Revista Española de Pedagogía

Revista Española de Pedagogía (REP)
ISSN: 0034-9461
e-ISSN: 2174-0909

Do motivation and perceptions of equality and discrimination in Physical Education impact physical activity in secondary education students? A sex-based analysis

¿Inciden la motivación y la percepción de igualdad y discriminación en Educación Física sobre la actividad física en estudiantes de educación secundaria? Un análisis por sexo

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Abstract:

The benefits of physical activity in the school setting are widely proven; however, factors such as student motivation and equality perceptions are determinants of participation and learning opportunities in Physical Education. The aim of the present research was to analyse existing relationships between physical activity, motivation and perceptions of equality and discrimination in Physical Education as a function of sex, as well as to identify the extent to which motivation and equality affect physical activity engagement in secondary education students. The sample was made up of 310 students (13.9 ± 1.2 years) with the PAQ-C, the motivation in Physical Education questionnaire and the questionnaire of perception of equality and discrimination in Physical Education being administered for data collection. Data were analysed according to Mann-Whitney U, Spearman correlation and linear regression outcomes. Main outcomes demonstrate statistically significant sex differences in physical activity engagement and perceptions of equality and discrimination. In turn, physical activity engagement was observed to be positively associated with intrinsic and extrinsic motivation (identified, introjected and external regulation). Further, perceived equality was related with self-determined forms of motivation, whilst perceived discrimination was related with less self-determined forms of motivation. Finally, regression outcomes revealed that identified regulation positively and significantly predicts physical activity engagement, whilst perceived

Date of receipt of the original: 2024-11-29.
Date of approval: 2025-04-10.
Please, cite this article as follows: Galeano-Rojas, D., Farías-Valenzuela, C., Hinojosa-Torres, C., & Valdivia-Moral, P. (2025). Do motivation and perceptions of equality and discrimination in Physical Education impact physical activity in secondary education students? A sex-based analysis [¿Inciden la motivación y la percepción de igualdad y discriminación en Educación Física sobre la actividad física en estudiantes de educación secundaria? Un análisis por sexo]. *Revista Española de Pedagogía, 83*(291), 383-398. https://doi.org/10.22550/2174-0909.4282

equality was inversely related with this variable. In conclusion, males present higher levels of physical activity engagement, lower perceptions of equality and higher perceptions of discrimination. Furthermore, more self-determined levels of motivation contribute towards higher levels of physical activity engagement in the context of Physical Education.

Keywords: physical education, motivation, gender equality, discrimination, physical activity, secondary education.

Resumen:

Los beneficios de la actividad física en el ámbito escolar están ampliamente comprobados; sin embargo, factores como la motivación y la percepción de igualdad de los estudiantes son determinantes para las oportunidades de participación y aprendizaje en Educación Física. La presente investigación tiene como objetivo analizar las diferencias por sexo y las relaciones entre la actividad física, la motivación y la percepción de igualdad y discriminación en Educación Física, así como predecir la incidencia de la motivación y la igualdad sobre la actividad física en estudiantes de educación secundaria. La muestra estuvo conformada por 310 estudiantes (13.9 ± 1.2 años) y los instrumentos utilizados para la recolección de datos fueron el PAQ-C, el cuestionario de motivación en la Educación Física y el cuestionario de percepción de igualdad y discriminación en Educación Física. Los datos se analizaron con la prueba U de Mann-Whitney, el coeficiente de correlación de Spearman y un análisis de regresión lineal. Los resultados principales demuestran diferencias estadísticamente significativas por sexo en la actividad física y la percepción de igualdad de trato y discriminación. A su vez, se observa que la actividad física se asocia de manera positiva con la motivación intrínseca y extrínseca (regulación identificada, introyectada y externa); la igualdad de trato, con niveles de motivación más autodeterminados, y la discriminación, con los niveles de motivación menos autodeterminada. Por último, el análisis de regresión demostró que la regulación identificada predice de forma positiva y significativa los niveles de actividad física, mientras que la igualdad de trato lo hace de modo inverso. En conclusión, los hombres presentan mayores niveles de actividad física, menor percepción de igualdad de trato y mayor discriminación. Además, niveles de motivación más autodeterminados contribuyen a mayores niveles de actividad física en el contexto de la Educación Física.

