

PEDAGOGY - ELEMENTARY  
PHYSICAL EDUCATION

**An Application of the  
Trans-Contextual Model of  
Motivation in Elementary School  
Physical Education**

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**Abstract**

*Elementary school physical education can play a prominent role in promoting children's leisure-time physical activity. The trans-contextual model of motivation has been proven effective in describing the process through which school physical education can affect students' leisure-time physical activity. This model has been tested in secondary education, but there is no evidence on the applicability of the model in elementary education. In the present study, we assessed the effect of motivation in elementary school physical education on leisure-time physical activity motivation and the related decision-making process. The sample consisted of 241 pupils ( $M_{age} = 11.52$ ,  $SD = .51$ ) recruited from elementary schools in Northern Greece. Participants completed a questionnaire including measures of physical education and leisure-time physical activity motivational regulations, attitudes, subjective norms, perceived behavioral con-*

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*trol, and intentions toward leisure-time physical activity. The results of hierarchical regression analyses indicated that motivational regulations in physical education best predicted the respective leisure-time physical activity regulations. In addition, leisure-time physical activity motivational regulations predicted intentions toward physical activity. Multiple mediation analyses indicated that the effect of leisure-time physical activity motivational regulations on intentions was partially mediated by perceived behavioral control. The findings support prior research and demonstrate an important mechanism of how motivation in elementary school physical education can influence leisure-time physical activity. Autonomous motivation in elementary school physical education led to higher students' intentions toward physical activity outside the school.*

Physical activity participation plays an important role in preventing chronic noncommunicable diseases. According to the World Health Organization (2013), physical inactivity is the fourth leading factor for preventable diseases and premature death in developing and developed countries, accounting for more than 3 million deaths annually. Physical activity participation follows a developmental trend, in a way that physically active children and adolescents have significantly higher chances to be physically active adults (Ferreira, Twisk, van Mechelen, Kemper, & Stehouwer, 2005; Hallal, Victora, Azevedo, & Wells, 2006; Telama et al., 2005). Hence, it is important to promote physical activity participation in this age group. School physical education (PE) is a prominent method to promote physical activity participation in children and adolescents and accordingly build healthy lifestyle habits. In fact, participation in school PE should produce cognitive, affective, and behavioral outcomes that promote leisure-time physical activity (LTPA) participation (Hagger, Chatzisarantis, Culverhouse, & Biddle, 2003). LTPA participation contributes largely toward maintaining a healthy lifestyle and abstaining from unhealthy behaviors in adolescence and in adulthood (Hallal et al., 2006; Telama et al., 2005). However, it remains a question if school PE promotes engagement in physical activity outside school. In the present study, we set out to assess if elementary school PE is associated with engagement in LTPA in school pupils. The theoretical backgrounds of the study are derived from the trans-contextual model (TCM) of motivation (Hagger et al., 2003), a model that explains the ways through which PE at a school level is linked to LTPA in children and adolescents.

## **Component Theories of the Trans-Contextual Model**

The TCM includes components of self-determination theory (Deci & Ryan, 1985, 2002, 2012), the hierarchical model of intrinsic and extrinsic motivation (Vallerand, 2007), and the theory of planned behavior (Ajzen, 1985). Core elements of each approach are incorporated into the TCM and contribute to the development of a mechanism through which motivation in school PE can be transferred to LTPA (Hagger, 2009; Hagger & Chatzisarantis, 2012; Hagger et al., 2003).

More specifically, a core element of self-determination theory involves the distinction between intrinsic and extrinsic motivation. The former reflects engagement in an activity for the inherent pleasure and fun derived from involvement. Participation due to intrinsic motivation indicates high levels of self-determination. Extrinsic motivation, on the other hand, corresponds to engaging in an activity to obtain rewards or avoid punishment (Deci & Ryan, 2008). Four dimensions of extrinsic motivation have been identified, with varying levels of self-determination (Ryan & Connell, 1989).

