Interplay of different contextual motivations and their implications for exercise motivation

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Abstract
The aim of this study was to analyze the interaction between different contextual motivations and exercise motivation. The sample consisted of 449 exercisers aged between 16 and 53 years. Questionnaires were used to measure the satisfaction of basic psychological needs, self-determined motivation and the autotelic experience during exercise. The level of self-determined motivation regarding health, leisure and interpersonal relationships was also measured. The results of the structural equation modeling demonstrated that basic psychological needs and self-determined motivations about health and leisure positively predicted the self-determined motivation to exercise. Moreover, the self-determined motivation to exercise positively predicted the autotelic experience. The model was invariant across age, although some gender differences were found. Specifically, the self-determined motivation towards health in men did not significantly predict the self-determined motivation to exercise. These results represent to evaluate the role that other contextual motivations play in exercise motivation.

Key words: Self-determination theory, health, leisure, interpersonal relationships, autotelic experience.

Introduction

The hierarchical model of intrinsic and extrinsic motivation (HMIEM) is a human motivation model that puts forward a set of postulates and colloraries that have been widely applied in the fields of sports and physical activity (Vallerand, 2007a). This model complements the self-determination theory (Deci and Ryan, 2000; Ryan and Deci, 2007) by considering that different motivational levels exist. The HMIEM distinguishes between global motivation (a person's general motivation), contextual motivation (orientation to a specific context, such as physical activity) and situational motivation (only seen while developing a particular activity). Although many of the hypotheses proposed by the model have been tested in sports and physical activity, a major aspect that has yet to be resolved is the interaction between different contextual motivations (Vallerand, 2007b). This study was designed in order to analyze how motivation about health activities, leisure activities and interpersonal relationships could interact with exercise motivation.

The HMIEM states that a range of social factors influence people's basic psychological needs and that these coexist within three levels of motivation, thereby contributing to different motivation types, which are, in turn, related to cognitive, behavioral and affective consequences. If the social factors in one's life (e.g., instructors, parents, and friends) satisfy the needs for autonomy, competence, and relatedness of an individual who exercises, this could result in more self-determined types of motivation (e.g., intrinsic, integrated, and identified regulation), and therefore in more positive consequences (e.g., enjoyment, exercise adherence) (for reviews see Vallerand and Rousseau, 2001; Vallerand, 2007a).

Hypotheses in the model also propose that the motivation in a particular context might be explained by the motivation in other contexts. Although this connection is not specifically outlined in the HMIEM' postulates and corollaries, it is graphically represented in the Vallerand model (2001). In fact, Vallerand (2007b) proposes that there may be at least three types of interactions: facilitative, conflicting, and compensative.

Concerning facilitative interactions, the studies that have tested the trans-contextual model of motivation (Hagger et al., 2003; 2005; 2009) have shown how self-determined motivation in the context of physical education facilitates self-determined motivation in the leisurely context of physical activity. In the same line of inter-context dynamics, Boiché and Sarrazin (2007) studied a group of French adolescents, revealing that self-determined motivation in friendship, school and sports positively predicted the instrumentality between sports context and the remaining contexts. This means that the presence of self-determined motivation in different contexts allows them to be compatible.

Boiché and Sarrazin (2007) found that self-determined motivations in the contexts of friendship and school were negatively associated with the inter-context conflict. However, self-determined motivation in sports positively predicted the school-sport conflict. These results suggest that when motivation at school is less self-determined than motivation in sports, adolescents perceive that school is taking time and energy away from practicing sports. The absence of conflict between school and sports was associated with participation in sports-related activities. Ratelle et al. (2005) demonstrated that self-determined motivation at school negatively predicted the conflict between the contexts of leisure and education, while self-determined motivation in leisure was unrelated to the conflict. The motivational conflict between the two contexts was associated with negative academic consequences.

Finally, compensation would occur when the decline in self-determined motivation in one context caused someone to compensate for it by increasing the self-determined motivation in another context (Vallerand, 2007b).

The current study aimed to further analyze the interaction between different motivational contexts as they apply to the field of exercise. Specifically, the relationships between exercise motivation and motivation in the contexts of health, leisure and interpersonal relationships, domains of life that have been shown to involve exercise, were tested. Exercise is a healthy activity that is practiced as a leisure activity, often encouraging social relationships (Aarnio et al., 2002; Frankish et al., 1998; Patterson and Chang, 1999; Rodríguez et al., 2008). Here, how self-determined motivation in these three contexts is related to self-determined motivation in exercise was analyzed. People appear to have interrelated preferences across diverse domains of activity (Gaudron and Vautier, 2007), for example, motivation about proper nutrition and medical checkups (health-related activities), as well as attendance in cultural activities and social meetings (relationships and leisure activities), might relate to the exercise motivation in a facilitative way.

