Effects of Teaching Personal and Social Responsibility Model: systematic review and meta-analysis

Efectos del Modelo de Enseñanza de Responsabilidad Personal y Social: revisión sistemática y metanálisis

Pablo Navarro-Talón[1]
Encarnación Ruiz-Lara[1]
Noelia González-Gálvez[1]

[1] Facultad del Deporte, UCAM Universidad Católica de Murcia, Spain

Correspondence:
Encarnación Ruiz-Lara
erlara@ucam.edu

Short title:
Teaching Personal and Social Responsability

How to cite this article:
Navarro-Talón, P., Ruiz-Lara, E., & González-Gálvez, N. (2024). Effects of teaching personal and social responsibility model: systematic review and meta-analysis. *Cultura, Ciencia y Deporte, 19*(61), 2140. https://doi.org/10.12800/ccd.v19i61.2140

Received: 27 November 2023 / **Accepted:** 08 April 2024

Abstract

Teaching Personal and Social Responsibility (TPSR) model comes has been shown to be a crucial model to enable and promote the appropriate progress of students. The objective of this study is to evaluate the efficacy of the TPSR model on children and adolescents' physical education students. The study employed a systematic search of three major databases, up to 31 March 2022. This meta-analysis adhered to the PRISMA guidelines and it was registered at PROSPERO. The study quality was assessed using the PEDro score. The meta-analysis demonstrated that the TPSR model had a significant impact on all the investigated variables, namely, social responsibility (DEM = 1.62; $p < .001$), personal responsibility (DEM = 1.05; $p < .001$), sportsmanship (DEM = .66; $p = < .001$), autonomy (DEM = 1.18; $p < .001$), competence (DEM = 0.69; $p < .001$), social relations (DEM = 1.37; $p < .001$), intrinsic motivation (DEM = 1.48; $p < .001$), extrinsic motivation (DEM = - 0.34; $p = .002$), and demotivation (DEM = - .91; $p < .001$). The findings of this study indicate that the TPSR model has significant educational potential in the promotion of multiple variables, thereby enhancing the teaching-learning process and the holistic development of students of physical education.

Keywords: Physical education, pedagogical model, motivation, basic psychological needs, sportsmanship.

Resumen

El modelo de Enseñanza de la Responsabilidad Personal y Social (TPSR) se ha mostrado como un modelo crucial para posibilitar y promover el progreso adecuado de los alumnos. El objetivo de este estudio es evaluar la eficacia del modelo TPSR en niños y adolescentes estudiantes de educación física. El estudio empleó una búsqueda sistemática en tres bases de datos principales, hasta el 31 de marzo de 2022. Este meta-análisis se adhirió a la guía PRISMA y se registró en PROSPERO. La calidad del estudio se evaluó mediante la puntuación PEDro. El meta-análisis demostró que el modelo TPSR tuvo un impacto significativo en todas las variables investigadas, a saber, responsabilidad social (DEM = 1.62; $p < .001$), responsabilidad personal (DEM = 1.05; $p < .001$), deportividad (DEM = 0.66; $p = < .001$), autonomía (DEM = 1.18; $p < .001$), competencia (DEM = .69; $p < .001$), relaciones sociales (DEM = 1.37; $p < .001$), motivación intrínseca (DEM = 1.48; $p < .001$), motivación extrínseca (DEM = - 0.34; $p = .002$), y desmotivación (DEM = - .91; $p < .001$). Los resultados de este estudio indican que el modelo TPSR tiene un potencial educativo significativo en la promoción de múltiples variables, mejorando así el proceso de enseñanza-aprendizaje y el desarrollo holístico de los estudiantes de educación física.

Palabras clave: Educación física, modelo pedagógico; motivación, necesidades psicológicas básicas, deportividad.

Introduction

In recent times, there has been mounting apprehension regarding negative attitudes and conduct displayed by Physical Education students, which may lead to unsportsmanlike tendencies. This issue can impede the teaching and learning process (Menéndez-Santurio & Fernández-Río, 2016). Consequently, educational institutions have urged the development of plans and tools within the educational milieu to cultivate skills and competencies that can eliminate such attitudes.

During the teaching-learning process of physical education, responsibility is considered a fundamental element, understood as a moral obligation that the subject has towards oneself and towards others (Menéndez-Santurino & Fernández-Río, 2016). In this sense, both social and personal responsibility can be enhanced through physical education thanks to the fact that it presents an eminently procedural learning environment where numerous interactions arise between the student (Molina et al., 2020). There are two fundamental types of responsibility: personal and social. Social responsibility corresponds to values such as respect for the rights and opinions of others, social sensitivity, and empathy, while personal responsibility corresponds to values such as effort and autonomy (Hellison, 2011).

In this regard, intrinsic motivation is related to adaptive behaviours such as life satisfaction (Méndez-Giménez et al., 2016). The Self-Determination Theory (Deci & Ryan, 2002) has established itself as one of the most significant frameworks for the study of motivational processes. It indicates that an individual's motivations are reflected along a continuum of self-determination made up of different types of motivational regulations: intrinsic motivation, extrinsic motivation, and demotivation. Intrinsic motivation refers to the act of engaging in an activity for one's own pleasure and interest. It is a type of motivation that is entirely hedonistic in nature. Extrinsic motivation, on the other hand, refers to behaviours that are influenced by external factors (for example a prize). Finally, demotivation is characterised by the absence of internal or external motivation (Deci & Ryan, 1985). Moreover, The Self-Determination Theory establishes the existence of three basic psychological needs (competence, autonomy, and relatedness) that can affect the different types of existing motivation (Deci & Ryan, 2002). The need for relationships with others is understood as the feeling of belonging to a group of equals that an individual experiences when they share situations with individuals with whom they feel connected. The need for competence refers to the desire to act effectively with the environment, to experience opportunities in which to show and develop one's own capabilities (Vlachopoulos et al., 2010). Finally, autonomy refers to the regulation that a person exercises over themselves (Ryan & Deci, 2006).

In this sense, self-determined behaviours have been associated with greater sportsmanship and the practice of fair play (Guzmán & Carratalá, 2006). The physical education teacher tries to work on sportsmanship within his classrooms by promoting courtesy towards classmates, respecting turns, favoring his own efforts and that of others (Hernández-Andreo et al., 2020).

In this sense, it will be desirable to promote sportsmanship in physical education classes with the objective of increasing the levels of self-determination that is associated with greater behaviors oriented towards fair play and therefore, as a result, will result in fewer events of aggression and behaviours dangerous unsportsmanlike (Gómez-Buendia, et al., 2022). This is where the Teaching Personal and Social Responsibility (TPSR) model assumes significance, as it has been demonstrated to be a pivotal model in facilitating and promoting the appropriate progress of students (Wright & Walsh, 2020). In fact, it has been established that students imbued with TPSR have successful experiences that enable them to develop their personal and social skills and responsibility in sport and in life (Escartí et al., 2013: 159; Martinek & Hellinson, 2016). To this end, responsible behaviours are fostered through various and diverse means with TPSR, enabling primary and secondary education students to confront the vicissitudes and difficulties in their lives with greater ease and advance their holistic development (Escartí et al., 2013; Martinek & Hellinson, 2016).

Similarly, the TPSR model presents numerous advantages: (1) it provides an opportunity for learners to express their opinions, thoughts and engage in deliberation; (2) it encourages reflection and collaboration with students to instill values; (3) it is receptive to new ideas or changes due to its open-ended nature; and (4) it establishes achievable objectives that are employed as a framework for evaluating learners (Jiménez, 2000). Furthermore, research has demonstrated that meeting basic psychological needs positively impacts learners' perception of learning. It has also been established that the implementation of strategies to fulfill basic psychological needs results in increased satisfaction of autonomy and competence, as well as intrinsic motivation (Franco & Coterón, 2017). In addition, numerous studies have indicated that the TPSR model leads to improvement in values related to personal and social responsibility, such as respect, self-worth, self-control, effort, self-esteem, emotional stability, and leadership (Cecchini et al., 2007; García-García et al., 2020; Merino-Barrero et al., 2020). Notably, sportsmanship demonstrates a significant correlation with the factors of commitment to practice, social conventions, and respect for rules, which are crucial values to be nurtured in adolescents as they undergo skill and capacity development (Sánchez-Alcaraz, Ocaña-Salas, et al., 2020).

