

# Efectos de dos formatos instructivos, Educación Deportiva e Instrucción Directa, en la respuesta psicológica de estudiantes de secundaria

## Effects of two instructional approaches, Sport Education and Direct Instruction, on secondary education students' psychological response

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**Resumen:** El objetivo de este estudio fue examinar los efectos de dos formatos instructivos, Educación Deportiva e Instrucción Directa, en la respuesta psicológica de un grupo de estudiantes de secundaria. 217 (113 varones, 104 mujeres) estudiantes (12-17 años) de un colegio urbano (de 1º a 4º ESO) accedieron a participar. En cada nivel, todos los sujetos fueron distribuidos aleatoriamente en dos grupos de estudio: el grupo experimental experimentó Educación Deportiva y el grupo comparativo experimentó Instrucción Directa. Diferentes sub-escalas extraídas de varios cuestionarios (PLOC, BPNES, IMI, SGS-PE, PMCSQ-2) fueron usadas para medir los efectos del programa de intervención. Los datos fueron analizados utilizando el programa estadístico SPSS 19.0. Los resultados mostraron que el grupo de Educación Deportiva mejoró de manera significativa la motivación intrínseca, la autonomía, la competencia, el interés, el aburrimiento, la responsabilidad social, las relaciones sociales y el aprendizaje cooperativo. El grupo de Instrucción Directa mostró mejoras significativas solo en autonomía, responsabilidad social y aprendizaje cooperativo. La Educación Deportiva puede promover respuestas psicológicas adaptativas en adolescentes.

**Palabras clave:** necesidades psicológicas básicas, motivación intrínseca, metas sociales, aprendizaje cooperativo.

**Abstract:** The goal of this study was to examine the effects of two instructional approaches, Sport Education and Direct Instruction, in a large sample of Spanish secondary education students' psychological response. 217 (113 males, 104 females) students (12-17 years) from one urban, coeducational high school (grades 8-11<sup>th</sup>) agreed to participate. On each grade, all subjects were randomly distributed in two study groups: the experimental group experienced Sport Education, while the comparison group experienced Direct Instruction. Several subscales extracted from different questionnaires (PLOC, BPNES, IMI, SGS-PE, PMCSQ-2) were used to measure the effects of the intervention program. All data was analyzed using the SPSS 19.0 statistical program. Results showed that the Sport Education group significantly improved intrinsic motivation, autonomy, competence, interest, boredom, social responsibility, social relationship and cooperative learning. The Direct Instruction group showed significant gains only in autonomy, social responsibility and cooperative learning. Sport Education can significantly promote adaptive psychological responses in adolescents. **Keywords:** basic psychological needs, intrinsic motivation, social goals, cooperative learning.

### Introduction

For years, sport has been one of the dominant contents in physical education (PE). Unfortunately, some students' experiences have been so negative that many are not willing to practice outside school. In order "to educate students to be players in the fullest sense and to help them develop as competent, literate, and enthusiastic sportspersons", Sport Education (SE) was developed (Siedentop, Hastie & Van der Mars, 2004, p.7). Its basic elements are: seasons, affiliation, formal competition, culminating event, record keeping and festivity (see Siedentop, 1994 for a full description of each one of them). Over the last decade, its popularity among physical educators and students has experienced an exponential increase. Alexander and Luckman (2001) reported that from a sample of almost 400 PE teachers (primary and secondary) over 80 percent believed that SE generates more interest among students than other instructional models. One possible reason for this success could be the fact that

one of its goals is "to provide authentic, educationally rich sport experiences for girls and boys in the context of physical education" (Siedentop, 1994, p. 18). This idea seems very appealing to students and teachers alike. As a natural consequence of this interest, the model and its possible benefits have been increasingly examined. In the last decade, three major reviews have been conducted on SE: Hastie, Martínez and Calderón (2011), Araujo, Mesquita and Hastie (2014), and Evangelio, González-Villora, Serra-Olivares and Pastor-Vicedo (2016). Research topics that have emerged in this search include, among others, students' content knowledge ((Mahedero, Calderón, Arias-Estero, Hastie, & Guarino, 2015; Pritchard, Hawkins, Wiegand & Metzler, 2008), sport enthusiasm (Alexander & Luckman, 2001), sport competence (Araujo, 2015; Browne, Carlson & Hastie, 2004; Layne & Hastie, 2014); involvement and participation (Alexander, Taggart & Thorpe, 1998; Hastie, Farias & Gutiérrez-Díaz, 2015), fitness (Sluder, Buchanan, & Sinelnikov, 2009), social responsibility and empowerment (Hastie, Ward, & Brock, 2016; Kinchin & O'Sullivan, 2003), sport culture (Layne &

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Yli-Piipari, 2015) or motivation (Cuevas, García-López, & Contreras, 2015; Perlman, 2011; Perlman & Caputi, 2016).

