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PEDAGOGY

The Effect of a Goal-Setting Program in Physical Education on Cognitive and Affective Outcomes of the Lesson

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Abstract

This study investigated the effects of a goal-setting intervention on students' physical education and leisure-time physical activity motivation cognition. One hundred sixty-nine primary school pupils in fifth and sixth grades (11–12 years old) participated in the study and were randomly divided into two groups. Ninety-four students participated in a goal-setting intervention program that lasted five physical education lessons, and seventy-five students served as a control group. Perceived autonomy support in physical education classes, autonomous motivation in physical education, enjoyment during physical education, vitality, attitudes, perceived behavioral control, and intention toward out-of-school physical activity were measured at the beginning and end

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of the intervention program through anonymous questionnaires. The results indicated that goal setting served as a useful strategy for the promotion of autonomy support in physical education lessons, producing positive effects on leisure-time physical activity–related cognition.

Recent evidence suggests that modern lifestyle hinders physical activity and a majority of children and adolescents have fewer opportunities for exercise. Physical education has been proliferated as a school subject that can provide opportunities for physical activity and positively influence public health (Hills, Dengel, & Lubans, 2015). Current educational curricula, though, provide physical education lessons that do not satisfy the World Health Organization criteria for exercise in children and adolescents (Brener et al., 2017). Thus, the lesson needs to be as effective as possible for maximum effect on students and, in addition, for promotion of lifelong participation in physical activity. To address this need, this study investigated the effect of a goal-setting intervention on students' physical education and leisure-time physical activity motivation and cognition.

Self-Determination Theory

Self-determination theory (SDT) is a theory of human motivation and personality that deals with people's inherent growth tendencies (Deci & Ryan, 2000). More precisely, SDT focuses on the motivation behind the choices people make and the degree to which an individual's behavior is self-motivated and self-determined (Deci & Ryan, 2000; Ryan & Deci, 2002, 2017; Van den Berghe, Vansteenkiste, Cardon, Kirk, & Haerens, 2014). Central in SDT is the distinction of three main types of motivational regulations, namely, intrinsic motivation, extrinsic motivation, and amotivation (Deci & Ryan, 1985, 2000). An *intrinsically* motivated behavior reflects involvement in an activity for the satisfaction and pleasure derived from the activity itself. Intrinsically motivated behaviors are accompanied by feelings of competence and self-determination. On the other hand, extrinsic motivation refers to activity involvement for rewards or avoidance of punishments. This type of motivation is operated through four motivational regulations that vary on self-determination. These motivational regulations include *integrated* regulation, which signifies the complete internalization of this value together with the existing values of the individual, and *identified* regulation, which

indicates that a person takes part in an activity because they recognize and accept the underlying value of this behavior. These two types of extrinsic motivation represent relative high levels of self-determination. On the other hand, an *introjected* regulated behavior represents the involvement of an individual in action with the intention of gaining self-worth or avoiding feelings of guilt or shame. Last, an *externally* regulated behavior involves engagement in an activity for external rewards or avoidance of threats and punishments, and involvement is characterized by the absence of feelings of autonomy and fun. These two types of extrinsic motivation are characterized by relatively low levels of self-determination. The last type of motivation, *amotivation,* has been described as a behavioral regulation that is characterized by the absence of motivation and, therefore, self-determination (Deci & Ryan, 2008).

Intrinsic motivation and identified regulation form autonomous motivation, whereas introjected and external regulations form controlled motivation. Autonomous motivation results in more adaptive behaviors and positive outcomes in comparison to controlled motivation. These outcomes can be affective, such as higher sense of well-being, vitality, and positive affect; cognitive, such as higher attention and deep processing during a task; and behavioral, such as more effort, persistence, and greater activity levels (Boiché, Sarrazin, Grouzet, Pelletier, & Chanal, 2008; Standage, Duda, & Ntoumanis, 2005). On the other hand, controlled forms of regulated behaviors may produce internal pressure and fear of looking incapable, surface processing during a task, and avoidance or quitting of the task at hand (Deci & Ryan, 2008).

