

Broadening the trans-contextual model of motivation: A study with Spanish adolescents

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The original trans-contextual model of motivation proposed that autonomy support from teachers develops students' autonomous motivation in physical education (PE), and that autonomous motivation is transferred from PE contexts to physical activity leisure-time contexts, and predicts attitudes, perceived behavioral control and subjective norms, and forming intentions to participate in future physical activity behavior. The purpose of this study was to test an extended trans-contextual model of motivation including autonomy support from peers and parents and basic psychological needs in a Spanish sample. School students ($n = 400$) aged between 12 and 18 years completed measures of perceived autonomy support from three sources, autonomous motivation and

constructs from the theory of planned behavior at three different points in time and in two contexts, PE and leisure-time. A path analysis controlling for past physical activity behavior supported the main postulates of the model. Autonomous motivation in a PE context predicted autonomous motivation in a leisure-time physical activity context, perceived autonomy support from teachers predicted satisfaction of basic psychological needs in PE, and perceived autonomy support from peers and parents predicted need satisfaction in leisure-time. This study provides a cross-cultural replication of the trans-contextual model of motivation and broadens it to encompass basic psychological needs.

Despite the acknowledged benefits of regular physical activity for health, the percentage of individuals engaging in sufficient physical activity to confer health benefits is low (World Health Organization, 2010). Specifically, in the case of children and adolescents, a recent Spanish survey of the habits of physical activity in the school population showed that 37% of boys and 26% of girls between 6 and 7 years of age are sufficiently active according to guidelines stipulating at least 5 h of physical activity per week. Although this percentage increases to 66% in boys and 44% in girls between 10 and 11 years of age, there is a progressive decline thereafter with only 44% of boys and 16% of girls between 16 to 18 years of age sufficiently active (Spanish Sports Council, 2011). This data, together with increases in health problems associated with inactivity and a positive energy balance like overweight and obesity, are of concern to governments and have motivated them to implement campaigns for the promotion of physical activity and healthy diet (e.g., Ministry of Health, Social Policy and Equality of Spain, 2011). Accordingly, professionals in education, health, and exercise have noted the important role that physical education (PE) can play in the promotion of healthy lifestyle habits (Hagger et al., 2003).

PE can be an effective means to provide, from an early age, the knowledge, skills, and attitudes necessary for regular participation in physical activity and sports throughout life (Dauenhauer & Keating, 2011). However, campaigns for the promotion of physical activity and interventions in PE classes must be based on theory and formative research that identifies the explanatory variables of physical activity participation (Biddle et al., 2004). A key issue is to analyze whether the teaching styles, methods, and practices incorporated in PE classes influence and motivate children to engage in similar learning activities and behaviors outside of the school context (Ciani et al., 2010). Motivation determines direction, intensity, and persistence of behaviors, establishing why people do certain activities, with what strength, and how much time they invest in it (Iso-Ahola & St.Clair, 2000). Motivation is closely linked with intentional behavior and is a key construct to analyze in the context of physical activity promotion (Hagger et al., 2007a). This is because physical activity is assumed to be an intentional behavior that is directly affected by motivational antecedents (Hagger & Chatzisarantis, 2009a). Along this line, the trans-contextual model (TCM) of motivation has been developed (Hagger et al., 2003; Hagger & Chatzisarantis,

2012). The purpose of the present study is to apply this model to explain how the perceived motivational support offered by social agents in PE translates into motivation to engage in physical activity outside of school in Spanish school children. The present study will examine whether the model can be replicated in this cultural context as well as extending it to include additional constructs from self-determination theory (SDT, Deci & Ryan, 1991).

The model makes an original contribution to knowledge by illustrating how motivation in one context leads to motivation in another context for behaviors that are likely to share many aspects across the contexts. This is because the behavior in one context activates a motivational script or “schema” that is relevant to engaging in similar behaviors in another (Vallerand, 2007). In the present adapted model, the need satisfying function of behaviors in both contexts is included as an important bridge to explain why motivation in an educational context (e.g., PE) is related to motivation in a leisure-time context (e.g., physical activity). The model is also important because it addresses two fundamental shortcomings of the component theories, SDT and the theory of planned behavior (TPB, Ajzen, 1985). A limitation of SDT is that the mechanisms by which generalized contextual motivational orientations are translated into intended action are not fully explained. A limitation of the TPB is that the origins of the social-cognitive factors that predict intended behavior are unclear. In the next sections, we outline the conceptual basis and fundamental hypotheses of the TCM and provide detail of how the current study extends this model by incorporating basic psychological needs.

The TCM of motivation

The focus on the TCM is to explain the process by which motivation in the educational field may be transferred to extramural contexts (Hagger & Chatzisarantis, 2012). This model has been largely applied in PE contexts, analyzing how perceived support for motivation in class can influence motivation toward performing physical activity during class time and, critically, in leisure-time and actual physical activity behavior outside of school. The strength of this model lies in the integration of different motivational theories (Orbell et al., 2006; Hagger, 2009), such that a complementary explanation is provided for the motivational processes that are unexplained in each component theory (Hagger et al., 2003; Hagger & Chatzisarantis, 2009b). Specifically, the TCM integrates SDT, the hierarchical model of intrinsic and extrinsic motivation (HMIEM, Vallerand, 2007), and TPB.

Consistent with SDT, the TCM proposes that perceived autonomy support from the PE teacher for physical activity may help to develop autonomous motivation toward physical activities in a PE context in the student. In other words, if the teacher is perceived to provide the opportu-

nity for choice in class, allows the student to participate in decision making, and is concerned with the student’s physical activity outside of class, the three key aspects of autonomy support (Reeve et al., 1999), it is probable that the student will experience a more autonomous level of motivation. A student with high levels of autonomous motivation participates in class because he/she values the importance of PE and enjoys the activities therein.

In addition, the TCM proposes that autonomous motivation in PE contexts can be transferred to leisure-time physical activity context (i.e., participation in physical activity because its benefits are valued, because it is part of the student’s true sense of self, and because of the pleasure derived from it). This hypothesis is derived from Vallerand’s (2007) HMIEM. Vallerand proposed that autonomous motivation from SDT operates at three levels of generality: global, contextual, and situational. Global-level motivation reflects a generalized disposition to be autonomously motivated and influences behavior in a number of contexts. Contextual-level motivation is motivation to engage in behaviors in a given context, such as PE or leisure-time physical activity. Motivation at the situational level refers to autonomous motivation toward specific bouts of a given behavior. It is at the contextual level where transfer between contexts occurs. Vallerand hypothesized that motivation in a given context will be determined both by global-level motivation (i.e. generalized motivation at the trait level, probably akin to causality orientations and similar constructs), but also by motivation from other closely related contexts. The type of motivation in contextual areas that bear close proximity in terms of potential to satisfy psychological needs to other contexts (e.g., PE and physical activity in a school context) could ultimately draw from motivation these contexts. In fact, there is evidence elsewhere in the educational literature to support this mechanism. For example, Gurtner et al. (2012) found that individuals tend to align their levels of motivation, particularly adaptive ones, across similar contexts, and labeled these “trans-contextual effects”. The mechanism of transfer from one context to another in the TCM (e.g., the relationship between autonomous motivation in PE and leisure-time) represents a recognition that educational experiences and accompanying behaviors (e.g., learning about physical exercise that one enjoys in PE) that support autonomy, and therefore likely satisfy psychological needs, lead individuals to seek out like experiences in other contexts particularly if there is congruence between the types of motivation in each context. This alignment and transfer process has also been recognized and supported empirically in other areas (Mata et al., 2009; Pavey & Sparks, 2010; Gurtner et al., 2012).

