

1 **Effects of an intervention program with teachers on the development of**
2 **positive behaviours in Spanish physical education classes**

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1 **Effects of an intervention program with teachers on the development of** 2 **positive behaviours in Spanish physical education classes**

3 *Background:* The physical education context has been emphasised as an ideal environment for
4 developing positive behaviours among students. Under the Positive Youth Development
5 paradigm, various initiatives have been conducted with the aim of promoting personal and
6 social responsibility among adolescents. Self-Determination Theory has been widely used to
7 analyse students' motivational processes during physical education classes.

8 *Purpose:* This study aimed to measure the effects of a multidisciplinary intervention with
9 teachers on the development of positive behaviours in physical education classes.

10 *Participants:* Twenty physical education teachers participated in the study ($M_{age} = 35$ years;
11 $SD = 2.32$) along with 777 of their students ($M_{age} = 12.81$ years; $SD = .93$). The teachers
12 (male = 16; female = 4) were between the ages of 29 and 48 ($M = 35.2$ years; $SD = 2.32$). The
13 students who participated in this study (male = 377; female = 400) were divided into 52
14 classes and were between the ages of 12 and 16 ($M = 12.81$; $SD = .93$).

15 *Research design:* A quasi-experimental design was used that consisted of a control group and
16 three groups in which an intervention was developed. In the control group, the teachers did
17 not receive any type of intervention; in the second group, the teachers received a training
18 program to develop strategies for supporting basic psychological needs and promoting
19 positive behaviours; in the third group, the teachers received a didactic unit to promote
20 positive behaviours; and in the last group, the teachers received a combination of the two
21 previous interventions.

22 *Data analysis:* A repeated-measures ANCOVA was used for every dependent variable
23 included in the study to analyse the effect of Group*Time interaction, including Gender and
24 Grade Level as covariates. The fixed effects caused by Intercept, Group, Time and the
25 Group*Time interaction were calculated using compound symmetry as the type of covariance
26 and restricted maximum likelihood as the estimation method.

27 *Findings:* By examining the differences between pre-test and post-test, it was determined that
28 in comparison with the students in the control group, the students from the three experimental
29 groups had generally improved scores on the variables related to positive behaviours, such as
30 perceptions of the teacher's support, as well as the development of the targeted behaviours.

31 *Conclusions:* These results provide information about the efficacy of an intervention program
32 with teachers that consists of strategies for developing positive behaviour and support for
33 basic psychological needs to promote the development of positive student behaviour.

34 *Keywords:* Intervention effects, self-determination, positive behaviours, adolescents.

1 **Introduction**

2 In recent years, public administrations have marked a clear path towards prioritising the
3 improvement of the educational process with the goal of creating a system that will allow the
4 adequate integration of new generations into society. In Spain, these efforts have been
5 emphasised because of the high rates of juvenile delinquency that have been reported in
6 various studies and that have focused attention on the increase in violent behaviour among
7 adolescents (Fernández, Bartolomé, Rechea, and Megias 2009).

8 To find a solution to this problem, numerous authors have highlighted physical
9 education (PE) classes as the ideal environment for developing positive behaviours such as
10 respect for others, self-control and cooperation among adolescents (Armour, Sandford, and
11 Duncombe 2013; Holt, Sehn, Spence, Amanda, and Ball 2012). The purely mechanical vision
12 of PE has been left behind in the interest of a more integral perspective that encourages not
13 only biological improvements but also the adoption of certain values and attitudes. In this
14 way, PE classes offer the potential to reduce violent behaviours in the student body because
15 of the unique interrelation they create among students (Armour et al. 2013).

16 From this integral perspective on PE, many authors have studied intervention
17 programs that adopt the paradigm of Positive Youth Development (PYD) as a theoretical
18 framework (Fraser-Thomas, Côté, and Deakin 2005; Larson 2000; Lerner, Almerigi,
19 Theokas, and Lerne 2005). This perspective affects the development of certain skills and
20 attitudes among adolescents that enable their adequate transition to adulthood with the goal of
21 becoming healthy, responsible people who care about others (Damon 2004). Within the
22 paradigm of PYD, the Five Cs model (Lerner, Lerner, et al. 2005) suggests five factors as
23 determinants of positive development: competence, confidence, connection, character, and
24 caring. Although PYD is not a model specifically created for the PE and sports contexts,

1 various authors have taken this perspective as a foundation to develop their training
2 programs.

3 Following also the PYD perspective, the Personal and Social Responsibility Model
4 (Hellison 2003) has applied it within the context of PE and sports and made it a determinant
5 in the development of different international initiatives. This model was developed with the
6 purpose of instilling personal and social responsibility among youth at high risk of social
7 exclusion, providing a framework to strengthen responsibility among youths as they complete
8 sports activities and transferring this behaviour to other life contexts. This model has been
9 implemented in the context of PE in different countries.