A basic premise of SDT is that the social environment produced by social agents, such as parents, teachers, and coaches, influences the formation of motivational regulations. The theory identifies two types of interpersonal interactions that form the so-called motivational climate, namely, autonomy-supportive and controlling climates (Deci & Ryan, 2012). An autonomy-supportive climate provides opportunities to students to identify, nurture, and develop their inner motivational resources, whereas a controlling climate puts pressure on students to think, feel, or behave in a specific way (Reeve, 2009; Reeve & Jang, 2006). In SDT tradition, it is expected that an autonomy-supportive climate will foster autonomous

motivation, whereas a controlling climate will undermine autonomous motivation and promote controlled motivation (Deci & Ryan, 2000; Ryan & Deci, 2002; Vallerand, 2007).

In the context of physical education, SDT has been widely adopted and used to explain students' motivation. Past evidence consistently shows that an autonomy-supportive climate during PE lessons can assist students in endorsing autonomous motivation and achieving positive outcomes from participation, such as high levels of interest, effort and concentration, positive self-esteem, vitality, and higher levels of students' intention to be physically active in leisure-time settings (e.g., Barkoukis, Hagger, Lambropoulos, & Tsorbatzoudis, 2010; Hagger, Chatzisarantis, Barkoukis, Wang, & Baranowski, 2005; Krijgsman et al., 2017; Ntoumanis, 2012; Ntoumanis & Standage, 2009; Sebire, Jago, Fox, Edwards, & Thompson, 2013; Taylor & Ntoumanis, 2007; Van den Berghe et al., 2014; Vlachopoulos, 2012).

Theory of Planned Behavior

A set of outcomes related to the physical education lesson has been derived from the theory of planned behavior (TPB), a theoretical model that attempts to predict and explain human behavior in specific contexts (Ajzen, 1991). According to this approach, the core component of human behavior is the individual's *intention* to perform a given activity. Intention is supposed to reflect the individual's levels of motivation, whereas it reveals how much the person will try to achieve their goal. Three independent critical factors determine an individual's intention toward behavior. The first is the individual's *attitude* toward the behavior, which refers to positive or negative evaluations of the behavior per se. The second determinant is named *subjective norm,* which describes the person's beliefs about whether or not a behavior is approved by significant others. The third is the individual's *perceived behavioral control,* which denotes the extent to which the person believes that they have the ability to control the behavior at hand. In general, positive judgments about the behavior, strong social influences, and greater levels of perceived behavioral control lead to stronger intention to engage in the desired behavior. The effect of these three determinants on the prediction of intention has been proved in several studies and varies across different areas and behaviors (e.g., Davide, Sogari, & Mora, 2015; De Bruijn & Rhodes, 2010; Flack & Morris, 2017; Jiang, Ling, Feng, & Shao, 2017;

Londono, Davies, & Elms, 2017; Rhodes et al., 2014; Xu, Ling, Lu, & Shen, 2017).

With respect to the application of the TPB on the prediction of people's physical activity, a large body of research confirming the predictive utility of the model already exists. TPB has been extensively studied in association with SDT and there is consistent evidence that autonomous motivation is associated with more positive attitudes toward the behavior at hand and subjective norms, higher scores of perceived behavioral control and intentions, and higher actual behavior (see Hagger & Chatzisarantis, 2009, for a meta-analysis). Evidence suggests that an autonomy-supportive climate in physical education lessons can promote positive cognition toward leisure-time physical activity and actual physical activity behavior. More specifically, perceptions of autonomy-supportive climate foster autonomous motivation in physical education, which in turn promotes autonomous motivation in leisure-time physical activity and positive attitudes toward physical activity participation (Barkoukis & Hagger, 2009, 2013; Barkoukis, Hagger, et al., 2010; Hagger & Chatzisarantis, 2009; Hagger et al., 2005; Hagger, Chatzisarantis, Culverhouse, & Biddle, 2003; Hamilton & White, 2008; Mok & Lee, 2013; Plotnikoff, Lubans, Costigan, & McCargar, 2012). Overall, an autonomy-supportive climate can produce positive outcomes with respect to the physical education lesson itself (e.g., enjoyment and vitality) and the leisure-time physical activity (e.g., attitudes and intentions).