A structural equation model, in which the satisfaction of basic psychological needs positively predicted the self-determined motivation to exercise, which, in turn, predicted the frequency of autotelic experiences (enjoyment), was tested. In addition, the self-determined motivations in the contexts of health, leisure and interpersonal relationships were included as positive determinants of the exercise motivation (Figure 1). This assumption suggests that when individuals develop self-determined mechanisms for regulation that involve different identities or activities, they feel more authentic and satisfied, and thus they have a tendency to integrate various roles and functions (Ryan, 1993). The invariance of the model across gender and age was analyzed through a multi-group analysis.

Methods

Participants

A total of 449 exercisers (222 men, 223 women, and 4 undefined) between the ages of 16 and 53 (M = 30.30, SD = 8.70) participated in this study. All of the participants were involved in activities at different sports centers (336 public and 113 private) throughout a large city in Spain. More specifically, 200 of the participants practiced guided activities (e.g., aerobics, indoor cycling), 101 practiced semi-guided activities (e.g., coached strength training) and 148 practiced free activities (e.g., squash, free swimming, free strength training). Regarding the frequency of exercise, 21 attended their sports center less than two days a week, 190 two or three days a week, and 236 on more than three days. Two of the participants did not indicate their practice frequency.

Measures
Basic psychological needs: In order to measure the satisfaction of basic psychological needs in the context of exercise, the Spanish version (Sánchez and Núñez, 2007) of the Basic Psychological Needs in Exercise Scale (Vlachopoulos and Michailidou, 2006) was used. This instrument begins with the sentence "In the sports center…" and measures the satisfaction of the needs for autonomy (e.g., "I feel very strongly that I have the opportunity to

make choices with respect to the way I exercise"), competence (e.g., "I feel that I can manage with the requirements of the training program I am involved") and relatedness (e.g., "I feel very much at ease with the other exercise participants"). There are 12 items on the questionnaire (four for each factor). The answers were scored using a Likert scale from 1 (*totally disagree*) to 5 (*very strongly agree*). In this study were obtained the Cronbach alpha coefficients of 0.69 for autonomy, 0.77 for competence and 0.85 for relatedness. Although one of the factors obtained a slightly low alpha value, it must be taken into account that the items numbers were reduced and, therefore, that value could be considered marginally acceptable although this limitation is acknowledged.
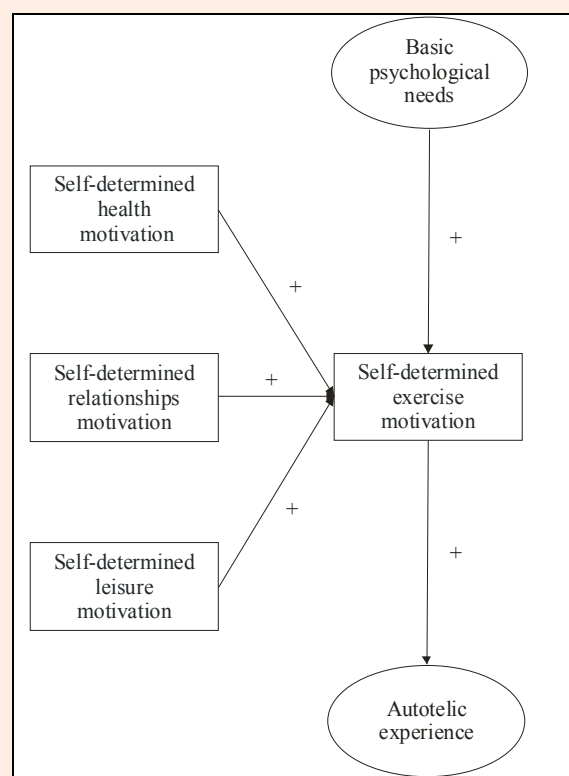

Figure 1. Hypothesized structural equation model.