Research has linked motivation and learning in PE settings, which has made the first one a focus of research; specially regarding the way personal and environmental elements involved in the teaching/learning process relate to student learning and achievement (Chen, 2001). There has been a call for studies on SE based in grounded theoretical models of student motivation in PE such as the self-determination theory (SDT) (Ryan & Deci, 2000). Basically, this theory identifies three types of behavioral regulation: intrinsic motivation, extrinsic motivation, and amotivation. Intrinsic motivation can be defined as doing an activity for its inherent satisfaction, which represents the highest degree of self-determined motivation. It has been confirmed as a determinant for positive, motivated behaviour in PE students (Mitchell, 1996). Therefore, it is the most interesting type of motivation for educators.

Intrinsic motivation has also been linked to individuals' psychological traits such as enjoyment (Deci & Ryan, 2000). Research tells us that intrinsically motivated individuals tend to show interest and experience enjoyment in the activity that they are performing (Deci & Ryan, 1985). Certainly, students tend to participate in an activity when they find it interesting and fun, when they do not feel bored while doing it (Ntoumanis, 2001). This is a key element, since research is telling us that student PE engagement declines as students progress through secondary education because they feel bored in their classes (López, López, & Díaz, 2015, 2016; Mowling, Brock, & Hastie, 2004). Boredom, or better its antonym enjoyment, can positively enhance young people's attitudes toward PE and, ultimately, physical activity participation' (McPhail, Gorely, Kirk, & Kinchin, 2008, p. 344).

Motivation, within the SDT, can be strongly influenced by three essential psychological needs that are directly linked to the students' social environment: autonomy, competence and relatedness (Deci & Ryan, 2000). Autonomy is the desire to be the source about one's own behaviour (Deci & Ryan, 1985) and it is experienced when one perceives his/her behaviour as being self-endorsed (Ryan & La Guardia, 2000). Competence is viewed as the student's perception of being able to show success or effectiveness within a particular context (Deci, 1975). Finally, relatedness refers to the feeling of being connected with significant others who care for them, or that one belongs in a given social setting (Vlachopoulos & Michailidou, 2006). Certainly, any factor in the social environment of the class that could contribute to a student's autonomy, competence, and relatedness has the potential to facilitate the development of intrinsic motivation (Vallerand, 1997).

Students have social reasons for trying to succeed academically too. The literature suggests that at least two social

goals are associated with achievement in education: social relationship goals, that refer to an individual's desire to form and maintain positive peer relationships in school (Patrick, Hicks, & Ryan, 1997) and social responsibility goals, that represent a desire to adhere to social rules and role expectations (Wentzel, 1991). Both of them are very important in PE, since it is a subject where social interactions among students are constantly present in tasks and games. Consequently, teachers' decisions regarding the social context of his/her class could be crucial for the development of students' social goals. Regarding these social interactions, cooperative learning can be defined as "students learning with, by, and for each other" (Metzler, 2005, p. 257) and according to Siedentop et al. (2004, p. 18), it is inherent to SE since 'the model is consistent with various forms of cooperative learning'. Certainly, students work in the same groups through the entire season, and they are given responsibility for performing several roles: coach, referee, equipment manager, etc that are beneficial for the group.

In recent years, there has been a call for studies that could assess the effects of SE on a large sample of coeducational classes (Wallhead & Ntoumanis, 2004), for studies that could focus on objective measures of students' perceptions of the model (Spittle & Byrne, 2009), for comparative studies between SE and other instructional models, with large data sets, and implemented in different sites of the world (Hastie et al., 2011).

Based on the aforementioned, the purpose of this study was to assess the effects of two instructional approaches, SE and Direct Instruction (DI), on students' psychological response. Our first hypothesis was that students in the SE group will improve their intrinsic motivation. The second hypothesis was that this same group of students will improve their basic psychological needs. The third hypothesis was that students experiencing SE will improve their interest/enjoyment and decrease their boredom. Our fourth hypothesis was that SE will improve students' social goals. Our fifth and final hypothesis was that students in the SE group will increase their cooperative learning.

