perception of current exercise frequency varied between 1 and 6 training sessions in time point 1(M= 2.44; SD= 1.04), and between 1 and 10 training sessions in time point 2 (M = 2.68; SD= 1.54). On time point 1, participants reported how long they had been exercising prior to data collection, which resulted in the following frequency distribution: 7 had been exercising up to 6 months (7%), 5 had been exercising more than 6 months to 1 year (5%), 17 had been exercising more than 1 year to 5 years (17%), and 71 had been exercising for more than 5 years (71%). On time point 2, participants reported their exercise frequency in the previous 3 months, which resulted in the following frequency distribution: 33 participants (32.4%) exercised 1 or 2 times per week, 14 participants (13.7%) exercised 3 times per week, 18 participants (17.6%) exercised 4 or 5 times per week, and 37 (36.3%) exercised 6 or 7 times per week.

Instruments

Demographic and athletic information. Demographic and athletic information was collected using a questionnaire that was developed for the current study, and that evaluated both personal information (e.g., gender, age, weight, height, and desire for ideal weight) and athletic information (e.g., attraction toward exercise and past exercise behaviours). Self-reported current weight and height measurements were used to determine body mass indexes. The desire for ideal weight was determined by asking participants if they would like their weights to be higher, lower, or the same as their current weights. Values for the attraction toward exercise variable were obtained by asking participants

how much they liked to exercise, using a Likert scale (0 = *not at all*, 3 = *very much*). Self-reported past exercise behaviour on time point 1 was obtained by asking participants to choose the interval among four periods of time that best described how long they had been exercising (up to 6 months, more than 6 months but not more than 1 year, more than 1 year but not more than 5 years, and more than 5 years). On time point 2, self-reported past exercise frequency was obtained by asking participants to report the number of training sessions they had done during the previous 3 months, offering the following options: 1 or 2 times per week, 3 times per week, 4 or 5 times per week, and 6 or 7 times per week.

Perception of Current Exercise Frequency. Each participant was asked to rate his or her frequency of exercise per week, based on a typical week of exercise by a single item (e.g., "Considering a typical week of exercise for you, indicate below how many times you do exercise in this fitness centre").

Exercise Attitudes (Ajzen, 2002; Portuguese adaptation by Gomes & Capelão, 2012). Attitudes toward exercise were measured using a 7-point bipolar adjective scale with three items used to evaluate the instrumental attitude component of attitudes (e.g., useful/ useless, wise/foolish, beneficial/harmful; Cronbach's "alpha" values in this study at time point 1 was .77, and at time point 2 was .88) and three items that were used to evaluate the affective attitude component of attitudes (e.g., enjoyable/unenjoyably, interesting/boring, relaxing/ stressful; "alpha" values at time point 1 was .99, and at time point 2 was .90). The statement that preceded each adjective was ''for me, practicing regular exercise over the next three months will be…''. The scores were obtained by adding item values and the sum was then divided by the total number of items, forming the subscale.

Perceived Behavioural Control (Ajzen, 2002; Portuguese adaptation by Gomes & Capelão, 2012). Perceived behavioural control was measured by averaging the participant's responses over the following three items: "I am confident that I will be able to perform regular exercise in the next *4 weeks*/*2 months*/*3 months*". Responses were scored using a Likert scale ranging from *not at all true for me* to *completely true for me* (Cronbach's "alpha" values in this study at time point 1 was .99, and at time point 2 was .90).