First, integrated regulation is the most self-determined dimension of extrinsic motivation. In this dimension, participation in an activity is facilitated by the assimilation or matching of the activity at hand with other traits and attributes of the person. Second, integrated regulation, although with different characteristics, is also presented as a dimension of intrinsic motivation. In identified regulation, activity involvement is a result of the importance posed by the individual on the behavior for the self. Third, introjected regulation reflects engagement in an activity for external reasons, creating feelings of guilt or shame and self-derogation after failure. Finally, the least self-determined dimension of extrinsic motivation is external regulation. Externally regulated students participate in activities to obtain rewards or avoid punishment (Deci & Ryan, 2008). Intrinsic motivation and identified regulation create autonomous motivation, whereas introjected and external regulations control motivation (Ratelle, Guay, Vallerand, Larose, & Sénécal, 2007).

Motivational regulations are influenced by the perceived climate created by social agents such as teachers, parents, and coaches. According to the theory, the social agents' initiated climate can be either autonomy supportive or controlling. An autonomy-supportive climate reflects teachers' interpersonal behaviors aiming to develop students' internal locus of causality and volitional intentions to act, and controlling climate involves interpersonal behaviors aiming

to enforce specific ways of thinking and behaviors (Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2009; Reeve & Jang, 2006). Perceptions of autonomy-supportive environment result in increased autonomous motivation and adaptive outcomes from activity involvement, whereas controlling climates elevate levels of controlling motivation and maladaptive outcomes (Bartholomew et al., 2009).

A fundamental element of the hierarchical model of intrinsic and extrinsic motivation is that motivation distinction exists in global, contextual, and situational levels of generality (Vallerand, 1997, 2007). In the TCM, motivation is addressed mostly at the contextual level, which reflects motivation in specific life contexts such as school-based PE and LTPA. An important corollary of the model is that motivation from one context can be transferred into motivation in another similar context at the same level of generality (Vallerand & Ratelle, 2002). For instance, intrinsic motivation in PE can be transferred to intrinsic motivation in competitive sport and LTPA contexts. These contexts can be considered similar because they involve the provision of physical activity.

The third theoretical approach that has been incorporated into the TCM is the theory of planned behavior. This theory has been widely used to explain the decision-making process in volitional behaviors (Armitage & Conner, 2001). Behavioral intention is considered the key variable of the model and the most influential predictor of behavior. Intentions correspond to an individual's willingness and determination in engaging in a specific behavior and are largely influenced by social cognition constructs, such as attitudes, subjective norms, and perceived behavioral control (PBC). Attitudes reflect the positive or negative evaluations toward the behavior associated with expectations about specific and desired outcomes. Subjective norms describe the significant others' evaluation of the behavior and the pressure posited to the individual to become involved in the behavior. Finally, PBC indicates the individual's self-efficacy beliefs in performing the behavior (Ajzen, 2002; Webb & Sheeran, 2006).

There is growing evidence on the integration of these approaches. From a theoretical viewpoint, an integration of theoretical approach has been proposed in recent developments to provide a more comprehensive understanding of human behavior. In the integrative model (Fishbein, 2009) and theory of triadic influence (Flay, Snyder, & Petraitis, 2009), a sequence through which distal variables influence proximal variables has been proposed, and these influence

behavior. More specifically, Fishbein and Ajzen (2010) argued that planned behavior theory variables are heavily influenced by motivation-related beliefs, such as those described in self-determination theory. In fact, Hagger, Chatzisarantis, and Harris (2006) indicated that they mediate the effect of motivation-related variables on behavioral intentions. This integration was further confirmed in a recent meta-analysis (Hagger & Chatzisarantis, 2009).