10 For example, Wright and Burton (2008) developed a 20-lesson program based on the
11 Hellison model in the United States. The participants were 23 African American students in
12 an urban high school, with a mean age of 14.8 years. The authors tested the effectiveness of
13 the intervention to promote five skills: (a) establishing a relevant curriculum, (b) navigating
14 barriers, (c) practicing life skills, (d) seeing the potential for transfer, and (e) creating a
15 valued program (how the program became valued in the school). Gordon (2010) analysed the
16 effects of a six-month program teaching personal and social responsibility with 93 students
17 (13-15 years of age) in a New Zealand secondary school. The results highlighted the
18 effectiveness of the program to improve the students' social and personal responsibility,
19 while not achieved a significant improvement in transfer to other contexts of life.

20 Specifically in Spain, Cecchini and collaborators (Cecchini, Montero, Alonso,
21 Izquierdo, and Contreras 2007; Cecchini, Montero, and Peña 2003) developed an intervention
22 program consisting of 10 sessions with students between the ages of 12 and 14 years aimed at
23 social and personal improvement as well as a teacher training on didactic strategies to
24 encourage social and personal responsibility. These authors demonstrated that the students in
25 the experimental group increased their perceptions of self-control and fair play behaviours in

1 comparison with the control group. In a different vein, Escartí and collaborators (Escartí,
2 Gutiérrez, Pascual, and Llopis 2010; Escartí, Gutiérrez, Pascual, and Marín 2010)
3 demonstrated the effects of an intervention program based on the Hellison model with
4 students aged 11 to 14 years. The program included a block of content consisting of 30
5 sessions aimed at developing social and personal responsibility in addition to a 30-hour
6 teacher training to implement a set of activities aimed at instilling social and personal
7 responsibility. The analysis of their results shows that students in the experimental group
8 significantly increased their social and personal responsibility during PE classes in
9 comparison with the control group.

10 These initiatives prove the effectiveness of an intervention that combines a set of
11 training sessions and teacher training to implement teaching strategies that encourage positive
12 development. However, none of the previously described studies considers the influence of
13 motivational processes in the development of positive behaviours during PE classes. Along
14 this line of thinking, studies have analysed the contextual conditions that provide ideal
15 learning environments for positive student development through PE and have highlighted
16 motivational processes as a key element in the achievement of positive student development
17 (Armour et al. 2013; Holt et al. 2012). In particular, Ward and Parker (2013) conducted a
18 case study with 23 participants that aimed to analyse the atmosphere created in a program for
19 adolescent positive behaviour through basketball. The qualitative analysis indicated that
20 adolescents highlighted autonomy, competence, relatedness and enjoyment as key elements
21 in promoting their acquisition of adaptive behaviours.

22 To address these contextual determinants, the present study is based on the postulates
23 of Self-Determination Theory (SDT: Deci and Ryan 2000; Ryan and Deci 2000). SDT
24 explains that in order for people to start and remain in a determined activity, it is necessary to
25 fulfil three basic psychological needs in such a way that when they are satisfied, they amplify

1 intrinsic motivation, and when they are not satisfied, they lead to more extrinsic regulation.
2 These needs are called autonomy satisfaction (the will and wish to self-organise experience
3 and behaviour), competence satisfaction (the feeling of efficacy at executing a determined
4 activity) and relatedness satisfaction (the feeling of connection and belonging with everyone
5 else). In this sense, Skinner and Belmont (1993) elaborated a theoretical model in which they
6 explain a series of motivational strategies to encourage the satisfaction of these basic
7 psychological needs among students.

8 First, autonomy support strategies are based on adopting students' views, interests and
9 preferences, fostering their internal motivational resources and using a non-controlling
10 teaching style. Thus, an autonomy-supportive environment appears when students' interests
11 and preferences are considered and students are encouraged to take control of their behaviour
12 (Reeve, 2009). Competence support strategies aim to improve students' sense of control by
13 developing their perceptions of their abilities and offering them clear, comprehensible,
14 explicit and detailed information. A competence-supportive environment emerges when the
15 social context is structured, predictable, contingent, and consistent (Skinner & Edge, 2002).
16 Lastly, relatedness support strategies are aimed at encouraging the integration of all
17 classmates into the class group and improving the relationships between teachers and
18 students. Methodological strategies (e.g., varying the criteria for the creation of groups) or
19 content strategies (e.g., group dynamics, role play or trust activities) are examples of
20 relatedness-supportive teaching.

21 Even though numerous intervention studies have aimed to encourage positive
22 development through PE classes, few have confirmed (quantitatively or qualitatively) the
23 benefits of these classes on positive behaviour. To our knowledge, there is no concrete
24 evidence that confirms the effects of an intervention program that, in addition to specific
25 positive development strategies, includes a teacher training program on motivational

1 strategies to improve learning environments and, through the improvement of the teaching-
2 learning process, to facilitate the development of positive behaviour during PE classes. For
3 this reason, the present study makes an important contribution to explaining the learning
4 environments that can contribute to positive behaviours among students during PE classes
5 and confirming the effects of three different experimental conditions: a) a training program
6 for teachers on motivational (basic psychological needs support) and methodological
7 strategies (guided towards the development of positive behaviour in class) (Training Program
8 Group), b) a didactic unit composed of 10 sessions aimed at encouraging positive behaviour
9 (Didactic Unit Group), and c) a multifaceted training based on the combination of the two
10 previous interventions (Integral Training Group).