Palabras clave: educación física, motivación, igualdad de género, discriminación, actividad física, educación secundaria.

1. Introduction

The main benefits of physical activity (PA) at the school level are that it helps to maintain a healthy energy balance and prevent overweight and obesity, reduce risk factors for cardiovascular diseases and stress, and improve psychological wellbeing, mental health, social interactions, cognitive function and academic performance (Galeano-Rojas et al., 2024; Infantes-Paniagua et al., 2023; Rodríguez-Torres et al., 2020). In this sense, the World Health Organisation (WHO, 2022) defines the reduction of physical inactivity in children and adolescents as a crucial task, outlining Physical Education (PE) as a vital setting for physical activity promotion, given its potential benefits in terms of cardio-metabolic, bone, physical, cognitive and mental health. This is important due to the fact that PA engagement tends to decrease as children grow up, above all in females, and that it has been demonstrated that those who are physically active at school age are more likely than those who are not to maintain an active lifestyle throughout the rest of their life. This makes it vital to identify solutions and preventive strategies to address this issue (Muñoz-Donoso et al., 2023; Solmon, 2015).

Schools and, particularly, PE classes, emerge as suitable settings for the promotion of PA given that they provide opportunities to guarantee that a minimum amount of time is spent in moderate and vigorous engagement, in addition to boosting motivation to integrate motor experiences into one's lifestyle outside of school (Lobo et al., 2023; Moral-García et al., 2023). In this sense, it is key to identify aspects that can improve student engagement and adherence to PA in the PE context (Montes-Reyna et al., 2024), especially considering the fact that children and young people spend a large part of their day at school (Camacho-Miñano et al., 2012). In addition, for many students, PE classes represent the only space in which they can engage in PA (Zueck et al., 2020). For this reason, Solmon (2015) and Urrutia-Medina et al. (2024) indicate that it is crucial to conduct more in-depth research into student motivation in PE classes, given that these motivations impact the way in which students act and learn, the decisions they make and, essentially, the way in which they choose to live their lives.

Motivation has been shown to be a key factor in teaching processes pertaining to PE (Castro-Sánchez et al., 2019) and, even, a predictor of extracurricular PA (Alcaraz-Ibáñez et al., 2022; Leo et al., 2016). One of the most commonly applied theories for studying motivation in the context of PE is self-determination theory. This describes forms of motivation towards performing an activity that range on a continuum from the most to least the self-determined (Castro-Sánchez et al., 2023). Three core types of motivation are illustrated: intrinsic motivation, extrinsic motivation (integrated, identified, introjected and external regulation) and demotivation (Deci & Ryan, 1985).

According to Deci and Ryan (1985, 2000), intrinsic motivation is when engagement in an activity is driven by satisfaction, pleasure and the benefits offered by the activity, with the activity being an outcome in itself, as opposed to participating in order to achieve some other objective. Extrinsic motivation, on the other hand, comprises four types of regulation. Firstly, integrated regulation refers to activities that are aligned with lifestyle habits. Secondly, identified regulation manifests when students perform an activity to gain certain benefits that they identify for themselves at a personal or social level (Deci & Ryan, 2000; Ryan & Deci, 2020). Introjected regulation is displayed when engagement is driven by personal pride and ego, in addition to avoid feelings of shame or guilt. Finally, external regulation pertains to performing an activity as a means of earning external rewards or avoiding punishment and criticism. The final core motivational type, demotivation, refers to a lack of interest in activity or activity not having meaning (Ryan & Deci, 2020).

