

## Article

# Application of teaching personal and social responsibility model to the secondary education curriculum. Implications for students and teachers

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**Abstract:** The aim was to implement a value-promoting program (Teaching Personal and Social Responsibility, TPSR) and to assess its impact on students. Method: The program was applied for 8 months with 257 students from three secondary school centres (151 boys and 106 girls) with a mean of 15.97 years old (SD = 2.31). They were in three groups, 67 students (control group), 90 students receiving at least 60% of the total teaching time the value-promoting program (experimental group for global education, EG-GE) and 100 students (experimental group only for physical education, EG-PE). As main results improvements were found in the EG-GE for responsibility, psychological mediator index, self-determination index, resilience, climate and prosocial behaviours. In the EG-PE improved were observed in the self-determination index, classroom climate and prosocial behaviours. Female students and from EG-GE improve much more than males and from EG-PE. The outcomes in psychological variables can be higher if TPSR is applied to the whole subjects apart from physical education. These results are even more pronounced for female students in personal and social responsibility. It is worth highlighting the importance of coordinating educational institutions to facilitate the involvement of the greatest number of teachers.

**Keywords:** Pedagogical model, physical education, school contents, methodology, psychology, motivation.

## 1. Introduction

The social demand asks education to provide students with tools to be able to adapt to the constant changes and requirements of education and of a society riddled with knowledge where autonomous work within a collaboration network is essential. Among the models that promote these values we can highlight Hellison's Teaching Personal and Social Responsibility model [1], generally applied to Physical Education (PE) and after-school activity contexts [2]. Don Hellison's scholarship made a lasting impact on the academic literature, policy, and practice of physical education and sport pedagogy, in the past, and nowadays [3].

The most current reviews [4-6], conclude this model in PE has a high number of evidence if its effectiveness to reduce aggressiveness, solve problems, improve responsibility, motivation. In addition, they suggest new lines should consider the possibility of being introduced in other school subjects to enhance the results found.

In this regard, studies such as Richards et al. [7] provide a list of strategies for promoting social and emotional learning with the TPSR and Gordon et al. [8] express their concern for the transfer of learning acquired by students beyond PE and sport. Wright et al. [9], conclude that TPSR could be applied in Secondary school curriculum, and in this line, Leo et al. [10], show the continuous professional development (CPD) as a possible solution for adapting the model to other subjects.

The first study that considered the use of TPSR in other subject was Escartí et al. [11], with primary school students, where the fidelity of TPSR was sought, concluding that, although worse values were obtained in the transfer and lifestyles promotion compared to other results found, they suggest the school curriculum as the ideal framework for the TPSR development, going beyond the PE subject alone.

Now, recent studies have revealed positive results after TPSR implementation in schools, not only in variables like motivation, responsibility, or autonomy, but also in classroom climate in primary and secondary school students [12]. Furthermore, this methodology is considered suitable for teachers from different subjects and useful to teach values and improve their lessons, being essential the teacher teamwork [13]. Therefore, responsibility promotion, could contribute to the improvement of other factors such as resilience, prosocial behaviours, violence perception and, consequently, classroom climate, factors that have been considered from various studies among others, as can be seen in the reviews [5,6].

Another important variable to take in mind is gender. The studies revealed that levels of personal and social responsibility increased both for male and female students after the TPSR model was applied [14], but differences were significant in boys compared to girls [15]. Following the study by Smith et al. [16], male students generally have higher satisfaction levels of autonomy, competence and social relatedness needs as well as in intrinsic motivation in relation to female students. However, the study by Manzano-Sánchez et al. [17] shows recently the differences relating to TPSR. They found that TPSR program can be used to improve the responsibility in both, but only female students improved their basic psychological needs and intrinsic motivation.

The present study, sought to follow the criteria for applying TPSR [5]; a sample size larger than 15 students, minimum duration of one academic year, applied at least twice a week, with adapted content and a good environment. In addition, as stated by Gray et al. [18], achieving pedagogical changes requires a commitment between student learning, values, and professional needs. Therefore, data are collected, both from students and teachers, in a quantitative and qualitative way, which, as proposed by Wright et al. [19], is essential to complement the study, compare the results and know the implications for students and teachers.

The main aims of the present study were to assess the feasibility from the students perspective and the effects of TPSR application to secondary education general context. Furthermore, this study sought to find the differences due to gender on responsibility, motivation, satisfaction of basic psychological needs, resilience, prosocial behaviours, violence and classroom climate, and to compare them with a PE-only intervention group (as it has been traditionally done for this model) and with a control group.