TPSR, developed by Hellison in 1970, aimed to instill positive values in adolescents at high risk of exclusion through sport. Later, it was adapted for educational purposes to promote these values in students (Pardo & García-Arjona, 2011). TPSR seeks to equip students with the necessary tools to become effective individuals in their social environment and to develop responsibility for themselves and others, allowing them to take control over their lives (Sánchez-Alcaraz et al., 2019).

TPSR can be applied to all students, as it facilitates the development of crucial psychosocial aspects such as respect, self-control, confidence, empathy, autonomy, cooperation, and leadership in various sporting contexts (Pardo & García-Arjona, 2011). The model is built upon four key principles: (1) integration to prevent physical activity content from being replaced or deleted; (2) cession of responsibilities to allow students to reflect and make decisions; (3) communication and interaction to build trust between teacher and student; and (4) transfer of learned values to students' daily life contexts (Hellison, 2011).

The TPSR model consists of five levels that serve as the foundation of the model: (1) respect for the participation and learning of others without disrupting these processes; (2) student participation and effort, avoiding negative situations, which tends to foster intrinsic motivation and commitment to the sessions; (3) learner autonomy by becoming more proactive and self-regulating their own learning; (4) cooperation with others without seeking a reward, as the decision to act should be intrinsic to the learner; and (5) transfer of all that was learned in the sessions to the students' lives outside of school (Hellison, 2011).

TPSR is an interesting teaching alternative to promote participation and learning in students, and is considered an ideal and perfect pedagogical model for teaching physical education (Pozo et al., 2016). With regards to this issue, the systematic review carried out by Pozo et al. (2016) highlights the use of diverse methodologies for program implementation and the presence of high heterogeneity among the analysed samples. In general, intervention programmes have been found to display significant effects for students at risk of social exclusion; however, these effects may vary from those seen in students who are not considered to be at risk (Sánchez-Alcaraz, Courel, et al., 2020). Thus, it is considered crucial to explore the varying effects of such programmes amongst different populations.

For all these reasons, there is a need to carry out an analysis of the scientific evidence on this updated model that includes and summarizes the main findings with respect to the relevant justified variables: social and personal responsibility, sportsmanship, motivation and the three fundamental psychological needs (autonomy, competence, and social relationships).

Hence, this study seeks to investigate the impact of the TPSR model onsocial responsibility, personal responsibility, sportsmanship, fundamental psychological needs (autonomy, competence, and social relationships) and motivation on children and adolescents' physical education students.

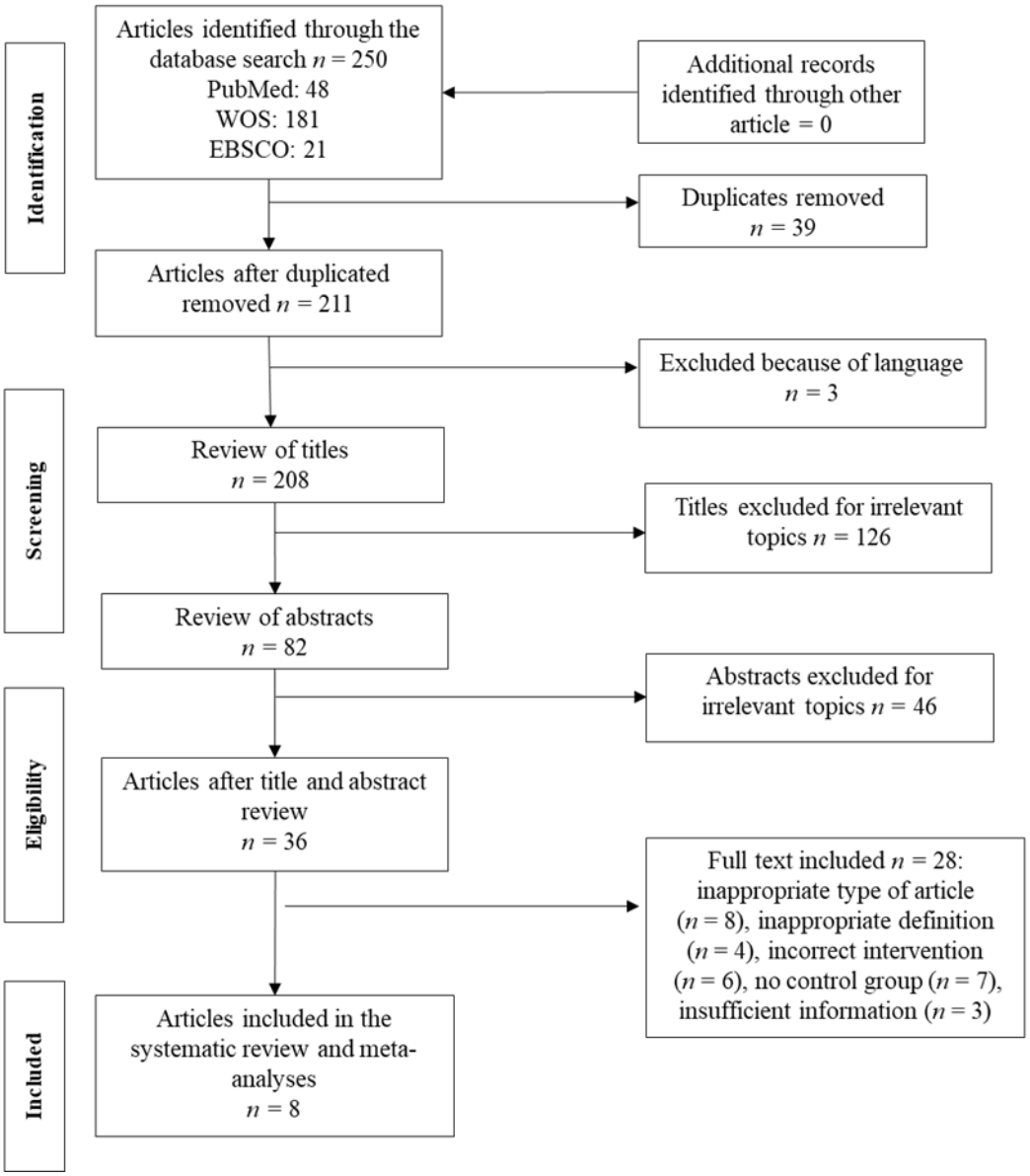
Materials and Methods

Search Strategies and Article Identification

This systematic review and meta-analysis was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-analyses guidelines (PRISMA) (Page et al., 2021), following the Cochrane Handbook for Systematic Reviews of Interventions (Higgins et al., 2011). The process of selecting articles for inclusion in the systematic review and meta-analysis can be seen in Figure 1.

The literature search and screening were performed independently by two researchers (PNT and NGG). If there was any disagreement, the search was conducted again. In this sense, the reliability between the two authors was calculated using Cohen's Kappa, which showed a strong level of agreement with an index of .88 (McHugh, 2012). This sense, the reliability between the two authors was calculated using Cohen's Kappa, which showed a strong level of agreement with an index of .88 (McHugh, 2012).