11 Thus, this present work seeks to prove the effects of these three interventions in
12 comparison with a group of teachers who did not receive any type of intervention regarding
13 the development of positive behaviour in students during PE classes and students'
14 perceptions of teachers' support of the identified behaviours. Specifically, this work
15 hypothesises that students in any of the three intervention groups would display increased
16 positive behaviours and increased perceptions of their teachers' support of these behaviours
17 in comparison with the control group. Additionally, we hypothesised that students in the
18 combined group would display the greatest increase.

19 **Method**

20 *Participants*

21 The participants in this study were 20 PE teachers and 777 of their students from 20 Spanish
22 public secondary schools. The teachers were between the ages of 29 and 48 ($M = 35.2$ years;
23 $SD = 2.32$); 17 of the teachers were male and 4 were female. All of the teachers had taught
24 for between 6 and 16 years ($M = 10.34$; $SD = 4.70$). The students who participated in this
25 study were divided into 52 classes and were between the ages of 12 and 16 ($M = 12.81$; $SD =$

1 .93); 377 were male, 400 were female, 423 were enrolled in year 8, and 354 were enrolled in
2 year 9. The participation rate was 95.5%. Thirty-five questionnaires were invalid because the
3 students did not complete one of the two measures.

4 Participating teachers were purposefully selected using the following criteria: 1)
5 minimum teaching experience of 5 years; 2) teaching a minimum of two classes with year 8
6 and/or year 9 students; and 3) having access to a classroom equipped with computer or to a
7 computer room with an internet connection to collect data. Regarding the conditions
8 assigned, teachers were selected based on their availability to attend the training program
9 (depending on the closeness between the teacher's hometown and the city where the program
10 was developed).

11 ***Measures***

12 *Positive behaviour.*

13 To measure the students' perceptions of the development of positive behaviour in PE classes,
14 the Questionnaire of Positive Behaviors in Physical Education was used (CCPEF: Sánchez-
15 Oliva, Sánchez-Miguel, Leo, Amado, and García-Calvo 2013). A Likert-type scales anchored
16 on two opposite poles was used, consists of 18 items that start with the phrase "In PE
17 classes..." and measure respect for rules, facilities and materials (4 items, e.g., "I don't
18 respect the facilities of the school" and "I respect the facilities of the school"); assessment of
19 effort (3 items, e.g., "Giving maximum effort is not worth it" and "The most important is to
20 give maximum effort"); tolerance and respect for classmates (4 items, e.g., "I have a hard
21 time accepting classmates with at a low level" and "I accept my classmates regardless of their
22 level"); cooperation (3 items, e.g., "I don't like to participate in group work" and "I love to
23 participate in group work"); and self-control (4 items, e.g., "When my patience is tested, I
24 become aggressive" and "When my patience is tested, I know how to control my impulses").
25 A confirmatory factor analysis was conducted that reflected the following adjustment

1 indexes: $\chi^2/df = 4.19$; $CFI = .96$; $TLI = .95$; $SRMR = .03$ y $RMSEA = .04$. The analysis of
2 internal consistency indicated Cronbach's alphas between .70 and .75 for the pre-test and
3 between .81 and .87 for the post-test.

4 Additionally, to assess students' perceptions of teachers' support of positive
5 behaviours, a teacher adaptation of the CCPEF was administered (Sánchez-Oliva et al. 2013).
6 Thus, the statement was changed to "In physical education classes, our teacher ... ", and each
7 of the items was replaced for this purpose. For example, the item "I don't respect the facilities
8 of the school" was replaced by "respects the facilities of the school" to create a questionnaire
9 grouped into five factors: respect for norms and materials support, assessment of effort
10 support, tolerance and respect for classmates support, cooperation support and self-control
11 support. Similarly, we conducted a confirmatory factor analysis that reflected the following
12 fit indices: $\chi^2/df = 6.81$, $CFI = .95$, $TLI = .94$, $SRMR = .04$ and $RMSEA = .06$. The analysis of
13 internal consistency revealed Cronbach's alphas between .72 and .78 in the pre-test measure
14 and between .85 and .88 for the post-test.

15 The answers to the previously mentioned questionnaires were evaluated with a Likert
16 scale ranging from 1 to 5, where 1 corresponded to completely agree with the "negative"
17 statement and 5 to completely agree the "positive" statement.

18 ***Procedure***

19 The present study was approved by the Ethics Committee of our university and was
20 supported by the Spanish Professional Association of PE Teachers. The main researcher
21 contacted the schools to explain the study's objectives and to ask for their participation in the
22 project. The schools obtained parental consent via an informed consent form because the
23 participants were minors. Prior to the data collection, we explained the meaning of each
24 questionnaire to the teachers. All questionnaires were completed in a classroom environment
25 before each class began. The questionnaires were completed online via Google Docs software

1 (see note 1), which participants could access via a link provided by the researchers. The PE
2 teachers emphasised to the student body that completing the questionnaire was completely
3 voluntary, that their responses would remain anonymous, and that they should answer
4 honestly regarding their feelings towards PE.

5 *Design*

6 A quasi-experimental design was used consisting of a control group and three groups in
7 which a type of intervention was developed and conducted during the second trimester of the
8 2011/2012 school year.