The Behavioural Regulation in Exercise Questionnaire -2 (Markland & Tobin, 2004; Portuguese adaptation by Palmeira, Teixeira, Silva, & Markland, 2007). This instrument evaluates behavioural regulation in exercise contexts, assessing five dimensions: (a) external regulation (4 items; "alpha" values in this study at time point 1 was .81, and at time point 2 was .81, e.g., "I exercise because other people say I should"); (b) introjected regulation (3 items; "alpha" values in this study at time point 1 was .68, and at time point 2 was .57, e.g., "I feel guilty when I don't exercise"); (c) identified regulation (4 items; "alpha" values in this study at time point 1 was .91, and at time point 2 was .58, e.g., "I value the benefits of exercise"); (d) intrinsic regulation (4 items; "alpha" values in this study at time point 1 was .96, and at time point 2 was .85, e.g., "I exercise because it's fun"); and (e) amotivation (4 items; "alpha" values in this study at time point 1 was .50, and at time point 2 was .77, e.g., "I don't see why I should have to exercise"). "Alpha" coefficients revealed significant problems in three dimensions (e.g., introjected regulation, identified regulation, and amotivation), which resulted in their removal from subsequent analyses. Responses were scored using a Likert scale ranging from 0 (*not true for me*) to 4 (*very true for me*). Individual scores for each dimension were obtained by adding item values and dividing their sums by the total number of items forming the subscale.

Athletic Condition Questionnaire (Gomes et al., 2011). For the purpose of this study, participants were evaluated using two dimensions of this questionnaire. The first dimension was satisfaction with body shape and physical appearance (3 items; "alpha" values in this study at time point 1 was .97, and at time point 2 was .88). These items were scored using a Likert scale

ranging from 1 (*Extremely dissatisfied*) to 5 (*Extremely satisfied*) (e.g., "I am satisfied with my weight"). The second was weight-related instructor pressure (4 items; "alpha" values in this study at time point 1 was .93, and at time point 2 was .90). These items were scored using a Likert scale ranging from 1 (*Strongly disagree*) to 5 (*Totally agree*) (e.g., "My exercise leader claims that it is urgent for me to diet"). Individual scores for each dimension were obtained by adding item values and dividing their sums by the total number of items forming the subscale.

Procedure

The current study followed the ethical procedures outlined in the Declaration of Helsinki. Participant selection and data collection involved the following steps: i) one member of the research team met with the manager of a fitness centre in order to explain the research objectives and data collection procedures; ii) after receiving approval from the fitness centre manager, exercisers were invited to participate in the study, being assured that their data would remain anonymous and confidential. Participants were informed that the study involved two time points of data collection, and they were asked to report their fitness centre registration numbers so that they could be contacted for time point 2. Only participants who agreed with those conditions were included in the study, and all of them provided written informed consent before participating. Data collection occurred before or after an exercise session, or on two separate occasions (the first one to distribute questionnaires, which were taken home to complete, and the second one to collect the questionnaires). During time point 1, 211 questionnaires were distributed and 153 were collected and considered valid (the return rate was 72.5%). However, during time point 2, it was not possible to contact 51 participants, which reduced the sample to 102 participants and the final return rate to 48.3%.

Study design

Participants responded to the evaluation protocol based on their frequency of exercise practice in the specific fitness centre described before. During time point 1, some of the measures asked participants to give their opinions over a period of at least three months. Because of this, the second time point of data collection was only done six months later, in order to guarantee that the period of time selected in the first time point of evaluation had passed.

The evaluation protocol was the same during both time points. The only difference to assign was that at time point 1 participants indicated their past exercise behaviour based on their exercise experience over one of four periods of time (e.g., up to 6 months, more than 6 months to 1 year, more than 1 year to 5 years, and more than 5 years). At time point 2, they reported past exercise frequency based on the number of training sessions they had done in the last 3 months.

Results

Predicting the Perception of Current Exercise Frequency

The prediction of the PCEF in time points 1 and 2 was made using a regression analysis with blocked entry procedures. For that, two regression models were defined for each time point. The number of participants in the present study was adequate to use regression analysis, being included more than ten cases for each observed variable (Jaccard & Wan, 1996). The first model tested the predictor values of personal (e.g., gender, age, BMI, and desire for ideal weight) and athletic variables (e.g., attraction toward exercise and self-reported past exercise behaviour). Those two groups of variables (personal and athletic) were entered separately in the regression models of time points 1 and 2, in order to understand their specific contribution

to explain the PCEF. The second regression model tested the predictor values of psychological variables in explaining the PCEF. Again, the potential predictor variables were entered separately into the regression models of both time points 1 and 2, in order to understand their specific contributions in the explanation of the predicted variable. Thus, in the first block variables based on the TPB were introduced (e.g., exercise attitudes and perceived behavioural control); in the second block, variables based on the behavioural regulation dimensions were introduced (e.g., external regulation and intrinsic regulation); and in the final block, satisfaction and instructor variables were introduced (e.g., satisfaction with body shape and physical appearance, and weight-related instructor pressure). The four tested models showed no problems of multicollinearity, and the data were normally distributed (Tabachnick & Fidell, 2001). However, we had to control some outliers due to results obtained from the "residual casewise diagnostics".