### **The Trans-Contextual Model**

All abovementioned theories contribute to the formation of the TCM (Hagger, 2009). Self-determination theory (Deci & Ryan, 1985) provides the concept of motivational regulations and describes the effect of social environment on the formation of these regulations. The possibility of transferring motivation from one setting to a similar one at the same level of generality was derived from the hierarchical model (Vallerand, 1997, 2007). Finally, the process through which motivation influences actual behavior is fully described in the theory of planned behavior (Ajzen, 1985, 2002). The basic premises of the model indicate that an autonomy-supportive climate in PE will result in autonomous motivation in PE, which in turn will produce autonomous motivation in LTPA. Autonomous motivation in LTPA will positively influence intentions toward LTPA and actual LTPA through the effect of social cognitive variables, such as attitudes, subjective norms, and PBC (Barkoukis & Hagger, 2013; Hagger & Chatzisarantis, 2009; Hagger et al., 2003).

The TCM has received extensive support in PE and LTPA contexts. Shen, McCaughy, and Martin (2007, 2008) investigated and verified the mediating role of the variables of the theory of planned behavior on the autonomy-supportive climate–LTPA relationship. Hagger et al. (2003) confirmed the hypotheses in regard to the model in a sample of high school students. Also, Hagger, Chatzisarantis, Barkoukis, Wang, and Baranowski (2005) and Hagger et al. (2009) cross-culturally supported most of the hypotheses in regard to the model in high school students from the United Kingdom, Greece, Poland, Singapore, Finland, Estonia, and Hungary. Although some minor culture-specific variations were found in some relationships tested, the pattern of relationships was consistent across samples with different cultural backgrounds. Hagger and Chatzisarantis (2009) further extended the model by examining the effect of parents' and peers' autonomy support on the formation of autonomous motivation. They reported a significant but weak effect of parents'

and peers' autonomy support on LTPA motivation, highlighting the important role of school PE in the development of LTPA behavior. Furthermore, Barkoukis, Hagger, Lambropoulos, and Tsorbatzoudis (2010) showed that psychological need satisfaction in secondary PE can mediate the effect of autonomy support in PE and LTPA and provided further evidence on the psychological mechanism through which teacher-initiated motivational climate can influence LTPA.

The aforementioned studies provide strong empirical support for the TCM. However, in most of the existing research on TCM and LTPA in the school PE context, the samples were adolescents aged 14 years or older, and there is a dearth of related studies among younger populations. As the World Health Organization (2013) has recommended, children should engage in daily extracurricular physical activities as doing so will prevent the onset of childhood and adolescent obesity, will reduce the risk for diabetes metabolic syndrome in the short and in the longer term, and can sustain healthy lifestyles through adulthood. Given the developmental differences within the elementary/preadolescent school population, and given the differences in the curricula of elementary and secondary PE lessons (Klein & Hardman, 2008), it is important to extend the investigation of the TCM in elementary school PE.

Based on past literature in secondary education and theoretical predictions, we assumed that motivational regulations in PE would predict their respective regulation in LTPA (H1). Regulations that are close in the self-determination continuum may have a significant effect on the dependent regulation. All other regulations were assumed to have a neutral effect. Autonomous regulations in LTPA were expected to have a positive effect on intentions, whereas controlling regulations a neutral or negative effect (H2). The effect of LTPA motivational regulations on intentions was assumed to be mediated by attitudes, PBC, and subjective norms (H3). Actual participation in LTPA was not measured. This decision was made having in mind the age of the students in the study. Pupils at this age heavily rely on their parents for transportation to and from a sport facility. Hence, it is possible that the pupils of the study could develop high intention toward LTPA but not exhibit behavior for reasons beyond their control.

# Method

## Sample

The sample of the study consisted of 241 pupils (males = 128, females = 113;  $M_{\text{age}} = 11.52$ ,  $SD = .51$ ) recruited from three coeducational elementary schools in an urban city of Northern Greece. Pupils were attending the fifth and sixth grade. A stratified sampling approach was used to randomly select three school units. The schools were selected from the official list of schools provided by the Ministry of Education. Based on the location of the selected schools and the description of school principals, schools were considered to be typical coeducational schools including students of middle socioeconomic status.