9 [INSERT FIGURE 1 HERE]

10 All participants underwent the initial measurement and completed the questionnaires
11 related to positive behaviour. Next, the teachers in the training program group and in the
12 integral training group participated together in a training program. The teachers in the
13 didactic unit group and the integral training group then conducted an elaborated didactic unit,
14 and the teachers in the control group and the training program group were instructed to
15 conduct a didactic unit planned for the “Games and Sport” content block (see note 2). During
16 the intervention period, continuous contact with the participating teachers was maintained
17 with the objective of facilitating the teaching task as they conducted the training program’s
18 strategies and the didactic unit’s contents. After the completion of the didactic unit, all
19 students completed the questionnaires again. Each investigation group’s experimental
20 conditions are explained in detail.

21 *Control Group.*

22 Because of the nature of the study, the teachers in the control group did not receive
23 any type of intervention. Furthermore, to prevent any Hawthorne effects (Adair, Sharpe, and
24 Huynh 1989), the study’s objectives were not explained to the teachers, who were instructed
25 to teach in a normal manner.

1 [INSERT TABLE 1 HERE]

2 *Training Program Group.*

3 The teachers in this group attended a training program taught by sport psychology and
4 educational psychology specialists. The program was based on the postulates of SDT and the
5 contributions of experimental works that had been previously developed (Aelterman et al.
6 2013; Cheon, Reeve, and Moon 2012; Holt et al. 2012; Tessier, Sarrazin and Ntoumanis
7 2010). The program lasted 15 hours, was grouped into three 5-hour sessions and built upon
8 two fundamental parts.

9 *Strategies for developing positive behaviour* (Holt et al. 2012). The combination of the
10 designed strategies was focused on encouraging the following behaviours: discipline,
11 tolerance and respect for classmates, sportsmanship, cooperation and teamwork, assessment
12 of effort, self-control and respect for norms and materials. For this reason, the teacher
13 training was divided into two parts: a first phase in which methodological strategies were
14 presented, and a second block in which different activities and dynamics for this effect were
15 presented. An example of strategy for promoting discipline and self-control was the
16 establishment of rules and routines accepted by the pupils. To encourage the tolerance, respect
17 for classmates and materials, several examples of behaviour modification programs were
18 shown. Further, to promote sportsmanship on pupils, different specific activities were
19 explained, as role playing or moral dilemmas. Lastly, several cooperative activities were
20 shown with the aim to promote cooperation in PE classes.

21 *Strategies to support basic psychological needs* (Aelterman et al. 2013; Tessier et al. 2010).
22 Initially, the postulates of self-determination theory were explained within the context of PE:
23 a) different types of motivational regulation; b) the importance of needs satisfaction to
24 promote self-determined motivation; c) the influence of social factors on needs satisfaction
25 and motivational regulation; and d) studies that demonstrated the incidence of motivational

1 process for several outcomes in the PE context. Next, different motivational strategies were
2 presented to promote learning environments that would support autonomy satisfaction
3 (leadership and teaching style, students' freedom to make decisions, and students'
4 responsibility to select tasks), competence satisfaction (adapting teaching to the student's
5 ability, the importance of feedback and reinforcement, and information focused on the
6 intrapersonal progress) and relatedness satisfaction (encouragement of integration, activities
7 to foster confidence and getting to know each other).

8 For every need, the following structure was used: 1) definition of the construct; 2)
9 Enumeration of motivational strategies to promote this need satisfaction; 3) Practical
10 application in PE context, namely, how develop these strategies in a PE class. Overall, the
11 training program had a high practical component (videos, group dynamics, role playing,
12 proposed practical cases...), and teachers always had opportunities to interact and ask any
13 question.

14 *Didactic Unit Group.*

15 The teachers who were part of this group individually received a didactic unit that consisted
16 of 10 sessions that were developed using the contributions of other authors to create activities
17 aimed at positive development (Holt 2008; Hellison 2003). Regarding the structure of the
18 content, the sessions were divided into three parts: 1) warm-up, 2) main part, and 3)
19 relaxation. With the objective of making the teachers' work easier, every task included a part
20 called "didactic intervention," in which the focus of each task was explained to the teacher in
21 detail along with the key aspects for achieving the desired objectives.

22 The didactic unit followed a logical evolution with regard to developing various types
23 of content, teaching certain content in a specific manner and teaching other content in a cross-
24 curricular manner. Thus, the first sessions were directed towards working on aspects such as
25 tolerance and respect for others through activities to develop confidence, relay games or

1 games that promote respect. Subsequently, the sessions continued with cooperative activities.
2 Finally, the last sessions focused on respect for rules and sportsmanship with the help of
3 activities that involved moral dilemmas and role play as well as a session in which groups of
4 students had to change certain rules of known sports (beforehand), explain the new rules to
5 their classmates and propose different practical situations encouraged by respect for the new
6 rules. At the same time, the didactic unit was focused on cross-curricular work on other
7 issues, such as discipline, self-control, respect for facilities and evaluation of effort.