## Method

### Participants

A quasi-experimental, repeated measures design was used. A total of 217 (males: 113, females: 104) students (12 to 17 years of age) from the same urban, coeducational high school (grades 8 to 11) agreed to participate. The school was located in a medium-class neighbourhood. None of the students had experienced SE before the beginning of the study. Intact classes were used in the research project. They were randomly distributed in two groups on each grade: one group was

taught using the SE instructional model, while the other one was taught using the DI model. Classes met 2 times a week for a total of 55 minutes each day. Each group participated in a 12-lesson unit on the sport of Ultimate-Frisbee.

### Intervention program

DI is probably the most widely used instructional method in PE. It is based on content/skill development and teacher-centred decisions (Metzler, 2005). Each session is characterized by an initial warm-up phase, a progression on the teaching of skills, techniques and tactics during the main part of the lesson, and a full game towards the end. Teachers are fully responsible for everything that takes place during the lesson. Students do not have to make decisions or engage in hardly anything beyond participation in the different tasks and games. Groups and/or teams change on a daily basis, and they are usually selected by the teacher. He/she maintains total control of the class through lesson/class management, and usually plays the role of referee during the end-of-the-class games or matches. To avoid a possible bias, we tried to develop a DI learning unit that could be appealing for the students. Therefore, teams were made up of a maximum of 5 players (to increase active participation time), and the number of matches played along the unit was similar to the SE group (students usually like this games and tend to be motivated by them).

The SE learning unit developed in this project included the six key structural elements of the model: affiliation, record keeping, formal competition, seasons, festivity, and a culminating event (Siedentop, 1994). Students' teams were selected by the teacher to ensure that all of them were heterogeneous regarding ability and gender. They were small (4-5 members) to maximize active learning time and maintained for the entire length of the unit to maximize the feeling of affiliation. Within these groups, roles such as player, referee, coach, captain, and equipment manager were played by all group members at some point during the unit. The roles included in this experience were limited, because researchers did not want to overwhelm the students with many duties (they were new to SE). The unit followed the classical three-phase format, but, due to time constraints, the initial teacher-led phase was limited to one session, the student-led activities and games and formal competition phase lasted 10 sessions,

and the culmination phase took place in the last and final session. The first phase was used to explain the SE and its main features: students' roles, record keeping, skill practice, formal competition, and culminating event. The second phase was considered the 'season' where each lesson had 5 parts: a warm-up phase led by a student, followed by a period of time where students could work on their skills or tactics (also led by a student) and one scheduled match (formal competition) where students could practice/apply the learned skills. These last two parts were repeated to capitalize on learning. Modified small-sided games (3x3, 4x4) were always played to maximize participation and skill practice. The last phase consisted of a culminating tournament where all teams played each other.

Two qualified PE teachers taught all the lessons of both instructional approaches (SE and DI). One was randomly assigned to teach grades 8-9, and the other one taught grades 10 and 11. By using the same teacher in the same grade to teach both groups, the researchers sought to reduce the "teacher effect" that may occur if different teachers teach different instructional approaches (Browne et al., 2004). Selection of these teachers was based on their desire to implement both models of instruction, as well as their teaching experience (more than 6 years). Both participating teachers underwent a specific seminar (carried by the researchers) on SE prior to the beginning of the whole experience.

However, to guard against potential bias, two of the researchers, who had more than 5 years of experience on theory and practice of the SE, carefully prepared all lessons for both instructional approaches, considering the resources available in the target-school. Similarly, the implementation of both learning units on each grade was closely supervised by all the researchers. Previous research works (Browne et al., 2004; Hastie et al., 2015; Perlman, 2011; Perlman & Caputi, 2016; Mahedero et al., 2016; Pritchard et al., 2008; Spittle & Byrne, 2009; Wallhead & Ntoumanis, 2004) were used as a framework for the development and implementation of both instructional approaches (table 1). In conclusion, researchers tried to establish trustworthiness of the SE and DI approaches through teacher preparation, reflective practice and comparison between planned materials and observation of implementation through video analysis (Hastie & Sinelnikov, 2006; Parker & Curtner-Smith, 2005).