## Research Design

A two-wave prospective design was adopted. In the first wave (time one), participants completed self-report measures of autonomous motivation in a PE context (Hagger et al., 2003), and in the second wave, one week later, they completed a questionnaire including measures of the theory of planned behavior variables (Ajzen, 1985) and autonomous motivation in an LTPA context (Mullen, Markland, & Ingledew, 1997). The week between the first and second wave was used to minimize the amount of error variance that could be attributed to the use of similar measures of motivational regulations in PE and LTPA contexts (Hagger & Chatzisarantis, 2007). The items of the measures were simplified and adapted to elementary school students. Two elementary school PE teachers read the questionnaire and commented on the face validity and comprehension of the items.

School principals of the selected schools were contacted and permission was granted. Parental consent was obtained via a pre-print form explaining the aim and procedures of the study delivered to parents by their children. Parents who did not wish their child to take part in the study should return the form signed. No signed forms were returned to the investigators. Data were collected in quiet classroom conditions under our supervision. During completion, oral and written instructions were provided to pupils to enhance comprehension of the measures. Pupils were informed on their right to withdraw at any time of questionnaire completion, and they were reassured on the anonymity and confidentiality of their responses. The same procedure was followed in both data collection waves. Questionnaires were matched using participants' birth date, gender,

class, and school. Two weeks prior to the scheduled questionnaire administration, the PE teachers of the two schools were unexpectedly replaced. Thus, we decided not to use the data pertaining to perceptions of teachers' autonomy support as they may not accurately reflect the effect of motivational climate on the tested variables.

## Measures

**Autonomous motivation in physical education.** A modified version of Ryan and Connell's (1989) perceived locus of causality scale was used to measure autonomous motivation in PE. The scale comprises eight items measuring four types of motivation (two items per motivational regulation): *intrinsic motivation* (e.g., "I participate in physical education because it is fun"), *identified regulation* (e.g., "I participate in physical education because I value physical education"), *introjected regulation* (e.g., "because I will feel ashamed if I do not do physical education"), and *external regulation* (e.g., "I participate in physical education because important others want me to do physical education"). Responses were anchored on a 4-point scale ranging from 1 (*not true at all*) to 4 (*very true*).

**Autonomous motivation in leisure time.** The Behavioural Regulation in Exercise Questionnaire developed by Mullen et al.'s (1997) was used to measure autonomous motivation in a leisure-time context. Participants responded to the stem, "Why do you participate in active sports and/or vigorous physical activities in your spare time?" followed by the four motivational regulations. The questionnaire consisted of 15 items used to measure intrinsic motivation (four items; e.g., "I exercise because it is fun"), identified regulation (four items; e.g., "I exercise because it is important to make the effort"), introjected regulation (three items; e.g., "I exercise because I will feel guilty if I do not"), and external regulation (four items; e.g., "I exercise because others say I should"). Participants responded on a 7-point Likert scale ranging from 1 (*not true at all*) to 7 (*very true*). Internal consistency coefficients were satisfactory for intrinsic motivation and identification dimension, but low for introjected and external regulations (Table 1). Both regulations were retained in subsequent analyses, but respective findings should be treated with caution.

**Table 1**  
*Descriptive Statistics of Variables*

Variable	Cronbach's $\alpha$	<i>M</i>	<i>SD</i>
PE Intrinsic Motivation	–	3.56	.64
PE Extrinsic Regulation	–	2.97	.79
PE Introjected Regulation	–	2.79	.85
PE Identified Regulation	–	3.59	.61
PA Intrinsic Motivation	.68	6.11	1.06
PA Extrinsic Regulation	.50	3.15	1.45
PA Introjected Regulation	.40	4.25	1.53
PA Identified Regulation	.68	5.96	1.03
Intentions	.65	5.62	1.39
Attitudes	.89	6.36	.93
Perceived Behavioral Control	.76	5.62	1.17
Subjective Norms	.31	4.20	1.57

*Note.* PE = physical education; PA = physical activity. For scales with two items, Cronbach  $\alpha$  was not estimated.