Beginning with time point 1, the predictive values for personal and athletic variables were evaluated (Model 1), as were the predictive values of psychological variables (Model 2).

The first set of variables introduced as predictor variables were personal and athletic variables (Model 1, Table 1): gender, age, BMI, desire for ideal weight, attraction toward exercise, and self-reported past exercise behaviour. It should be mentioned that two groups were defined according to the frequency results for both the BMI and desire for ideal weight variables. In the case of BMI, participants were divided into two groups: those that had normal weight (n = 73, 79.3%) and those that were overweight (n = 19, 20.7%). Two groups were also established based on participants' desire for ideal weight: a group of participants who wanted to weigh less (n = 43, 42.2%) and a group of participants who wanted either remain the same weight

Table 1 *Regression model for the prediction of the Perception of Current Exercise Frequency at time point 1*

	R^2 (R^2 ajust.)	F	β	t
Model 1: Personal and athletic variables				
Block 1: Personal variables				
Gender [(a)]	.07 (.03)	(4, 80) 1.56n.s.	-.27	-2.19*
Age			-.03	-.28
BMI [(b)]			-.00	-.01
Desire for ideal weight [(c)]			-.01	-.08
Block 2: Athletic variables				
Attraction toward exercise	.12 (.05)	(6, 78) 1.78n.s.	.25	2.00*
Self-reported past exercise behavior			-.11	-.99
Model 2: Psychological variables				
Block 1: Theory of plan. beha. variables				
Instrumental attitude	.12 (.08)	(3, 71) 3.15*	.07	.53
Affective attitude			.32	2.45*
Perceived behavioral control			-.09	-.72
Block 2: Behavioral regulation variables				
External regulation	.14 (.08)	(5, 69) 2.27+	-.17	-1.33
Intrinsic regulation			-.02	-.13
Block 3: Satisfac. and instructor variables				
Satisfaction with body shape and physical appearance	.24 (.16)	(7, 67) 3.00**	.26	2.24*
Weight-related instructor pressure			.17	1.58

[(a)] Gender: 0-Male; 1-Female; [(b)] BMI: 0-Normal weight; 1-Overweight; [©] Desirefor ideal weight: 0-Lower than the current weight; 1-Same or higher than current weight.

+p < .10; *p < .05; **p < .01

or weigh more (n = 59, 57.8%). Thus, the first block explained 7% of the variance but the model did not achieved statistical criteria for significance. However, the PCEF was predicted by gender, meaning that being female was related with a lower PCEF. The second block, explained 12% of the variance but the model was not found to be significant. However, the PCEF was predicted by the attraction toward exercise, meaning that a lower attraction toward exercise was related with a lower PCEF. Two outliers were removed from the analysis.

Regarding the psychological variables (Model 2, Table 1), in the first block were introduced the TPB variables. These explained 12% of the variance and the model was found to be significant. The PCEF was predicted by the affective attitude, where lower values of affective attitude variable were related with lower values of the PCEF variable. In the second block, behavioural regulation dimensions were introduced and were found to explain 14% of the variance. The model was found to be marginally significant. External regulation and intrinsic regulation did not achieved significance criteria. In the third block, the satisfaction and instructor variables were introduced, and explained 24% of the variance. The model was found to be significant. The satisfaction with body shape and physical appearance predicted the PCEF. Thus, lower levels of satisfaction with body shape and physical appearance were related with lower perceptions of current exercise frequency.