Table 1. Comparison of Sport Education and Direct Instruction approaches.

Instructional component	Sport Education unit	Direct Instruction unit
Grades involved	8 <sup>th</sup> to 12 <sup>th</sup>	8 <sup>th</sup> to 12 <sup>th</sup>
Unit length	12 lessons	12 lessons
Number of lessons	2 per week (55 min. each)	2 per week (55 min. each)
Team formation	Heterogeneous, but evenly matched teams, that lasted the whole unit.	Randomly selected and changed continuously.
Student roles	Player, referee, coach, captain and equipment manager.	Player.
Game rules	Rules, team size, and playing area were modified to make them developmentally appropriate.	Rules, team size, and playing area reflected the adult indoor game of ultimate.
Game play	Modified games started on session 1 and throughout the rest of the unit. They took place in the middle and at the end of each session.	Games started on session 1 and throughout the rest of the unit. They took place in the final part of each session.
Formal competition	A formal schedule of games was developed and followed. Record keeping and publicity of results were maintained. There was a culminating festival.	Game scores were not kept officially.

Finally, in order to fit the space constrains of the school where the research project was going to take place, the indoor version of the sport of ultimate-frisbee was selected to be taught. Similarly, PE in Spain has certain time constraints, due to the current curriculum, that does not allow for long learning units. Therefore, both interventions lasted exactly the same length of time: 12 lessons. As mentioned earlier, researchers carefully monitored all sessions (videotaping 60% of them) to make sure that the cooperating teachers were following the prescribed tasks, activities, games, and instructional formats.

#### Data Collection

At pre and post-test, all participants were asked to complete the same specific questionnaire made-up of several subscales extracted from different internationally validated assessment instruments. All items were answered used a 5-point likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The goal was to assess several psycho-social constructs that are important in PE contexts.

*Intrinsic motivation.* To determine the influence of the intervention programs on students' contextual motivation towards PE, the intrinsic motivation subscale from the Perceived Locus of Causality scale was used (PLOC; Goudas, Biddle & Fox, 1994). This subscale consists of four items. The whole instrument was validated for Spanish PE contexts by Moreno, González-Cutre, and Chillón (2009).

*Psychological needs.* To determine the influence of the intervention programs on the students' innate psychological needs, the Basic Psychological Needs in Exercise Scale (BP-NES; Vlachopoulos & Michailidou, 2006) was used. It consists of three subscales that measure individuals' autonomy, competence, and relatedness. Each subscale has four items. This instrument was validated for Spanish PE contexts by

Moreno, González-Cutre, Chillón, and Parra (2008).

*Interest/enjoyment.* Buckworth, Lee, Regan, Schneider & Diclemente (2007) validated the adapted version of the Intrinsic Motivation Inventory (IMI; Deci & Ryan, 1985) for exercise settings. To determine the influence of the intervention program on the students' interest, the interest/enjoyment subscale was used. It consists of seven items. Following Hambleton, Merenda & Spielberger (2005), the subscale was translated into Spanish by a specialist, and then again into English to test their similarity with the original ones. Two experts assessed all the items, and they approved their adequacy to measure interest/enjoyment in Spanish secondary education contexts.

*Boredom.* To determine the influence of the intervention programs on the students' affective responses, three items developed by Duda, Fox, Biddle, and Armstrong (1992) to measure boredom were used. Cronbach's alpha coefficient was .70, showing that the items have acceptable internal consistency. Again, we followed Hambleton et al.'s (2005) procedures to adapt the subscale to Spanish contexts.

*Social goals.* Guan, McBride & Xiang (2006) validated the Patrick et al.'s Social Goal Scale (1997) to high school students in PE settings (SGS-PE). It was validated for Spanish contexts by Moreno, González-Cutre, and Sicilia (2007). It has eleven items: five for responsibility and six for relationship.

*Cooperative learning.* To determine the influence of the intervention programs on this specific element of the students' perceived motivational climate, the cooperative learning subscale from the Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2; Newton, Duda & Ying, 2000) was employed. It has four items. The instrument was validated for Spanish PE contexts by Gonzalez-Cutre, Sicilia, and Moreno (2008).