Goal Setting

The abovementioned evidence has consistently supported that an autonomy-supportive climate can foster autonomous motivation, which in turn positively influences proximal to the behavior variables, such as attitudes, subjective norms, perceived behavioral control, and intentions (Barkoukis & Hagger, 2009, 2013; Barkoukis, Hagger, et al., 2010; Hagger & Chatzisarantis, 2009; Hagger et al., 2003). Hence, the promotion of an autonomy-supportive climate has been considered an important avenue for fostering positive experiences during activity engagement (Reeve, 2009; Reeve & Jang, 2006). Among the more useful strategies of promoting adaptive motivation is appropriate goal setting (Duda, 2004; Locke & Latham, 2002).

Goal setting involves the development of a personal action plan that directs individuals' actions, not only helping them to monitor and evaluate its performance but also motivating them (Grant, 2012). It is generally accepted that goal setting can produce positive effects on personal development and self-management. More precisely, according to goal-setting theory, people who set difficult but attainable and specific goals and also know how to monitor and evaluate their progress perform better than those who set vague, easy, or do-your-best goals and do not monitor and evaluate their actions. Locke and Latham (1990) suggested that to be effective, goals have to be SMART, meaning that they must be Specific, Measurable, Attainable, Realistic, and Time-bound. Furthermore, investigating in what way goals affect performance, they proposed four mechanisms that underlie goal setting. The first mechanism is that goals help individuals to direct their attention toward activities relevant to the set goal. The second is that goals activate individuals, leading the person to put more effort to attain the goals. The third is that goals increase individuals' persistence, as people are likely to persist until the goal is met, and the fourth is that goals lead individuals to discover and use new task-applicable methods and strategies (Locke & Latham, 1990). In addition, goal setting includes several aspects that reflect an autonomy-supportive motivational climate. More specifically, it allows students to work at their own pace, provides opportunities for students to work on personal development and for the teacher to recognize personal improvement, promotes self-evaluation, allows students to make choices (e.g., define their personal goal) and take initiatives (e.g., define the strategy to achieve the goal), and fosters personal involvement, self-efficacy, and commitment to the activity (Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004; Papacharisis, Theofanidis, & Danish, 2007).

In the field of sports and physical education, the application of goal setting has been proved beneficial (see Horn, 2009, for an extensive review). Several studies support the positive effects of goal setting on performance (e.g., Barnett, 1977; Papaioannou, Ballon, Theodorakis, & Auwelle, 2004; Theodorakis, 1996; Theodorakis, Laparidis, Kioumourtzoglou, & Goudas, 1998), goal attainment (e.g., Johnson, Ostrow, Perna, & Etzel, 1997; Theodorakis, 1996), and motivational-related variables (e.g., Digelidis, Papaioannou,

Laparidis, & Christodoulidis, 2003; Duda, 2004; Giannini, Weinberg, & Jackson, 1988; Papacharisis, Goudas, Danish, & Theodorakis, 2005). The results of these studies support the notion that goal setting has the potential to promote achievement and sustain motivation. Thus, goal setting has been included in various interventions aiming to facilitate the positive development of students through adaptive motivation (e.g., Digelidis et al., 2003; Goudas & Giannoudis, 2008; Papacharisis et al., 2005).

This study investigated the effect of goal setting in physical education lessons on motivation indicators and outcomes related to the lesson. Goal setting can serve as an autonomy-supportive strategy in physical education lessons. So far, there is only limited evidence on whether goal setting in physical education can influence students' cognition and motivation in physical education (e.g., Digelidis et al., 2003; Papacharisis et al., 2005). Furthermore, there is a dearth of research linking goal setting in physical education with students' cognition about leisure-time physical activity. Based on the aforementioned review of the literature, it was hypothesized that students in a goal-setting group will report higher perception of autonomy-supportive motivational climate, higher levels of autonomous motivation, and lower levels of controlled motivation as compared with students in the control group. In addition, compared with control group students, intervention group students will report more positive outcomes from participating in the physical education lesson, namely, higher enjoyment and vitality. Finally, it was hypothesized that students in the goal-setting group will report more positive attitudes and subjective norms toward leisure-time physical activity and higher perceived behavioral control and intentions toward leisure-time physical activity.