Exercise motivation: In order to measure the participants' motivation to exercise, the Spanish version (González-Cutre et al., 2010) of the Behavioral Regulation in Exercise Questionnaire was used, including items to measure the integrated regulation (Wilson et al., 2006). The instrument begins with the sentence "Why do you engage in exercise…" and is composed by 23 items: four measuring intrinsic regulation (e.g., "I enjoy my exercise sessions"), four measuring integrated regulation (e.g., "I exercise because it is consistent with life goals"), three measuring identified regulation (e.g., "It's important to me to exercise regularly"), four measuring introjected regulation (e.g., "I feel like a failure when I haven't exercised in a while"), four measuring external regulation (e.g., "I take part in exercise because my friends/family/partner say I should") and four measuring amotivation (e.g., "I think exercising is a waste of time"). Responses were scored on a Likert scale from 0 (*not true*

for me) to 4 (*very true for me*). The alpha values obtained in this study were 0.86 for intrinsic regulation, 0.86 for integrated regulation, 0.66 for identified regulation, 0.72 for introjected regulation, 0.79 for external regulation, and 0.72 for amotivation. Given the average scores from the different subscales, the self-determination index (SDI) was calculated, assigning a weight of +3 to the intrinsic regulation, +2 to the integrated, +1 to the identified, -1 to the introjected, -2 to the external, and -3 to the amotivation (Vallerand, 2007b). In this study, the SDI regarding exercise ranged from -5.25 to 24.

Motivation in health related activities, interpersonal relationships, and leisure: In order to measure the motivation of exercisers in other contexts of life, the Elderly Motivation Scale of Vallerand et al. (1995) was used. The motivation in health-related activities, interpersonal relationships and leisure were measured, considering that these contexts were closely related to exercise. The items designed to measure the motivation in the contexts of biological needs, religion and information were not used, since these were not relevant to the objective of this study. For each of the life domains, three questions were posed (e.g., for health: "Why do you keep up with your diet/nutrition (watch what you eat)?", for relationships: "Why do you have relationships with your friends?", for leisure: "Why do you have leisure activities in groups (with another person or more)?"). Questions were answered by scoring items between 1 (*does not correspond at all*) and 7 (*corresponds exactly*) for each of the following items: "I choose to do it for my own good" (shows self-determined extrinsic motivation [SDEM]), "I don't know; I don't see what it does for me" (amotivation), "Because I am supposed to do it" (non self-determined extrinsic motivation [NSDEM]), and "For the pleasure of doing it" (intrinsic motivation). The scale had three items to measure each of the four types of motivation in each context. Vallerand et al. (1995) considered four types of motivation in the scale, incorporating the SDEM into identified and integrated regulation, and the NSDEM into external and introjected regulation. In order to measure the SDI for each context, a +2 weight was assigned to the intrinsic motivation, +1 to the SDEM, -1 to the NSDEM, and -2 to the amotivation. The SDI ranged from -6.67 to 18 for health, -6 to 18 for interpersonal relationships, and -6 to 18 for leisure.

The scale was translated to Spanish following the back-translation procedure (Hambleton and Patsula, 1998), and the version obtained was revised by three experts in the self-determination theory. Before using this tool in our study, a pilot study was conducted, which caused us to make a few minor changes, ensuring understanding of the items. For instance, in the original item 'In general, why do you have relationships with other people?' the word 'other' was changed to 'the'. Since the scale had not been previously used in Spain, a confirmatory factor analysis (CFA) was made for each one of the domains of life (health, interpersonal relationships, and leisure) and the internal consistency calculated for the four factors in each context. The CFA results were the following (see Data Analysis section for the procedure and the exclusion criteria used for the fit indexes): for health-related activities, χ^2 (47, n = 449) = 159.54, p =

0.00, χ^2/df = 3.39, CFI = 0.91, IFI = 0.91, RMSEA = 0.073 (CI 90% = 0.061-0.086), SRMR = 0.059; for interpersonal relationships, χ^2 (48, n = 449) = 106.51, p = 0.00, χ^2/df = 2.21, CFI = 0.98, IFI = 0.98, RMSEA = 0.052 (CI 90% = 0.039-0.066), SRMR = 0.036; and for leisure, (48, N = 449) = 173.69, p = 0.00, χ^2/df = 3.61, CFI = 0.95, IFI = 0.95, RMSEA = 0.076 (CI 90% = 0.064-0.089), SRMR = 0.040.

The analysis of the internal consistency in the context of health revealed Cronbach's alpha values of 0.64 for intrinsic motivation, 0.73 for SDEM, 0.76 for NSDEM, and 0.67 for amotivation. In the context of interpersonal relationships, the values were 0.85 for intrinsic motivation, 0.91 for SDEM, 0.85 for NSDEM, and 0.84 for amotivation. In the context of leisure, the values were 0.74 for intrinsic motivation, 0.82 for SDEM, 0.85 for NSDEM, and 0.85 for amotivation.