## Procedure

Before collecting any data, investigators explained to all participants (students, teachers and administrators) the study to be conducted. Prior to the beginning of the intervention, a written consent, approved by the researchers' University Ethical Advisory Committee, was obtained from all participants. All questionnaires were administered by two of the researchers during regularly scheduled PE classes. Prior to questionnaire administration, the students were told that their responses would be kept confidential. They were also informed that their teachers would not have access to the

answers. Researchers encouraged students to respond as truthfully as they could, highlighting that their answers would not influence their PE grades.

## Data analysis

All gathered data were analyzed using SPSS 21.0 (IBM, Chicago, IL). A pre-test reliability analysis of all subscales was conducted to determine their consistency in the context of our research project. All of them yielded Cronbach's alphas values  $\geq .70$  (table 2) which are considered acceptable (Vincent, 2005).

Table 2. Descriptive statistics of the dependent variables.

Measure	Subscale	$\alpha$	Condition	Pre-test		Post-test		$f$
				M	SD	M	SD	
PLOC	Intrinsic Motivation	.77	DI	4.01*	.85	4.07	.73	
			SE	3.81	.75	3.95*	.76	
BPNES	Autonomy	.78	DI	3.29	.89	3.55*	.79	.16
			SE	3.13	.80	3.34*	.75	
	Competence	.78	DI	3.85	.68	3.94	.65	.26
			SE	3.73	.77	3.88*	.69	
IMI	Interest/ enjoyment	.83	DI	4.06	.77	4.18	.67	.09
			SE	4.02	.78	4.16	.66	
BOREDOM	Boredom	.81	DI	3.83	.82	4.01	.62	.16
			SE	3.79	.66	3.91*	.66	
SGS-PE	Responsibility	.71	DI	1.59	.92	1.47	.67	.03
			SE	1.64	.85	1.49*	.64	
	Relationship	.78	DI	4.23	.53	4.36*	.48	.06
			SE	4.29	.53	4.39*	.47	
PMCSQ-2	Cooperative Learning	.76	DI	4.39	.56	4.46	.47	.04
			SE	4.42	.48	4.48*	.63	
			DI	3.73	.88	3.94*	.73	
			SE	3.76	.79	4.04*	.61	.14

\* $p < .05$ .  $M$  = Mean,  $SD$  = Standard Deviation,  $f$  =  $MSE - MDI / SDDI$  (Glass et al., 1981)

## Results

First, exploratory analyses were conducted to establish whether data met parametric assumptions. The Kolmogorov-Smirnov test showed that most variables (Sig.  $< .05$ ) were not normally distributed in any of the study groups (DI and SE) of all the courses/levels included in this project (grades 6-11). Therefore, from this point, non-parametric tests were used to analyze gathered data.

In the pre-test, initial homogeneity between groups was assessed using the Mann-Whitney U test on every dependent variable: intrinsic motivation, autonomy, competence, rela-

tedness, boredom, social responsibility social relationship, and cooperative learning. Results showed that the DI group had initial higher scores only in one variable: Intrinsic Motivation ( $p < .05$ ). Therefore, the homogeneity between both study groups (DI and SE) could be considered very high.

In the post-test, the Mann-Whitney U test was used again to find significant differences between groups in every dependent variable: intrinsic motivation, autonomy, competence, relatedness, boredom, social responsibility social relationship, and cooperative learning. Results showed that the DI group had final higher scores only in one variable: Autonomy ( $p < .05$ ).

Pre and post-test descriptive statistics on all subscales were also calculated (table 3). The Wilcoxon Rank test was used to analyze the differences obtained within groups. Significant pre-post intervention differences ( $p < .05$ ) were found between the two groups on several dependent variables (table 3). Responsibility ( $p < .09$ ;  $p < .49$ ), cooperative learning ( $p < .04$ ;  $p < .00$ ) and autonomy ( $p < .02$ ;  $p < .00$ ) yielded significant increases from test 1 to test 2 on both treatment groups, DI and SE, respectively. Relationship, intrinsic motivation

( $p < .02$ ), competence ( $p < .02$ ), interest/enjoyment ( $p < .02$ ) and boredom ( $p < .03$ ) improved significantly only in the SE group after the intervention. Effect sizes ( $f$ ) were computed to quantify the difference between the two groups (Glass, McGraw & Smith, 1981). Results showed that  $f$  was weak in several variables and modest in others. Finally, no significant differences were found based on gender ( $p < .05$ ) or age ( $p < .05$ ) among groups.

Table 3. Wilcoxon Rank test pre and post-test results.