**Intentions.** Three items were used to measure intentions toward LTPA (e.g., “I am determined to participate in leisure-time physical activities in the next three weeks...”). Responses were provided on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

**Attitudes.** Attitudes were assessed with the stem proposition, “Participating in active sports and/or vigorous physical activities during my leisure time in the next three weeks is...” followed by five 7-point semantic differential scales with the bipolar adjectives *bad–good*, *harmful–beneficial*, *not enjoyable–enjoyable*, *useful–useless*, and *boring–interesting*. The mean score was calculated, with higher scores reflecting more positive attitudes toward LTPA.

**Subjective norms.** Subjective norms were assessed using two items (e.g., “My parents, teachers, and friends think that I should take part in physical activities during my leisure time in the next three weeks”) on 7-point scales ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). A mean score was computed with higher scores reflecting more favorable beliefs of significant others toward LTPA.

**Perceived behavioral control.** Three items were used to measure PBC (e.g., “I feel in complete control over whether I take part in physical activities during my leisure-time in the next three weeks”). Responses were anchored on a 7-point Likert scale ranging from 1 (*no control*) to 7 (*complete control*). A composite score was computed with higher scores indicating higher control over participating in LTPA.

## Results

### Preliminary Analyses

Means, standard deviations, and internal consistency coefficients are shown in Table 1. Extrinsic and introjected regulations in LTPA revealed low internal consistency. Because these are important in testing the hypotheses of the study, they were retained in the analyses. However, findings pertaining to these regulations should be interpreted and treated with caution. The analysis of correlation revealed moderate relations among the variables (Table 2).

### Effect of PE Motivation on LTPA Motivation

A linear regression analysis was used to test the effect of PE motivational regulations on the respective LTPA regulations. With respect to LTPA intrinsic motivation, the results of the analysis indicated a significant effect explaining 13.5% of the variance,  $F(4, 240) = 10.41, p < .001$ . PE intrinsic motivation was the only significant predictor,  $b = .26, p < .001$ . Similarly, a significant effect was found regarding the prediction of LTPA extrinsic regulation,  $\text{adj } R^2 = 14.0, F(2, 240) = 10.76, p < .001$ . PE extrinsic and introjected regulations were found to have a significant predictive effect on LTPA extrinsic regulation,  $b = .20, p < .01$ , and  $b = .19, p < .01$ , respectively. The results of the regression analysis regarding LPTA introjected regulation indicated a significant predictive effect from PE motivational regulations,  $\text{adj } R^2 = 14.7, F(2, 240) = 11.36, p < .001$ . Only PE introjected regulation emerged as a significant predictor,  $b = .26, p < .001$ . Finally, similar findings were found with respect to identified regulation. PE motivational regulations had a significant effect,  $F(4, 240) = 6.44, p < .001$ , explaining 8.3% of the variance. PE identified and external regulations were found to be significant predictors,  $b = .16, p < .05$ , and  $b = .14, p < .05$ , respectively.

**Table 2**  
*Correlation Analysis Among the Variables*

<b>Variable</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>
1. PE Intrinsic Motivation	.07	.03	.23**	.30**	.02	.08	.02	.09	.08	.12*	.01
2. PE Extrinsic Regulation		.39**	.27**	.20**	.31**	.26**	.24**	.07	.05	.09	.16**
3. PE Introjected Regulation			.40**	.20**	.32**	.35**	.23**	.11	.12	.12	.25**
4. PE Identified Regulation				.24**	.24**	.26**	.22**	.21**	.11	.09	.11
5. PA Intrinsic Motivation					.28**	.34**	.58**	.45**	.44**	.41**	.23**
6. PA Extrinsic Regulation						.61**	.35**	.24**	.18**	.18**	.45**
7. PA Introjected Regulation							.46**	.37**	.29**	.28**	.32**
8. PA Identified Regulation								.54**	.47**	.52**	.34**
9. Intentions									.44**	.61**	.27**
10. Attitudes										.50**	.19**
11. Perceived Behavioral Control											.30**
12. Subjective Norms											

\* $p < .05$ . \*\* $p < .01$ .