Method

Participants

One hundred sixty-nine primary school pupils (92 boys, 76 girls, 1 did not declare gender) participated in the study. The students were fifth and sixth graders (11–12 years old) of two public schools in an urban area of Northern Greece.

Design and Procedure

The study design was in line with the Code of Ethics in Research of the Aristotle University of Thessaloniki. From the list of schools in the broader area of Thessaloniki, schools eligible to take part in the study were screened (i.e, typical coeducational schools, having two classes per grade, flexible in implementing innovative teaching approaches) and two were randomly selected. School principals and physical education teachers were informed about the purpose of the study, and they agreed to take part in it. The two physical education teachers (1 male, 1 female) selected were MSc holders and had written dissertations on sport psychology. As part of their studies, they had attended courses related to goal setting. Still, two one-hour sessions were conducted between the research team and the physical education teachers to establish the protocol of the intervention. In these sessions, the particularities of the intervention were discussed and decisions were made. More specifically, an intervention protocol was developed including (a) the information that would be presented to students with respect to the goal setting, (b) the exercises to be used and the time spent in each one, and (c) the principles of the goal-setting approach that would be used by the students. Based on this protocol, a self-monitoring checklist was developed. Following each lesson, the physical education teachers ticked in the checklist whether the predefined tasks were completed. With some minor differences in the time spent in some activities, the protocol was implemented as planned.

Following the institutional ethics committee rules, the researchers obtained consent forms from both students and parents/carers. The students were randomly assigned into intervention and control groups. The class of the students served as the unit of selection. Four classes were assigned into the intervention group and another four classes into the control group. Overall, 94 students (46 boys, 48 girls) participated in a goal-setting intervention program, whereas 75 students (46 boys, 28 girls, 1 did not declare gender) served as a control group. Students in the intervention group attended a five-lesson program linking basketball motor skills to goal setting. All lessons lasted 45 min. In addition to the practical skills of basketball, intervention group participants were introduced to goal-setting procedures. Through group learning and written worksheets, they

learned about the importance of setting goals. The SMART approach was used with respect to the goal-setting procedures (Cross & Lynch, 1988). More precisely, the first lesson of the intervention group was devoted to explaining to the students the principles of SMART goals. Students were informed about how to set Specific, Measurable, Attainable, Realistic, and Time-bound goals in physical education tasks. In this lesson, students also completed examples of SMART goals with respect to taught tasks (e.g., ball-shooting: number of successful shoots; ball-dribbling: time to complete a route between cones). Finally, in this first lesson, students performed a test in each basketball drill, which was used as the reference point. In the second lesson, students set SMART goals based on their performance on this test. Students were free to set their personal goals by themselves. Furthermore, to fully integrate goal-setting steps, students prepared at home a goal-setting plan for an aspect of their life (nutrition, physical conditioning, studying, etc.) and brought it back for discussion with the physical education teacher in the next lesson. This activity was optional and only students interested in this activity provided the plan to the teacher. Approximately half of the students of the intervention group engaged in this activity. In the following lessons, the teachers taught an exercise on a specific drill and then students worked on their goal for that drill. This process was repeated for all basketball drills tested in this study across the lessons. The same five-lesson basketball program without goal setting was taught to the control group. The practice teaching style (Mosston & Ashworth, 1986) was used as the teaching approach in the delivery of the basketball drills in both groups. At the beginning and end of the program, both groups responded to questionnaires concerning (a) perceived autonomy support in physical education classes, (b) autonomous motivation in physical education, (c) enjoyment during physical education, (d) vitality, and (e) intention, attitudes, and perceived behavioral control toward out-of-school physical activity. The participants were assured that their answers would remain confidential and that the data of the study would be used only for research purposes.