Measure	Subscale	Condition	Sum of positive ranks	Sum of negative ranks	Asymptotic significance	Z scores
PLOC	Intrinsic Motivation	DI	1988.50	1752.50	.610	-.511
		SE	1305.50	647.50	.020*	-2.331
	Autonomy	DI	2807.00	1288.00	.002*	-3.070
		SE	1387.50	442.50	.000*	-3.502
BPNES	Competence	DI	1693.00	1157.00	.154	-1.426
		SE	1095.50	389.50	.002*	-3.082
	Relatedness	DI	1818.50	1184.50	.105	-1.620
		SE	1458.50	752.50	.023	-2.277
IMI	Interest/ enjoyment	DI	2323.00	1418.00	.051	-1.953
		SE	2003.00	847.00	.002*	-3.072
BOREDOM	Boredom	DI	559.00	767.00	.232	-.989
		SE	197.00	469.00	.030*	-2.165
	Responsibility	DI	2009.00	994.00	.009*	-2.600
		SE	841.50	433.50	.049*	-1.995
SGS-PE	Relationship	DI	1708.50	1372.50	.400	-.841
		SE	1297.50	593.50	.011*	-2.558
PMCSQ-2	Cooperative Learning	DI	2588.50	1239.50	.004*	-2.876
		SE	1497.50	272.50	.000*	-4.665

\* $p < .05$

The data obtained was also modelled through the Generalized Estimating Equation (GEE) procedure to estimate the main effects and the interactions (Hardin & Hilbe, 2003). This method extends general linear model methods by estimating parameters, while controlling for the within-subject

correlated error present in longitudinal data (Hendricks, Wassell, Collins, & Sedlak, 1996). Table 4 shows the results of the analysis, which confirmed the significant increases found in several variables.

Table 4. Generalized Estimated Equations.

Measure	Subscale	Source	Wald chi square	df	Sig.
PLOC	Intrinsic Motivation	Intersection	23715.255	1	.000
		Factor	40.471	1	.000*
	Autonomy	Intersection	2560.436	1	.000
		Factor	46.731	1	.000*
BPNES	Competence	Intersection	22970.652	1	.000
		Factor	204.423	1	.000*
	Relatedness	Intersection	21718.119	1	.000
		Factor	1.436	1	.231
IMI	Interest/ enjoyment	Intersection	13305.505	1	.000
		Factor	52.153	1	.000*
BOREDOM	Boredom	Intersection	279.063	1	.000
		Factor	210.892	1	.000*
	Responsibility	Intersection	25117.225	1	.000
		Factor	22.214	1	.000*
SGS-PE	Relationship	Intersection	91272.228	1	.000
		Factor	11.050	1	.000*
PMCSQ-2	Cooperative Learning	Intersection	5183.179	1	.000
		Factor	7.176	1	.007*

\*p &lt; .05

## Discussion

The purpose of this study was to determine the effects of two instructional approaches, SE and DI, on students' psychological response. Our results showed an increase in the students' intrinsic motivation, autonomy, competence, relatedness, interest, boredom, social responsibility, social relationship, and cooperative learning after experiencing SE.

Regarding our first hypothesis, participants significantly increased their intrinsic motivation only after experiencing the SE Model. Students in the DI group did not show any significant difference after the intervention program. This finding lends support from previous studies in different educational contexts. Sinelnikov, Hastie, and Prusak (2007), in a sample of Russian students, found that, after experiencing a SE unit, they showed high levels of self-determined behaviour, and low levels of amotivation. Spittle and Byrne (2009), in a group of Australian boys and girls, also indicated that the group that experienced SE was more capable of maintaining higher levels of intrinsic motivation than the traditional approach group. Perlman and Caputi (2016) found that SE can decrease levels of amotivation in secondary education students. Finally, Perlman and Goc Karp (2010, p. 414), in a group of youngsters from the United States, also reported that their students "began to operate within introjected/identified regulation", moving towards a more self-determined behaviour, af-

ter experiencing SE. Our results agree with the ones obtained in these different research works, but it is the only one that specifically measured intrinsic motivation, which is the type of motivation that teachers would like their students to develop. These results show that SE can significantly foster adaptive motivational responses in Spanish students, which tend to lead to a better response in education. Authors such as Spittle and Byrne (2009) and Wallhead and Ntoumanis (2004) have indicated that the structural elements of SE could facilitate a task-involving climate in PE, which, in turn, would help the students become more self-determined (Mitchell, 1996). This is very important because Xiang, Lee and Shen (2001) believe that as adolescents progress through high school, they tend to become more ego-oriented. Instructional models such as SE can help modify this tendency. Our study included students from all high school grades, and all showed a significant change towards intrinsic motivation after experiencing SE.