## 2. Materials and Methods

### 2.1. Design

Following Anguera et al. [20], a mixed method approach was applied based on qualitative (observational analysis during the model implementation and semi-structured interviews) and quantitative instruments (pre- and post-test using a non-equivalent control group).

The intervention program lasted for eight months, from the end of the first academic quarter along the second and third quarters. The contents were selected according to the current education laws in Spain [21], and they were designed different tasks for each subject to work every one of the responsibility levels (Table 1). Before and after the intervention, the students answered a questionnaire in two sessions. They were two lessons on two different days to prevent bias due to lack of time for questionnaire completion in a quiet environment during 30 minutes per session. The participants were requested to provide honest answers. Furthermore, a semi-structured interview was conducted at the end of the intervention with some of the teachers involved in the program.

**Table 1.** Task Examples in three different subjects.

	Physical Education	Spanish Language	Mathematics
<b>Level 1</b>	Play a basketball game where everyone has to touch the ball before throwing.	Syntax learning in groups of 4. Together, make 5 sentences, being able to not participate if they do not interrupt.	In groups of 6, play up the pencil with simple mathematical operations, not all of them being able to participate but always encouraging their classmates.
<b>Level 2</b>	Perform a strength and endurance circuit using the Borg scale according to the stand where they are (1 to 10).	Do morphology exercises with 3 levels of difficulty to solve, each student chooses the one that is a challenge for him or her.	Perform a series of exercises of second-degree problem equations where each one should try to do all the exercises they can, all adding a point for trying, which is put together to a collective marker for the whole class.
<b>Level 3</b>	Make a personal plan to work the stretching of a muscle group after carrying out an assessment.	Prepare an essay on any author of the literature of the generation of 98 and show it in class.	Based on what they have perceived as more difficult, do a work with a proposal to improve the content and example exercises (rule of 3, second degree equations, basic geometric problems...).
<b>Level 4</b>	Peer teaching: one student teaches another how to perform hand touch in volleyball correcting it after learning it.	In groups of 4, each one makes a part of a text comment and one is the leader who says what part each one does and presents it to the rest of the class.	In pairs, a student performs a math problem (calculation of areas) at home and then in the next lesson, he or she presents it to his/her partner and helps him/her solve it and his/her partner does the same with another topic (calculation of the hypotenuse).
<b>Level 5</b>	Carry out a handball championship acting as a referee with lower-grade.	With the youngest students, make a giant goose contest with language and literature questions where in pairs, the older students can help the Little ones but only with gestures.	In groups of 6, carry out a popular market with invented products where parents can go shopping and the students are the guides and workers.

## 2.2. Participants

Participants were selected based on accessibility and convenience. The following inclusion criteria were established: (a) to complete all test scales, (b) to complete the pre- and post-tests on both occasions, and (c) to complete at least 90% of the test items (excluding double answers). After applying the criteria and calculating Mahalanobis distance to remove outliers, the final sample consisted of 257 students. They were 67 in the control group (CG), 90 in the experimental group in global education (EG-GE)—application the TPSR in at least 60% of curriculum content, among others, Maths, Geography, Music, Language and Literature, Foreign Language—and 100% TPSR only in the PE (EG-PE). Groups were composed for accessibility and convenience. The sample was composed of 151 boys and 106 girls with mean age of 15.28 years old ( $SD = 3.20$ ). The distribution of age and

gender was similar in all the groups. On the other hand, 30 teachers participated in the study.

### *2.3. Procedure*

#### *Teacher specific professional development*

Teacher specific professional development is needed in order to implement any educational program [10]. All teachers held their lessons in their usual space in the corresponding classroom, using the gym or the school yard in the case of PE. Neither of them had previous experience with the intervention, except one PE teacher, receiving all of them a training course in TPSR as part of a school seminar. In this course, they received a new TPSR formation, similar but simplify to the first initial formation, and at the end of this formation, the teachers could ask their doubts.

Teachers were trained on TPSR following the suggestion by Pascual et al. [22] and other authors referenced in that research. We used a two-phase approach: (1) 5-hour seminar on the model theory and practice, where they were explained how to design climates in the classroom based on the model and they were provided with global and specific strategies for responsibility development, using a theoretical and practical master class, as well as individual and group works. They were also provided a “model guide” to review the different strategies discussed, as well as other strategies [23]. (2) Continuous training: during the program implementation (eight months), the main researcher met the teachers on several occasions and through different means, having a continuous contact and meeting with them on a weekly basis to share possible concerns and solutions. Sessions were implemented in the different subjects and one session was recorded and evaluated by the research team, who in week three provided a report of the session with suggestions for improvement. This sequence was repeated along the whole intervention, as well as quarterly meetings for teachers to discuss the intervention.