Figure 1
Flowchart of the study selection



The inclusion criteria for research to be included in this paper were: (a) studies about TPSR model-based with pre- and post-test intervention measures and control group; (b) children and adolescents physical education students (primary, secondary and high school); (c) articles published in English and Spanish; (d) articles that measure social responsibility, personal responsibility, sportsmanship, basic psychological needs, intrinsic motivation, extrinsic motivation, or demotivation before and after the intervention; and (d) articles that included at least a sample size of 30 subjects, since a small sample size may lead to lack of precision and inconsistency in meta-analysis. In addition, exclusion criteria were also established: (a) articles that included subjects at risk of social exclusion and/or with behavioural problems; (b) intervention models that used a variant of the selected model; and (c) conference publications, systematic reviews, and theoretical works.

Three databases were searched for this purpose: PubMed, Web of Science (WOS) and EBSCO, during the month of March 2022, using specific keyword combinations. The terms "personal and social responsibility" were always used in combination with "model," "education," "physical activity," "program," "hybridised," "approach," "school," "pupils," "children," "adolescents," "classroom," "training," and "curriculum." For instance, the following phrase was used for WOS: ((("personal and social responsibility") AND ("Model" OR "Education" OR "Physical activity" OR "Program" OR "Hybridized" OR "Approach" OR "School" OR "Pupils" OR "Children" OR "Adolescents" OR "Classroom" OR "Training" OR "curriculum"))). This search was customized for each database.

Risk of Bias Assessment

The quality of the studies was assessed using the "Physiotherapy Evidence Database" score (PEDro) (Maher et al., 2003). The PEDro scale provides information on the validity and reliability of the articles (Moseley et al., 2011). A risk of bias summary graph was created to identify the authors' judgments, broken down according to each risk of bias criterion in all included studies.

Statistical Analysis

The meta-analysis was conducted using R software version 3.6.0 (Copyright (C) 2019, R Foundation for Statistical Computing) with the metacont package. The forest plots were created using the forestplot package. Continuous data was used for the meta-analysis, with sample size and changes in mean and standard deviation between pre- and post-test measures of the TPSR interventions. Each study included an experimental group (EG) that received the TPSR model-based intervention and a control group (CG) that was compared to the experimental group. The mean (M) and standard deviation (SD) between the pre- and post-test measures of the interventions were obtained and analyzed. If any necessary data was not reported, the authors were contacted for the required data. Manzano-Sánchez et al. (2019) provided their data separately for male and female genders, where 1 was associated with males and 2 with females in this meta-analysis (Manzano-Sánchez et al., 2019, 2021).

If studies did not present the necessary data, standard deviations were calculated and imputed when possible, using standard errors and confidence intervals. The appropriateness of the application of a fixed or random effects model for the pooled analysis was determined based on the Cochrane Q test (x^2), Higgins I2, and significance (p). The DerSimonian-Laird (Cohen) pooling method was used, and heterogeneity was assessed.

The meta-analysis was conducted using a random or fixed effects model, as appropriate, to determine the pooled estimated standardized mean difference (*SMD*). Cohen's d (Cohen, 1988) was used to interpret the DerSimonian-Laird (Cohen) effect size estimates as small (0 to .2), medium (.3 to .7), and large (≥ .8). Significant differences were determined at a level of $p < .05$. The quality of the included studies was assessed using the PEDro scale to evaluate their validity and reliability. A risk of bias summary graph was created to identify the authors' judgments, broken down according to each risk of bias criterion in all included studies.

Results

Table 1 displays the characteristics of the included studies. In terms of sample size, an average of 186.62 students from primary, secondary, and baccalaureate education participated. The eight studies had a total of 1396 students, with 700 in the experimental group and 696 in the control group. The average duration of the interventions was 19.25 weeks with a frequency of two sessions per week for all studies, and a mean deviation of 8.25. The duration of each session was 55 minutes, except for two studies (Cecchini et al., 2007; Sánchez-Alcaraz et al., 2019) where sessions lasted 60 minutes, resulting in an average duration of 56.25 minutes per session, with a mean deviation of 1.875.

Football was the chosen sport in two studies (Cecchini et al., 2003, 2007), while other sports such as basketball, handball, volleyball, hockey, baseball, badminton, table tennis, and acrobatic gymnastics were used in other interventions (Merino-Barrero et al., 2020; Sánchez-Alcaraz et al., 2019). However, the sport used was not specified in the remaining interventions (García-García et al., 2020; Manzano-Sánchez et al., 2019, 2021; Sánchez-Alcaraz et al., 2013).

Most control groups received traditional and conventional methodology with three distinct parts: (1) warming up; (2) main part; and (3) cool down. They also used a traditional direct instruction methodology (García-García et al., 2020; Merino-Barrero et al., 2020; Sánchez-Alcaraz et al., 2013, 2019). The methodology used in other investigations was not specified. All experimental groups in all studies received the TPSR model-based intervention.

The studies focused on the first (Cecchini et al., 2003) and third year of secondary education (Cecchini et al., 2007), baccalaureate (Manzano-Sánchez et al., 2019), and the last year of primary education (sixth grade) combined with another secondary course (García-García et al., 2020; Merino-Barrero et al., 2020; Sánchez-Alcaraz et al., 2013, 2019).

Table 1
Characteristics of research included in the systematic review and meta-analyses

Author	Design/sample/ genre	Age/course/ sport	Time	Criteria	Intervention	Variables
Cecchini et al. (2003)	E / TS = 142; EG = 72; CG = 70	AR = 12-13 years; MA = 12.5 years / Secondary /Futsal	D = 8 weeks WF = 2 days ST = 55'	Public school students 12-13 y	EGI = TPSR	SPO
Cecchini et al. (2007)	E / TS = 124; EG = 63; CG = 61	AR = 13-14 years; MAM = 13.4; MAF = 13.8 / Secondary/Futsal	D = 8 weeks WF = 2 days ST = 60'	-	EGI = TPSR	SPO
García-García et al. (2020)	QE / TS = 57; EG = 26; CG = 31; EM = 61.5%; EF = 38.5%	AR = 11-14 years; MA = 11.93 / Primary and Secondary/ contents under the law	D = 20 weeks WF = 2 days ST = 55'	IC = Attendance, and demographic characteristics	EGI = TPSR CGI = conventional	SR, PR
Manzano-Sánchez et al. (2019)	QE / TS = 85; EG = 35; CG = 50; EM = 47.2%; EF = 52.8%	AR = 14-18 years; MA = 16.22/ Secondary and Baccalaureate/ contents under the law	D = 35 weeks WF = 2 days ST = 55'	IC = Demographics, accessibility and convenience. EX = Pre- and post-test and items	EGI = TPSR	SR, PR, AU, COMP, SOCR, IM, EM, DEM
Manzano-Sánchez et al. (2021)	QE / TS = 167; EG = 100; CG = 67; EM = 37%; EF = 63%	MA = 15.97 years / Secondary/ contents under the law	D = 35 weeks WF = 2 days ST = 55'	IC = Accessibility and convenience. EC = Scales and no response (90%)	EGI = TPSR	SR, PR, COMP, SOCR, IM, EM, DEM
Merino-Barrero et al. (2020)	QE / TS = 72; EG = 35; CG = 37; EM = 60%; EF = 30%	AR = 11-13 years; MA = 12.05 / Primary and Secondary/ contents under the law	D = 20 weeks WF = 2 days ST = 55'	IC = Attendance and questionnaire	EGI = TPSR CGI = Direct instruction	SR, PR, SPO, AU, COMP, SOCR, IM, EM, DEM
Sánchez-Alcaraz et al. (2013)	E / TS = 186; EG = 90; CG = 96	MAP = 11.99; MAS = 15.49 / Primary and Secondary	D = 12 weeks WF = 2 days ST = 55'	-	EGI = TPSR CGI = conventional	SR, PR
Sánchez-Alcaraz et al. (2019)	QE / TS = 563; EG = 280; CG = 293	AR = 12-15 years; MA = 13.73 / Primary and Secondary/ Futsal, basketball, handball, volleyball and traditional games	D = 16 weeks WF = 2 days ST = 60'	IC = Territorial division	EGI = TPSR CGI = conventional	SR, PR, SPO

Note: E: Experimental; QE: Quasi-experimental; TS: total sample; EG: experimental group; CG: control group; EM: experimental male; EF: experimental female; MA: mean age; AR: age range; MAM: mean age male; MAF: mean age female; MAP: mean age primary; MAS: mean age secondary; WF: weekly frequency; D: duration; ST: session time; IC: inclusion criteria; EG: exclusion criteria; EGI: experimental group intervention; CGI: control group intervention; SPO: sportsmanship; SR: social responsibility; PR: personal responsibility; AU: autonomy; COM: competence; SOCr: social relation; IM: intrinsic motivation; EM: extrinsic motivation; DEM: demotivation; IR: internal regulation; IDR: identified regulation; ER: external regulation.