For time point 2, the same procedure was used to define the predictor variables, as for time point 1. Thus, the predictive values of personal and athletic variables (Model 3) were evaluated, as well as the predictive values of psychological variables (Model 4).

Starting with the personal and athletic variables (Model 3, Table 2), it should be mentioned that for BMI and desire for ideal weight two groups were also

Table 2 *Regression model for the prediction of the Perception of Current Exercise Frequency at time point 2*

	R^2 (R^2 ajust.)	F	β	t
Model 1: Personal and athletic variables				
Block 1: Personal variables				
Gender [(a)]				-.27
Age	.09 (.04)	(4, 80) 1.56n.s.	(4, 80) 1.87n.s.	-.11
BMI [(b)]				-.00
Desire for ideal weight [(c)]				.06
Block 2: Athletic variables				
Attraction toward exercise	.12 (.05)	(6, 78) 1.78n.s.	(6, 78) 1.70n.s.	.17
Self-reported past exercise behavior				.06
Model 2: Psychological variables				
Block 1: Theory of plan. beha. variables				
Instrumental attitude	.12 (.08)	.08 (.04)	(3, 85) 2.36+	-.09
Affective attitude				.33
Perceived behavioral control				-.01
Block 2: Behavioral regulation variables				
External regulation	.14 (.08)	.08 (.03)	(5, 83) 1.51n.s.	.01
Intrinsic regulation				-.11
Block 3: Satisfac. and instructor variables				
Satisfaction with body shape and physical appearance	.24 (.16)	.21 (.14)	(7, 81) 3.04**	.38
Weight-related instructor pressure				.02

[(a)] Gender: 0-Male; 1-Female; [(b)] BMI: 0-Normal weight; 1-Overweight; [(C)] Desirefor ideal weight: 0-Lower than the current weight; 1-Same or higher than current weight.

+p < .10; *p < .05; **p < .01

defined according to the frequency results. For BMI, two groups were defined: a group of participants who were normal weight (n = 75, 79.8%) and a group of participants who were overweight (n = 19, 20.2%). Two groups were also defined, based on participants' desire for ideal weight: a group of participants who wanted to weigh less (n = 41, 40.6%) and a group of participants who wanted to either remain the same weight or weigh more (n = 60, 59.4%). Under these conditions, the first block explained 9% of the variance but the model was not found to be significant. However, the PCEF was predicted by gender, meaning that being female was related with a lower PCEF. The second block explained 12% of the variance but the model was not found to be significant. Attraction toward exercise and self-reported past exercise behaviour did not predict the PCEF. Six outliers were removed from the analysis.

For the model based on psychological variables (Model 4, Table 2), the TPB variables were introduced in the first block and explained 8% of the variance. The model was found to be marginally significant. The PCEF was predicted by the affective attitude, meaning that a lower value of affective attitude was related with a lower PCEF. In the second block, the behavioural regulation dimensions were introduced and together they explained 8% of the variance but the model was found not to be significant. Neither external regulation, nor intrinsic regulation had significant values. In the third block, the satisfaction and instructor variables were introduced, showing to explain 21% of the variance. That resulting model was found to be significant. The satisfaction with body shape and physical appearance predicted less PCEF, such that a reduced satisfaction with body shape and physical appearance was related with lower values of the PCEF. Three outliers were removed from the analysis.

Differences in the Psychological Variables across Time and Gender

Differences in the psychological variables (e.g., exercise attitudes, perceived behavioural control, and behavioural regulation, satisfaction with body shape and physical appearance, and weight-related instructor pressure) between males and females, in time points 1 and 2, were tested using a 2X2 repeated measures MANOVA. Specifically, the psychological variables were the dependent variables, considering the time point of evaluation the within-subjects factor, and gender as the between-subjects factor.