Furthermore, the TCM applies the postulates from TPB to explain how the autonomous types of motivation (contextual and actual) form the basis of social-cognitive judgments regarding future situational behaviors. Accordingly, the TCM proposes that autonomous

motivation in leisure-time physical activity is related to attitudes, subjective norms, and perceived behavioral control. These hypothesized links between constructs from an organismic theory like SDT and social-cognitive constructs from the TPB merely serve to elucidate the proposal by Deci and Ryan (1985) that people will bring their cognitive and affective systems in line with their overall motives in order to orient themselves toward behaviors likely to be autonomously motivating and, importantly, satisfying the basic psychological needs of autonomy, competence, and relatedness. Attitudes reflect beliefs that engaging in a future intended behavior will lead to desirable outcomes and it is mainly consistent with the motivation to satisfy the need for autonomy (to perceive that he/she can select and make decisions); subjective norms reflect perceptions of the social influence emanating from significant others with respect to engaging in a given behavior and is likely associated with motivation to satisfy the need for relatedness (to feel connected with the individuals surrounding him/her); perceived behavioral control reflects ability or self-efficacy to perform a behavior and is consistent with motivation to satisfy the need for competence (to feel effective in interacting with the environment). Consistent with this, Deci and Ryan (1985) suggest that social cognitive theories are important to identify the immediate antecedents of behavior, but neglect the origins of the antecedents: "Cognitive theories begin their analysis with . . . a motive, which is a cognitive representation of some future desired state. What is missing, of course, is the consideration of the conditions of the organism that makes these future states desired" (p. 228). From Ajzen's (1985) theorizing, constructs like attitudes and intentions reflect these representations of such desired states (e.g., attitudes reflect the utility of a behavior to bring about future outcomes, and intentions reflect the amount of effort or intensity an individual will invest to pursue those future outcomes). The limitation of TPB is that it is relatively silent on the origins of these beliefs. SDT may provide an insight into the origins of the proximal antecedents of attitudes, intentions, and future behavioral engagement in theories like the TPB by identifying why an individual pursues those future states. Therefore the TCM, in integrating the TPB and SDT merely formally articulates Deci and Ryan's (1985) proposals as the process by which autonomous motivation affects the beliefs that regulate future behavioral engagement. A final link in the model is that attitudes, subjective norms, and perceived behavioral control are related to intentions to engage in physical activity that are associated with participation in physical activity consistent with the hypotheses of the TPB (Ajzen, 1985).

Broadening the TCM

Initially, the TCM was developed and tested by Hagger et al. (2003) using a correlational three-wave prospective

design and results supported the initial hypotheses proposed by the model. Perceived autonomy support from teachers in PE positively predicted the most autonomous types of motivation. These autonomous types of motivation in PE predicted their equivalent in the leisure-time physical activity context. Autonomous motivation in PE was found to mediate the effect of perceived autonomy support in PE on autonomous motivation in leisure-time physical activity. The most autonomous types of motivation in leisure-time physical activity positively predicted attitudes and perceived behavioral control. Furthermore, intentions mediated the positive relationship between attitudes and perceived behavioral control with physical activity behaviors. The hypothesis of the model has also been successfully replicated in numerous national samples and a recent review by Hagger and Chatzisarantis (2012) found that the important relationships proposed in the model were supported across the literature. It is important to note, however, that these studies did not analyze autonomy support from parents and peers, which presents an important limitation given that SDT research has shown that autonomy support from significant others has considerable effects on autonomous motivation and behavioral commitment (Hagger & Chatzisarantis, 2012). For example, some studies in sport (Jõesaar et al., 2011) and exercise (Moreno et al., 2008b) have shown the importance of peers autonomy support to satisfy basic psychological needs, develop autonomous motivation, and promote enjoyment and persistence. The literature also shows how autonomy support from parents is related to autonomous motivation and leisure-time physical activity (McDavid et al., 2012).

To overcome this limitation of the TCM, two studies tested the effects of significant others' support for autonomous motivation, including parents and peers, on motivation to engage in physical activity outside of school (Pihu & Hein, 2007; Hagger et al., 2009). Pihu and Hein (2007) study on Estonian students reinforced the proposals of the TCM and contributed new findings with the inclusion of autonomy support from significant others. Perceived autonomy support from parents predicted autonomous motivation in PE and leisure-time physical activity, while perceived autonomy support from peers only predicted autonomous motivation toward leisure-time physical activity. In addition, perceived autonomy support from parents directly predicted attitudes, subjective norms, and perceived behavioral control, while perceived autonomy support from peers predicted intentions. Hagger et al. (2009) conducted a study comparing samples of British, Finnish, Hungarian, and Estonian students. The results obtained were consistent with previous studies, finding that perceived autonomy support from peers positively predicted autonomous motivation towards leisure-time physical activity in the different samples, except for British students, and the perceived autonomy support from parents

only predicted autonomous motivation in leisure-time physical activity in the case of the Hungarian and British. Perceived parents autonomy support also positively and directly predicted attitudes and subjective norms. Results demonstrated that autonomy support from these additional social agents had effects on autonomous motivation toward physical activity in leisure-time but, critically, the effect of autonomy support from PE teachers was unaffected and remained significant.

The most recent extension of the TCM has been the inclusion of the basic psychological needs in the model (Barkoukis et al., 2010). Psychological needs for autonomy, competence, and relatedness have frequently been proposed as mechanisms in SDT, providing the impetus and origin for autonomous motivation. According to SDT, the relationship between autonomy support and autonomous motivation is mediated through the fulfillment of psychological needs. Previous studies adopting the TCM have not taken these variables into account, which represented an important limitation, considering the fundamental role played by the basic psychological needs within SDT (see Ntoumanis, 2012 for a review). The study by Barkoukis et al. (2010) found, with respect to previous studies, that the satisfaction of the needs for autonomy and competence mediated the relationship between perceived autonomy support and autonomous motivation in PE, while the competence and relatedness need satisfaction variables were the mediators in the leisure-time physical activity context. This study therefore indicated the important role of basic psychological need satisfaction in the TCM.

Reflecting on the role of basic psychological need satisfaction in the TCM, the effect of perceived autonomy support on autonomous motivation in educational contexts (e.g., PE) was hypothesized because autonomy support provided by significant others in PE gives an indication to the student that the activities the student does in that context provides an opportunity for psychological need satisfaction, consistent with SDT (Deci & Ryan, 1985). If PE teachers are perceived by students to provide autonomy support it is likely to foster autonomous motivation toward activities in that context. PE teachers are likely to be perceived as autonomy supportive if they adopt specific behaviors and interpersonal style to promote autonomy such as providing choice, positive feedback, encouraging a questioning approach, involving students in their own learning, and assisting children in setting personally meaningful goals (Reeve & Jang, 2006; McLachlan & Hagger, 2010). Pupils are therefore given clear messages through the behaviors and interpersonal style of the teachers, sometimes referred to as motivational “climate” of the context (Barkoukis & Hagger, 2013), that the activities in which they participate in that context are effective in satisfying their psychological needs.