8 *Integral Training Group.*

9 The teachers who belonged to this group received an integral intervention that
10 consisted of the previously explained training program and didactic unit. The teachers
11 initially attended the training program and then were supposed to develop motivational and
12 methodological strategies in an elaborated didactic unit.

13 ***Data analysis***

14 The data analysis was conducted with the statistical program SPSS 19.0 (Chicago, IL) and
15 was divided into two parts: a preliminary analysis and an analysis of the intervention effects.
16 First, the descriptive statistics of each variable in pre-test and post-test were calculated
17 according to the groups to which the students belonged. Then, with the objective of
18 identifying possible gender and grade-level effects, a multivariate analysis of variance
19 (MANOVA) was conducted to calculate the main effect of the interaction with an omnibus
20 test as well as a Bonferroni adjustment as a measurement of protection against Type I errors.

21 To analyse the intervention, a null model that included only the Time factor as a
22 within-subject variable was tested. The equation for the null model was as follows:

$$23 \quad Y = \mu + \text{Time} + S + E,$$

1 in which μ is the population mean of the dependent variable, Time is the effect of the within-
2 subject factor (Time), S is the variability between means of the subjects, and E represents
3 random errors.

4 Then, a repeated-measures ANCOVA was completed for every dependent variable
5 included in the study, including one between-subject factor (Group), one within-subject
6 factor (Time) and two covariates (Gender and Grade Level). The equation for Model 1 was as
7 follows:

$$8 \quad Y = \mu + \text{Group} + \text{Time} + \text{Group} * \text{Time} + S + \text{Gender} + \text{Grade Level} + E,$$

9 in which μ is the population mean of the dependent variable, Group is the effect of the
10 between-subject factor (Group), Time is the effect of the within-subject factor (Time), S is
11 the variability between the means of the subjects, Gender is the coefficient of the regression
12 between Gender and the dependent variable, Grade Level is the coefficient of the regression
13 between Grade Level and the dependent variable, and E represents random errors. Compound
14 symmetry was used as a type of covariance, and restricted maximum likelihood was used as
15 the estimation method. The fixed effects caused by Intercept, Group, Time and the interaction
16 Group*Time were calculated. Furthermore, the pairwise comparison of the marginal means
17 in each of the groups was analysed with the Bonferroni adjustment to determine the
18 differences between pre-test and post-test.

19 **Results**

20 *Preliminary Analysis*

21 Table 2 shows the descriptive statistics (mean and standard deviation) of the study variables
22 at pre-test and post-test according to the group to which the students belonged.

23 [INSERT TABLE 2 HERE]

24 Before the main analysis was conducted, the possible association between gender and
25 grade level and the dependent variables was analysed at pre-test. The MANOVA indicated

1 that the main effect for Gender caused a significant difference (Hotelling's $t = .01$; $F = .82$, p
2 $= .00$; partial $\eta^2 = .11$). Follow-up analysis showed that the girls, compared with the boys,
3 reported significantly higher scores in all cases ($p < .05$). The main effect for Gender also
4 caused a significant difference (Hotelling's $t = .03$; $F = .1.76$; $p = .04$; partial $\eta^2 = .03$).
5 Specifically, year 8 students had significantly higher scores ($p < .05$) for all dependent
6 variables with the exception of respect for classmates ($p = .41$), self-control ($p = .38$) and the
7 perception of respect for classmates support ($p = .08$) and perception of cooperation support
8 ($p = .12$). Based on these results, we decided to include gender and grade level as covariates
9 in the subsequent analyses.

10 ***Intervention Effects***

11 Table 3 shows the scores obtained in the analysis of variance that included the perception of
12 teacher support for positive behaviour as a dependent variable. The effects caused by the
13 Group factor (between-subject) indicated that students' perceptions of teacher support for
14 different positive behaviours, after averaging the pre- and post-test scores, varied according
15 to the study group. In the same way, the perception of respect for materials support,
16 cooperation support and self-control support also varied significantly according to the
17 moment (pre- or post-test). Further, the effects caused by the Group*Time interaction
18 indicated that there were differences in the pre-test and post-test scores for support regarding
19 materials, cooperation, respect for classmates and self-control. Lastly, with the objective of
20 verifying the effect of each intervention, the simple effects of each Group level were
21 compared and calculated (Heck, Thomas, and Tabata 2010). The results indicated a
22 significant decrease in respect for materials support, cooperation support and respect for
23 classmates support in the Control group, as well as a significant increase in cooperation
24 support and self-control support in the Training Program group.

25 [INSERT TABLE 3 HERE]

1 related to respect for materials and classmates at the beginning of the academic year and that,
2 on average, the teachers' developed strategies lost effectiveness as the course progressed. In
3 contrast, there were no significant variations among the students in the other groups in
4 respect for materials support and development of respect for materials. The studies by
5 Cecchini and collaborators (Cecchini et al. 2003; Cecchini et al. 2007) indicated that their
6 intervention program produced an improvement in respect for classmates, whereas students in
7 the control group did not change their behaviour. However, in these studies, the behaviours in
8 question were analysed based on three games of indoor soccer; consequently, the attitude in
9 question exclusively referred to behaviour in relation to this sport (kicks, tripping, holding,
10 blocking), which could have influenced the results.