## Effect of LTPA Motivation and Social Cognition on Intentions

A hierarchical regression was used to test the effect of LTPA motivational regulations on intentions and the effect of social cognition, namely, attitudes, PBC, and subjective norms, on intentions. In the first step of the analysis, the LTPA motivational regulations were entered and significantly predicted intentions,  $F(4, 239) = 30.04$ ,  $p < .001$ , explaining 33.5% of the variance. Intrinsic motivation, identified regulation, and introjected regulation were found to have a significant effect on intentions,  $b = .17$ ,  $p < .01$ ;  $b = .39$ ,  $p < .001$ ; and  $b = .16$ ,  $p < .05$ , respectively. In the second step, social cognition variables for the theory of planned behavior were entered. The addition of social cognition improved the predictive ability of the model,  $\text{adj } R^2 = 46.2$ ,  $F(7, 239) = 30.31$ ,  $p < .001$ ,  $R^2$  change = 13.2%. With respect to social cognition variables, only PBC was found to have a significant effect on intentions,  $b = .40$ ,  $p < .001$ . The effects of intrinsic motivation and introjected regulation were suppressed and turned out to be nonsignificant, whereas the effect of identified regulation was lowered but remained significant.

## Mediating Role of Social Cognitions

These findings of the hierarchical regression analysis imply a positive mediating effect of PBC on LTPA motivation–intentions relationship. Multiple mediation analysis (Preacher & Hayes, 2008) was used to test for the mediating role of PBC. Bias-corrected confidence intervals (95% CI) for standard errors were estimated using bootstrapping (1,000 resamples). Three multiple mediation models tested if (a) PBC mediated the relationship between LTPA intrinsic motivation and intentions, (b) PBC mediated the relationship between LTPA introjected regulation and intentions, or (c) PBC mediated the relationship between LTPA identified regulation and intentions. The first mediation model showed that PBC partially mediated the effect of intrinsic motivation on intentions,  $\beta_c = .590$ ,  $p < .001$ ,  $\beta_c = .309$ ,  $p > .001$ ;  $z_{\text{PBC}} = 5.68$ ,  $p < .001$ . Similarly, the second mediation model showed that PBC partially mediated the effect of introjected regulation on intentions,  $\beta_c = .342$ ,  $p < .001$ ,  $\beta_c = .197$ ,  $p > .001$ ;  $z_{\text{PBC}} = 4.27$ ,  $p < .001$ . Finally, a partial mediation effect was also evident in the third mediation model regarding the identified regulation–intentions relation,  $\beta_c = .750$ ,  $p < .001$ ,  $\beta_c = .429$ ,  $p > .001$ ;  $z_{\text{PBC}} = 6.14$ ,  $p < .001$ .

## Discussion

We assessed the effect of motivation in elementary school PE on LTPA motivation and decision-making processes with regard to LTPA participation. The results of the analyses indicated that motivational regulations in PE predicted the respective LTPA motivational regulations. In addition, LTPA motivational regulations predicted intentions toward physical activity, and this effect was partially mediated by PBC.

More specifically, the results of the analyses confirm the first hypothesis, as PE motivational regulations predicted LTPA regulations. These findings are in agreement with past research and theory (Hagger et al., 2003; Vallerand, 2007) and indicate that the transfer of motivation between contexts is manifested as early as age 10 (i.e., fifth grade). This is an important contribution to the extant research because it implies that 10-year-olds have already developed motivational schemata in several related contexts. Thus, elementary school PE could influence the formation of LTPA motivation, but this assumption should be examined in future research.