The most researched and analyzed variables were personal and social responsibility, investigated in five studies (García-García et al., 2020; Manzano-Sánchez et al., 2021; Merino-Barrero et al., 2020; Sánchez-Alcaraz et al., 2013, 2019). Sportsmanship was investigated in four articles (Cecchini et al., 2003, 2007; Merino-Barrero et al., 2020; Sánchez-Alcaraz et al., 2019). Basic psychological needs (autonomy, competence, and relatedness), intrinsic and extrinsic motivation, and demotivation were studied in three investigations (Manzano-Sánchez et al., 2019, 2021; Merino-Barrero et al., 2020). Extrinsic motivation was analyzed in two different ways: as a single variable (Manzano-Sánchez et al., 2019) and as three

distinct parts: external regulation, identified regulation, and introjected regulation (Manzano-Sánchez et al., 2021; Merino-Barrero et al., 2020). The variables studied in each investigation can be seen in Table 1.

Table 2 presents the scores acquired on the PEDro scale for each of the studies encompassed in the analysis. The findings demonstrate that the quality scores varied from six to nine points, indicating an acceptable level of quality in the selected studies. Additionally, Figure 2 provides a condensed overview of the risk of bias, outlining the authors' assessments concerning each bias criterion across all studies analyzed.

Table 2
Articles scores on the PEDro scale

Research	1	2	3	4	5	6	7	8	9	10	11	Final score
Cecchini et al. (2003)	1	1	0	1	1	0	0	1	1	1	1	7
Cecchini et al. (2007)	1	1	0	0	1	1	0	1	1	1	1	7
García-García et al. (2020)	1	0	0	1	1	0	1	1	1	1	1	7
Manzano-Sánchez et al. (2019)	1	0	0	1	1	0	1	1	1	1	1	7
Manzano-Sánchez et al. (2021)	1	0	0	0	1	0	1	1	1	1	1	6
Merino-Barrero et al. (2020)	1	1	0	0	1	1	1	1	1	1	1	8
Sánchez-Alcaraz et al. (2013)	1	1	0	0	1	0	0	1	1	1	1	6
Sánchez-Alcaraz et al. (2019)	1	1	0	0	1	0	0	1	1	1	1	6

Figure 2
Risk of bias summary: authors´ judgements broken down according to each risk of bias criterion across all included studies

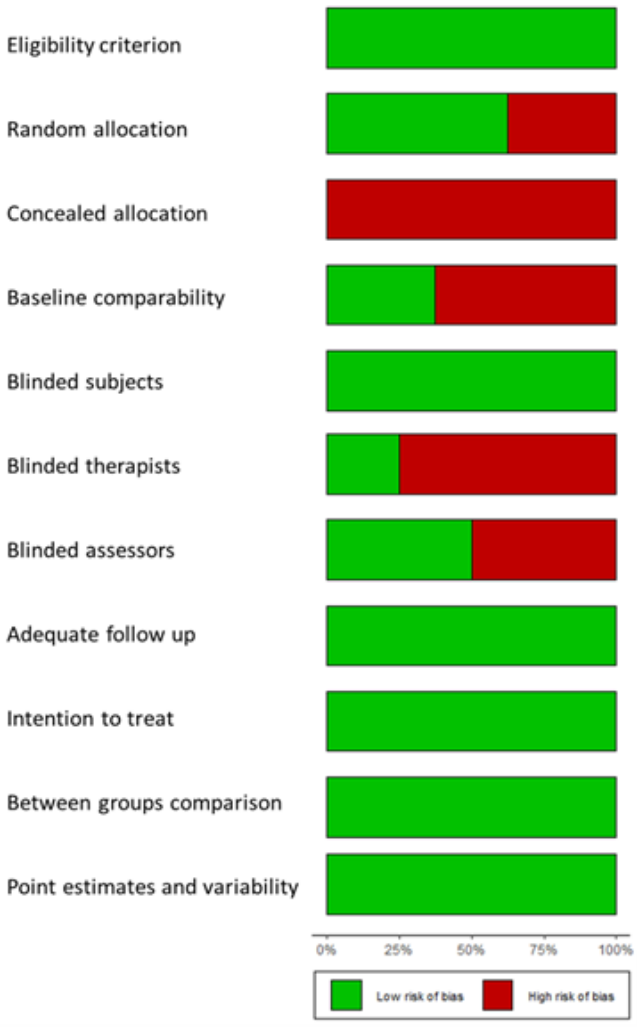
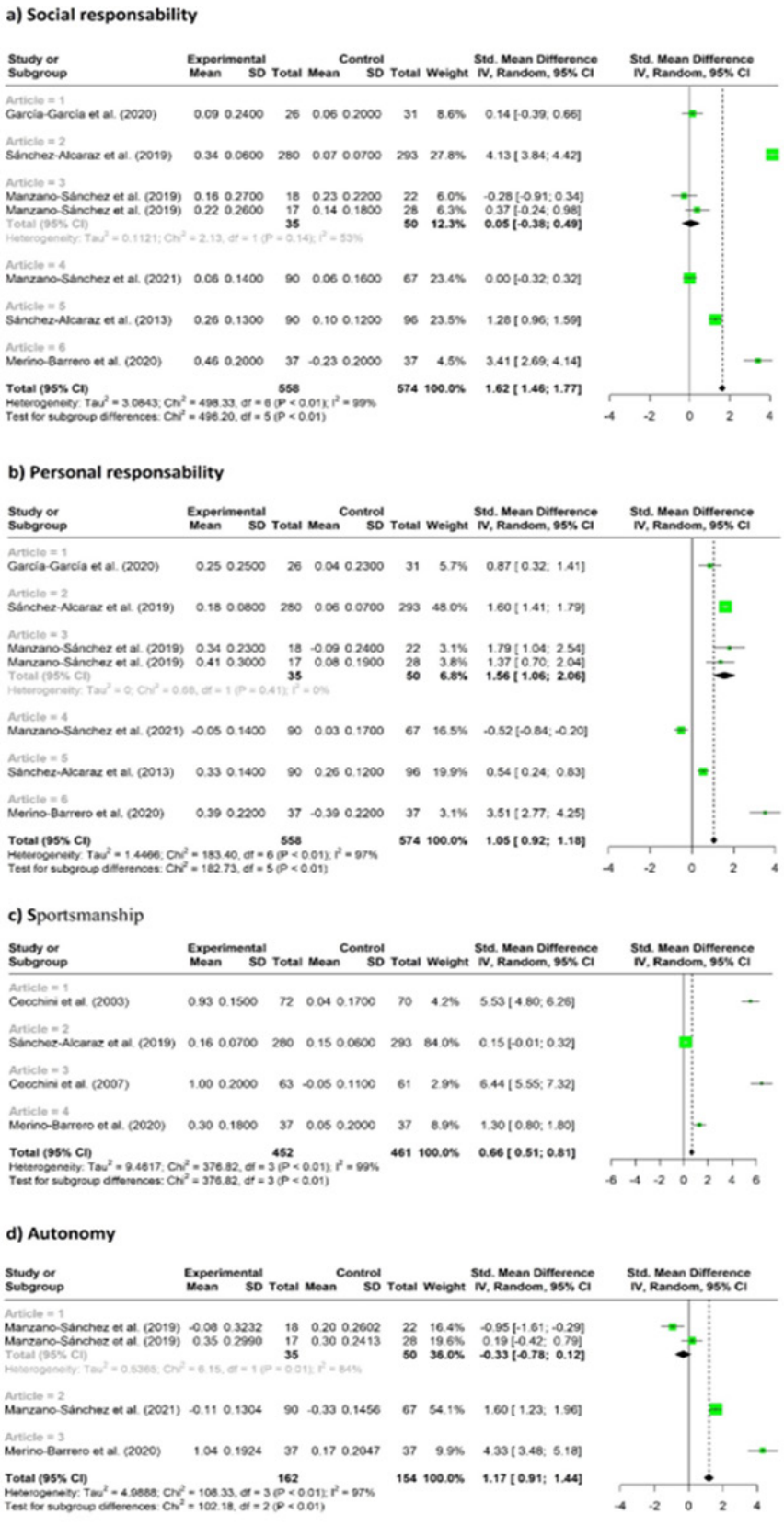
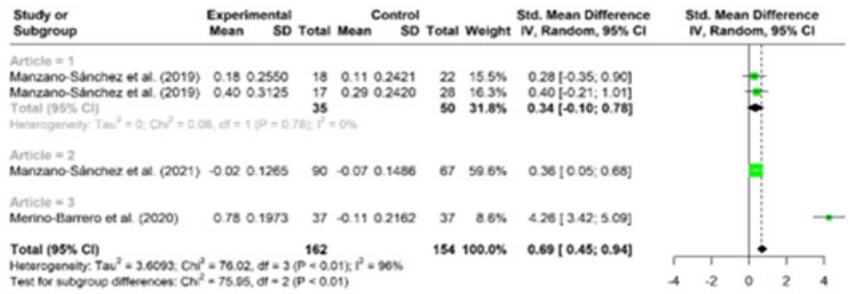