11 The findings of the present study could be explained by the system of rules and
12 routines established by the teacher at the beginning of the academic year and, in particular,
13 the way these types of strategies are maintained over time. In this sense, one part of the
14 teacher training program was related to explaining the necessary determinants for
15 successfully following a system of rules and routines. It was emphasised that the fundamental
16 aspect of any system was that it should be "clear, fulfillable, consistent and accepted by the
17 students." If these criteria were not met, it is possible that as the sessions continued, teachers
18 had greater difficulty managing the students' attitudes and behaviours regarding the rules,
19 facilities and materials or respect for classmates (tolerance, help, empathy). Similarly, in the
20 elaborated didactic unit, various strategies to employ in each session were explained to
21 encourage adequate use of the materials, as was a pick-up system, in which the students were
22 part of the process. To conclude, the results were informative regarding the efficacy of the
23 developed intervention with the teachers, the training program and the didactic unit based on
24 the fact that the intervention groups maintained their perceptions with regard to respect for
25 materials and classmates and their perceptions of support from the teacher in addition to

1 developing the desired behaviours. By contrast, the control group showed a significant
2 decrease in these measurements.

3 When analysing the results for cooperation, the students in the integral training
4 program group experienced an increase in the perception of teacher support ($p < .001$). Thus,
5 the intervention program formed by the training and didactic unit caused the students to
6 perceive an increase in the resources allocated by the teacher to encourage cooperation.
7 Specifically, the training program included a specific section about strategies to promote
8 relatedness, which may have affected cooperation support. In addition, the didactic unit
9 included two specific sessions to promote cooperation, which could also have caused this
10 change in students' perceptions.

11 Similarly, all of the students showed a decrease in the perception of cooperation. This
12 result was somewhat surprising because not only did cooperation not improve (contrary to
13 our expectations), it decreased somewhat, a finding that should be explained based on
14 analyses of the group processes in sports teams because there are no studies in the context of
15 PE that support these results. It has been demonstrated in the sports context that variables
16 such as cohesion and cooperation tend to decrease as the season advances, primarily due to
17 conflicts that can appear because of interpersonal relationships (Leo, Sánchez-Miguel,
18 Sánchez-Oliva, Amado and García-Calvo 2012). A similar phenomenon can occur in PE
19 classes, reducing the level of interest in cooperation and working in groups as the academic
20 year advances. Additionally, given the characteristics of the training program and the didactic
21 unit, it is possible that some of the developed strategies and tasks intended to encourage
22 autonomy or group problem solving (role play, group discussion) caused small conflicts
23 among the students in a way that indirectly affected their tendency to cooperate.

24 Regarding the self-control behaviours, the three intervention groups showed increased
25 perceptions of teacher support of self-control behaviours, whereas the members of the control

1 group decreased their scores after the intervention period. However, only the didactic unit
2 group showed significantly increased scores ($p < .05$), demonstrating the efficacy of the
3 didactic unit to help teachers promote self-control behaviours. As explained in the method
4 section, the didactic unit focused on cross-curricular work on self-control. However, as
5 shown, the proposed activities aimed at improving respect, tolerance and cooperation also led
6 to a change in students' perceptions regarding the promotion of self-control. In contrast,
7 students in the training program group and the integral training group significantly increased
8 their scores on the development of self-control behaviours after the intervention period.
9 However, students in the control group also increased their scores, so it is not possible to
10 conclude that any interventions were effective. These results are not in line with those of
11 previous studies (Cecchini et al. 2003; Cecchini et al. 2007), which demonstrated positive
12 effects caused by a social and personal responsibility intervention on students' self-control.

13 The didactic unit alone was not sufficient to cause significant changes, although the
14 scores increased. The perceptions of students in the control group with regard to teacher
15 support of their self-control did not vary, but their perceptions regarding the development of
16 self-controlled behaviour during PE classes increased. In the case of students in the didactic
17 unit group, the lack of significant differences could be attributable to the fact that behaviour
18 modification programs are more effective to improve students' self-controlled behaviours
19 (e.g., contingency contracts, reward programs), and only the teachers in the training program
20 used these types of strategies.

21 Lastly, none of the experimental conditions in this study resulted in a change in
22 students' perceptions regarding the assessment of effort (perception of support and
23 development of the behaviour). In analysing each of the interventions, the didactic unit
24 addressed this variable in an integrative manner, meaning that there were no specific activities
25 designed to make students more conscious of the importance of putting maximum effort into

1 tasks independently. This is contrary to what occurred with the other behaviours and
2 attitudes, for which specific activities encouraged specific behaviours. With regard to the
3 training program, the strategies were included in the part that aimed to support competence
4 and that had a more methodological basis (intrapersonal evaluation, importance of feedback
5 and reinforcement). Although these strategies could have led the teachers to develop
6 strategies to make students aware of the importance of effort in any achievement context,
7 students did not perceive a change in their teachers' behaviour. Furthermore, it is logical to
8 think that attitudes towards the assessment of effort with respect to personal character are the
9 least likely to undergo significant changes, which as demonstrated by the analysis of the
10 results.