When analysing the TPB variables, no significant differences between the time points and gender were found in the instrumental attitude component (Wilks' λ = .99, $F(1,92)$ = .11, n.s., η^2 = .00), neither in the affective attitude component (Wilks' λ = .99, $F(1,90)$ = .08,n.s., η^2 = .00). However, multivariate tests were significant on the perceived behavioural control dimension (Wilks' λ = .96, $F(1,95)$ = 4.24, p < .05, η^2 = .04). Tests of within-subjects effects showed an interaction between the two time points and found that, although the male group maintained the same level of perceived behavioural control between time points 1 and 2, the female group showed a decrease across the two time points.

Analysis of the behavioural regulation dimensions found no significant differences in the external regulation dimension between the time points and gender (Wilks' λ = .99, $F(1,95)$ = .20, n.s., η^2 = .00); however, differences were found in the intrinsic regulation dimension (Wilks' λ = .95, $F(1,95)$ = 4.59, p < .05, η^2 = .05). Tests of within-subjects effects showed an interaction between the two time points. In this case, whereas the male group showed an increase in intrinsic regulation, from time point 1 to time point 2, the female group showed a decrease between the two time points.

In testing the satisfaction and instructor variables, no differences between the time points and gender were found regarding the satisfaction with body shape and physical appearance (Wilks' λ = .99, $F(1,92)$ = .10, n.s., η^2 = .00) nor in terms of weight-related instructor pressure (Wilks' λ = 1.00, $F(1,84)$ = .03, n.s., η^2 = .00). However, the tests of between-subjects effects revealed differences between males and females ($F(1,84)$ = 9.00,

Table 3 *Differences in the psychological variables across time and gender*

	Time point 1		Time point 2			
	Male	Female	Male	Female		
Variables	M (SD)	M (SD)	M (SD)	M (SD)	df	F
Theory of planned behavior						
Instrumental attitude	6.28(1.30)	6.23(.75)	6.24(1.38)	6.50(1.18)	1, 92	.11
Affective attitude	6.45(.74)	6.37(.94)	6.35(94)	6.21(1.29)	1, 90	.08
Perceived behavioral control	93.67(10.91)	88.75(15.00)	93.11(10.43)	81.84(18.40)	1, 95	4.24*
Behavioral regulation variables						
External regulation	.42(.63)	.25(.60)	.44(.64)	.34(.61)	1, 95	.20
Intrinsic regulation	3.35(.68)	3.40(.62)	3.47(.68)	3.26(.76)	1, 95	4.59*
Satisfaction and instructor variables						
Satisfaction with body shape and physical appearance	3.64(.89)	3.35(.81)	3.74(.94)	3.39(.90)	1, 92	.10
Weight-related instructor pressure	1.87(.92)	1.37(.63)	1.89(.93)	1.42(.83)	1, 84	.03

*p < .05

$p < .01$), being the females more influenced by weight-related instructor pressure than males.

Discussion

In a reflection of the first specific objective of this study, which was to observe the predictive values of personal, athletic, and psychological characteristics of the participants on the PCEF, two aspects should be highlighted. First, four variables (one personal variable, one athletic variable in time point 1, and two psychological factors) predicted the PCEF. Thus, lower perceptions of current exercise frequency were predicted by gender, namely being female; by less attraction toward exercise (time point 1); by decreased affective attitude toward exercise; and, by lower levels of satisfaction with body shape and physical appearance. Second, several variables failed to predict the PCEF, including three personal variables (e.g., age, BMI, and desire for ideal weight), one athletic variable (e.g., self-reported past exercise behaviour), and five psychological factors (e.g., instrumental attitude, perceived behavioural control, external regulation, intrinsic regulation, and weight-related instructor pressure). The most obvious conclusion is that there were more variables that failed to predict the PCEF (nine dimensions) than variables that possessed predictive value (four variables). This weakness of the predictor variables is reinforced by the variance explained by the four regression models. The personal and athletic variables explained 12% of the variance in the PCEF at both time points, and the psychological variables explained 24% of the variance in time point 1, and 21% in time point 2. These values are not particularly high, which suggests that their capacity to predict the PCEF is not totally evident. This result confirms the idea that predicting the perception of exercise behaviour is as difficult as studying the variables that intervene in the intention-behaviour gap and that explains effective exercise behaviour (Biddle & Fuchs, 2009; Hagger et al., 2002; Hamilton & White, 2008; Li & Chan, 2008).