Similarly, the mechanism behind the link between autonomous motivation in educational (e.g., PE) and extramural (e.g., leisure-time physical activity) contexts could be described in terms of the satisfaction of psychological needs. Experiencing activities as autonomous in PE, through the perceived autonomy-supportive behaviors of the PE teacher in that context, serves as information for the pupil as to whether similar behaviors in other contexts might provide opportunities to satisfy their psychological needs and experience behaviors as autonomous. Vallerand (2007) suggests that the opportunity to engage in similar behaviors in different contexts may activate the same motivational schema in which information regarding the potential for the action to be experienced as autonomous and satisfy psychological needs is stored. Furthermore, students may actively pursue similar behaviors in different contexts by forming beliefs and intentions to pursue them in the future because they view them as having potential to satisfy needs. So need satisfaction acts as the mechanism by which autonomous motivation in PE may engender autonomous motivation outside of school. The current model extends the TCM because it provides a formal test of these mechanisms.

Present study

The TCM has been shown to be effective in explaining the motivational processes that underpin children and adolescents’ involvement in physical activity (Hagger & Chatzisarantis, 2012), and because of this, it is a reference model for the design of school interventions with the goal of promoting healthy lifestyle habits (Wallhead et al., 2010). However, the correlational studies conducted to date on the TCM have some limitations. Although the model has been extended to include additional variables such as autonomy support from multiple sources and basic psychological need satisfaction and tested in diverse samples, no studies on the TCM exist that account for both the roles of the basic psychological need satisfaction and autonomy support from parents and peers in a single study. The studies by Hagger et al. (2009) and Pihu and Hein (2007) include autonomy support from significant others in the model but did not include basic psychological needs, while the study by Barkoukis et al. (2010) added the basic psychological needs to the model but omitted parents and peers autonomy support. In addition, Barkoukis et al. (2010) reported low internal consistency statistics for some of the need satisfaction variables, thus necessitating further refinement of these variables. It is also important to replicate the model in multiple cultural contexts (Hagger et al., 2005, 2009; Barkoukis & Hagger, 2009).

Taking into account these considerations, the present study was designed with the aim of testing an extended version of the TCM accounting for autonomy support from multiple sources (PE teachers, peers, and parents)

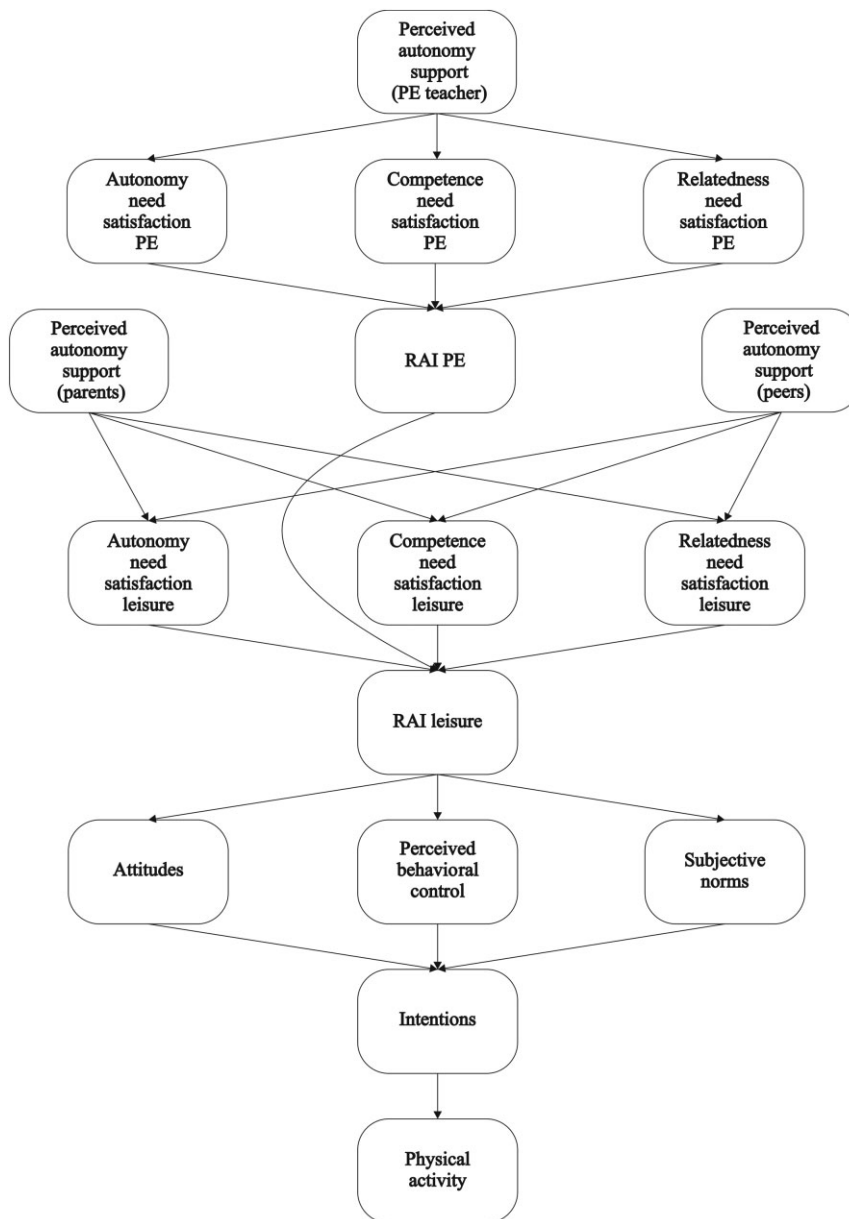


Fig. 1. Hypothesized trans-contextual model of motivation. It was expected that all relationships depicted by arrows were positive. RAI, Relative Autonomy Index.

and basic psychological need satisfaction in a sample of Spanish school students. The research is unique and will make an original contribution to knowledge by incorporating both psychological need satisfaction and perceived autonomy support from multiple sources and it will be the first time that the TCM postulates would be tested in Spanish school students. Specifically, the complete motivational sequence specified in the TCM was studied, analyzing how teachers' autonomy support is associated with students' psychological need satisfaction to develop autonomous motivation in a PE context, and how this autonomous motivation is transferred to an autonomous motivation in a leisure-time physical activity context. We also tested the relationships between autonomy support from other social agents, like parents

and peers, and adolescents' psychological need satisfaction, autonomous motivation in the leisure-time physical activity context, and physical activity participation, through attitudes, perceived behavioral control, subjective norms and intentions.