Autotelic experience: In order to measure the disposition to the autotelic experience in exercise, the Spanish version (González-Cutre et al., 2009) of the Dispositional Flow Scale-2 (Jackson and Eklund, 2002) was used. The autotelic experience factor consisted of four items (e.g., "When I exercise in the sports center, I really enjoy the experience") that were answered using a Likert scale from 1 (*never*) to 5 (*always*). An alpha coefficient of 0.86 was obtained in this study.

Procedure

The managers of the different sports centers were contacted to inform them of the aims of our research and asked for their collaboration. All instruments were administrated before the beginning of an exercise session. A trained researcher explained how to fill out the forms, emphasizing the voluntary and anonymous nature of the responses, and answering all of the questions and concerns that arose. The various questionnaires were answered in about 25 minutes. The research was approved by the ethical board of Almería University and informed consent was obtained from participants.

Data analysis

First, the descriptive statistics and the bivariate correlations were calculated. Then, a structural equation model in two steps (Anderson and Gerbing, 1988) was conducted. In the first step, the validity of the measurement was confirmed using an analysis in which the different variables were freely correlated. The second step analyzed the predictive relationships between the satisfaction of basic psychological needs in exercise, the SDI for health-related activities, the SDI for interpersonal relationships, the SDI for leisure, the SDI for exercise, and the propensity to the autotelic experience in exercise. It was hypothesized that the basic psychological needs in exercise and the SDIs in the contexts of health, relations, and leisure, would positively predict the SDI for exercise, which, in turn, would positively predict the autotelic experience. The structural equation model was conducted using the maximum likelihood estimation method and the *bootstrapping* procedure (Mardia's coefficient = 62.76). This procedure showed that the estimates were robust and not affected by lack of normality (Byrne, 2001).

Table 1. Mean, standard deviation and correlations among all variables.

	M	SD	1	2	3	4	5	6	7	8
1. Autonomy	3.85	.70	-	.67**	.63**	.39**	.30**	.17**	.15**	.41**
2. Competence	3.77	.66	-	-	.62**	.43**	.33**	.15**	.12**	.33**
3. Relatedness	3.83	.83	-	-	-	.38**	.24**	.14**	.13**	.41**
4. Exercise SDI	16.46	5.71	-	-	-	-	.43**	.31**	.38**	.39**
5. Health SDI	7.53	4.46	-	-	-	-	-	.41**	.41**	.24**
6. Relationships SDI	12.11	4.69	-	-	-	-	-	-	.74**	.26**
7. Leisure SDI	12.05	4.88	-	-	-	-	-	-	-	.24**
8. Autotelic	4.23	.65	-	-	-	-	-	-	-	-

** p < 0.01

In order to test the goodness of fit of the model, different indexes were used: χ^2/df, Comparative Fit Index (CFI), Incremental Fit Index (IFI), Root Mean Square Error of Approximation (RMSEA) and the confidence interval (CI) at 90% and Standardized Root Mean Square Residual (SRMR). Since χ^2 is very sensitive to the sample size (Jöreskog and Sörbom, 1993), a ratio between chi-square and the degree of freedom (χ^2/df) was used. For this indicator, values below 5 are usually accepted (Bentler, 1989). According to Hu and Bentler (1999), CFI and IFI values greater than 0.95 along with a RMSEA value equal or lower than 0.06, and a SRMR value equal or lower than 0.08, indicate a good fit of the model. Nevertheless, some psychometric experts consider that CFI and IFI values are too demanding and difficult to obtain using complex models that use actual data instead of simulated data (e.g., Marsh et al., 2005). Consequently, values above 0.90 are usually considered acceptable. Other authors consider values of 0.08 or below acceptable for RMSEA (Browne and Cudeck, 1993).

Finally, a multi-group analysis was used to test the factorial invariance of the model across gender and age. A totally non-invariant multi-sample model was tested, serving as a baseline for comparison for the following models. This model was compared to different models using invariance. Successive steps checked whether there were statistically significant differences in χ^2 between the unconstrained (non-invariant) model and the models with invariant measurement weights, structural weights, structural covariances, structural residuals, and measurement residuals (Byrne, 2004). In this analysis, a new constraint to each tested model was added. The statistical packages SPSS 15.0 and AMOS 7.0 were used to perform the different analysis.