11 In summary, the results of the present work demonstrate the positive effects of a
12 multidisciplinary intervention with PE teachers. Students whose teachers had received some
13 type of intervention had improved perceptions of their teachers' support with regard to
14 developing and maintaining positive behaviour. More precisely, the developed intervention
15 with teachers had a greater effect on students' perceptions of their teachers' support for
16 adaptive behaviours, but this was not sufficient to cause relevant changes in the students'
17 perceptions of their development of the specific behaviours.

18 There are several reasons to explain this finding. On the one hand, it is possible that
19 the high number of strategies presented during the training program (motivational and
20 methodological) could difficult the development of this amount of strategies. Perhaps, future
21 studies could think divide the intervention in two part over time, with the aim to facilitate the
22 understanding of the strategies. Also, it is possible that the strategies developed by the
23 teachers (motivational strategies as well as the content of lessons) were not sufficiently clear
24 to cause a change in the students. For example, the teachers may have developed motivational
25 or methodological strategies to create suitable learning environments for positive

1 development (e.g., developing a program for behaviour modification aimed at respect for the
2 materials used), but the students, despite perceiving that the teacher was attempting to
3 improve these behaviours, may not have changed their perceptions with regard to applying
4 these types of behaviour. Furthermore, and as a primary explanation of the results, it is
5 possible that the short time period between the pre-test and post-test (5–6 weeks) was not
6 sufficient for the students to change their perceptions with regard to these variables. This
7 finding is similar to the findings from the study by Tessier et al. (2010), in which the
8 intervention used with teachers was not sufficient to cause a change in students' perceptions
9 in the majority of the included variables. It is possible that a more profound intervention,
10 combined with a new measurement at the end of the course, would have caused a greater
11 change based on the strategies applied by the teachers.

12 On the other hand, it is important to highlight the limitations of this study. The mayor
13 limitation is related to the follow-up of the methodological strategies developed by the
14 teachers. It might have been more useful to conduct a detailed follow-up of the
15 implementation of the motivational strategies worked on the training program, which could
16 have been systematically observed. However, the large number of participants, together with
17 the large geographic distance between the different schools, prevented an individual analysis
18 of the interpersonal styles developed by the teachers during the experimental phase, which
19 significantly reduced the previously mentioned limitation. Future studies should include an
20 observations of teachers' motivational and methodological strategies as to obtain a more
21 objective measure of their interpersonal style. Also future researches could consider to
22 analyze the results from a multilevel perspective, with the aim to test the level of variability
23 between students or/and between classes. Furthermore, it would have been of interest to
24 collect a follow-up measure at the end of the academic year with the objective of
25 demonstrating the degree of stability of students' perceptions following the different

1 interventions. Although this was the intention of the authors, the reduced number of hours
2 dedicated to PE as a subject and the fact that teachers had to dedicate two classes to the data
3 collection hindered the implementation of this follow-up measure.

4 In conclusion, the results of the present work show the efficacy of implementing a
5 training program with PE teachers aimed at positive youth development. We demonstrated
6 the suitability of PE for encouraging positive behaviours that can be applied to other life
7 contexts and having teachers develop specific strategies to create learning environments in
8 which the improvement of personal and social responsibility is encouraged.

9 **Notes**

10 1. Google Docs is software that allows users to create online surveys. After the questionnaire
11 is created, a URL is provided for students to access the questionnaire. Once the student has
12 completed the questionnaire, the data is stored in an Excel document and can be accessed
13 only by the administrator. This program was deemed suitable as it allowed multiple students
14 to complete the questionnaire at the same time.

15 2. In the Spanish educational system, there are four blocks of contents: physical condition
16 and health, games and sport, activities in nature and body language.

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Table 1.

Distribution of study participants.

	Control Group	Formation Group	Didactic Unit Group	Integral Training Group
Teachers ($n = 20$)				
Number of participants	$n = 5$	$n = 5$	$n = 5$	$n = 5$
Age ($M \pm SD$)	37.2 ± 6.38	33.6 ± 1.95	32.5 ± 2.65	33.8 ± 4.97
Teaching experience ($M \pm SD$)	14.50 ± 6.76	9.25 ± 2.22	8.05 ± 3.61	9.40 ± 3.85
Students ($n = 777$)				
Number of participants	$n = 269$	$n = 151$	$n = 146$	$n = 211$
Age ($M \pm SD$)	$12.68 \pm .84$	$12.85 \pm .89$	$12.76 \pm .79$	12.97 ± 1.11
Academic Year (Year 8; Year 9)	181; 88	71; 80	72; 74	99; 112

Note. M = Mean; SD = Standard Deviation.

Table 2.

Descriptive analysis.