We planned to conduct a three-wave prospective study to test the following hypotheses derived from the TCM (see Fig. 1): (1) perceived autonomy support from PE teachers would positively predict the perceived satisfaction of the competence, autonomy, and relatedness needs of the students; (2) the three basic psychological need satisfaction variables would positively predict autonomous motivation in PE; (3) the basic psychological need satisfaction variables would mediate the relationship between perceived autonomy support and autonomous

motivation in PE; (4) autonomous motivation in PE would positively predict autonomous motivation towards leisure-time physical activity; (5) autonomous motivation in PE would mediate the relationship between the need satisfaction variables in PE and motivation in leisure-time physical activity; (6) perceived parents and peers autonomy support would positively predict the three basic psychological needs in leisure-time physical activity; (7) the three basic psychological need satisfaction variables would positively predict autonomous motivation in leisure-time physical activity; (8) the psychological need satisfaction variables would mediate the relationship between perceived parents and peers autonomy support and autonomous motivation during leisure-time; (9) autonomous motivation towards leisure-time physical activity would positively predict attitudes, perceived behavioral control, and subjective norms to engage in leisure-time physical activity; (10) autonomous motivation during leisure-time would mediate the relationship between the psychological need satisfaction variables in leisure-time and attitudes, perceived behavioral control, and subjective norms toward leisure-time physical activity; (11) attitudes, perceived behavioral control, and subjective norms would positively predict intentions to engage in leisure-time physical activity; (12) intentions would positively predict physical activity; (13) intentions would mediate the effects of attitudes, perceived behavioral control, and subjective norms on physical activity.

Method

Participants

Four hundred high school students (200 males and 200 females) aged between 12 and 18 years ($M = 13.90$, $SD = 1.33$) from five schools in a Spanish province participated in this study. The students received two weekly sessions of mandatory PE with duration of 50 min per session. The classes were coeducational and the majority of the students were of Caucasian race and of middle socioeconomic class. The contents of PE lessons in the Spanish curriculum are distributed in four blocks: fitness and health, games and sports, body expression, and physical activity in the natural environment, covering the different manifestations of physical activity in which Spanish people participate in their leisure-time.

Measures

Autonomy support

To measure perceived autonomy support from teachers, parents, and peers, the Spanish version of the Perceived Autonomy Support Scale for Exercise Settings (PASSES; Hagger et al., 2007b) was used (Moreno et al., 2008c). This scale comprises 12 items evaluating one single factor of autonomy support. The same 12 items are answered separately for each of the three social agents (e.g., "My PE teacher/parents/peers provide(s) me with choices, options, and opportunities about whether to do active sports and/or vigorous exercise in my free time"). The tool is scored on a Likert scale of 1 (strongly disagree) to 7 (strongly agree). In this study, a Cronbach's alpha value of 0.91 was obtained for the PE teachers, 0.93 for parents, and 0.94 for peers.

Basic psychological needs

The Spanish version of the Basic Psychological Needs in Exercise Scale (Vlachopoulos & Michailidou, 2006) was used. This scale has been validated in Spain in the leisure-time physical activity context (Sánchez & Núñez, 2007) as well as in PE (Moreno et al., 2008a), with few adaptations. It is composed of 12 items that measure fulfillment of autonomy (e.g., "The exercises I do in PE/the exercise or sport program I follow is(are) highly compatible with my choices and interests"), competence (e.g., "I feel I have been making a huge progress with respect to the end result I pursue in PE/the exercise or sport program I do"), and relatedness (e.g., "I feel that I associate with my classmates/the other exercise or sport participants in a very friendly way") using a Likert scale of 1 (totally disagree) to 5 (very strongly agree). The Cronbach's alpha values obtained in this study were 0.79 for autonomy, 0.78 for competence, and 0.84 for relatedness in the context of PE and 0.86 for autonomy, 0.85 for competence, and 0.88 for relatedness in the leisure-time physical activity context.

Motivation

To measure the different types of motivation from SDT in PE classes, the validated Spanish version of the Perceived Locus of Causality Scale (PLOC, Goudas et al., 1994) was used (Moreno et al., 2009). The scale has a common stem "I take part in this PE class . . ." followed by 20 items that measure intrinsic motivation (e.g., ". . . because I enjoy learning new skills"), identified regulation (e.g., ". . . because it is important for me to do well in PE"), introjected regulation (e.g., ". . . because I would feel bad about myself if I didn't"), external regulation (e.g., ". . . so that the teacher won't yell at me"), and amotivation (e.g., ". . . but I really feel I'm wasting my time in PE"). Responses are made on 7-point Likert-type scales ranging from 1 (strongly disagree) to 7 (strongly agree). In this study, the following Cronbach's alpha values were obtained: 0.85 for intrinsic motivation, 0.81 for identified, 0.65 for introjected, 0.66 for external, and 0.79 for amotivation.

Motivation toward physical activity during leisure-time was evaluated using the Spanish version of the Behavioural Regulation in Exercise Questionnaire-2 (BREQ, Markland & Tobin, 2004), although it added the items developed by Wilson et al. (2006) to measure integrated regulation (González-Cutre et al., 2010). The participants were asked, "Why do you engage in exercise?" and were then required to respond to a total of 23 items that measured intrinsic regulation (e.g., "I exercise because it's fun"), integrated (e.g., "I exercise because it is consistent with my life goals"), identified (e.g., "I value the benefits of exercise"), introjected (e.g., "I feel guilty when I don't exercise"), external (e.g., "I exercise because other people say I should"), and amotivation (e.g., "I think exercising is a waste of time") on 5-point Likert-type scales anchored by 0 (not true for me) to 4 (very true for me). In this study, Cronbach's alpha values of 0.80 for intrinsic regulation, 0.82 for integrated, 0.73 for identified, 0.75 for introjected, 0.77 for external, and 0.77 for amotivation were obtained.

Scores obtained for the different types of motivation were grouped in an index that reflected the degree of autonomous motivation (RAI: Relative Autonomy Index). This index was calculated by assigning a weight to each type of motivation according to its position on the self-determination continuum. Thus, for the PLOC, a weight of +2 was assigned to intrinsic motivation, +1 to identified regulation, -1 to the mean score calculated between the introjected regulation and external regulation, and -2 for amotivation. For the BREQ, the assigned weights were as follows: +3 for intrinsic regulation, +2 for integrated, +1 for identified, -1 for introjected, -2 for external, and -3 for amotivation (Vallerand, 2007). The score for each type of motivation was multiplied by its corresponding weight to calculate the final index score, and then all of the products were summed.

Theory of planned behavior

The TPB variables were measured using items developed by Hagger and colleagues (e.g., Hagger et al., 2009; Barkoukis et al., 2010) in their research on the TCM.

Attitudes were measured using 7-point scales with five bipolar adjectives (boring-interesting, unenjoyable-enjoyable, bad-good, useless-useful, harmful-beneficial) for participants to respond to the following common statement: "Participating in active sports and/or vigorous physical activities during my leisure time in the next 5 weeks is . . .". The scale Cronbach's alpha value was 0.89.

Subjective norms were measured using four items (e.g., "Most people close to me expect me to do active sports and/or vigorous physical activities during my leisure time for the next 5 weeks") on 7-point Likert-type scales anchored by 1 (strongly agree) to 7 (strongly disagree) (Cronbach's $\alpha = 0.83$).