Regarding our second hypothesis, our results showed a significant increase in two of three types of basic psychological needs after experiencing the SE model: competence and autonomy. Students in the DI group did not show any significant difference in competence and relatedness, but they did in autonomy. These results reinforce the same idea discussed in previous paragraphs: when students improve their autonomy and their feelings of competence, their behaviour becomes more intrinsically motivated and more self-referenced.

Vallerand (1997) considered that those factors in the social environment that fulfill students' needs for autonomy, competence, and relatedness will facilitate intrinsic motivation, whereas ignoring these needs will negatively affect students' self-determined motivation. Deci and Ryan (2000) are more emphatic when they state that an individual's psychological health requires that all three needs are satisfied. Our results reinforce the idea that SE can be one of these key factors to achieve this important goal. One reason that could explain these results is that "a primary goal of SE is to develop competent performers" (Siedentop, 1994, p. 4). Several studies have found significant gains in students' game performance (Araujo, 2015; Browne et al., 2004; Pritchard et al., 2008), knowledge and game skills (Layne & Hastie, 2014; Mahedero et al., 2015), and shot selection and execution, skills tests, and tactical awareness (Hastie, Sinelnikov & Guarino, 2009). These results show that a SE unit can increase students' feelings of competence. As stated by Perlman and Goc Karp (2010, p. 414): "...it is possible to support students' psychosocial needs within the SE by focusing on team affiliation, positive sporting behaviours...". These important features of SE seem to play an extremely important role in shifting the motivational response of students towards a more adaptive one, but we must add that playing different roles like coach, equipment manager or referee are extremely important to develop autonomy in our students. McPhail et al. (2008, p. 352) believe that: "SE promoted a lot of support for students' increased responsibility, with students appreciating and enjoying the autonomy they were encouraged to have by practicing a number of roles". When students are forced to work in small groups to teach other students, to set up the equipment necessary to perform a task or play a game, or to act as a referee in a game, they become active participants of the whole teaching-learning process. Their level of responsibility increases, and, at the same time, their feelings of independence from significant others augment (autonomy from the teacher or more qualified classmates), their sense of relatedness to others also are amplified because they must collaborate to achieve different goals, and, finally, their sentiments of competence as players, coaches or referees are also enhanced. Time of exposure to SE is a very important factor to improve the psychological needs previously mentioned. As described by Wallhead and Ntoumanis (2004, p. 15): "the lack of significant improvement in the SE students' perceived competence might be due to the relatively short duration of the intervention (8 1-hr lessons)". Certainly, studies where this instructional model was implemented just once a week did not yield significant gains in some of these basic psychological needs (McPhail et al., 2008). Perlman (2011) blamed on the short length of the intervention (20 lessons) the lack of change in students' competence. However, our results in a 12-lesson Sport Education unit do not support this idea.

Regarding our third hypothesis, our results showed a significant increase in the students' interest/enjoyment for the activity after the implementation of the SE unit. In this same trend, results showed a significant decrease in students' boredom. These results reinforce the same basic idea: students found the SE model more interesting. They enjoyed the same activity more when it was taught using SE, and, consequently, their feelings of boredom decreased. These results concur with others obtained in previous research (Alexander et al., 1998; Browne et al., 2004; Hastie et al., 2015; Wallhead & Ntoumanis, 2004), where the participants reported that they had experienced greater enthusiasm and enjoyment after a SE unit. Moreover, Grant (1992) registered positive effects of a SE intervention in unmotivated students that seemed to dislike PE. Teachers, when they are interviewed, believe that SE yields greater student interest in PE (Alexander & Luckman, 2001). These results reinforce a key idea discussed throughout the text: intrinsic motivation is extremely important because, among other reasons described earlier, it is positively related to students feeling less bored in PE (Ntoumanis, 2001). Deci and Ryan (1985) believe that when students are intrinsically motivated, they show interest in an activity, because they experience enjoyment (not boredom) and feelings of competence and control. Similarly, according to Wallhead and Ntoumanis (2004, p. 16): "ego orientation negatively predicts enjoyment in the SE curriculum", but, as discussed earlier, SE can facilitate a task-involving climate in PE (Spittle & Byrne, 2009), and consequently, students' enjoyment, and not boredom, as measured in our study. As discussed earlier, the amount of time students are exposed to SE is a very important factor in achieving significant gains in their interest, enjoyment or boredom. Different studies, where this instructional model was implemented just once a week, did not yield significant gains in any of these parameters (McPhail et al., 2008; Spittle & Byrne, 2009).