The results of the second specific objective of this study showed that the predictor variables were very consistent and stable over time. Specifically, gender differences, affective attitudes toward exercise, and lower levels of satisfaction with body shape and physical appearance were found to be predictive variables of the PCEF, in both time points of data collection. This finding may explain why the amounts of explained variance for each of the four regression models were very similar between the two time points. Therefore, it

can be concluded that the predictor variables selected for this study made the same contributions toward explaining the variance of the PCEF over time, and that they do not change significantly when they are monitored for several months. It is also important to note that only one variable of the TPB assumed to be predictive of the PCEF. In fact, it was observed that only the affective attitude toward exercise was found to be a predictor of the PCEF, which confirms the need to analyse the contributions of other theoretical dimensions to fully explain exercise behaviour (Conner et al., 2000; Sheeran & Abraham, 2003; Sheeran et al., 1999).

The final specific objective of this study was to examine the stability of the psychological factors over time, taking into consideration gender differences. In this case, three aspects should be highlighted. First, in the case of the TPB variables, the perceived behavioural control was not stable across time and gender, being observed that the female group decreased their perception of control across the two periods of exercise activity. Likewise, no differences were found in the instrumental or affective attitude components of the TPB. Second, in the case of the behavioural regulation dimensions, no differences were found in the external regulation dimension but the intrinsic regulation dimension was not a stable dimension across time and gender. In this case, the male group showed an increase in intrinsic regulation from time point 1 to time point 2, whereas the female group showed a decrease between the first and second time points. Third, in the case of satisfaction and instructor variables, no differences were found in participants' levels of satisfaction with body shape and physical appearance, or in the weight- related instructor pressure. Thus, these dimensions were stable across time. However, the tests for between- subjects effects showed that the female group felt more weight-related instructor pressure, compared to males.

So, it can be concluded that two variables were not stable across time and gender (e.g., perceived behavioural control and intrinsic regulation), one variable was different between gender (e.g., weight-related instructor pressure), and four variables were stable across time and gender (e.g., instrumental attitude, affective attitude, external regulation, and satisfaction with body shape and physical appearance). By analysing those variables with significant changes, it can be said that the practice of exercise is less motivating for women than for men, and that the decreased perceptions of behavioural control and increased pressure from the instructor regarding weight could make exercise practice less positive and gratifying for women. These findings can be related to some others that suggest the women's tendency to be less physically active at most ages compared to men (Trost et al., 2002).

In summary, although the explained variance of personal, athletic, and psychological characteristics of the participants are not very high in the prediction of PCEF, they are relatively stable over time, both in terms of the amount of explained variance and in the specific variables that are predictive of the PCEF. Additionally, some psychological dimensions are not stable across time and gender, raising the possibility that the practice of exercise can be less interesting for women, and ultimately increase their likelihood to dropout. Regardless the interest of these results, some limitations should be addressed. First, it was defined for this study a cross-sectional design that used a convenience sample with individuals doing exercise in a private fitness centre, that of course do not represent the general population. Second, some of the behavioural regulation dimensions did not reach acceptable "alpha" values (e.g., introjected regulation, identified regulation, and amotivation scales), which reduced the understanding of their impact on exercise practice. Third, the results obtained in this study were based on self-reported indicators of exercise practice (e.g., the perception of current exercise frequency), being possible that some individuals overestimated (or underestimated) their habits of exercise. This last aspect, poses a major challenge for future research, and consists on testing these results using not only the PCEF of the participants but, if possible, using objective measures

of exercise frequency in order to observe these differences. As mentioned by Armitage (2005), measurements of exercise behaviour using single-occasion self-reports can be problematic, because they are susceptible to memory biases. It would be also interesting to know if the predictor variables used in this study are more able to account for variance in either the PCEF or the effective frequency of exercise collected by consulting the registration rates of the exercise that was really done. Testing this hypothesis can provide specific information about the factors that promote exercise behaviour and those that prevent exercise dropout.

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