Figure 3

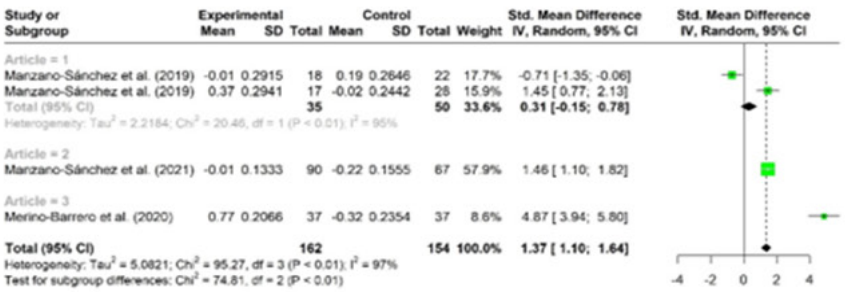
Meta-analysis of a) social responsibility, b) personal responsibility, c) sportsmanship, d) autonomy, e) competence, f) social relations, g) intrinsic motivation, h) extrinsic motivation, and i) demotivation



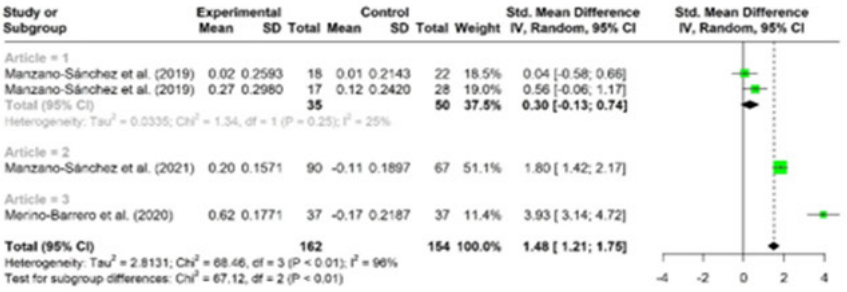
e) Competence



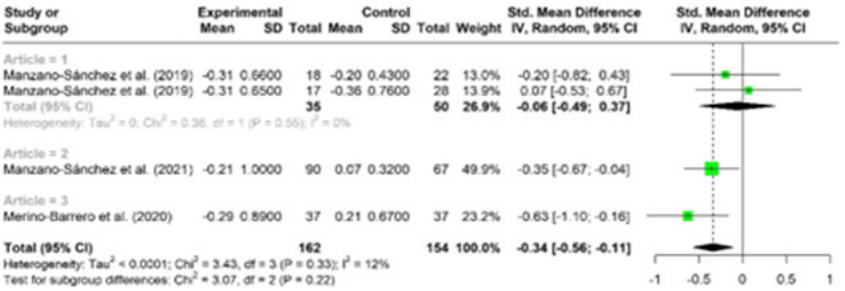
f) Social relations



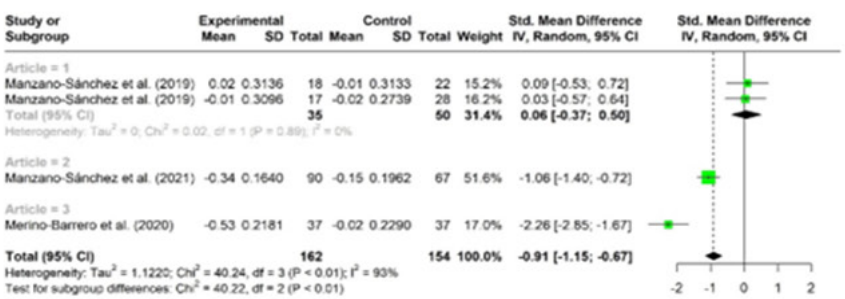
g) Intrinsic motivation



h) Extrinsic motivation



i) Demotivacion



In terms of social and personal responsibility, three out of seven (Merino-Barrero et al., 2020; Sánchez-Alcaraz et al., 2013, 2019) and five out of seven (Manzano-Sánchez et al., 2019; Merino-Barrero et al., 2020; Sánchez-Alcaraz et al., 2013, 2019) studies, respectively, demonstrate an improvement in the experimental group (EG) following the implementation of the TPSR model-based program. Four studies analyzed the sportsmanship variable, all of which showed significant improvements after applying the TPSR model-based (Cecchini et al., 2003, 2007; Merino-Barrero et al., 2020; Sánchez-Alcaraz et al., 2019).

Regarding basic psychological needs (autonomy, competence, and relatedness), one out of four investigations reported significant differences in autonomy, two out of four cases demonstrated significant improvements in competence, and one out of three cases showed improvement in relatedness after the intervention with the TPSR model-based (Merino-Barrero et al., 2020). With respect to intrinsic and extrinsic motivation, two out of four (Manzano-Sánchez et al., 2019; Merino-Barrero et al., 2020) and two out of three (Manzano-Sánchez et al., 2021; Merino-Barrero et al., 2020) cases showed improvements following the intervention, respectively.

Extrinsic motivation was investigated in two different ways: as a single factor or as three factors (external, identified, and introjected regulation). One study did not show improvement in extrinsic motivation as a single factor (Manzano-Sánchez et al., 2019), while the other two studies found improvements in external regulation (Manzano-Sánchez et al., 2021), identified regulation (Merino-Barrero et al., 2020), and introjected regulation (Manzano-Sánchez et al., 2021), respectively.