In this sense, motivation is a determining aspect when it comes to identifying student drivers towards PE classes and PA engagement. Nonetheless, it is necessary to clarify that student behaviour in this subject is mediated by situations and experiences that only arise as a function of gender. Such experiences lead individuals to form more negative or positive attitudes towards PA engagement (Carcamo et al., 2020), given that, in PE classes, gender stereotypes are more acutely perceived than in other subjects due to the greater interaction between students. This can give rise to perceptions of equality or discrimination that condition the way in which one acts with other students (Valdivia-Moral et al., 2018). Some of the main factors that can lead to inequality in the PE setting, a setting in which physical differences are heightened, include activity type, the curriculum, student likes and interests, language, feedback, material and grouping strategies (Arcila-Arango et al., 2022).

In this way, the role of the teacher is crucial for avoiding or reducing the perception of stereotypes by striving to motivate and encourage both males and females, given that the way in which they act will influence perceptions around whether or not equal treatment exists (Pérez et al., 2018). In addition, learning experiences must be structured in such a way that success is framed in terms of mastery, effort and individual task progress, incorporating content that is aligned with the needs and interests of all students (Cañabate et al., 2023; León-Reyes et al., 2024; Montes-Reyna et al., 2024). This is due to the fact that activities are often targeted more towards males than females, or vice versa, which generates feelings of inferiority, and affects participation, motivation and, even, self-esteem (Martínez-Abajo et al., 2020). For this reason, it is necessary to recognise student perceptions of certain attitudes and behaviours as a function of context, the subject matter and ways of interacting with teachers and peers. Previous research has demonstrated that students who perceive more equal treatment are more active during PE classes (Arcila-Arango et al., 2022). Particularly in women, this rebounds on preventing dropout and promoting greater commitment and enthusiasm towards PA engagement (Lamoneda et al., 2023; Llanos-Muñoz et al., 2022).

Students with stronger perceptions of equal treatment tend to have more active lifestyles and exhibit greater PA adherence, cooperation, self-confidence, positive affective feelings, rule compliance, effort and skill mastery pertaining to PA (Arrebola et al., 2019; Castillo et al., 2013; Navarro-Patón et al., 2020). In addition, equality has been found to be mediated by student perceptions of motivational climate and teacher interaction styles. Specifically, discrimination is linked with an ego-oriented motivational climate and teacher control strategies (Moreno-Murcia et al., 2011). In this case, motivation tends to be external and so experiences of success are scarcer, and disappointment, anxiety and dropout are higher (Castillo et al., 2013; López, 2021). In this sense, it is necessary to conduct a more in-depth analysis of student motivation, in addition to their perceptions of equality and discrimination in PE classes. This will support the provision of greater opportunities for participation and promote positive learning experiences of PA engagement in both males and females, with the aim of improving adherence to a more physically active and healthy lifestyle. Thus, against this backdrop, the aims of the present study are to: (a) analyse sex differences in the relationships between PA engagement, motivation and perceptions of equality and discrimination in PE; and (b) determine the predictive value of intrinsic motivation, extrinsic motivation (identified, introjected and external regulation) and perceptions of equal treatment in PE in terms of PA engagement.

2. Method

2.1. Design and participants

The present study was quantitative in nature and employed an experimental, cross-sectional and descriptive research design. The sample was composed of 310 students enrolled on years one to four of compulsory secondary education (CSE). The average age of participants was 13.9 ± 1.2 years. In terms of distribution, 169 (54.5%) participants were male, 125 were female (40.3%) and 16 did not report their sex (5.2%) (see Table 1). Students came from one of three participating public CSE institutions located in the province of Granada and had a medium-low socioeconomic status. Non-probabilistic convenience sampling was used due to the fact that element selection does not depend on probability, but on the characteristics of the research (Hernández-Sampieri et al., 2014). Inclusion criteria used when forming the sample dictated that participants must be enrolled on CSE during the 2022-2023 academic year, belong to a mixed educational institution and count with written informed consent of the parents or legal guardians. On the other hand, participants were excluded if they failed to adequately complete all questions, or if their parents or legal guardians did not provide written informed consent.