Each PE motivational regulation predicted the respective LTPA motivational regulation. Past research within the TCM has largely relied on the measurement of RAI and the transference of self-determination from the context of PE to LTPA (Hagger et al., 2003; Hagger et al., 2005). The present study indicates that each motivational regulation can influence the respective LTPA regulations. Controlling motivational regulations in PE could produce controlling motivation in LTPA. These findings imply that fostering controlling motivation in PE will probably result in the development of maladaptive motivation in LTPA. So far, past evidence has heavily relied on the development of autonomous motivation to enhance self-determination (Pihu, Hein, Koka, & Hagger, 2008). However, according to self-determination theory and past research, there is evidence that sport participants may endorse simultaneously autonomous and controlling motivation (Vlachopoulos, Karageorghis, & Terry, 2000). The use of specific strategies to decrease controlling motivation may further enhance self-determination. PE teachers should avoid using strategies, such as uttering solutions and directives, making ought-to and deadline statements, asking controlling questions, and criticizing the student to ensure the decrease of controlling motivation (see Bartholomew et al., 2009; Reeve & Jang, 2006).

The findings partially support the second hypothesis of the present study. Autonomous motivational regulations in LTPA had a positive effect, but contrary to expectations, introjected regulation also had a positive effect on intentions. The findings pertaining to autonomous motivational regulations are consistent with past research in secondary education. The positive effect on intentions demonstrates that elevated levels of autonomous motivation are more likely to produce positive intentions toward physical activity. These findings are also in line with Vallerand's (2007) contentions that the effects of contextual-level motivational constructs can influence more proximal, situational-level constructs.

Although introjected regulation is considered as an extrinsic motivation, it reflects the first step in the internalization process of the behavior (Vansteenkiste, Soenens, & Vandereycken, 2005). Past evidence on self-determination theory has shown that introjected regulation may have positive or negative influence on outcomes of behavior (Gillison, Osborn, Skevington, & Standage, 2009). In the present study, introjected regulation acted as an adaptive motivational type. This might be ascribed to the age of the participants. It is possible that younger children cannot distinguish the internal and external reasons that may apply pressure to them and categorize them both as internal pressure. If this is the case, introjected regulation in young children may act as an autonomous motivational type and children participate in an activity out of their own choice to release their internal pressure.

Only PBC was found to mediate the effect of LTPA motivational regulations on intentions. Prior research with high school students has shown attitudes and subjective norms to also mediate this relationship (Hagger et al., 2003). These findings imply that in childhood the sense of control over behavior is an important determinant of the decision to involve in this behavior. It is possible that children understand that although they may hold favorable views toward a behavior and the environment is supportive, the crucial aspect determining behavior initiation is the perception of their ability to engage in the behavior. Thus, students with positive perceptions about their ability to be involved in LTPA benefit from the formation of adaptive motivational regulations and develop higher intentions for participation in LTPA.

## **Conclusions, Limitations, and Future Directions**

Overall, the present study supports the hypotheses in the TCM in a sample of elementary school children. Motivational regulations in

PE predicted the respective regulations in LTPA, which in turn positively predicted intentions toward physical activity participation. The latter effect was mediated by PBC. The present study is the first study in which the TCM has been tested in elementary school. This is an important contribution to the literature, having in mind that the age children initiate out-of-school physical activity participation has decreased and that there are huge developmental differences between elementary school and high school students. Nevertheless, the present study has several shortcomings. First, because of an unfortunate incident (PE teachers removed), perceptions of motivational climate were not included in the analyses and a complete test of the TCM was not possible. The replacement of the PE teachers might have confused students' responses, with some responding having in mind the old teacher and some the new one. Thus, there would have been no consistency in the measurement of perceptions of motivational climate, and this could have jeopardized the findings of the study. In future studies, researchers should incorporate a measure of perceptions of motivational climate to allow a complete test of the model. Another limitation of the study concerns the assessment of the constructs of the model in elementary school. Although a careful adaptation of the measures for elementary school students was made, two subscales had low internal consistency. Findings pertaining to these constructs should be treated with caution. Researchers should further investigate the validity and reliability of the instruments. Notwithstanding these limitations, the present study demonstrates an important mechanism of how motivation in elementary school PE can influence LTPA.

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