Results

Descriptive statistics and correlation analysis

Table 1 illustrates that the participants obtained similar average scores in terms of the satisfaction of all basic psychological needs, and, moreover, that they were above the midpoint of the scale. The SDI score was moderately high across the different contexts, considering the range of oscillation of these variables in the study. However, in the context of health, an intermediate score was obtained. The score for autotelic experience was relatively high.

The correlation analysis showed a positive association between the SDI for exercise and the satisfaction of the needs for autonomy, competence and relatedness, as well as the SDI regarding health, relations and leisure.

The SDI for exercise also correlated positively with the autotelic experience.

Structural equation modeling

To perform the analysis, the SDI scores in each one of the contexts were used as observed variables. The latent variable "autotelic experience" that consisted of four indicators (its four items), and the latent variable "satisfaction of the basic psychological needs" that used the average score in autonomy, competence and relatedness as indicators, were also used. Following the example of several previous studies (Ntoumanis, 2005; Taylor et al., 2008), to group the three needs into one unique latent variable was decided because of the high correlation found between autonomy and competence in the measurement model (r = 0.90). This grouping did not weaken the model, given that the main objective of the study was not to examine the relationship between basic psychological needs and the self-determined motivation to exercise, but rather to study the contextual interaction across the different motivations.

The fit indexes for the measurement model were satisfactory: χ^2 (33, N = 449) = 91.38, p = 0.00, χ^2/df = 2.76, CFI = 0.97, IFI = 0.97, RMSEA = 0.063 (CI 90% = 0.048-0.079), SRMR = 0.031. In addition, the correlations between all variables were statistically significant, ranging from 0.17 to 0.74.

The fit indexes obtained for the hypothesized structural model were as follows: χ^2 (37, N = 449) = 148.52, p = 0.00, χ^2/df = 4.01, CFI = 0.95, IFI = 0.95, RMSEA = 0.082 (CI 90% = 0.068-0.096), SRMR = 0.095. The satisfaction of basic psychological needs (β = 0.39), and the SDIs for both health (β = 0.19) and leisure (β = 0.26), positively predicted the SDI for exercise, which, in turn, positively predicted the autotelic experience (β = 0.42). The SDI for the relationships did not significantly predict the SDI for exercise. The modification indexes suggested that the model substantially improved if a parameter was introduced between the satisfaction of the basic psychological needs and the autotelic experience, such that this relationship would be partially mediated (Figure 2). The indexes of this new model indicated a good fit: χ^2 (37, n = 449) = 102.98, p = 0.00, χ^2/df = 2.78, CFI = 0.97, IFI = 0.97, RMSEA = 0.063 (CI 90% = 0.049-0.078), SRMR = 0.044. Explained variances of 37% for SDI and 30% for autotelic experience were obtained.

To determine whether the interaction between different contextual motivations actually helped to clearly increase the explained variance of the exercise motivation, the SDI values for health, relations, and leisure were eliminated from the model. The model obtained the
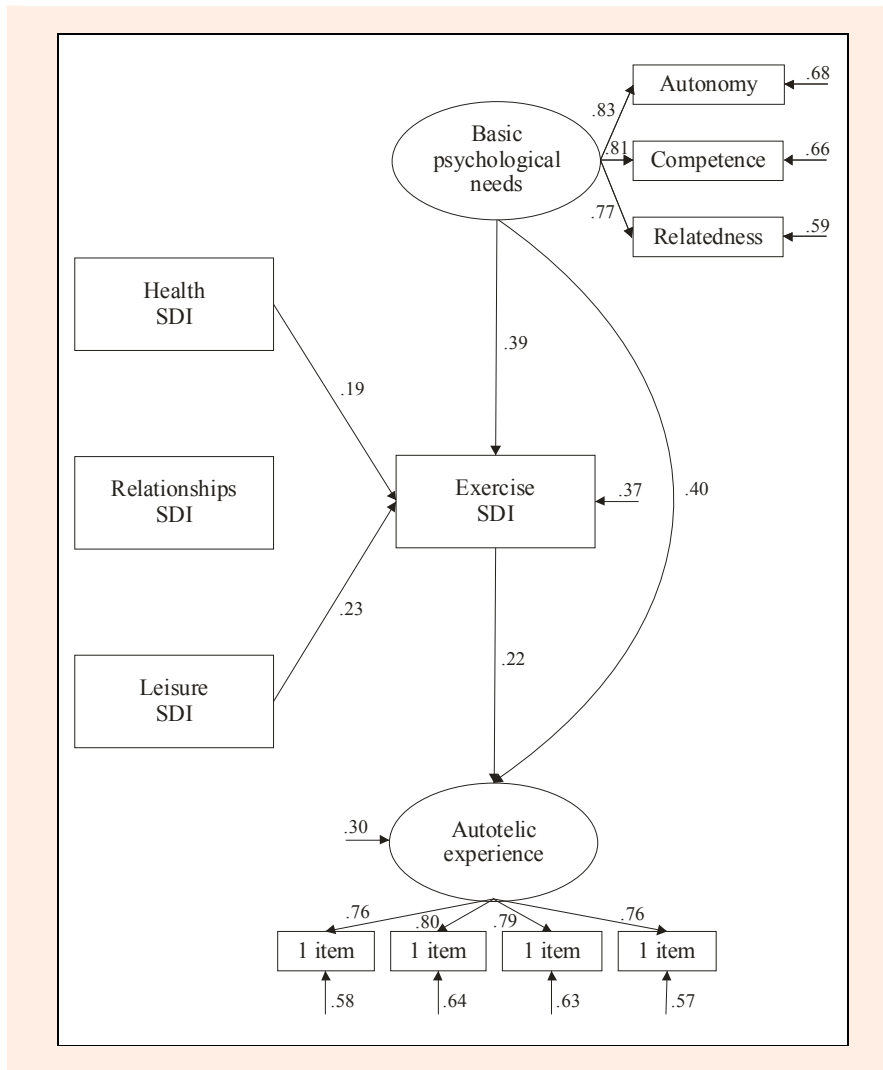
Figure 2. Final structural equation model. All the parameters are standardized and statistically significant. Explained variances are shown on the small arrows.