Perceived behavioral control was measured using three items (e.g., "How much control do I have over doing active sports and/or vigorous physical activities in my leisure time in the next 5 weeks") using 7-point Likert-type scales ranging from 1 (no control) to 7 (complete control) (Cronbach's $\alpha = 0.84$).

Intentions were measured using three items (e.g., "I plan to do active sports and/or vigorous physical activities during my leisure time in the next 5 weeks") using 7-point Likert-type scales anchored by 1 (strongly agree) and 7 (strongly disagree) (Cronbach's $\alpha = 0.84$).

Physical activity behavior

Physical activity conducted during leisure-time was measured through an adaptation of the Godin and Shephard's (1985) Leisure-Time Exercise Questionnaire (Hagger et al., 2003, 2005, 2009; Barkoukis et al., 2010). Participants responded to two items (e.g., "I engaged in vigorous physical activity for 20 minutes at a time the following regularity in the past five weeks") with responses made on 6-point Likert-type scales ranging from 1 (almost never) to 6 (every day). The inter-item correlation for these items was 0.86. This questionnaire has been shown to be valid and reliable in assessing physical activity levels and intensities but it does not permit the identification of the precise types of physical activity in which the respondents are involved.

Past behavior

Past physical activity was measured using one single item (Hagger et al., 2003, 2005, 2009; Barkoukis et al., 2010): "In the course of the past 6 months, how often, on average, have you participated in vigorous physical activities for 20 min at a time?" Responses were indicated on a 6-point Likert-type scale anchored by 1 (not at all) and 6 (most days per week).

Research design and procedure

The questionnaire items were administered at three different time points following the protocol established to test the TCM (e.g., Hagger et al., 2009). Initially, at the middle of the course, participants completed the measures related to the perception of autonomy support from PE teachers, the fulfillment of basic psychological needs and motivation in PE. At a second sitting, 1 week later, a second questionnaire was administered with measures related to the perception of autonomy support from parents and peers, the fulfillment of basic psychological needs and motivation in leisure-time physical activity, the TPB variables, and past physical activity behavior. The time interval of 1 week between the first and the second sessions was used to minimize the amount of error variance introduced in the data that could be attributed to the use of similar measures in PE and leisure-time (Hagger & Chatzisarantis, 2012).

Five weeks later, participants completed a third questionnaire to measure physical activity during leisure-time.

The translation to the measures in Spanish that had not been validated prior to this study was performed using standardized back-translation techniques (Brislin, 1986). A bilingual translator translated the questionnaire from English to Spanish, and the questionnaire was then back-translated into English by a group of independent bilingual translators. This process was repeated until the original version and the back-translated English version were virtually identical.

To conduct the study, we requested the authorization of the education centers and the participants' parents. The ethical board of the second author's university approved this research, and all participants provided informed consent. The students were informed that they were participating in a study regarding motivation toward physical activity and that the data gathering would take several weeks. The questionnaires were answered anonymously during class time and were identified using a code (name initials and date of birth), which allowed us to match the measurements from the three sessions.

Data analysis

First, confirmatory factor analyses (CFA) of the instruments, which have not been validated in a Spanish context, were conducted. CFA was performed using the maximum likelihood estimation method with the bootstrapping procedure by the statistical package AMOS 18 (SPSS Inc., Chicago, Illinois, USA). This procedure ensured the robustness of the estimated model and corrects for any departures from multivariate normality (Byrne, 2001). To analyze the goodness of fit, the following indices were used: chi-square (χ^2) coefficient, chi-square to degrees of freedom ratio ($\chi^2/\text{d.f.}$), comparative fit index (CFI), incremental fit index (IFI), root mean square error of approximation (RMSEA) plus its 90% confidence interval, and the standardized root mean square residual (SRMR). In general, a nonsignificant χ^2 value, $\chi^2/\text{d.f.}$ values lower than 5, CFI and IFI values equal to or higher than 0.95, RMSEA values equal to or lower than 0.06, and SRMR values equal to or lower than 0.08 were considered indicative of adequate fit of the model to the data (Hu & Bentler, 1999).

Second, the descriptive statistics were calculated, a correlation analysis was conducted among the studied variables, and then the path analysis of the predictive relationships hypothesized in the model was carried out. The path analysis was performed using the maximum likelihood estimation method with the bootstrapping procedure in the statistical package AMOS 18. The same fit indices and cutoff points described for the CFA were used. The proposed mediation effects were tested using Preacher and Hayes (2008) methods for multiple mediation. Bootstrapping was used to obtain confidence limits for the indirect (mediated) effects.

Results

Preliminary analysis

As the Spanish version of the PASSES had only been validated for PE teachers, a CFA of the parents and peers versions was conducted in the current study. The fit indices obtained for the PASSES for parents [χ^2 (54, $n = 400$) = 186.64, $P < 0.001$; $\chi^2/\text{d.f.} = 3.45$; CFI = 0.95; IFI = 0.95; RMSEA = 0.078 (90% CI = 0.066 to 0.091); SRMR = 0.036] and peers [χ^2 (54, $n = 400$) = 307.93, $P < 0.001$; $\chi^2/\text{d.f.} = 5.70$; CFI = 0.92; IFI = 0.92; RMSEA = 0.10 (90% CI = 0.097 to 0.120); SRMR = 0.043] suggesting adequate fit of the models.

A CFA for the TPB variables (a model with four correlated factors: attitudes, subjective norms, perceived

behavioral control, and intentions) was also conducted. To obtain acceptable fit indices, it was necessary to introduce two correlations between two error variance terms, one between two items of the attitudes factor and another between two items of the subjective norms [χ^2 (82, $n = 400$) = 359.61, $P < 0.001$; $\chi^2/d.f. = 4.38$; CFI = 0.94; IFI = 0.94; RMSEA = 0.092 (90% CI = 0.082 to 0.100); SRMR = 0.060].

The descriptive statistics and correlations among the averaged manifest study variables are given in Table 1.

Path analysis

We tested the hypothesized TCM (Fig. 1) controlling for the effect of past physical activity behavior by including this variable as an independent predictor of all model variables, consistent with previous TCM studies (Hagger et al., 2003, 2009; Barkoukis et al., 2010). Following the protocol established by such studies, the attitudes, subjective norms, and perceived behavioral control errors in prediction were correlated, and the need for autonomy, competence, and relatedness errors in prediction on each context (PE and leisure-time) were also correlated. The analysis of the hypothesized model obtained the following fit indices: χ^2 (85, $n = 400$) = 322.13, $P < 0.001$; $\chi^2/d.f. = 3.79$; CFI = 0.93; IFI = 0.93; RMSEA = 0.084 (90% CI = 0.074–0.093); SRMR = 0.090. However, the modification indices suggested substantial improvement of the model could be obtained by adding the following paths in the model: between relatedness in PE and RAI in leisure-time; between perceived parents autonomy support and attitudes, subjective norms, and perceived behavioral control; between autonomy need satisfaction in leisure-time and attitudes, subjective norms, perceived behavioral control, and intentions; and between relatedness in leisure-time and physical activity. All of these relationships were theoretically plausible, and the model obtained the following good fit indices: χ^2 (74, $n = 400$) = 113.26, $P < 0.05$; $\chi^2/d.f. = 1.53$; CFI = 0.99; IFI = 0.99; RMSEA = 0.036 (90% CI = 0.022–0.049); SRMR = 0.036. The explained-variance values were 70% for intentions and 48% for physical activity. The tests of the proposed relationships in the model based on the proposed hypotheses are as follows (Fig. 2):

Hypothesis 1. Perceived autonomy support from PE teachers positively predicted the autonomy ($\beta = 0.50$, $P < 0.001$), competence ($\beta = 0.53$, $P < 0.001$), and relatedness ($\beta = 0.40$, $P < 0.001$) need satisfaction variables for the PE context.