Measures

Perceived autonomy support in physical education classes. The Greek version of the Perceived Autonomy Support Scale for

Exercise Settings (Barkoukis & Hagger, 2009, 2013) was used to measure students' perceived autonomy support provided by their physical education teachers. This measure consists of 15 items and the Greek version has shown adequate psychometric properties (α = .82; Hagger et al., 2005). An example item is "I feel that my PE teacher provides me with choices, options, and opportunities to do active sports and/or vigorous exercise." Participants responded on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

Autonomous motivation in physical education. A modified for physical education version of the Perceived Locus of Causality Scale by Ryan and Connell (1989; Barkoukis & Hagger, 2009, 2013) was used to measure autonomous motivation in physical education. The scale measures four types of motivation through two items each: intrinsic motivation (e.g., "I participate in PE because it is fun"), identified regulation (e.g., "I participate in PE because I value PE"), introjected regulation (e.g., "because I will feel ashamed if I do not do PE"), and external regulation (e.g., "I participate in PE because important others want me to do PE"). Responses were anchored on a 4-point scale from 1 (*not true at all*) to 4 (*very true*).

Enjoyment in physical education. The respective dimension of the Greek version of the Intrinsic Motivation Inventory (IMI; McAuley, Duncan, & Tammen, 1989; Tsigilis & Theodosiou, 2003) was used to assess students' responses in physical education lessons. The enjoyment subscale comprises four items (e.g., what we do in physical education is very interesting) and the Greek version has shown acceptable internal consistency (α = .83–.88). Students responded on 5-point scales from 1 (*strongly disagree*) to 5 (*strongly agree*).

Vitality. Students' subjective vitality was used as an indicator of well-being. The Subjective Vitality Scale (Ryan & Frederick, 1997) was used. The scale comprised seven items (e.g., I feel energized) and the Greek version showed adequate internal consistency (α = .75; Vasileiadis, 2017). Participants rated their vitality on a 7-point scale (1 = *strongly disagree*; 7 = *strongly agree*).

Theory of planned behavior variables. The variables of the TPB were assessed based on Ajzen's (2002) recommendations. More specifically, intentions were estimated via two items (e.g., "I intend to do active sports and/or vigorous physical activities during my

leisure-time in the next 5 weeks"). Students responded on a 7-point scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Attitudes were assessed with four semantic differential bipolar adjectives (i.e., *bad–good*, *not enjoyable–enjoyable*, *useful–useless*, and *boring–interesting*). Students responded to the stem question, "Participating in active sports and/or vigorous physical activities during my leisure-time in the next five weeks is. . . ." Responses were anchored on 7-point scales from 1 (negative pole) to 7 (positive pole). Two items were used to measure subjective norms (e.g., "People important to me think that I should do active sports and/or vigorous physical activities during my leisure-time in the next 5 weeks"). Students rated their responses on 7-point scales from 1 (*strongly disagree*) to 7 (*strongly agree*). Perceived behavioral control was assessed via three items (e.g., "I feel in complete control over whether I do active sports and/or vigorous physical activities in my leisure-time in the next 5 weeks") on 7-point scales from 1 (*no control*) to 7 (*complete control*).

Statistical Analysis

Pearson's *r* correlation analyses were conducted to assess the relationships between all the dependent variables in the pre- and postintervention measurements. For the inspection of the intervention effects, a series of analyses of covariance (ANCOVA) with repeated measures were performed. In each analysis, the score of the first measurement was used as the covariate, the score of the second measurement was used as the dependent variable, and the group *(intervention-control)* was the independent variable.

Results

Descriptive Statistics

Table 1 shows the means, standard deviations, and internal consistency scores of the study variables. Based on SDT and TPB, almost all the correlations found in both measurements were expected (Table 2). Overall, there were positive associations among scales measuring "perceived autonomy support in physical education," "identified" and "internal regulation in physical education," "enjoyment" and "vitality in physical education," and "attitude," "intention," and "perceived behavioral control in physical activity." The strongest positive association was noticed in the postintervention

measurement between "intention" and "perceived behavioral control toward physical education" ($r = .69$, $p < .001$), whereas the strongest negative correlation was noticed between "perceived autonomy support in physical education" and "subjective norms toward physical education" ($r = -.24$, $p < .001$), also in the postintervention measurement (Table 1).