following fit indexes: χ^2 (18, $N = 449$) = 80.15, $p = 0.00$, $\chi^2/df = 4.45$, CFI = 0.96, IFI = 0.96, RMSEA = 0.088 (CI 90% = 0.069-0.108), SRMR = 0.038. Satisfaction of the basic psychological needs explained 25% of the variance from the SDI for exercise. Therefore, the explained variance from SDI was sensitively reduced (12%) when the other contextual motivations were eliminated from the model.

Invariance analysis

First, using the multi-group analysis, whether the model was invariant across gender was analyzed. The results (Table 2) showed no significant differences in chi-square values for the measurement weights, however, differences

were seen for the rest of the parameters. These results suggest that the model differed between men and women. Next, the model was separately tested for both genders. The model obtained acceptable fit indexes for men: χ^2 (37, n = 222) = 89.74, p = 0.00, $\chi^2/df = 2.42$, CFI = 0.95, IFI = 0.95, RMSEA = 0.080 (CI 90% = 0.059-0.102), SRMR = 0.062. Nevertheless, the SDI for health did not significantly predict the SDI for exercise. In this case, the SDI for leisure ($\beta = 0.33$) and the basic psychological needs ($\beta = 0.30$) explained 29% of the variance of the SDI for exercise. The model obtained better fit indexes for women: χ^2 (37, n = 223) = 49.41, p > 0.05, $\chi^2/df = 1.33$, CFI = 0.99, IFI = 0.99, RMSEA = 0.039 (CI 90% = 0.000-0.065), SRMR = 0.029. Furthermore, the

Table 2. Multi-group invariance analysis across gender.

Models	χ^2	df	χ^2/df	$\Delta\chi^2$	Δdf	CFI	IFI	SRMR	RMSEA (90% CI)
Model 1	139.15	74	1.88	-	-	.97	.97	.029	.045 (.033-.056)
Model 2	149.61	80	1.87	10.45	6	.97	.97	.030	.044 (.033-.055)
Model 3	157.84	84	1.87	18.68*	10	.97	.97	.032	.045 (.034-.055)
Model 4	185.71	94	1.97	46.56*	20	.96	.96	.044	.047 (.037-.057)
Model 5	189.51	95	1.99	50.35*	21	.96	.96	.046	.047 (.037-.057)
Model 6	223.91	103	2.17	84.75*	29	.95	.95	.046	.051 (.042-.061)

Note. Model 1 = unconstrained; Model 2 = invariant measurement weights; Model 3 = invariant structural weights; Model 4 = invariant structural covariances; Model 5 = invariant structural residuals; Model 6 = invariant measurement residuals. * p < 0.05

Table 3. Multi-group invariance analysis across age.