#### *TPSR intervention program:*

Hellison's program fully realized that getting students to become positive contributors to their community meant that experiences that engender a greater sense of being a responsible person had to be provided [24]. In this regard, Hellison proposed a structured session in five parts. In this study, we joined parts four and five: (1) Relational time: the teacher interacted with the students to create bonds with them, (2) Awareness talk: The teacher presented the academic and value goals of the session, according to the responsibility model level, (3) Activity plan: This was the largest part of the practical lesson, where responsibility strategies were integrated in the different tasks, (4) Group meeting and self-assessment: At the end of every session, teacher and students shared their perceptions with regard to individual and collective responsibility and behaviours, as well as the teacher's behaviour, pointing their thumbs up (positive evaluation), to one side (medium) or down (negative evaluation). Furthermore, these strategies were also applied in order to solve individual and collective conflicts, fully integrating TPSR in the lessons.

#### *Fidelity of implementation*

Hastie et al. [25] suggested that researchers should provide: (a) a rich description of the curricular elements of the teaching unit, (b) a detailed validation of the model implementation based on the pedagogical model, and (c) a detailed description of the program context to help the reader understand the research design and the results obtained. Elements (a) and (c) have already been described in the previous section.

To validate model implementation one session per teacher and month (two seasons in the first month) were recorded and analysed. Tool for assessing responsibility-based education (TARE) was used to evaluate strategies applied to teach responsibility [26].

Four observers analysed the presence or absence of the strategies applied by teachers during the lessons in 5-min periods. Teachers were filmed and they received a behaviour report and suggestions for improvement. In control and EG-GE group, two teachers were selected to represent these groups in the results (Table 2). They were selected at the beginning of the study engaging to make at least 1 record per month. The camera was installed in the classroom prior to the beginning of the study to familiarize students and avoid spontaneous behaviours. All teachers used at the end of the program all strategies. Inter reliability was carried out between the new experts and a researcher experimented in this kind of analysis, while the intra-observer was carried out analysing two different moments over 2 days, guaranteeing an agreement greater than 90%. The check list instrument (Table 2) was composed by the tool for assessing responsibility-based education [27]. The instrument was used to identify the responsibility elements respectively. Total agreements (TA) were calculated using the formula: number of total agreements (NTA) divided by agreements (A) plus disagreements (D) ( $TA = NTA / (A + D)$ ).

**Table 2.** Fidelity Implementation Instrument.

	EG-GE	EG-PE	Control
	class use	class use	class use
<b>“Modelling respect” (M).</b> Teacher models respectful communication. This would involve communication with the whole group and individual students.	1.00	1.00	0.97
<b>“Setting expectations” (E).</b> Teacher explains or refers to explicit behavioural expectations. These could relate to safe practices, rules and procedures, or etiquette.	0.78	0.9	0.76
<b>“Opportunities for success” (S).</b> Teacher structures lesson so that all students have the opportunity to successfully participate and be included regardless of individual differences.	0.79	0.7	0.87
<b>“Fostering social interaction” (SI).</b> Teacher structures activities that Foster positive social interaction. This could involve student—student interaction through cooperation, teamwork, problem solving, conflict resolution or debriefing.	0.65	0.92	0.04
<b>“Assigning tasks” (T).</b> Teacher assigns specific responsibilities or tasks that facilitate the organization of the program or a specific activity. This could look like taking attendance, setting up equipment, keeping score/records, or officiating a game.	0.67	0.81	0.02
<b>“Leadership” (L).</b> Teacher allows students to lead or be in charge of a group. This could look like demonstrating for the class, leading a station, teaching/leading exercises for the whole class, or coaching a team.	0.68	0.41	0.26
<b>“Giving choices and voices” (V).</b> Teacher gives students a voice in the program. This could involve group discussions, voting as a group, individual choices, students asking questions, making suggestions, sharing opinions, evaluating the teacher or program.	0.62	0.81	0.31

<b>“Involving students in assessment” (A). Teacher allows student to have a role in learner assessment. This could take the form of self- or peer-assessment related to skill development, behaviour, attitude, etc.,</b>	0.38	0.31	0.01
<b>“Transfer” (Tr). Teacher directly addresses the transfer of like skills or responsibilities from the lesson beyond the program.</b>	0.20	0.21	0.01
<b>Total</b>	64.1%	67.4%	37.1%

EG-GE = Experimental group in general education; EG-PE = Experimental group in physical Education

2.4. Measurements

A closed-question questionnaire was used in the present study. It was divided into two parts: The first one, for sociodemographic variables, and the second one, which included the different questionnaires used in the study:

(1) Personal and Social Responsibility Questionnaire (PSRQ): To measure personal and social responsibility levels. It was adapted for Spanish school context by Escartí et al. [28]. This scale consists of 14 items, seven to assess social responsibility and seven for personal responsibility. The answers were provided on a Likert-type scale ranging from 1 (totally disagree) to 6 (totally agree). Reliability in the pre-test was 0.89 for social responsibility and 0.86 for personal responsibility, while it was .085 for both in the post-test. Reliability of the complete scale was 0.91 in the pre-test and 0.90 in the post-test.