Finally, demotivation was analyzed, and two out of four cases demonstrated improvements after applying the TPSR model-based (Manzano-Sánchez et al., 2021; Merino-Barrero et al., 2020), while the other two studies did not report any improvements (Manzano-Sánchez et al., 2019). Figure 3 illustrates the meta-analysis of social responsibility, personal responsibility, sportsmanship, basic psychological needs (autonomy, competence, and relatedness), intrinsic motivation, extrinsic motivation, and demotivation, respectively. In all analyses, significant differences between the experimental and control groups were observed in relation to the pre- and post-tests (all $p < .001$).

Discussion

The purpose of this study was to investigate the impact of the TPSR model on social responsibility, personal responsibility, sportsmanship, fundamental psychological needs (autonomy, competence, and social relationships) and motivation on children and adolescents physical education students. The TPSR model had a significant effect on all these variables. This is the first meta-analysis that summarizes and analyses the effect of this pedagogic model on children and adolescents' physical education students. In this sense, systematic reviews have been previously carried out, however they mainly focus on the competitive and extracurricular field (Baptista et al, 2020) and previous systematic review indicated that there is little research carried out in this regard in the school environment and that the application of this model in physical education classes is a minority, being applied mainly in the extracurricular context (Caballero-Blanco et al., 2013). In addition, another's systematic review of this model did not include a meta-analysis (Pozo et al., 2016; Shen et al., 2022).

The results showed a significant improvement in social responsibility, which is in line with other studies (Baptista et al., 2020; Caballero-Blanco et al., 2013; Menéndez-Santurio & Fernández-Río, 2016). Improvements in social responsibility were also associated with a reduction in aggressive and disruptive behaviour among students and an increase in positive social behaviours, including conflict resolution (Gordon, 2010). The meta-analysis found significant differences in most studies that analysed this variable, indicating that the TPSR model could have a significant effect compared to a conventional methodology. However, four investigations did not reach significant differences (García-García et al., 2021; Manzano-Sánchez et al., 2019; Manzano-Sánchez et al., 2021). The main reasons for these results could be the duration of the interventions and that social responsibility is presented at the last level of the intervention program.

Similarly, the meta-analysis found significant differences in personal responsibility, which is related to a decrease in aggression and disruptive behaviours in students (Gordon, 2010); as well as in other reviews in similar and extracurricular contexts (Caballero-Blanco et al., 2013; Menéndez-Santurio & Fernández-Río, 2016). The development of personal responsibility can lead students to associate sportsmanship as a positive characteristic and violence as a negative one (Cecchini et al., 2003). The TPSR model can also create a positive learning environment that influences behavior in physical education (PE) and allows students to make decisions and express their opinions (Dyson et al., 2020). The meta-analysis found significant differences in this variable, indicating that the TPSR model could be more effective compared to a conventional methodology.

Regarding sportsmanship, the meta-analysis found significant differences. The TPSR model is ideal for developing sportsmanship in students, according to other studies (Wright & Burton, 2008). Improvements in responsibility can be associated with increased levels of sportsmanship, leading to educational sporting practices based on pro-social values and the reduction of violence, allowing the existence of an ideal school climate for the development of the students' learning process (Gutiérrez et al., 2011). The TPSR model could also help to reduce unsporting behavior associated with foul play

or giving too much importance to winning (Wright & Burton, 2008). Additionally, values such as "self-control, care and empathy" play an essential role in the development of students' sportsmanship (Merino-Barrero et al., 2020). However, one investigation found opposite results (Sánchez-Alcaraz et al., 2019). Generally, significant differences are obtained with respect to the investigations that studied sportsmanship, indicating that the TPSR model could have a greater effect compared to a conventional methodology.

In relation to the basic psychological needs, the meta-analysis reveals significant differences for autonomy, competence, and social relations, supported by other studies (Caballero-Blanco et al., 2013; Pardo & García-Arjona, 2011). Higher levels of responsibility among students are linked to greater perceptions of autonomy, competence, and relatedness, resulting in self-determined motivation (Belando-Pedreño et al., 2015). Intrinsic motivation is also positively associated with autonomy (Menéndez-Santurio & Fernández-Río, 2016). Autonomous activities are essential to develop both types of responsibility (Escartí et al., 2013). However, interventions focusing on female students did not lead to significant differences in autonomy (Manzano-Sánchez et al., 2019), nor did another intervention that did not compare gender (Menéndez-Santurio & Fernández-Río, 2016). Competence was improved in connection with other investigations (Menéndez-Santurio & Fernández-Río, 2016), and social responsibility was found to be a crucial factor for student development and success in the TPSR model (Hellison, 2011). This variable had a greater effect compared to autonomy and competence (Merino-Barrero et al., 2020). In general, the meta-analysis shows significant differences in the three variables of basic psychological needs, indicating that the TPSR model may have a greater impact compared to conventional methodologies.

There is a possible relationship between basic psychological needs and intrinsic motivation (Méndez-Giménez et al., 2017). This meta-analysis found improvement in intrinsic motivation, as well as other studies (Escartí et al., 2013). Personal and social responsibility are positively associated with intrinsic motivation in PE (Li et al., 2008). Improving intrinsic motivation has significant benefits for students, including increased intention to be physically active (Méndez-Giménez et al., 2017). However, one intervention did not show significant differences in intrinsic motivation for either gender (Manzano-Sánchez et al., 2019). Nevertheless, the meta-analysis determines significant differences in this variable, indicating that the TPSR model may have a better influence compared to conventional methodologies.

The meta-analysis reveals significant differences in pre- and post-test extrinsic motivation for both groups in the two investigations, supported by other studies (Escartí et al., 2013). A novel project-based model was also found to have a significant effect compared to traditional methodology (Bayonas-Plazas & Baena-Extremera, 2017). However, educators should understand that an extrinsic motivational climate may not promote long-term development and may impede the development of an intrinsic motivational climate.

Based on the findings of this study, significant differences in demotivation were observed in two articles (Manzano-Sánchez et al., 2021; Merino-Barrero et al., 2020), which is consistent with previous research (Escartí et al., 2013; Valero-Valenzuela et al., 2020). These studies suggest that the Teaching Personal and Social Responsibility (TPSR) model promotes motivation and interest in the subject, while reducing demotivation and boredom. However, the meta-analysis also reveals non-significant results for both genders in some interventions (Manzano-Sánchez et al., 2019), and it is suggested that the baccalaureate-designed intervention may not have improved extrinsic motivation. Other studies with similar results did not separate gender, but had longer interventions with more participants, which may have influenced the significant findings (Manzano-Sánchez & Valero-Valenzuela, 2019). TPSR is found to decrease demotivation and increase motivation, leading to increased participation and interest in the subject (García-Castejón et al., 2021), and the meta-analysis indicates that TPSR may have a greater effect compared to more conventional methodologies.

However, it is important to note that the interventions in this study were all conducted in schools in Spain, and results may differ in other countries with different cultures. Furthermore, while TPSR is considered a consolidated model, it is not one of the most prominent pedagogical models in the educational field, and there are fewer interventions with pre- and post-test measures compared to other models. Therefore, more studies are needed to provide consistent results.

In terms of future applications, further research should explore additional variables related to physical activity, quality of life, academic performance, and happiness to determine whether TPSR can also lead to significant improvements in these areas. For example, the Sport Education model conducted a meta-analysis on the variables of basic needs, intrinsic motivation, and prosocial attitudes and similar investigations could be carried out with TPSR. Likewise, it could be linked to specific curricular elements, such as previous research that proposes an innovative model of applying and adapting the principles of sports teaching during physical fitness tests (Carriedo, et al., 2020).