Models	χ^2	df	χ^2/df	$\Delta\chi^2$	Δdf	CFI	IFI	SRMR	RMSEA (90% CI)
Model 1	144.71	74	1.95	-	-	.97	.97	.037	.046 (.035-.057)
Model 2	146.69	80	1.83	1.98	6	.97	.97	.037	.043 (.032-.054)
Model 3	149.47	84	1.77	4.75	10	.97	.97	.039	.042 (.031-.053)
Model 4	164.52	94	1.75	19.81	20	.97	.97	.047	.041 (.030-.051)
Model 5	164.79	95	1.73	20.07	21	.97	.97	.047	.041 (.030-.051)
Model 6	221.74	103	2.15	77.03*	29	.95	.95	.052	.051 (.042-.060)

Note. Model 1 = unconstrained; Model 2 = invariant measurement weights; Model 3 = invariant structural weights; Model 4 = invariant structural covariances; Model 5 = invariant structural residuals; Model 6 = invariant measurement residuals. * p < 0.05

relationships were significant, such that basic psychological needs ($\beta = 0.45$), the SDI for leisure ($\beta = 0.18$) and the SDI for health ($\beta = 0.26$) explained 45% of the variance of the SDI for exercise.

Given that the age range of the sample was quite wide, an invariance multi-group analysis across age was performed. The median was used to establish two age groups that were homogeneous in size. The study analyzed whether the model was invariant across these two groups. The first group comprised 212 participants between the ages of 16 and 28 (M = 22.93, SD = 3.61) and the second group comprised 237 participants between the ages of 29 and 53 (M = 36.90, SD = 6.28). Table 3 shows the fit indexes for the six compared models. There were no significant differences in chi-square values between the unconstrained model and the different models with invariance, with the exception of model 6 (invariant measurement residuals), which provided support for the existence of invariance in the model across age (Byrne et al., 1989; Marsh, 1993). Furthermore, the model obtained fit indexes that were acceptable for the younger age group, χ^2 (37, n = 212) = 70.76, p = 0.00, χ^2/df = 1.91, CFI = 0.97, IFI = 0.97, RMSEA = 0.066 (CI 90% = 0.042-0.089), SRMR = 0.059, and for the older age group, χ^2 (37, n = 237) = 73.95, p = 0.00, χ^2/df = 1.99, CFI = 0.97, IFI = 0.97, RMSEA = 0.065 (CI 90% = 0.043-0.087), SRMR = 0.037, where the proposed relationships were significant in both groups.

Discussion

The goal of this study was to analyze the interaction between self-determined motivation to exercise and motivation in the contexts of health, leisure and interpersonal relationships. In order to achieve this goal, the following model for exercise was tested: basic psychological needs → self-determined motivation → autotelic experience, exploring the contributions of these three contextual motivations to the motivation in exercise. Analysis of the interaction among different contextual motivations and its implication for consequences is one of the unexplored research scopes within HMIEM (Vallerand, 2007b). Previous studies in the areas of physical activity and sports (e.g., Boiché and Sarrazin, 2007; Hagger et al., 2009) have analyzed the role of some inter-context dynamics in motivation, but not in the context of exercise. This study serves as a starting point for analyzing the connection between exercise motivation and motivation in other contexts.

As hypothesized, the results demonstrate that the self-determined motivations about health and leisure positively predicted the exercise motivation, though how

it is discussed below, motivation towards health was only related to exercise motivation in women. These results reveal a motivational interconnection between the contexts of health, leisure and exercise. It is important to consider that physical exercise is a leisure activity that contributes to health benefits (Aarnio et al., 2002; Frankish et al., 1998); thus, it is quite logical that the motivations in the three contexts (health, leisure, and exercise) are related. It is likely that possessing the self-determined motivation to pay attention to nutrition and rest, not to consume alcohol, tobacco or other drugs, to visit the doctor periodically and to practice good hygiene, are related to the self-determined motivation to join a sports center. Likewise, the results suggest that the self-determined motivation to exercise might be related to self-determined motivation in other leisure activities. Although one might think that some leisure activities could conflict with others, the hypothesis of this study is based on the consideration that a self-determined motivation in all of the activities would facilitate their compatibility (Boiché and Sarrazin, 2007). Therefore, those who are able to enjoy leisure activities and appreciate the importance of this time, will want to explore the different facets that it may present. These types of people are active and passionate about their involvement in various activities.

This motivation in the contexts of health, leisure and exercise would maintain a close relationship with the global motivation of that individual (causality orientation). Thus, people with an autonomy orientation (Deci and Ryan, 2000) that involves regulation of behavior based on self-imposed interests and values, would possess a more self-determined motivation in different contexts, thereby facilitating the integration of the different activities in lifestyle. That is, physical exercise would integrate into other activities involved in health and leisure, thereby enhancing among all of these a harmonious self. From this point of view, the first consideration to remember when encouraging the practice of exercise is educating people about the culture of leisure, and promoting healthy life habits (Frankish et al., 1998).