(2) Psychological Need Satisfaction in Exercise (PNSE): To measure the satisfaction of the need of competence, autonomy, and social relationships. The scale adapted for Spanish and to the educational context by Moreno et al. [29] was used. This scale consists of 18 items, six to evaluate each need: competence, autonomy, and relationships with others. These were preceded by the sentence “During my training...” and the answers were provided on a Likert-type scale ranging from 1 (False) to 6 (True). Reliability in the pre-test was 0.72 for autonomy, 0.73 for competence and 0.75 for relationships, while it was 0.76, 0.80 and 0.77, respectively, in the post-test. Moreover, the psychological mediator index (PMI) was applied to evaluate the three variables jointly, yielding an internal consistency of 0.85 in the pre-test and 0.86 in the post-test.

(3) Motivation toward Education Scale (in French, EME): To measure motivation from the most self-determined types to the most external causes and amotivation. The Spanish version of “the Échelle de Motivation en Education” validated by Núñez et al. [30] was used. The questionnaire consists of 7 subscales, called intrinsic motivation to know, to accomplish and to experience sensations, identified motivation, introjected motivation, external motivation and amotivation. The instrument is composed of 28 items preceded by the sentence “I go to school/high school because...” with a seven-point Likert-type scale, from 1 (totally disagree) to 7 (totally agree), and distributed into seven subscales, five of them containing four items and two of them containing three items. The internal consistency analysis yielded the following values in the pre-test: 0.82 for intrinsic motivation to know (0.81 post-test), 0.74 to experience (0.80 post-test), 0.84 to accomplish (0.85 post-test), 0.90 for general intrinsic motivation (0.92 post-test), 0.69 for identified regulation (0.71 post-test), 0.69 for external regulation (0.73 post-test), 0.80 for introjected regulation (0.82 post-test) and 0.78 for amotivation (0.75 post-test). Moreover, the self-determination index (SDI) was applied.

(4) Teenage Inventory of Social Skills (TISS): To assess prosocial and antisocial behaviours. It was designed by Inderbitzen et al. [31] and translated into Spanish by Inglés et al. [32]. The questionnaire consists of two subscales: prosocial values including positive

social behaviours such as cooperation, community participation, altruism or ability to express feelings, and antisocial values such as aggressiveness, low self-esteem, social anxiety, presumptuousness or insolence. A six-point Likert-type scale is used, from 1 (does not describe me at all) to 6 (totally describes me). Internal consistency was 0.88 in the pre-test and 0.87 in the post-test.

(5) Questionnaire of School Violence (Cuestionario de Violencia Escolar, CUVE): To evaluate violence perception. It was designed by Álvarez et al. [33]. Answers are provided on a Likert-type scale ranging from 1 (totally disagree) to 5 (totally agree). The questionnaire's total internal consistency was 0.97 in the pre-test and 0.96 in the post-test.

(6) Questionnaire to assess school social climate (CECSCE): To evaluate the climate perceived by students about their class, teacher and school. It was designed by Trianes et al. [34]. The questionnaire consists of two subscales called "Climate relative to the school", made of eight items, and "Climate relative to the teachers", composed of six items. A five-point Likert-type scale was used, ranging from 1 (totally disagree) to 5 (totally agree). The internal consistency analysis yielded a value of .81 for school climate and 0.81 for teacher climate in the pre-test, while it was 0.83 and 0.76, respectively, in the post-test. Internal consistency for general classroom climate (average of the two climate types) was 0.87 in the pre-test and 0.87 in the post-test.

(7) Resilience Scale (RS-14): It was designed by Sánchez-Teruel et al. [35] based on the scale created by Wagnild et al. [36] to measure the degree of individual resilience, considered a positive personality characteristic that enhances individual adaptation to adverse situations. The first factor, called personal competence, yielded an internal consistency value of 0.84 in the pre-test and 0.82 in the post-test. The second factor, acceptance of self and life, yielded 0.69 in the pre-test and 0.64 in the post-test. Internal consistency of the complete scale was 0.87 in the pre-test and 0.85 in the post-test.