Conclusions

The meta-analysis reveals that the TPSR model-based intervention is significantly more effective in promoting social and personal responsibility, sportsmanship, basic psychological needs, intrinsic and extrinsic motivation, and reducing demotivation on children and adolescents' physical education students compared to other more conventional and traditional

pedagogical approaches. Thus, the study provides evidence for the benefits and positive effects of the TPSR model on students, facilitating their holistic development and enhancing the teaching-learning process. Given the advantages of the TPSR model, it represents a valuable alternative to the more widely used conventional pedagogical approaches in Physical Education. Furthermore, despite being one of the least known and utilized models, the significant outcomes of this research suggest that the TPSR model should be more frequently implemented in educational settings.

Ethics Committee Statement

Not applicable due to the type of systematic review research presented.

Conflict of Interest Statement

The authors have no conflict of interest.

Authors' Contribution

Conceptualization P.N.T., E.R.L. & N.G.G; Methodology P.N.T. & N.G.G.; Software P.N.T. & E.R.L.; Validation E.R.L. & N.G.G.; Formal Analysis P.N.T. & N.G.G.; Investigation P.N.T., E.R.L. & N.G.G.; Resources P.N.T. & E.R.L.; Data Curation P.N.T.; Writing – Original Draft P.N.T., E.R.L. & N.G.G.; Writing – Review & Editing P.N.T., E.R.L. & N.G.G.; Visualization E.R.L. & N.G.G.; Supervision E.R.L. & N.G.G. All authors have read and agreed to the published version of the manuscript.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author [erlara@ucam.edu].

References

Baptista, C., Corte-Real, N., Regueiras, L., Seo, G., Hemphill, M., Pereira, A., Días, C., Martinek, T., & Fonseca, A. (2020). Teaching personal and social responsibility after-school: a systematic review. *Cuadernos de Psicología del Deporte, 20*(2), 1-25. https://doi.org/10.6018/cpd.346851

Bayonas-Plazas, M.G., & Baena-Extremera, A. (2017). Motivación en educación física a través de diferentes metodologías didácticas. *Profesorado, Revista de Currículum y Formación del Profesorado, 21*(1), 387-402. https://doi.org/10.30827/profesorado.v21i1.10370

Belando-Pedreño, N., Férriz-Morel, R., Rivas, S., Almagro, B., Sáenz-Lopez, P., Cervelló, E., & Moreno-Murcia, J.A. (2015). Sport commitment in adolescent soccer players. *Motricidade, 11*(4), 3-14. https://doi.org/10.6063/motricidade.2969

Caballero-Blanco, P., Delgado-Noguera, M. Á., & Escartí-Carbonell, A. (2013). Analysis of teaching personal and social responsibility model-based programmes applied in USA and Spain. *Journal of Human Sport and Exercise, 8*(2), 427-441. https://doi.org/10.4100/jhse.2012.82.10

Carriedo, A., Méndez-Giménez, A., Fernández-Río, J., & Cecchini, J. A. (2020). Enseñanza y aplicación de los test de condición física en Educación Secundaria: una propuesta basada en el modelo de educación deportiva. *Cultura, Ciencia y Deporte*, *15*(46), 529–540. https://doi.org/10.12800/ccd.v15i46.1644

Cecchini, J.A., Montero, J., & Pena, J.V. (2003). Repercusiones del programa de intervención para desarrollar responsabilidad personal y social de Hellison sobre los comportamientos de fair-play y el autocontrol. *Psicothema, 15*(4), 631-637. https://reunido.uniovi.es/index.php/PST/article/view/8067/7931

Cecchini, J.A., Montero, J., Alonso, A., Izquierdo, M., & Contreras, O. (2007). Effects of personal and social responsibility on fair play in sports and self-control in school-aged youths. *European Journal of Sports Science, 7*(4), 203-2011. https://doi.org/10.1080/17461390701718497

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed). Lawrence Earlbaum Associates.

Deci, E.L., & Ryan, R.M. (1985). *Intrinsic motivation and self-determination in human behaviour.* Plenum Press. https://doi.org/10.1007/978-1-4899-2271-7

Deci, E.L., & Ryan, R.M. (2002). Overview of self-determination theory: an organismic dialectical perspective. In E. L. Deci & R.M. Ryan (Eds.), *Handbook of self-determination research* (pp. 3-36). University of Rochester Press.

Dyson, B., Howley, D., & Wright, P.M. (2020). A scoping review critically examining research connection social and emotional learning with three model-based practices in physical education: have we been doing this all along? *European Physical Education Review, 27*(1), 76-95. https://doi.org/10.1177/1356336X20923710

Escartí, A., Gutiérrez, M., Pascual, C., & Wright, P. (2013). Observación de las estrategias que emplean los profesores de educación física para enseñar responsabilidad personal y social. *Revista de Psicología del Deporte, 22*(1), 159-166. https://www.redalyc.org/pdf/2351/235127552046.pdf

Franco, E., & Coterón, J. (2017). The effects of a physical education intervention to support the satisfaction of basic psychological needs on the motivation and intentions to be physically active. *Journal of Human Kinetics, 59*(1), 5-15. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5680682/pdf/hukin-59-005.pdf

García-Castejón, G., Camerino, O., Castañer, M., Manzano-Sánchez, D., Jiménez-Parra, J.F., & Valero-Valenzuela, A. (2021). Implementation of a hybrid educational program between the model of Personal and Social Responsibility (TPSR) and the Teaching Games for Understanding (TGfU) in physical education and its effects on health: an approach based on mixed methods. *Children, 8*(7), 1-22. https://doi.org/10.3390/children8070573

García-García, J., Manzano-Sánchez, D., Belando Pedreño, N., & Valero-Valenzuela, A. (2020). Personal and social responsibility programme effects, prosocial behaviors, and physical activity levels in adolescents and their families. *International Journal of Environmental Research and Public Health, 17*(9), 1-14. https://doi.org/10.3390/ijerph17093184

Gómez-Buendía, Á., Sánchez-Alcaraz, B. J., Cifo, M. I., & Gómez-Mármol, A. (2022). Efectos de un modelo híbrido de enseñanza (MED + TGfU) y el modelo de responsabilidad personal y social sobre la deportividad y la diversión en estudiantes de 4º ESO y 1º Bachillerato. *Retos: Nuevas Tendencias en Educación Física, Deporte y Recreación*, *43*, 550–559. https://doi.org/10.47197/retos.v43i0.85928

Gordon, B. (2010). An examination of the responsibility model in a New Zealand secondary school physical education program. *Journal of Teaching in Physical Education, 29*(1), 21-37. https://doi.org/10.1123/jtpe.29.1.21

Gutiérrez, M., Escartí, A., & Pascual, C. (2011). Relationships among empathy, prosocial behavior, aggressiveness, self-efficacy and pupils' personal and social responsibility. *Psicothema, 23*(1), 13-19. https://www.psicothema.com/pdf/3843.pdf

Guzmán, J. F., & Carratalá, V. (2006). Psychological mediators and sport motivation in Spanish judokas. *International Journal of Sport Science, 5*, 1-11. https://doi.org/10.5232/ricyde2006.00501

Hellison, D. (2011). Teaching *personal and social responsibility through physical activity* (3rd ed.). Human Kinetics. https://doi.org/10.5040/9781718208919

Hernández-Andreo, L., Gómez-Mármol, A., & Cifo-Izquierdo, M. I. (2020). Effects on motivation and implicit beliefs about self ability using the sports education model and the traditional style in secondary education. *Sustainability*, *12*(9), 38-43. https://doi.org/10.3390/su12093843

Higgins, J.P.T., & Green, S. (2011). *Cochrane handbook for systematic reviews of interventions.* Version 5.1. 0 [updated March 2011]. The Cochrane Collaboration. www.cochrane-handbook.org

Ioannidis, J.P.A. (2008). Interpretation of tests of heterogeneity and bias in meta-analysis. *Journal of Evaluation in Clinical Practice, 14*(5), 951-957. https://doi.org/10.1111/j.1365-2753.2008.00986.x