The motivation in interpersonal relationships, however, did not relate to the exercise motivation in the model. This lack of a relationship is surprising when considering the importance of exercise in increasing social interaction (e.g., Chogahara et al., 1998). It was expected that individuals who had a self-determined motivation to relate to friends and family, also had a self-determined motivation to exercise, given that exercising is a very useful approach to relating with people. The absence of a connection between these two motivations is probably due to the measurement instrument used in this study. One of the items that was used to measure motiva-

tion towards leisure (Why do you have leisure activities in groups (with another person or more)?) clearly overlaps with the motivation towards interpersonal relationships. In fact, the correlation between these two variables in the measurement model was high (0.74). This could entail that the effect of motivation in interpersonal relationships on the exercise motivation was absorbed by the effect of motivation in leisure on exercise motivation.

The results also demonstrated, in accordance with the self-determination theory, that satisfaction of the basic psychological needs positively predicted the self-determined motivation to exercise, which then predicted the frequency of autotelic experiences. However, the satisfaction of basic psychological needs also directly predicted the autotelic experience. Recent studies about physical activity and sports also found a partially mediated relationship between basic psychological needs and different consequences (Álvarez et al., 2009; McDonough and Crocker, 2007; Taylor et al., 2008). These findings demonstrate the importance of basic psychological needs in the context of physical activity, not only for motivation, but also because they relate directly to various behavioral, cognitive, and affective outcomes.

The results of the multi-group analysis showed that the model was invariant across age, indicating that the relationships in this study are applicable to different age groups. However, it is important to consider that only two subgroups of age were analyzed in this study to maintain homogeneity in the sample size. Future studies must confirm that the relationships obtained are observed throughout different stages of life.

Some differences in the relationships based on gender were found. Specifically, in male participants, motivation in the context of health did not significantly predict the exercise motivation, whereas leisure motivation played a major role in explaining this variable. These relationships can be interpreted from two different points of view. Women are usually assumed to take on the burden of household duties, frequently acting as the coordinator of the family life and fulfilling a role of mother, wife and housekeeper. This fact, together with the increasing representation of women into the workplace, might interfere or contaminate their leisure time (Mattingly and Bianchi, 2003), thereby leading men to be more satisfied with their leisure activities than women (Daig et al., 2009). In fact taking on adult responsibilities, particularly of a traditional role in family life and home care, is related to a reduction of physical activity in women (Bell and Lee, 2005). For this reason, it is possible that the motivation in the context of leisure provides a better explanation of the exercise motivation for men than for women. On the other hand, women generally cite more reasons to exercise as being related to health, physical condition and well-being than men do (Moreno et al., 2007), perhaps explaining the stronger relationship that is found in women between motivation in terms of health and exercise motivation. In this vein, it is possible that messages promoting health may not to be so important for men who would focus their exercise on filling their leisure time and relaxing.

Although the obtained results contribute useful information about the interactions between different contex-

tual motivations, it is important to consider the correlational and cross-sectional nature of this data, preventing the establishment of causal relationships and generalization of the results. It must be taken into account that measurement errors may favor the initial hypothesis. Further studies are necessary in order to address the role of motivation in different contexts by using longitudinal designs and qualitative analysis that allow in-depth explanation of the different relationships and potential differences between genders. Furthermore, it would be advisable for new research to analyze similar models differentiating according to the exercise stages and practice frequency. It is possible that those variables can affect the proposed relationships and the analysis of them will allow a better understanding on exercise motivation.

Additionally, motivation in the contexts of health, leisure and interpersonal relationships was measured in a general way in this study, without differentiating between the distinct activities involved in each context. Moreover, this study exclusively considered the facilitative interaction between these contexts and the exercise motivation. It would be interesting for future studies to analyze, for example, whether the motivation seen in some leisure activities could conflict with exercise. The development of new instruments to measure the self-determination continuum across different contexts would be useful. Finally, it should also be noted that only people who exercise in sports centers participated in this study. Future studies should use participants that engage in of other forms of exercise as a sample.

Conclusion

In conclusion, this study has demonstrated the contribution of self-determined motivations in the contexts of leisure, health and interpersonal relationships, to the exercise motivation. The obtained findings reveal an interaction among contextual motivations, facilitating a better understanding of the processes that improve motivation in the context of exercise.

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