## 2.5. Ethics

To conduct the study, written consent from the researcher's University Ethics Committee, the board of directors of the school and parents/guardians of each student was obtained. Students agreed to participate and were treated in agreement with the ethical guidelines of the American Psychological Association with respect to participant assent, parent/guardian consent, confidentiality, and anonymity. Informed consents were requested from the students and their parents. An introduction letter was addressed to three secondary schools and the approval by the ethics committee was obtained (1685/2017).

## 2.6. Data Analysis

Data analysis was conducted in two consecutive phases. The first phase concerned questionnaire analysis, for which IBM SPSS 22.0 software was used. TARE instrument's reliability was analysed by calculating its internal consistency in the pre- and post-test using Cronbach's alpha test. A MANOVAs was used to analyse the variables using group as fixed factor. Univariate contrasts were tested through a one-way ANOVA. The second phase involved teacher's behaviour analysis and was performed using Excel 2010 to analyse TARE frequencies and percentages.

## 3. Results

### *Students and teachers' questionnaires*

Table 3 shows in the pre-test analysis differences in autonomy between CG and EG-PE and between EG-GE and EG-PE; in personal responsibility between CG and EG; and

in violence between CG and EG-PE and between EG-GE and EG-PE. The EG-GE presented the lowest autonomy and highest violence levels, while the CG showed the lowest personal responsibility levels.

Post-test analysis among groups was performed (Table 3) and differences were found between the CG and the EG-GE in resilience and its three dimensions, competence and social responsibility. Significant differences between the CG and the EG-PE were only observed in intrinsic motivation (IM) to know. In any case, the results were in favour of the EG-GE or the EG-PE, both reaching higher values than the CG. Perceived violence values were lower in the EG-PE than in the other two groups (CG and EG-GE).

The pre- to post-test differences per group (Table 3) yielded in the CG there were only changes in PMI. In the EG-GE differences were found in IM to know, IM to experience, general IM, introjected regulation (R), resilience – acceptance, resilience – competence, total resilience, autonomy, competence, teacher climate, prosocial behaviours, social and personal responsibility, SDI, PMI and general climate. Finally, in the EG-PE differences were found in introjected R, external, amotivation, teacher climate, school climate, prosocial behaviours, SDI and general climate.

The interaction effect (group x time) analysis showed (Table 3) that the intervention had a significant effect in intrinsic motivation to know, intrinsic motivation to experience, intrinsic motivation to accomplish, introjected regulation, autonomy, school climate, personal responsibility, violence, PMI and general climate. Between the CG and the EG-PE: In introjected regulation, resilience, autonomy, personal responsibility, and PMI. Differences between the EG-GE and the EG-PE were only found in violence, in favour of the EG-GE.

**Table 3.** Intervention results.

		Pre-test		Post-test		Pre-post difference		Between-group difference of means		
		Mean	SD	Mean	SD	p-value	Cohen's D	diff	p-value	eTa
Group										
IM to know	Control	4.82	1.22	4.68	1.33	0.475	0.11	0.138	0.086	0.019
	Experimental	4.78	1.02	5.16	1.28	0.020*	-0.33	-0.382		
	PE Experimental	5.16	1.30	5.24	1.18	0.517	-0.07	-0.086		
	p-value + eTa	0.059	0.022	0.014*	0.033					
IM to experience	Control	3.95	1.34	3.74	1.44	0.340	0.15	0.215	0.065	0.021
	Experimental	4.02	1.13	4.42	1.50	0.021*	-0.30	-0.405		
	PE Experimental	4.35	1.32	4.58	1.32	0.142	-0.18	-0.231		
	p-value + eTa	0.079	0.020	0.001**	0.056					
IM to accomplish	Control	4.75	1.26	4.76	1.42	0.962	-0.01	-0.010	0.441	0.006
	Experimental	4.95	1.03	5.30	1.38	0.060	-0.28	-0.345		
	PE Experimental	4.98	1.38	5.27	1.14	0.057	-0.23	-0.289		
	p-value + eTa	0.470	0.006	0.021*	0.030					
General IM	Control	4.51	1.16	4.40	1.25	0.555	0.09	0.110	0.093	0.019
	Experimental	4.58	0.91	4.96	1.29	0.017*	-0.34	-0.377		
	PE Experimental	4.83	1.15	5.03	1.07	0.090	-0.18	-0.202		
	p-value + eTa	0.119	0.017	0.002**	0.048					
Identified R.	Control	5.34	1.01	5.26	1.27	0.692	0.07	0.076	0.304	0.009