Li, W., Wright, P., Rukavina, P.B., & Pickering, M. (2008). Measuring students' perceptions of personal and social responsibility and the relationship to intrinsic motivation in urban physical education. *Journal of Teaching in Physical Education, 27*(2), 167-178. https://doi.org/10.1123/jtpe.27.2.167

Maher, C.G., Sherrington, C., Herbert, R.D., Moseley, A.M., & Elins, M. (2003). Reliability of the PEDro scale for rating quality of randomized controlled trials. *Physical Therapy, 83*(8), 713-721. https://doi.org/10.1093/ptj/83.8.713

Manzano-Sánchez, D., González-Víllora, S., & Valero-Valenzuela, A. (2021). Application of the teaching personal and social responsibility model in the secondary education curriculum: implication in psychological and contextual variables in students. *International Journal of Environmental Research and Public Health, 18*(6), 1-14. https://doi.org/10.3390/ijerph18063047

Manzano-Sánchez, D., Valero-Valenzuela, A., Conde-Sánchez, A., & Chem, M.Y. (2019). Applying the personal and social responsibility model-based program: differences according to gender between basic psychological needs, motivation, life satisfaction and intention to be physically active*. International Journal of Environmental Research and Public Health, 16*(*13*), 1-11. https://doi.org/10.3390/ijerph16132326

Martinek, T., & Hellison, D. (2016). Learning responsibility through sport and physical activity. In N.L. Holt (Ed.), *Positive youth development through sport* (pp. 180–190). Routledge/Taylor & Francis Group. https://doi.org/10.4324/9781315709499-15

McHugh, M.L. (2012). Interrater reliability: the kappa statistic. *Biochemia Medica, 22*(3), 276-282. https://doi.org/10.11613/BM.2012.031

Méndez-Giménez, A., Cecchini-Estrada, J.A., Fernández-Río, J., Méndez-Alonso, D., & Prieto-Saborit, J.A. (2017). Metas de logro 3x2, motivación autodeterminada y satisfacción con la vida en Educación Secundaria. *Revista de Psicodidáctica, 21*(2), 1-16. https://doi.org/10.1016/j.psicod.2017.05.001

Menéndez-Santurio, J.I., & Fernández-Río, F. (2016). Violence, responsibility, friendship and basic psychological needs: effects of a sport education and teaching for personal and social responsibility program. *Journal of Psychodidactics, 21*(2), 245-260. https://doi.org/10.1387/RevPsicodidact.15269

Merino-Barrero, J.A., Valero-Valenzuela, A., Belando Pedreño, N., & Fernandez-Rio, J. (2020). Impact of sustained TPSR program in students' responsibility, motivation, sportsmanship and intention to be physically active. *Journal of Teaching in Physical Education, 39*(2), 247-255. https://doi.org/10.1123/jtpe.2019-0022

Molina, M., Gutiérrez, D., Segovia, Y., & Hopper, T. (2020). El modelo de Educación Deportiva en la escuela rural: amistad, responsabilidad y necesidades psicológicas básicas. *Retos: Nuevas Tendencias en Educación Física, Deporte y Recreación*, *38*, 291–299. https://doi.org/10.47197/retos.v38i38.73685

Moseley, A.M., Herbert, R.D., Maher, C.G., Sherrington, C., & Elkins, M.R. (2011). Reported quality of randomize controlled trials of physiotherapy intervention has improved over time. *Journal of Clinical Epidemiology, 64*(6), 594-601. https://doi.org/10.1016/j.jclinepi.2010.08.009

Page, M.J., McKenzie, J.E., Bossuyt, P.M., Boutron, I., Hoffmann, T.C., Mulrow, C.D., Shamseer, L., Tetzlaff, J.M., Akl, E.A., Brennan, S.E., Chou, R., Glanville, J., Grimshaw, J.M., Hróbjartsson, A., Lalu, M.M., Li, T., Loder, E.W., Mayo-Wilson, E., McDonald, A., ... Moher, D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*, *372*(71), 1-9. https://doi.org/10.1136/bmj.n71

Pardo, R., & García-Arjona, N. (2011). El modelo de responsabilidad: desarrollo de aspectos psicosociales en jóvenes socialmente desfavorecidos a través de la actividad física y el deporte. *Revista de Psicología y Educación, 6*(1), 211-222. https://www.revistadepsicologiayeducacion.es/pdf/67.pdf

Pozo, P., Grao-Cruces, A., & Pérez-Ordás, R. (2016). Teaching personal and social responsibility model-based programmes in physical education: a systematic review. *European Physical Education Review, 24*(1), 56-75. https://doi.org/10.1177/1356336X16664749

Ryan, R.M., & Deci, E.L. (2006). Self-regulation and the problem of human autonomy: does psychology need choice, self-determination, and will? *Journal of Personality*, *74*(6), 1557-1586. https://doi.org/10.1111/j.1467-6494.2006.00420.x

Sánchez-Alcaraz, B.J., Courel, J., Sánchez, C., Valero, A., & Gómez, A. (2020). El modelo de responsabilidad personal y social a través del deporte: revisión bibliográfica. *Retos: Nuevas Tendencias en Educación Física, Deporte y Recreación*, *37*, 755–762. https://doi.org/10.47197/retos.v37i37.67890

Sánchez-Alcaraz, B.J., Gómez-Mármol, A., Valero-Valenzuela, A., & De la Cruz, E. (2013). Aplicación de un programa para la mejora de la responsabilidad personal y social en las clases de educación física. *Motricidad. European Journal of Human Movement, 30*, 121-129. https://dialnet.unirioja.es/servlet/articulo?codigo=4775589

Sánchez-Alcaraz, B.J., Gómez-Mármol, A., Valero-Valenzuela, A., Belando, N., & Moreno, J.A. (2019). Achieving greater sportsmanship and decreasing school violence through responsibility and sport practice. *Revista de Psicología del Deporte, 28*(2), 151-160. https://dialnet.unirioja.es/servlet/articulo?codigo=7024684

Sánchez-Alcaraz, B.J., Ocaña-Salas, B., & Gómez-Mármol, A. (2020). Relación entre violencia escolar, deportividad y responsabilidad personal y social en estudiantes. *Apunts,* (139), 65-72. https://doi.org/10.5672/apunts.2014-0983.es.(2020/1).139.09

Shen, Y., Martinek, T., & Dyson, B. (2022). Navigating the processes and products of the teaching personal and social responsibility model: a systematic literature review. *Quest*, *74*(1), 91-107. https://doi.org/10.1080/00336297.2021.2017988

Valero-Valenzuela, A., García, D.G., Camerino, O., & Manzano-Sánchez, D. (2020). Hybridisation of the teaching personal and social responsibility model and gamification in physical education. *Apunts. Educación Física y Deportes, 1*(141), 63-74. https://doi.org/10.5672/apunts.2014-0983.es.(2020/3).141.08

Vlachopoulos, S.P., & Michailidou, S. (2006). Development and initial validation of a measure of autonomy, competence, and relatedness in exercise: the basic psychological needs in exercise scale. *Measurement in Physical Education and Exercise Science, 10*(3), 179-201. https://doi.org/10.1207/s15327841mpee1003_4

Wright, P.M., & Burton, S. (2008). Implementation and outcomes of a responsibility-based physical activity program

integrated into an intact high school physical education class. *Journal of Teaching in Physical Education, 27*(2), 138-154. https://doi.org/10.1123/jtpe.27.2.138

Wright, P.M., & Walsh, D. (2020). Don Hellison's life and legacy: introduction to the special issue. *Journal of Teaching in Physical Education, 39*(3), 286-288. https://doi.org/10.1123/jtpe.2020-0024