Table 1. Descriptive statistics pertaining to the sample.

Sex	***n***	**%**	**Acd. year**	***n***	**%**	**Age**	***n***	**%**
Male	169	54.5	1st	82	26.5	12	51	16.5
Female	125	40.3	2nd	74	23.9	13	57	18.4
Missing	16	5.2	3rd	96	31	14	98	31.6
Total	310	100	4th	58	18.7	15	66	21.3
			Total	310	100	16	29	9.4
						17	9	2.9
						Total	310	100

2.2. Variables and instruments

2.2.1. Sociodemographic characteristics

An ad hoc questionnaire was used to gather sociodemographic participant data with regards to age, sex, nationality, type of educational institution and academic year.

2.2.2. Physical activity

For analysis of PA engagement, the Spanish version of the Physical Activity Questionnaire PAQ-C (Manchola-González et al., 2017) was employed. This instrument comprises ten items, nine of which estimate PA levels and one which evaluates whether some pathology or other event had impeded PA engagement during the week prior to questionnaire completion. Items are rated along a Likert scale that ranges from 1 to 5. In the case of item 1, total response scores are summed and then averaged by dividing by the number of activities considered by the questionnaire. With regards to items 2, 3, 4, 5, 6, 7 and 8, scores between 1 and 5 are given. Item 9 describes the weekly frequency with which students engage in PA. Finally, final scores of between 1 and 5 are obtained, with higher scores indicating greater PA engagement. In the original validation study for this instrument, internal consistency was found to be α = .83, which is slightly lower than the value obtained in the present study (α = .91), whilst composite reliability (CR) was .79 and extracted mean variance (EMV) was .36.

2.2.3. Motivation

In order to assess motivation, the motivation in Physical Education questionnaire (CMEF) (Sánchez-Oliva et al., 2012) was administered. This questionnaire comprises 20 items that are rated along a Likert scale ranging from 1 (totally disagree) to 5 (totally agree) and assess the following types of motivation: intrinsic motivation (items 1, 6, 11 and 16), extrinsic motivation (identified regulation: items 2, 7, 12 and 17; introjected regulation: items 3, 8, 13 and 18, and; external regulation: items 4, 9, 14 and 19) and demotivation (items 5, 10, 15 and 20). Original validation of this scale produced internal consistency values of between α = .77 and .83, whilst in the present study values were α = .86, CR = .90 and EMV = .36.

2.2.4. Perceptions of gender equality and discrimination

In order to evaluate perceptions of equality and discrimination, the perceptions of equality and discrimination in PE questionnaire (CPIDEF) (Cervello et al., 2004) was administered. This questionnaire is composed of 19 items that are rated along a Likert scale ranging from 0 (totally disagree) to 10 (totally agree) and assess the following dimensions: equality of treatment (items 1, 2, 3, 5, 6, 10, 13, 15, 16, 17, 18 and 19) and discrimination (4, 7, 8, 9, 11, 12 and 14). The instrument has previously presented internal consistency of α = .77 (Valdivia-Moral et al., 2018) and obtained values of α = .78, CR = .78 and EMV = .26 in the present study.

2.3. Procedure

Initially, during the month of December in 2022, the study was submitted to the Committee of Research Ethics at the University of Granada and, in the month of March, approval was received under the reference number 3324/CEIH/2023. Following this, for data collection, contact was made with educational institutions, via management teams, informing them about the nature of the study and requesting the participation of their students. Given that the students were minors, an informed consent form for parents or legal guardians to sign was included within the information pack. Likewise, it was stated that study participation was entirely voluntary, with participants being free to leave the study at any time. Anonymity was also guaranteed throughout the research process.