Hypothesis 2. The psychological need satisfaction variables for autonomy ($\beta = 0.23$, $P < 0.001$) and competence ($\beta = 0.35$, $P < 0.001$) in PE positively predicted autonomous motivation in PE. The association between relatedness and autonomous motivation in PE was not significant.

Table 1. Descriptive statistics and correlations among variables

Variables	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
1. PAS PE teacher	5.06	1.26																		-0.01
2. Autonomy PE	3.37	0.83	0.50**																	0.01
3. Competence PE	3.91	0.79	0.63**	0.53**																0.06
4. Relatedness PE	4.35	0.75		0.63**	0.53**															0.04
5. RAI PE	8.06	5.48			0.39**	0.41**														0.09
6. PAS parents	5.59	1.21				0.40**	0.41**													0.15**
7. PAS peers	5.21	1.34				0.40**	0.52**	0.58**												0.01
8. Autonomy leisure	4.00	0.89				0.53**	0.39**	0.39**	0.06											0.03
9. Competence leisure	3.94	0.87				0.53**	0.39**	0.39**	0.06	0.07										0.10*
10. Relatedness leisure	4.15	0.86				0.53**	0.39**	0.39**	0.06	0.11*	0.09									0.03
11. RAI leisure	10.38	7.33				0.53**	0.39**	0.39**	0.06	0.11*	0.09	0.07								0.10*
12. Attitudes	5.77	1.26				0.53**	0.39**	0.39**	0.06	0.11*	0.09	0.07	0.14**							0.04
13. Subjective norms	5.47	1.26				0.53**	0.39**	0.39**	0.06	0.11*	0.09	0.07	0.14**	0.08						0.04
14. Control	5.29	1.37				0.53**	0.39**	0.39**	0.06	0.11*	0.09	0.07	0.14**	0.08	0.06					0.04
15. Intentions	5.19	1.71				0.53**	0.39**	0.39**	0.06	0.11*	0.09	0.07	0.14**	0.08	0.06	0.06				0.04
16. Physical activity	4.06	1.32				0.53**	0.39**	0.39**	0.06	0.11*	0.09	0.07	0.14**	0.08	0.06	0.06	0.44**			0.39**
17. Past physical activity	4.23	1.43				0.53**	0.39**	0.39**	0.06	0.11*	0.09	0.07	0.14**	0.08	0.06	0.06	0.44**	0.51**		0.39**
																				0.40**
																				0.49**
																				0.54**
																				0.34**
																				0.30**
																				0.43**
																				0.41**
																				0.57**
																				0.69**
																				0.66**

* $P < 0.05$; ** $P < 0.01$. PAS, perceived autonomy support; PE, physical education; RAI, Relative Autonomy Index.

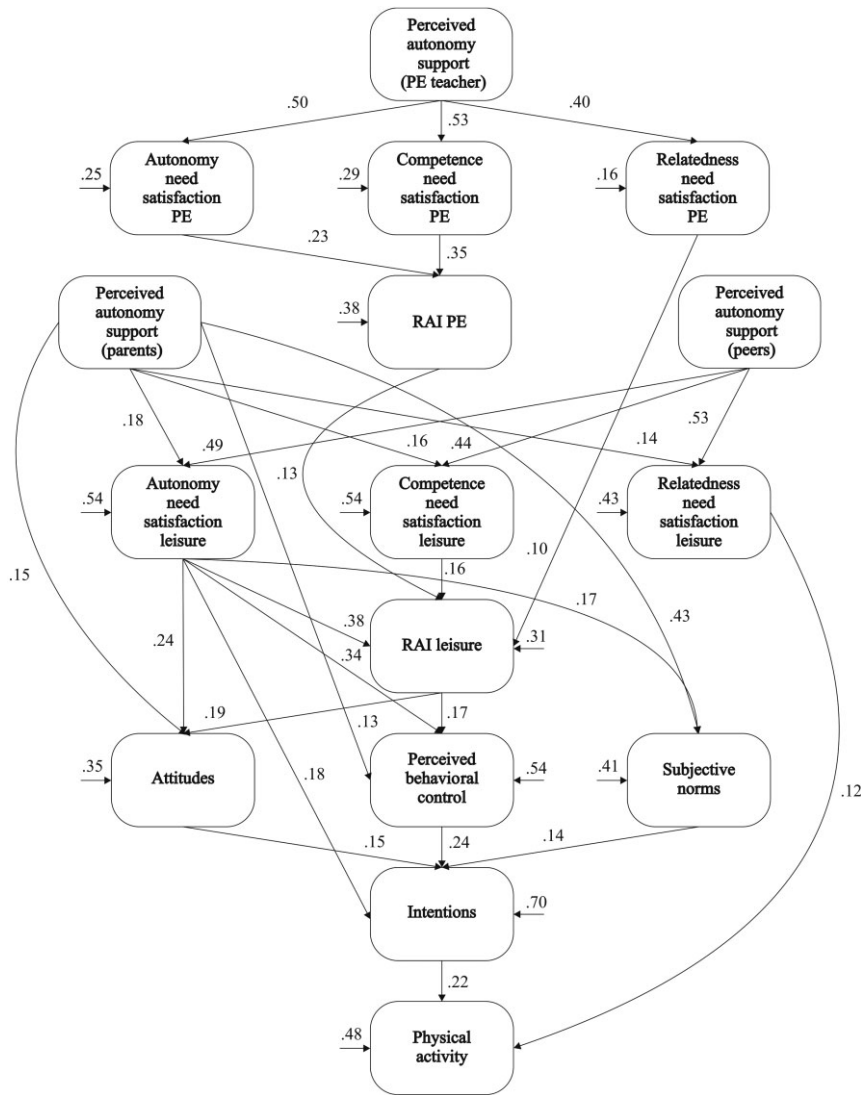


Fig. 2. Final trans-contextual model of motivation. All the parameters are standardized and statistically significant. Explained variances are shown on the small arrows. RAI, Relative Autonomy Index.

Hypothesis 3. The relationship between perceived autonomy support from PE teachers and autonomous motivation in PE was mediated through the competence and autonomy need satisfaction variables in PE (indirect effect: $\beta = 0.33$, $P < 0.01$).

Hypothesis 4. Autonomous motivation in PE positively predicted autonomous motivation in a leisure-time context ($\beta = 0.13$, $P < 0.05$).