Effect of the Intervention on the Motivational Variables

In perceived autonomy support in physical education, after the adjustment for differences in the preintervention measurement, $F(1, 135) = 29.15$, $p < .001$, there were significant differences between the two groups in the postintervention measurement, $F(1, 135) = 8.99$, $p < .01$. The adjusted means showed that the intervention group students ($M = 5.46$, $SE = .09$) felt more autonomous in physical education classes than the control group students ($M = 5.01$, $SE = .11$).

For the motivational regulations, no differences were found between the two groups with regard to introjected and external regulations, and intrinsic motivation in physical education. Only for identified regulation in physical education, after the adjustment for differences in the preintervention measurement, $F(1, 166) = 4.34$, $p < .05$, were significant differences between the two groups found, $F(1, 166) = 17.98$, $p < .001$. The intervention group students reported higher scores in this scale ($M = 3.76$, $SE = .05$) than the control group students ($M = 5.42$, $SE = .06$).

Effect of the Intervention on the Outcomes of the Lesson

Regarding enjoyment in physical education, after the adjustment for initial differences, $F(1, 156) = 28.66$, $p < .001$), there were still significant differences between the two groups, $F(1, 156) = 26.09$, $p < .001$. The intervention group students declared that they enjoyed the lesson more ($M = 6.31$, $SE = .11$) than did the control group students ($M = 5.46$, $SE = .12$).

Regarding vitality, after the adjustment for possible differences in the preintervention measurement, $F(1, 133) = 12.33$, $p < .01$, there were still significant differences between the intervention and control groups, $F(1, 133) = 11.60$, $p < .01$. The intervention group students scored higher in this construct ($M = 5.67$, $SE = .09$) than the control group students ($M = 5.18$, $SE = .11$).

Table 1
Means, Standard Deviations, and Internal Consistency Scores

	Pre					Post				
	Intervention group		Control group			Intervention group		Control group		
Variable	***M***	***SD***	***M***	***SD***	**Alpha**	***M***	***SD***	***M***	***SD***	**Alpha**
1. Perceived autonomy support in PE	5.51	.64	4.95	.98	.86	5.55	.78	4.83	1.15	.89
2. Introjected regulation in PE	2.76	.66	2.82	.81	-	2.90	.61	2.74	.87	-
3. External regulation in PE	2.36	.74	2.78	.80	-	2.44	.60	2.75	.93	-
4. Identified regulation in PE	3.58	.55	3.64	.50	-	3.75	.39	3.43	.62	-
5. Internal regulation in PE	3.65	.55	3.44	.83	-	3.71	.40	3.51	.77	-
6. Enjoyment in PE	5.80	1.01	5.84	1.37	.84	6.30	.71	5.42	1.14	.87
7. Vitality in PE	6.09	.73	5.84	.95	.81	5.68	.75	5.03	1.05	.76
8. Attitude toward PA	6.46	.85	6.39	.88	.85	6.31	1.07	6.13	1.15	.81
9. Intention toward PA	5.82	1.40	5.76	1.44	-	6.11	1.09	5.52	1.57	-
10. Perceived behavioral control toward PA	6.04	1.02	5.90	1.08	.73	6.27	.96	5.63	1.16	.66
11. Subjective norms toward PA	3.06	1.31	4.13	1.67	-	2.96	1.62	4.32	1.66	-

Table 2
Correlations Between All the Dependent Variables Before (Upper Row) and After (Bottom Row) the Intervention