	Control Group		Formation Group		Didactic Unit Group		Integral Training Group	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Perception of teacher support								
Respect to the materials Support	4.75(.49)	4.61(.70)	4.73(.57)	4.70(.56)	4.84(.37)	4.86(.43)	4.70(.51)	4.65(.70)
Cooperation Support	4.60(.62)	4.51(.73)	4.61(.57)	4.60(.65)	4.68(.58)	4.76(.53)	4.32(.72)	4.55(.79)
Respect for classmates Support	4.66(.55)	4.51(.77)	4.62(.62)	4.62(.69)	4.79(.50)	4.84(.48)	4.63(.51)	4.62(.72)
Self-Control Support	4.47(.65)	4.42(.76)	4.38(.68)	4.51(.66)	4.67(.56)	4.75(.54)	4.40(.63)	4.50(.79)
Assessment of effort Support	4.60(.60)	4.52(.79)	4.62(.63)	4.59(.68)	4.74(.54)	4.75(.54)	4.53(.62)	4.56(.80)
Development of positive behaviours								
Respect to the materials	4.67(.53)	4.63(.69)	4.75(.40)	4.75(.50)	4.73(.47)	4.78(.50)	4.64(.53)	4.63(.73)
Cooperation	4.34(.77)	4.28(.78)	4.37(.68)	4.36(.71)	4.54(.58)	4.51(.65)	4.28(.76)	4.24(.87)
Respect for classmates	4.36(.60)	4.35(.71)	4.32(.65)	4.33(.63)	4.47(.54)	4.54(.58)	4.19(.65)	4.25(.76)
Self-Control	3.93(.85)	4.07(.90)	3.89(.86)	4.07(.75)	4.07(.84)	4.20(.80)	3.80(.86)	3.93(.97)
Assessment of effort	4.66(.57)	4.60(.69)	4.67(.52)	4.71(.62)	4.73(.53)	4.75(.55)	4.55(.61)	4.61(.75)

Note. Standard Deviations are represented in the parentheses.

Table 3.
 Repeated measure ANCOVA of perception of teacher support for positive behaviour.

	Respect to the materials Support		Cooperation Support		Respect for classmates Support		Self-Control Support		Assessment of effort Support	
	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>
Fixed Effects										
Intercept	7054.49	.00***	4958.34	.00***	5637.00	.00***	4591.72	.00***	4934.57	.00***
Group	4.24	.01**	7.66	.00***	5.56	.00***	7.59	.00***	4.15	.01*
Time	5.30	.02*	3.84	.05*	1.09	.30	5.68	.02*	.44	.51
Group x Time	2.62	.05*	7.80	.00***	3.56	.01**	2.82	.04*	.98	.40
Gender	9.88	.00***	12.58	.00***	8.80	.00***	7.68	.01**	5.74	.02*
Grade Level	.38	.54	.77	.38	.45	.50	.02	.89	.06	.80
	I-J	<i>P</i>	I-J	<i>p</i>	I-J	<i>p</i>	I-J	<i>p</i>	I-J	<i>p</i>
Pairwise Comparisons (Post vs Pre)										
Control Group	-.14	.00***	-.09	.04*	-.15	.00***	-.05	.04*	-.08	.07
Formation Group	-.03	.54	-.01	.91	.00	.98	.13	.19	-.03	.67
Didactic Unit Group	.02	.74	.08	.18	.06	.33	.08	.03*	.01	.87
Integral Training Group	-.05	.24	.24	.00***	-.01	.85	.10	.23	.03	.62
Global Fit										
-2LL Null Model	2511.41		3095.86		2836.43		3093.15		3077.55	
-2LL Model 1	2512.85		3064.88		2829.17		3082.30		3083.41	

* $p < .05$, ** $p < .01$, *** $p < .001$; Note. I-J = Post-Test score – Pre-Test score.

Table 4.
 Repeated measure ANCOVA of perception of the development of positive behaviours.

	Respect to the materials		Cooperation		Respect for classmates		Self-Control		Assessment of effort	
	<i>F</i>	<i>P</i>	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>
Fixed Effects										
Intercept	7203.98	.00***	3727.37	.00***	4374.10	.00***	2058.06	.00***	5823.52	.00***
Group	2.66	.05*	5.89	.00***	7.17	.00***	3.38	.02*	2.95	.03*
Time	.00	.97	1.24	.27	1.47	.23	21.72	.00***	.26	.61
Group x Time	.88	.45	.16	.92	.72	.54	.17	.92	1.17	.32
Gender	19.01	.00***	15.30	.00***	25.00	.00***	3.42	.06	3.78	.05*
Grade Level	.86	.35	2.19	.14	1.17	.28	.18	.67	.06	.81
	<i>I-J</i>	<i>P</i>	<i>I-J</i>	<i>P</i>	<i>I-J</i>	<i>P</i>	<i>I-J</i>	<i>P</i>	<i>I-J</i>	<i>P</i>
Pairwise comparisons (Post vs Pre)										
Control Group	-.05	.19	-.06	.20	-.02	.66	.15	.00***	-.06	.19
Formation Group	.00	.97	-.01	.89	.02	.76	.19	.01**	.04	.51
Didactic Unit Group	.05	.30	-.03	.66	.06	.28	.13	.06	.02	.77
Integral Training Group	-.01	.82	-.03	.57	.06	.19	.12	.04*	.06	.25
Global Fit										
-2LL Null Model	2518.25		3322.25		2899.51		3752.28		2927.47	
-2LL Model 1	2516.22		3299.95		2873.35		3751.73		2841.68	

* $p < .05$, ** $p < .01$, *** $p < .001$; Note. I-J = Post-Test score – Pre-Test score.