Hypothesis 5. Autonomous motivation in PE mediated the relationship between autonomy and competence need satisfaction variables in PE and autonomous motivation in leisure-time (indirect effect: $\beta = 0.03$, $P < 0.01$ for autonomy; $\beta = 0.05$, $P < 0.05$ for competence). However, relatedness need satisfaction in PE showed a significant direct effect on autonomous motivation in leisure-time ($\beta = 0.10$, $P < 0.05$).

Hypothesis 6. Perceived parents autonomy support positively predicted the autonomy ($\beta = 0.18$, $P < 0.001$), competence ($\beta = 0.16$, $P < 0.001$), and relatedness ($\beta = 0.14$, $P < 0.01$) need satisfaction variables in leisure-time. Perceived peers autonomy support also positively predicted the autonomy ($\beta = 0.49$, $P < 0.001$), competence ($\beta = 0.44$, $P < 0.001$), and relatedness ($\beta = 0.53$, $P < 0.001$) need satisfaction variables in leisure-time. In addition, a direct effect was also found for perceived parents autonomy support on attitudes ($\beta = 0.15$, $P < 0.01$), subjective norms ($\beta = 0.43$, $P < 0.001$), and control ($\beta = 0.13$, $P < 0.01$).

Hypothesis 7. The psychological need satisfaction variables of autonomy ($\beta = 0.38$, $P < 0.001$) and competence ($\beta = 0.16$, $P < 0.05$) in leisure-time positively predicted autonomous motivation in leisure-time. Relatedness need satisfaction in

leisure-time did not significantly predict autonomous motivation in leisure-time.

Hypothesis 8. The relationship between perceived parents and peers autonomy support and autonomous motivation in leisure-time was mediated by the satisfaction of the needs for autonomy and competence in leisure-time (indirect effects: $\beta = 0.09$, $P < 0.01$ for parents; $\beta = 0.26$, $P < 0.05$ for peers).

Hypothesis 9. Autonomous motivation in leisure-time positively predicted attitudes ($\beta = 0.19$, $P < 0.001$) and perceived behavioral control ($\beta = 0.17$, $P < 0.001$), but did not show a significant relationship with subjective norms.

Hypothesis 10. Autonomous motivation in leisure-time mediated the effect of autonomy need satisfaction in leisure-time on attitudes (indirect effect: $\beta = 0.07$, $P < 0.01$) and perceived behavioral control (indirect effect: $\beta = 0.06$, $P < 0.01$). Autonomous motivation also mediated the effect of competence need satisfaction in leisure-time on attitudes (indirect effect: $\beta = 0.03$, $P < 0.05$) and on perceived behavioral control (indirect effect: $\beta = 0.03$, $P < 0.05$). In addition, a direct effect of autonomy need satisfaction in leisure-time on attitudes ($\beta = 0.24$, $P < 0.001$), subjective norms ($\beta = 0.17$, $P < 0.01$), perceived behavioral control ($\beta = 0.34$, $P < 0.001$), and intentions ($\beta = 0.18$, $P < 0.001$) was found.

Hypothesis 11. Attitudes ($\beta = 0.15$, $P < 0.001$), subjective norms ($\beta = 0.14$, $P < 0.001$), and perceived behavioral control ($\beta = 0.24$, $P < 0.001$) positively predicted intentions.

Hypothesis 12. Intentions positively predicted physical activity ($\beta = 0.22$, $P < 0.001$). In addition, relatedness need satisfaction in leisure-time also predicted, directly and positively, physical activity behavior ($\beta = 0.12$, $P < 0.01$).

Hypothesis 13. Intentions mediated the effects of attitudes (indirect effect: $\beta = 0.03$, $P < 0.01$), subjective norms (indirect effect: $\beta = 0.03$, $P < 0.01$), and perceived behavioral control (indirect effect: $\beta = 0.05$, $P < 0.01$) on physical activity behavior.

Discussion

The present study analyzed an extended version of the TCM in a sample of Spanish students. The purpose of the model is to map the psychological processes by which school students' autonomous motivation from SDT in an educational context (PE) is transferred to motivation, future intentions, and actual behavior toward physical activity in a separate, but related, context, namely, leisure-time. This study is the first, to our knowledge, to incorporate additional variables from SDT, namely, perceived parents and peers autonomy support together with satisfaction of basic psychological needs, to arrive at a more comprehensive model. Results supported the

hypotheses of the TCM, clarifying the process of motivational transference from an educational context into an extramural context. In addition, the study provided cross-cultural replication by confirming its postulates in a Spanish culture.

Consistent with SDT, the results showed that perceived autonomy support from PE teachers positively predicted the satisfaction of the three basic psychological needs in PE and that these positively predicted autonomous motivation in PE, with the notable exception of the satisfaction of need for relatedness. In addition, the mediation of the relationships between perceived autonomy support and the autonomous motivation variables by the psychological need satisfaction variables in PE was also supported (hypotheses 1–3). These results are similar to those from the only study to date that has included the basic psychological needs in the TCM (Barkoukis et al., 2010). Barkoukis et al. (2010) also did not find a significant association between relatedness need satisfaction variable and autonomous motivation in PE. In our case, this absence of a relationship could be explained by the unexpected *a priori* association between relatedness in PE and autonomous motivation toward leisure-time physical activity. It is possible that interpersonal relationships play a more important role in the promotion of physical activity during leisure-time than in the motivation toward PE classes, where other needs may have had greater weight. In this sense, it must be taken into account that an elevated percentage of the population in Spain engages in physical activity with friends, peers, and/or family members (García Ferrando & Llopis, 2011). It is not surprising that good relationships with classmates are manifested in the participation in extracurricular physical activity with those same peers, without being necessarily implicated in motivation to engage in PE. In fact, Spanish students consider that being with friends is an important motivator for the participation in physical activity and physically active children tend to have better relationships with others (Fraile & De Diego, 2006).

Current results also showed autonomous motivation in PE positively predicted autonomous motivation in leisure-time physical activity, and there was mediation of the effect of the psychological need satisfaction variables in PE on autonomous motivation in leisure-time by autonomous motivation in PE (hypotheses 4 and 5). These results provide strong support for key trans-contextual effect of autonomous motivation and also provide partial indication of the mechanism for this effect. Results are consistent with SDT and the HMIEM that consistency in autonomous motivation for behaviors across similar contexts is likely because acting in each context provides an opportunity for psychological need satisfaction. This study is a new example of the importance that PE classes could have in the promotion of physical activity habits outside of school. As postulated by the TCM, promoting and achieving positive motiva-

tion in PE classes could be the first step in the student's motivation to participate in physical activity outside of school (Hagger & Chatzisarantis, 2012).

One of the main contributions of this study was to confirm that perceived autonomy support from parents and peers positively predicted the fulfillment of the three basic psychological needs in leisure-time physical activity (hypothesis 6). This is the first study that confirms these relationships within the TCM. In addition, the basic psychological needs for competence and autonomy in leisure-time physical activity positively predicted autonomous motivation toward leisure-time physical activity, thus mediating the relationship between perceived autonomy support and motivation (hypotheses 7 and 8). These results bring to light the important role played by parents and peers in the development of autonomous motivation toward physical activity in leisure-time. It is also important to note, though, that the effect of perceived autonomy support from teachers, despite being more distal, was not nullified by the inclusion of different sources of autonomy support, consistent with previous research. This indicates that a multitude of sources of autonomy support can affect autonomous motivation to engage in future physical activity. For this reason, it seems advisable that interventions for the promotion of healthy lifestyles focus not only on promoting autonomous motivation through PE teachers (e.g., Chatzisarantis & Hagger, 2009) but also take into account the parents (e.g., informative talks and sports activities organized for parents and children) and peers (e.g., extracurricular programs that include health physical activity).