Construct	Condition	Mean (SD)								
		Control	Experimental	PE Experimental	p-value	eTa	Control	Experimental	PE Experimental	p-value
Introjected R.	Control	4.97	1.37	4.65	1.57	0.229	0.22	0.321	0.028*	0.028
	Experimental	5.06	0.97	5.45	1.48	0.043*	-0.32	-0.400		
	PE Experimental	5.07	1.44	5.37	1.15	0.028*	-0.23	-0.303		
	p-value + eTa	.889	0.001	0.001**	0.055					
External R.	Control	5.73	1.02	5.82	1.05	0.637	-0.09	-0.090	0.652	0.003
	Experimental	5.79	1.03	6.07	1.01	0.056	-0.28	-0.280		
	PE Experimental	5.73	0.94	5.98	0.90	0.033*	-0.27	-0.246		
	p-value + eTa	0.910	0.001	0.304	0.009					
Amotivation	Control	2.17	1.34	2.02	1.24	0.480	0.11	0.142	0.764	0.002
	Experimental	2.39	1.01	2.11	1.47	0.155	0.22	-0.280		
	PE Experimental	2.28	1.45	1.94	0.97	0.042*	0.28	0.341		
	p-value + eTa	0.566	0.004	0.658	0.003					
Resilience – acceptance	Control	4.68	1.19	4.94	1.06	0.147	-0.23	-0.262	0.058	0.022
	Experimental	4.83	0.93	5.42	1.14	0.000**	-0.57	-0.588		
	PE Experimental	4.94	1.17	5.04	1.03	0.473	-0.09	-0.099		
	p-value + eTa	0.313	0.009	0.012*	0.034					
Resilience – competence	Control	5.00	0.93	5.10	1.03	0.487	-0.11	-0.108	0.041*	0.025
	Experimental	5.10	0.77	5.50	0.90	0.002**	-0.48	0.399		
	PE Experimental	5.32	0.89	5.29	0.83	0.811	0.03	0.026		
	p-value + eTa	0.050	0.023	0.025*	0.029					
Total resilience	Control	4.93	0.93	5.07	0.94	0.343	-0.15	-0.141	0.028*	0.028
	Experimental	5.04	0.74	5.48	0.89	0.000**	-0.54	-0.439		
	PE Experimental	5.24	0.89	5.24	0.81	0.992	0.00	-0.001		
	p-value + eTa	0.063	0.022	0.012*	0.034					
Autonomy	Control	3.39	0.65	3.06	0.77	0.009**	0.46	0.325	0.000**	0.073
	Experimental	3.35	0.69	3.70	0.81	0.002**	-0.47	-0.350		
	PE Experimental	3.70	0.80	3.59	0.73	0.256	0.13	0.103		
	p-value + eTa	0.002**	0.048	0.000**	0.105					
Competence	Control	3.64	0.67	3.57	0.81	0.581	0.09	0.070	0.050*	0.023
	Experimental	3.64	0.68	3.94	0.92	0.021*	-0.37	-0.300		
	PE Experimental	3.82	0.71	3.80	0.73	0.835	0.03	0.020		
	p-value + eTa	0.135	0.016	0.023*	0.029					
Social relationships	Control	4.00	0.76	3.78	0.86	0.142	0.28	0.225	0.087	0.019
	Experimental	3.93	0.58	4.07	0.82	0.170	-0.20	-0.142		
	PE Experimental	3.95	0.84	3.94	0.76	0.960	0.01	0.005		
	p-value + eTa	0.826	0.002	0.080	0.020					
Teacher climate	Control	3.62	0.75	3.43	0.83	0.141	0.25	0.197	0.000**	0.061
	Experimental	3.49	0.61	3.83	0.66	0.000**	-0.54	-0.342		
	PE Experimental	3.58	0.79	3.85	0.79	0.000**	-0.34	-0.271		