Following the receipt of authorisation from participating educational institutions and signed consent from parents or legal guardians, a date was scheduled to complete questionnaire administration. Questionnaires were administered to students in paper format. During administration, a member of the research group was on hand at all times in order to ensure that the process was completed properly and to resolve any potential doubts. Finally, gathered data was extracted and integrated into a database for later analysis. The present research complied with recommendations laid out in the Declaration of Helsinki (World Medical Association, 2008).

2.4. Data analysis

All statistical analyses were performed using the software IBM SPSS Statistics 28.0. First, preliminary analysis was performed of descriptive data (mean and standard deviation) and questionnaire reliability was estimated according to Cronbach alpha (α) and complimentary values such as composed reliability and extracted mean variance. Further, the Kolmogorov-Smirnov test was applied in order to check whether data followed a normal distribution. Outcomes of this led to non-parametric tests being opted for (p <.05). Next, the Mann-Whitney U test was employed to compare differences in variables as a function of sex. This was complimented with effect size and statistical power estimates according to Hedges g. Finally, Spearman correlation coefficients were calculated to examine associations between variables and multiple linear regression was performed to estimate the predictive power of variables when it comes to explaining PA engagement.

3. Results

Table 2 presents outcomes of the descriptive analysis and Mann-Whitney U analyses used to compare mean differences between males and females. Initially, statistically significant differences emerged for PA engagement (p = .005, g = 0.71, 1-β =.71) with males reporting higher mean scores. At the same time, significant differences were observed for perceptions of equality of treatment (p = .031, g = 2.33, 1-β = .51) with females reporting higher mean scores, whereas, in terms of perceptions of discrimination, males reported higher scores (p = .002, g = 2.63, 1-β = .87). In contrast, no significant differences were found for any of the dimensions pertaining to motivation.

Table 2. Mean comparisons according to sex.

	Males			Females					
Variables	**M**	**SD**	**Mean range**	**M**	**SD**	**Mean range**	***p***	***g***	**1-β**
Physical activity	2.77	0.687	99.58	2.49	0.74	77.60	.005	0.71	.71
Intrinsic motivation	3.31	1.286	132.04	3.33	1.15	130.77	.893	1.23	.05
Identified regulation	3.06	1.180	130.92	3.11	1.11	132.27	.886	1.15	.06
Introjected regulation	2.85	1.059	134.93	2.78	0.99	130.45	.636	1.03	.08
External regulation	2.78	1.027	133.50	2.60	0.97	119.38	.129	1.01	.30
Demotivation	2.48	1.273	133.34	2.27	1.17	121.97	.22	1.23	.26
Equality of treatment	7.42	2.435	104.62	8.03	2.16	123.48	.031	2.33	.51
Discrimination	5.06	2.651	129.61	3.98	2.58	102.05	.002	2.63	.87

Note: M = mean; DE = standard deviation; p = significance (<0.05); g = Hedges effect size; 1-β = statistical power.

Table 3 presents outcomes of the correlation analysis performed via the Spearman correlation coefficient. Firstly, it can be observed that PA engagement is positively correlated with intrinsic motivation (p = .001, rho = .439), identified regulation (p = .001, rho = .477), introjected regulation (p = .001, rho = .329) and extrinsic regulation (p = .044, rho = .155). Turning attention to intrinsic motivation, this was found to be positively correlated with identified regulation (p = .001, rho = .776), introjected regulation (p = .001, rho = .512), external regulation (p = .001, rho = .373) and equality of treatment (p = .001, rho = .393). whilst also being negatively correlated with demotivation (p = .001, rho = -.280).

With regards to identified regulation, outcomes revealed that this is positively associated with introjected regulation (p = .001, rho = .577), external regulation (p = .001, rho = .421) and equality of treatment (p = .001, rho = .324), whilst also being negatively associated with demotivation (p = .001, rho = -.224). Moving on, introjected regulation was revealed to be positively associated with external regulation (p = .001, rho = .655) and equality of treatment (p = .032, rho = .147). External regulation was positively associated with demotivation (p = .001, rho = .224) and discrimination (p = .026, rho = .151). Finally, findings indicated that demotivation is positively related with discrimination (p = .001, rho = .268) and negatively related with equality of treatment (p = .001, rho = -.270), with equality of treatment and discrimination being negatively related (p = .001, rho = -.261).