Consistent with findings in the PE context, relatedness within the leisure-time context did not significantly predict autonomous motivation toward leisure-time physical activity, but it was rather directly and positively associated with physical activity behavior. In fact, relatedness need satisfaction in leisure-time was the only variable, with the exception of intentions, that was directly associated with physical activity behavior. This result supports our contention regarding the importance of relatedness need satisfaction for the commitment to physical activity participation in Spain. The mere fact of being with friends and enjoying social relationships could, in this case, directly induce a higher rate of physical activity spontaneously, without any need for deliberation. Furthermore, it could reflect a measurement issue in that variables like subjective norms reflect more pressuring, control forms of motivation rather than supportive, and therefore would not likely capture the shared variance between need for relatedness and physical activity behavior. However, this is only a hypothesis and more studies that demonstrate these relationships are needed.

In the last part of the model, we observed that autonomous motivation in leisure-time positively predicted attitudes and perceived behavioral control. Autonomous

motivation mediated the effect of the competence and autonomy need satisfaction variables in leisure-time on the TPB variables (hypotheses 9 and 10). However, direct effects of autonomy need satisfaction in leisure-time on attitudes, subjective norms, perceived behavioral control, and intentions were also found. These results show the connection between the current contextual motivation and the situational social and cognitive judgments that are determinants of future physical activity behaviors. These findings support our hypotheses by demonstrating the important consistency between autonomous forms of motivation and the social-cognitive judgments that underpin future behavioral engagement. This is consistent with a key premise within the TCM that autonomous motivation from SDT serves to provide insight into the developmental origins of the antecedent beliefs that underpin future behavioral engagement. It also indicates that the process by which psychological needs affect these antecedent variables is not full mediated by autonomous motivation. A possible reason for this is that autonomous motivation does not capture all needs satisfying behavior, and perhaps individuals form positive beliefs toward behaviors spontaneously as a result of the knowledge that the behavior is a need-satisfying behavior, rather than any further consideration of motivation.

However, in this study, no relationship was found between leisure-time autonomous motivation and subjective norms. This relationship is one that cast the most doubts on the TCM as the results obtained to date have been varied with studies from different countries having found positive, negative, or absent relationships (Hagger et al., 2003, 2005, 2009; Barkoukis & Hagger, 2009; Barkoukis et al., 2010). It is possible that the quality of motivation influences these relationships such that the greater the intrinsic, integrated, and identified reasons are to participate in physical activity, the lesser the degree to which others' opinions are valued (subjective norms). In addition, as mentioned above, subjective norms are generally operationalized as social pressure, so such controlling influences may be inconsistent with autonomous motivation and satisfaction of the psychological need for relatedness. Often these kinds of beliefs about social agents are consistent with controlling influences. In fact, in the study by Hagger et al. (2003), subjective norms were only positively related with external regulation. Future studies must study the relationship between motivation and other social-cognitive beliefs regarding significant others (e.g., social support) more thoroughly to clarify the extant results.

Perceived parents autonomy support not only directly predicted the basic psychological need satisfaction variables in leisure-time physical activity but also attitudes, subjective norms, and perceived behavioral control. Previous studies (Pihu & Hein, 2007; Hagger et al., 2009) also found a direct relationship between perceived parents autonomy support and different variables of the

TPB. However, there did not appear to be a direct relationship with perceived peers autonomy support. This result suggests that parents autonomy support, in addition to being a contextually relevant motivator, may also act independently regarding motivation in leisure-time (Hagger et al., 2009). Such findings reinforce the need to consider parents when implementing strategies for the promotion of physical activity. Parents' interest in their children's physical activity behaviors could directly result in the development of positive attitudes toward physical activity among children as well as the perception that they can freely decide on how, when, and in which activities to participate (perceived behavioral control) and the perception that their parents want them to engage in physical activity (subjective norms). This direct relationship between perceived parents' autonomy support and subjective norms could represent another explanation for the absence of relationships between subjective norms and autonomous motivation. It is possible that the development of subjective norms does not occur through motivation but rather that parents' autonomy support has a direct effect on the development of these norms.

Regarding the final set of predictions (hypotheses 11–13), the results reveal that attitudes, subjective norms, and perceived behavioral control positively predicted intentions, which, in turn, positively predicted physical activity behaviors. A clear mediator role for intentions was observed in these relationships. These results are consistent with different studies that have tested the TCM (Hagger & Chatzisarantis, 2012) and show how the different beliefs and judgments could influence physical activity through intentions, as proposed in the TPB.

In summary, the current study provides support for the postulates of the TCM, broadening them with the introduction of new variables and showing their applicability to the Spanish culture. The inclusion of variables for SDT in the TCM, such as perceived autonomy support from parents and peers and basic psychological need satisfaction, provide a clearer insight into the mechanisms behind the transfer of motivation across contexts. On the one hand, it seems evident that the satisfaction of basic psychological needs provides an indication of the process by which adolescents are motivated to engage in leisure-time physical activities after experiencing activities as autonomous and need satisfying in PE. On the other hand, social agents (teachers, parents, peers) also appear to play an important role in this process through the promotion of autonomous motivation and physical activity participation in leisure-time context. Despite the findings, it is important to stress that this is a correlational study that cannot determine cause-effect relation-

ships and that the results obtained could be subjected to other interpretations. In this sense, we have attempted to explain the predictive relationships found between the variables based on a specific theoretical framework, determining possible effects rather than causality. Given that the model seems strong and has great capacity to generalize across cultures (Barkoukis & Hagger, 2009), the next step to take in its development should be the implementation of intervention studies that target key constructs in the model including autonomy and psychological need support (e.g., Chatzisarantis & Hagger, 2007; Chatzisarantis & Hagger, 2009). Although some studies have already taken this step through interventions in PE (e.g., Wallhead et al., 2010) and provided very interesting results, the present study shows the need to design randomized controlled studies that also take into account parents and peers in the intervention.

Perspectives

The model demonstrates how perceived autonomy support offered by teachers in a PE context can increase students' motivation in that context but also motivation toward physical activity outside of school and actual leisure-time physical activity in future. Findings indicate the role that supporting autonomous forms of motivation in PE is likely to have on the satisfaction of psychological needs and motivation in PE and toward physical activity in out-of-school contexts. This study highlights the importance of school as an influence on behavior and activities in other life contexts. It indicates that teachers have the potential to have a profound influence on students' behaviors beyond the classroom and in other life spheres. The present research suggest that developing a climate of autonomy support in PE may contribute to students engaging in healthy and active lifestyles outside of school. The present findings also identify a unique role for parents and peers in supporting leisure-time physical activity toward promoting increased physical activity in the future.

Key words: self-determination theory, theory of planned behavior, physical education, physical activity.

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