		p-value + eTa	0.458	0.006	0.001**	0.055				
School climate	Control	3.33	0.76	3.12	0.69	0.088	0.29	0.214	0.003*	0.045
	Experimental	3.30	0.58	3.45	0.83	0.126	-0.20	-0.145		
	PE Experimental	3.46	0.73	3.69	0.73	0.001**	-0.32	-0.232		
	p-value + eTa	0.259	0.006	0.000**	0.084					
Prosocial behav- iours	Control	4.46	0.71	4.33	0.70	0.318	0.17	0.122	0.016*	0.032
	Experimental	4.32	0.55	4.58	0.79	0.003**	-0.38	-0.260		
	PE Experimental	4.29	0.83	4.51	0.73	0.014*	-0.28	-0.219		
	p-value + eTa	0.314	0.011	0.117	0.017					
Social responsi- bility	Control	4.75	0.85	4.81	0.81	0.684	-0.07	-0.054	0.050*	0.023
	Experimental	4.74	0.70	5.13	0.82	0.000**	-0.52	-0.391		
	PE Experimental	4.99	0.89	5.05	0.80	0.546	-0.07	-0.062		
	p-value + eTa	0.076	0.009	0.039*	0.025					
Personal respon- sibility	Control	4.57	0.96	4.60	1.04	0.878	-0.03	-0.025	0.026*	0.028
	Experimental	4.74	0.72	5.12	0.88	0.002**	-0.47	-0.375		
	PE Experimental	5.03	0.92	4.98	0.82	0.622	0.06	0.048		
	p-value + eTa	0.003**	0.020	0.001**	0.050					
Perceived vio- lence	Control	2.19	0.85	2.33	0.92	0.365	-0.16	-0.139	0.185	0.013
	Experimental	2.44	0.61	2.32	0.72	0.237	0.18	0.128		
	PE Experimental	1.88	0.78	2.00	0.68	0.208	-0.16	-0.115		
	p-value + eTa	0.000**	0.045	0.004**	0.043					
SDI	Control	4.68	3.81	4.82	4.46	0.829	-0.03	0.140	0.310	0.009
	Experimental	4.37	2.91	5.76	4.85	0.022**	-0.35	-1.389		
	PE Experimental	5.10	4.07	6.16	3.39	0.023**	-0.28	-1.055		
	p-value + eTa	0.377	0.096	0.131	0.016					
PMI	Control	3.68	0.58	3.47	0.65	0.045*	0.34	0.207	0.001**	0.055
	Experimental	3.64	0.52	3.90	0.66	0.004**	-0.44	-0.264		
	PE Experimental	3.82	0.66	3.78	0.61	0.549	0.07	0.042		
	p-value + eTa	0.089	0.019	0.000**	0.082					
General climate	Control	3.46	0.68	3.25	0.66	0.077	0.31	0.207	0.000**	0.062
	Experimental	3.38	0.55	3.61	0.67	0.006**	-0.38	-0.230		
	PE Experimental	3.51	0.70	3.76	0.72	0.000**	-0.35	-0.248		
	p-value + eTa	0.391	0.007	0.000**	0.082					

Note: \*  $p < .05$ ; \*\*  $p < .01$ ; eTa = size effect; IM = intrinsic motivation; R = regulation; SDI = Self-determination index; PMI = Psychological mediator index.

On the other hand, differences between gender were checked using a multiple one-way Anova on the pre-test and post-test variables. In female students, only they had differences in pre-test on competence between EG-PE and EG-GE (in favour of EG-PE  $p = 0.032$ ). And there were differences in the post-test between CG and EG-GE in favour of EG-GE in IM to know ( $p = 0.004$ ), IM to experience ( $p = 0.003$ ), IM to accomplish ( $p = 0.017$ ), IM ( $p = 0.002$ ), introjected R ( $p = 0.001$ ), resilience - acceptance ( $p = 0.030$ ), autonomy ( $p = 0.000$ ), teacher climate ( $p = 0.021$ ), school climate ( $p = 0.035$ ), personal responsibility ( $p = 0.040$ ), IMP ( $p = 0.002$ ) and general climate ( $p = 0.012$ ). EG-PE group showed differences

with CG, in favour of EG-PE in IM to experience ( $p = 0.025$ ), autonomy ( $p = 0.002$ ), teacher climate ( $p = 0.002$ ), school climate ( $p = 0.000$ ) and general climate ( $p = 0.000$ ).

In male students, there were differences in pre-test between CG and EG-PE in favour of EG-PE on resilience - competence ( $p = 0.026$ ), total resilience ( $p = 0.026$ ), personal responsibility ( $p = 0.001$ ). There was one difference between EG-PE and EG-GE in favour of EG-PE in autonomy ( $p = 0.041$ ). And finally, there were differences among EG-GE and CG ( $p = 0.000$ ) and EG-PE ( $p = 0.000$ ) always in favour of EG-GE for violence. In post-test there were differences between EG-PE and CG in favour of EG-PE in introjected regulation ( $p = 0.037$ ), autonomy ( $p = 0.039$ ) and personal responsibility ( $p = 0.039$ ). On the other hand, EG-GE group showed differences with CG in favour of EG-GE in post-test in autonomy ( $p = 0.016$ ), personal responsibility ( $p = 0.012$ ).

#### 4. Discussion

The main aim of the present study was to examine the effects of TPSR model implementation in a secondary school general context on responsibility, motivation, satisfaction of basic psychological needs, resilience, prosocial behaviours, violence and classroom climate, compared with an EG-PE (this is how the model has been traditionally applied) and a CG and sought the differences according to gender.