Table 3. Correlation analysis.

	2	3	4	5	6	7	8
1. Physical activity	.439**	.477**	.329**	.155*	-.131	-.022	-.057
2. Intrinsic motivation		.776**	.512**	.373**	-.280**	.393**	-.086
3. Identified regulation			.577**	.421**	-.224**	.324**	-.079
4. Introjected regulation				.655**	.045	.147*	.060
5. External regulation					.224**	0.133	.151*
6. Demotivation						-.270**	.268**
7. Equality of treatment							-.261**
8. Discrimination							

Note: * = p <0.05; ** = p <0.01.

Table 4 presents outcomes produced from the multiple linear regression performed, using the enter method, to examine the predictive power of intrinsic motivation, extrinsic motivation (identified, introjected and external regulation) and equality of treatment in terms of PA engagement. Outcomes revealed an R^2 value of .266. In other words, intrinsic motivation, extrinsic motivation and equality of treatment predicted 26.6% of variance in PA engagement. The model was confirmed to be statistically linear (F = 8.685; p = <.001). It can be observed that identified regulation is the variable that most significantly and positively predicts PA engagement AF (p = .008), whilst equality of treatment emerges as a significant predictor but with an inverse effect (p = -.032). In other words, higher identified regulation goes hand in hand with greater PA engagement, whilst stronger perceptions of equality of treatment predict lower PA engagement. No statistically significant outcomes were produced for any of the remaining variables.

TABLE 4. Linear regression outcomes.

Model	B	Standard error	β	*p*
Constant	2.153	.238		<.001
Intrinsic motivation	.101	.085	.175	.236
Identified regulation	.250	.093	.398	.008
Introjected regulation	.051	.086	.071	.552
External regulation	-.092	.073	-.126	.211
Equality of treatment	-.060	.028	-.189	.032

Note: B = unstandardized coefficient; β = standardised coefficient; *p* = significance.

4. Discussion

The present research aimed to determine differences according to sex and relationships between PA engagement, motivation and perceptions of equality and discrimination in PE. Another aim was to estimate the predictive power of intrinsic motivation; identified, introjected and external regulation, and equality of treatment perceptions in PE in terms of PA engagement. The importance of this study stems from the fact that it takes a sex perspective and shines a light on the relationships between variables and predictive power of these relationships regarding PA engagement. Indeed, whilst numerous different studies have previously examined the relationships between these variables (Castillo et al., 2013; Ordoñez & Heredia, 2021; Schenker, 2019; Zapatero et al., 2021), no prior evidence exists in which the overall impact of motivation and perceptions of equality and discrimination on PA engagement is examined in schoolchildren. In this sense, findings of the present study offer a new perspective of the role of PE for improving PA adherence and promoting physically active lifestyles.

Firstly, significant differences in PA engagement and perceptions of equality of treatment and discrimination emerged as a function of sex. Males reported higher mean scores than females for PA engagement, as supported by other previous research (Galeano-Rojas et al., 2024; Gasiūnienė & Miežienė, 2021; Vargas-Viñado & Herrera-Mor, 2020). This may be explained by the fact that males follow more physically active lifestyles, as much in the school setting as outside of school, possibly due to their tighter bond with sport, stronger predisposition towards high-intensity activities, and family and social influences that help males to have more time available at times of the day outside of the school timetable. In contrast, females exhibit more sedentary behaviours and higher PA dropout rates, which may be due to the diverse social stereotypes that emerge within and outside of the school setting (Bobo-Arce et al., 2024; Burton et al., 2020; Castillo et al., 2013; Vargas-Viñado & Herrera-Mor, 2020).