Regarding our fourth hypothesis, results showed a significant increase in students' social responsibility and social relationship goals after the SE intervention program. Students in the DI group significantly increased responsibility, but no changes were measured in relationship goals. According to Alexander and Luckman (2001) many teachers use SE to promote student's prosocial development via an increase of interactions among students or with teachers. This idea is shared by other researchers who believe that "...SE providing an environment which allows for positive social connections between peers and teacher..." (Perlman, 2011, p. 89). Certainly, our results support these ideas and they are in line with previous studies (Hastie et al., 2016; Kinchin & O'Sullivan, 2003). SE's key structural elements, such as small group work or differing student roles, make possible the development of these social goals. Creating a student-centred environment in PE helps students build up

a stronger feeling of ownership for their learning. When students are held responsible for teaching other classmates or setting up the necessary equipment to perform a task, their social responsibility and their social relationships increase. Moreover, even low-skilled students feel more acceptance within a SE framework (Carlson, 1995; Hastie, 1996) because students are divided in working groups and these remain unvarying for the entire season as in SE, developing a sense of belonging to their group. On the other hand, social relationship significantly increased only after the SE intervention. Previous research has shown that social responsibility goals are significant predictors of intrinsic motivation (Cecchini, Gonzalez, Mendez-Gimenez & Fernandez-Rio, 2011), and this bond is consistent with our results. Certainly, students under the influence of SE improved significantly their intrinsic motivation and their social goals (responsibility and relationship).

Regarding our final hypothesis, results from the present study showed a significant increase in students' feelings about their cooperative learning skills after both intervention programs. Regarding the SE group, this finding reinforces the idea that cooperative learning is an inherent component of this instructional model, and one of its main objectives: "work effectively within a group toward common goals" (Siedentop et al., 2004, p.11). Moreover, Hastie (1996) believes that SE represents a shift from just learning sport skills to work in cooperative groups, and this important change fosters enjoyment among students. Surprisingly, students in the DI approach also believed that they had improved their cooperative learning skills. Maybe, it is a question of what students think cooperative learning is. This instructional model is more than just 'help each other to get better and excel' (item 32, PMCSQ-2). Many teachers tend to consider cooperative learning, team work and group work synonymous terms, and research tells us that it is not true (Fernandez-Rio, 2009).

In conclusion, the implementation of an Ultimate-Frisbee learning unit within the SE framework yielded significant

positive results on intrinsic motivation, autonomy, competence, interest, boredom, social responsibility, social relationship and cooperative learning in a large sample of high school Spanish students. The present study also holds some limitations. First, it did not include a control group. However, the DI group could be considered a comparison group, since it is the most widely teaching method used in PE. A second limitation is that all the participants belonged to the same school. Future research should explore the effects of SE on students from different schools. Other research works should try to use other assessment instruments to obtain a wider view on student's motivation after experiencing SE or other instructional models. Similarly, SE should also be assessed in Primary Education students.

### Practical applications

The findings of this study have important practical applications. They have showed that a pedagogical model such as SE can significantly promote adaptive motivational responses in adolescents. It can improve students' basic psychological needs (autonomy and competence) which, in turn, foster more self-referenced behaviours. A unique element of our study is that it included a large sample of students from all different high school grades. Therefore, the results reported, and the benefits explained, apply to a wide age range within the adolescence framework and across different high school levels. Structural elements of this model such as affiliation, small group work, or role playing play an extremely important role in shifting the motivational response of students towards a more adaptative one through the development of students' autonomy and competence. Finally, another important issue is that students' boredom decreased after the implementation of the SE unit. Intrinsic motivation has been positively related to students feeling less bored in PE. Therefore, SE can make students' motivation more self-referenced, which, in turn, will make them enjoy PE more.

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