From the questionnaire analysis it can be highlighted that the EG-GE experienced a statistically significant improvement in personal and social responsibility, suggesting that the model implementation duration was appropriate [37]. This also agrees with positive results in responsibility when the time of the study using TPSR is enough [38].

Besides, considerable improvements were found in the most self-determined motivation for both the EG-GE and EG-PE, as well as in satisfaction of basic psychological needs for the EG-GE. These results were similar to those obtained by Manzano-Sánchez et al. [17] in the most recent studies involving these variables in all educational context.

The TPSR model implementation also led to very positive results in prosocial behaviours, unlike the study by García-García et al. [39], where they found no improvement with the application of TPSR to this variable. Furthermore, general climate, especially classroom climate, improved substantially in the EG-GE and EG-PE. This was in keeping with other studies including this variable, like those by Manzano-Sánchez et al. [12]. The latter was the first to apply TPSR to all school subjects and found increases in the most self-determined motivation, autonomy and classroom climate, results that are very similar to those of the present study.

By contrast, violence decreased in the EG-GE but not to a statistically significant extent. More emphasis on this aspect would be needed in order to obtain an improvement in this variable. These authors found significant improvements in attitudes towards violence, social responsibility, competence, and relationships among participants. However, [39] found no significant improvement either in suffered or perceived violence.

Lastly, resilience is one of the major novelties of this study since no previous study had measured it after the application of TPSR or other educational programs. We believe TPSR may be effective to improve students' resilience. However, it would be essential to apply it in all school subjects, since no improvements were found in the group where it was applied in PE only.

According to gender, focusing on girls, both experimental groups improve IM to experience, autonomy and all climate-related variables. However, in EG-GE general IM, IM to know, IM to accomplish, introjected regulation, resilience-acceptance, personal responsibility and IMP are also improved. As for the boys, it should be noted that the EG-PE started out with higher levels of autonomy than the CG, while in the post-test there were significant differences for both the EG-PE and the EG-GE versus the GC. These differences are according to the study by Manzano-Sánchez et al. [17] where they showed benefits of TPSR program only in female students. On the other hand, this study saw differences in

personal responsibility after the program in male and female students as the same that in the present study, but not in social responsibility, probably because the most values of social responsibility are in the last level and it was applied at the end of the intervention. Showing the rest of the variables, female students improve the values of teacher and student climate in both groups, but only EG-GE group improve their resilience. In male students, there are not differences in these variables, only in violence in favour of EG-GE. This seems to go against the results by Sánchez-Alcaraz et al. [15] who looks that male students, improve the psychological measures in most part than girls.

Thereby, taking into account the results given the detailed analysis leads us to consider the importance of making the students aware of their behaviour in order to achieve measurable changes in their conducts (significant improvements in the different psychosocial variables produced over time in the experimental groups). Along the same lines, Manzano-Sánchez et al. [17] corroborate the importance of coordination and involvement of all teachers participating in the TPSR application. In addition, Martinek et al. [40], highlight that the future of TPSR must take into account the contributions of teachers and instructors in order to achieve adequate development and their commitment to give the best of themselves [40]. On the other hand, future studies can continue expanding the Hellison Model in international context since nowadays a total of 31 countries have reported some level of TPSR presence [41].

As one of the major limitations, we must mention the intentional sample selection based on convenience. Future research should include a follow-up on the students after the intervention, which would make it possible to ascertain whether the levels reached were maintained over time. The sample could also be expanded in similar and/or different contexts and with the same teacher. Prospective studies should consider involving families as the major determinant of student responsibility [42].

## 5. Conclusions

The use of TPSR with secondary school students during at least 60% of the total teaching time led to general improvements in responsibility, the most self-determined motivation, satisfaction of basic psychological needs, resilience, prosocial behaviours and classroom climate, as well as to a positive trend in perceived violence.

TPSR results can be optimised through application in the whole educational context, modifying the traditional PE-only implementation pattern, which produced positive results, but not in all variables under study. Considering gender, female students can have better results than male students, showing in both cases better results in a group with more subjects implementing TPSR than only in PE.

Future research lines could combine qualitative and quantitative instruments, as well as including other variables of interest following Vallerand's sequence. Furthermore, it could be interesting to examine whether causal relationships exist among the satisfaction of basic psychological needs, motivation and the variables analysed in the present study as social factors, where responsibility could be considered as the major triggering factor. On the other hand, following the study from [43, 44], hybridizing this model with others (e.g., Cooperative Learning or Game-Centred Approach) can help to improve the results.

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