With regards to equality of treatment, females report higher mean scores, whilst males perceive greater discrimination. This finding is similar to those reported in previous research, such as in studies conducted by León-Reyes et al. (2024) and Valdivia-Moral et al. (2018), in which females also perceived greater equality of treatment in PE classes in comparison with males. However, studies conducted by Arcila-Arango et al. (2022) and Pérez et al. (2018) revealed that, despite females perceiving greater equality of treatment, they also reported higher levels of discrimination. In this sense, males perceived lower levels of equality of treatment and higher levels of discrimination. These differences tend to be associated, to a large extent, to the types of motivation encouraged by teachers (León-Reyes et al., 2024; Oliver et al., 2023), who may perceive that females are in need of greater motivation and, consequently, focus more on females and generate feelings of discrimination amongst males (Arcila-Arango et al. 2022; Jiménez et al., 2021). In addition, according to Blández et al. (2007) and Frühauf et al. (2022), even when teachers strive to motivate all students equally, females tend to be more impacted by these behaviours.

In terms of the relational analysis, PA engagement was positively related with intrinsic motivation and the different types of examined extrinsic motivation. This finding concurs

with those reported by Ordoñez and Heredia (2021) and Vaquero-Solís et al. (2020) which also revealed PA engagement to be positively associated with all dimensions of motivation, with the exception of external regulation and demotivation which were negatively related. In this sense, it has been argued that, as students engage in more PA, they exhibit higher levels of more self-determined forms of motivation (Chu & Zhang, 2020; Ley, 2020), which, in parallel, breeds adaptive behaviours regarding PA (Deci & Ryan, 2000).

Turning attention to motivation, positive associations were observed between the most and least self-determined forms of motivation, with intrinsic motivation and identified regulation being inversely related with demotivation. In line with these findings, studies conducted by Fierro et al. (2019) and Ordoñez and Heredia (2021) reported similar outcomes, whilst also revealing a negative relationship between intrinsic motivation and introjected regulation. Further, work conducted by Charchaoui et al. (2017), similarly, found demotivation to be negatively related with more self-determined types of motivation. In this way, it is crucial that students have opportunities to participate in environments that ensure positive experiences (Carcamo et al., 2020; Frühauf et al., 2022), given that success in PA is mediated by student task engagement, with the main reasons for participation being physical and mental wellbeing, peer relationships, skill development, and fun and recreation (Carcamo et al., 2020; Castillo et al., 2013).

Finally, relational analysis revealed existence of an inverse association between equality of treatment and discrimination, with equality of treatment being positively associated with more self-determined forms of motivation and discrimination being positively related with less self-determined forms of motivation. This finding is in line with that reported by Vera et al. (2009) who found equality of treatment and discrimination to also be negatively associated. In addition, in accordance with Lamoneda et al. (2023) and Martínez-Abajo et al. (2020), motivation is key for understanding diverse student perceptions linked to equality of treatment and discrimination in PE. Students with greater perceptions of equality of treatment also perceive more satisfactory motivational climates and interact more effectively with teachers and peers. In contrast, environments permeated with the use of control strategies and framed by ego-oriented motivational climates breed greater perceptions of discrimination and demotivation. This takes on special importance when it comes to PA dropout, particularly in women (Castillo et al., 2013; López, 2021; Moreno-Murcia et al., 2011; Solmon, 2015).

In light of that discussed above, given that gender stereotypes condition behaviour (Arcila-Arango et al., 2022; Arrebola et al., 2019; Jiménez et al., 2021; Valdivia-Moral et al., 2018), a clear need exists for teacher training in relation to gender, as well as a broad array of materials and methodologies which nudge teachers away from sexist behaviours that may affect student participation. This would help teachers overcome, amongst other issues, the failure to adapt culturally and socially accepted models of masculinity and femininity, which give rise to discriminatory and, even, aggressive behaviour (Martínez-Abajo et al., 2020; Mujica-Johnson et al., 2023). The surge of movements such as feminism shapes educational programs so that they pay more attention to girls in classes (Chihuailaf-Vera et al., 2024) and, consequently, boys may develop perceptions of discrimination. Further, according to Carcamo et al. (2020), boys tend to limit themselves to engaging in one or two sports, whereas girls tend to adapt more easily to different types of activities.