Variable	1	2	3	4	5	7	8	9	10	11	12
1. Perceived autonomy support in PE											
2. Introjected regulation in PE	−.03										
	.13										
3. External regulation in PE	−.18*	.34**									
	−.07	.43**									
4. Identified regulation in PE	.21**	.15	−.01								
	.35**	.40**	.18*								
5. Internal regulation in PE	.44**	.10	−.15	.46**							
	.39**	.02	−.17*	.42**							
6. Enjoyment in PE	.57**	−.07	−.05	.50**	.59**						
	.67**	.12	−.05	.47**	.68**						
7. Vitality in PE	.60**	.08	−.08	.47**	.58**	.74**					
	.63**	.27**	−.04	.55**	.57**	.74**					
8. Attitude toward PA	.51**	.11	.03	.37**	.44**	.47**	.63**				
	.32**	.10	.01	.31**	.19**	.34**	.34**				
9. Intention toward PA	.27**	.19*	−.04	.25**	.29**	.20**	.46**	.57**			
	.26**	.06	−.05	.28**	.18*	.29**	.41**	.65**			
10. Perceived behavioral control toward PA	.37**	.23**	.01	.22**	.24**	.18**	.38**	.60**	.62**		
	.33**	.06	−.08	.28**	.19*	.39**	.49**	.56**	.69**		
11. Subjective norms toward PA	−.17*	.17**	.28**	.03	−.16*	−.06	−.15	.09	.08	.15	
	−.24**	.18*	.25**	−.18*	−.11	−.13	−.18*	−.20*	−.20*	−.22*	

Note. PE = physical education; PA = physical activity.
*$p < .05$. **$p < .001$.

Effect of the Intervention on Leisure-Time Physical Activity Cognition

Similarly, with attitude toward physical activity in out-of-school settings in the postintervention measurement as the dependent variable, the analysis of covariance showed no differences between the two groups. In contrast, with no adjustment necessary for initial differences, $F(1, 168) = .65$, $p = .42$, the intervention group students scored significantly higher, $F(1, 168) = 8.02$, $p < .01$ ($M = 6.11$, $SE = .14$), in the scale measuring intention toward physical activity in out-of-school settings than the control group students ($M = 5.53$, $SE = .15$). Also, as expected, the intervention group students scored significantly higher, $F(1, 163) = 14.38$, $p < .001$, in the postintervention measurement ($M = 6.26$, $SE = .11$) regarding behavioral control toward physical activity in out-of-school settings than the control group students ($M = 5.63$, $SE = .12$). Adjustment for possible initial differences also was not necessary for this variable, $F(1, 163) = 3.48$, $p = .06$. Finally, with subjective norms in the postintervention measurement as the dependent variable, the analysis of covariance revealed that after the adjustment for possible differences preintervention, $F(1, 168) = 6.32$, $p < .05$, there were still statistically significant differences between the two groups, $F(1, 168) = 17.64$, $p < .001$. Control group students felt more pressure by significant others ($M = 4.19$, $SE = .19$) with respect to physical activity in out-of-school settings than did the intervention group students ($M = 3.07$, $SE = .17$).

Discussion

This study set out to examine the effect of a goal-setting intervention in physical education lessons. Guided from SDT and PBT and their integration, this study investigated the effect of goal setting on motivation indicators, students' experiences during physical education lessons, and students' beliefs toward leisure-time physical activity. The results of the analyses confirmed the study hypotheses about the positive effect of goal setting on the examined variables.

With respect to the first hypothesis, the results of the analyses support the positive effect of goal setting on perceptions of autonomy-supportive climate and autonomous motivation. Intervention group students reported higher perceptions of autonomy-supportive climate

and autonomous motivation in the postintervention measurement compared with the control group students. More specifically, differences between the groups were observed in identified regulation but not in intrinsic motivation. No significant differences were revealed for controlled motivation. Goal setting has been considered to involve processes that promote an autonomy-supportive climate (Vansteenkiste et al., 2004). This finding might be ascribed to the fact that goal setting allows students to work at their own pace and to make decisions during the learning process (see Grant, 2012). Therefore, students become more active agents during the lesson and have more opportunities for self-development. As a result, a lesson promoting these types of activities is perceived by students as highly autonomy supportive. The results of the study support this notion and indicate that goal setting can be used as a teaching practice and can effectively foster an autonomy-supportive climate.