Finally, with a view towards identifying the extent to which intrinsic motivation, extrinsic motivation and perception of equality of treatment predict PA engagement, findings highlight identified regulation as the variable that most significantly and positively predicts PA engagement, whilst equality of treatment is the most pronounced negative predictor. This finding coincides with that reported by Vaquero-Solís et al. (2020), who also found identified regulation to be a strong predictor of PA engagement, alongside intrinsic motivation and external regulation, with the latter being negatively associated, as was the case (although not significantly) in the present study. Similarly, Merino-Barrero et al. (2019) and Franco et al. (2017) argue that more self-determined levels of motivation predict the intention to be physically active and adhere to healthy lifestyle habits. This, in turn, provides a solid foundation for maintaining PA engagement over the entire life course (Habib et al., 2022). In another sense, the inverse predictive power of perceived equality of treatment is reflected through the finding that males reported higher mean values of PA engagement, but, at the same time, also exhibited lower perceptions of equality of treatment.

4.1. Limitations and future perspectives

With regards to study limitations, it serves to highlight that the research design used impedes conclusions from being made regarding causality, whilst the relatively small sample size also limits generalisability of the findings. In addition, with a view towards the future, it would be useful to employ instruments, such as accelerometers, which can provide more accurate information about PA engagement. Another approach could be to integrate qualitative measurement techniques, such as semi-structured interviews, in order to gather additional information related with student motivation and perceptions of equality and discrimination in PE. Likewise, it is recommended that intervention programs be designed that use autonomy-supportive pedagogical models in order to promote greater engagement and self-determined motivational predispositions and examine their impact on PA engagement and perceptions of equality and discrimination. In conclusion, initiatives are required that provide students with opportunities to participate in PE classes with high levels of motivation and equality. This will promote PA adherence and encourage healthier lifestyle habits.

5. Conclusions

With regards to the study goals, it can be concluded that statistically significant differences exist between males and females in the study variables of PA engagement, equality of treatment and discrimination, with males exhibiting higher PA engagement, lower perceptions of equal treatment and greater perceptions of discrimination. At the same time, PA engagement is positively related with intrinsic motivation, as well as identified, introjected and external regulation. When it comes to perceptions of equality and discrimination in PE, evidence supports that greater perceptions of equality are associated with higher intrinsic motivation, and identified and introjected regulation. At the same time, greater perceptions of discrimination were related with greater demotivation and external regulation. In other words, higher levels of self-determined motivation was associated with greater perceptions of equality and higher PA engagement, whilst, in contrast, lower levels of self-determined motivation went hand in hand with greater perceptions of discrimination.

Finally, regression outcomes demonstrated that identified regulation was the most powerful determinant of greater PA engagement, whilst perceptions of equal treatment had the opposite effect. This supports findings that males engage in higher levels of PA but have lower perceptions of equality of treatment. Further, both males and females exhibited higher levels of self-determined motivation in PE.

Authors' contributions

Dilan Galeano-Rojas: Conceptualization; Data collection; Formal analysis; Writing (original draft); Writing (review and editing); Research; Methodology.

Claudio Farías-Valenzuela: Data collection; Formal analysis; Methodology; Resource management.

Claudio Hinojosa-Torres: Supervision; Visualisation; Writing (original draft); Writing (review and editing).

Pedro Valdivia-Moral: Project management; Methodology; Resources; Supervision; Visualisation; Writing (review and editing).

Artificial intelligence (AI) policy

Authors declare that they have not used artificial intelligence (AI) for article elaboration.

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