With respect to motivation, goal setting can positively influence identified regulation. The increase on this motivational regulation can be ascribed to the fact that through the goal-setting lessons students were able to identify the benefits of physical education for personal improvement. Hence, students perceived that participating in the physical education lessons would help them achieve their personal goals. No effect was found on intrinsic motivation. This lack of effect is difficult to explain. It was expected that satisfaction of autonomy and competence needs through goal setting would produce an effect on intrinsic motivation. A plausible explanation for this lack of effect might be the reduced time students played during the lesson, which may counterbalance the need satisfaction effects. Still, this warrants more evidence, as need satisfaction was not measured in this study and students' playing time was not recorded. Furthermore, no intervention effects were found on extrinsic motivation regulations. This is consistent with Barkoukis, Tsorbatzoudis, and Grouios (2008) and Barkoukis, Koidou, Tsorbatzoudis, and Grouios (2012), who suggested that autonomous and controlled motivation are independent forms of motivation and an intervention fostering autonomous motivation may not influence controlled motivation. Instead, specific actions aiming to undermine controlled motivation should be implemented. In this sense, goal setting was not expected to influence controlled motivation being an autonomy-

supportive strategy. Nevertheless, the findings on the effect of the intervention on motivational regulations signal an important effect of the intervention on autonomous motivation, which is consistent with prior research. The findings also suggest that the use of autonomy-supportive strategies, such as goal setting, can promote autonomous forms of motivation (Barkoukis, Koidou, Tsorbatzoudis, & Grouios, 2010; Hagger & Chatzisarantis, 2009; Hagger et al., 2003).

Consistent findings were revealed with respect to the outcomes from physical education participation. Intervention group students reported higher enjoyment and vitality compared with control group students. Using goal setting seems to make the lesson more enjoyable as students work at their own pace and do not feel pressure due to social comparison. This is an inherent benefit of the goal-setting process, where according to goal-setting theory, when people set goals they demonstrate higher commitment toward the activity (Papacharisis et al., 2007; Vansteenkiste et al., 2004). The goal-setting approach increased students' perceptions of vitality. This finding illustrates that when students experience a new approach of teaching physical education that allows them to have choices and work at their own pace, they foster their own improvement, and their interest toward the lesson and physical activity renews. Overall, these findings align with SDT and goal-setting theory about the positive effects of goal setting, as an autonomy-supportive strategy, on cognitive, affective, and behavioral outcomes from lesson participation (Papacharisis et al., 2007; Vansteenkiste et al., 2004). The findings of this study clearly support previous theoretical evidence and suggest the use of goal setting can produce positive outcomes in physical education lessons.

The results of this study indicate that an autonomy-supportive strategy could increase leisure-time physical activity–related cognition. These findings align with the trans-contextual model of motivation (Barkoukis & Hagger, 2009, 2013; Barkoukis, Hagger, et al., 2010; Hagger & Chatzisarantis, 2009; Hagger et al., 2003), which suggests that the physical education lesson affects students' beliefs regarding leisure-time physical activity. The increase of leisure-time physical activity cognition can be ascribed to the increase in key motivation indices and affective responses during the lesson. More specifically, the increase in perceptions of autonomy-

supportive climate has been associated with increased leisure-time motivation and related cognition (Barkoukis & Hagger, 2013; Barkoukis, Hagger, et al., 2010). Furthermore, enjoyment has been found to influence such cognitions (Jaakkola, Yli-Piipari, Barkoukis, & Liukkonen, 2017; Yli-Piipari, Barkoukis, Jaakkola, & Liukkonen, 2013). Therefore, an increase in these variables induced by the intervention might have resulted in the increase on the scores of leisure-time physical activity cognition.

Overall, the findings of this study align with theoretical predictions and highlight the usefulness of goal setting as a strategy to promote autonomy support in physical education lessons. Despite the results being pretty robust, the study is not free of limitations. First, data were based on self-reports. Given the age of the participants, it is possible that they misunderstood questions or completed the survey in a socially desirable way. Although participants received instructions and were allowed to ask questions during survey completion and they were reassured about the anonymity of their responses, there is the possibility that they inflated the questions in a socially desirable way or were ashamed to ask for clarifications. Second, a follow-up measurement to examine the sustainability of the intervention effects was not performed. Nevertheless, the findings align with previous research and clearly demonstrate that the use of goal setting in physical education classes can improve students' perceptions of autonomy and lead to positive outcomes with respect to the lesson (i.e., can result in improved motor skill and fitness, motivation, and enjoyment and vitality) and leisure-time physical activity (attitudes, subjective norm, and perceived behavioral control and intentions).

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