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Predicting Intrinsic Motivation After an Adventure Education Program in Primary Schools: Enjoyment, Self-Confidence and Resilience According to Gender

Andrés Calmaestra [1], Antonio Baena-Extremera [1], Josué González-Ruíz [1,*] and José Antonio Sánchez-Fuentes [2]

[1] Department of Didactics of Musical, Plastic and Bodily Expression, University of Granada

[2] Department of Physical Activity and Sport, University of Murcia

* Correspondence: josue@ugr.es

Abstract

This study aimed to analyse the effects of a parkour-based Adventure Education (AE) program on the intrinsic motivation of primary school students, and to examine the role of enjoyment, self-confidence, and resilience as associated and predictive variables, considering differences according to time (pre-test–post-test) and gender. The sample consisted of 492 fifth- and sixth-grade primary education students (249 boys and 243 girls) with a mean age of 10.67 years, enrolled in 12 Spanish schools. A quasi-experimental design with pre-test and post-test measures was used following the implementation of a seven-session program based on the Pedagogical Model of Adventure Education. Data were collected using instruments validated in the Spanish population: the Intrinsic Motivation subscale of the Perceived Locus of Causality Scale, the Physical Activity Enjoyment Scale to measure enjoyment, the Self-Confidence subscale of the Competitive State Anxiety Inventory, and the Connor–Davidson Resilience Scale to assess resilience. Statistical analysis was performed using SPSS 28.0 software, conducting descriptive analyses, correlations, and hierarchical multiple linear regressions to examine the predictive capacity of the variables, and a 2×2 repeated-measures ANOVA (time × gender). The results showed significant increases in intrinsic motivation, enjoyment, self-confidence, and resilience after the intervention. Enjoyment emerged as the main predictor of intrinsic motivation, followed by self-confidence and resilience. Furthermore, the ANOVA revealed the significant effect of time whereas there were no significant differences between boys and girls, indicating that the program was equally effective for both genders.

Keywords: adventure education; motivation; parkour

1. Introduction

In the field of Physical Education (PE), motivation is recognized as a key factor for ensuring the students' enjoyment, active participation, and promotion of long-term healthy habits (Becerra-Fernández, Mayorga-Vega & Guijarro-Romero, 2025). The contributions of Self-Determination Theory (SDT; Deci & Ryan, 2000) distinguish, among other things, between intrinsic motivation (engaging in an activity for inherent pleasure and satisfaction) and extrinsic motivation (participating because of external rewards or internal pressures). This distinction has recently been applied within PE and has shown that intrinsic motivation is associated with positive achievement-related emotions, such as greater enjoyment and persistence (Carson et al., 2025; Navarro-Patón et al., 2024) in both boys and girls whereas amotivation is linked to negative emotions and withdrawal from physical activity (Işıkgöz, 2025) in both genders. Furthermore, regarding the students' gender, some studies have reported higher levels of intrinsic motivation and enjoyment among boys compared to girls (Navarro-Patón et al., 2024; Gómez-Rijo et al., 2011; Botella et al., 2021).

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In recent years, methodologies have emerged that enhance motivation while seeking to foster more meaningful learning and more positive emotions in Physical Education (PE). The Pedagogical Model of Adventure Education (PMAE) is characterized by individual, cooperative, and experiential tasks that make students face physical, social, and emotional challenges − combining challenge, uncertainty, adventure, and learning within the PE lesson (González-Melero et al., 2026). A recent mixed review shows that Adventure Education (AE) programs improve resilience and life satisfaction while reducing stress levels; moreover, they promote leadership, self-efficacy, peer support, and a sense of group belonging (Ghani et al., 2025). Using this pedagogical model, successful practices have been reported over a wide range of psychological and academic variables, based on activities such as caving, climbing, *via ferratas*, and numerous adventure sports (Baena-Extremera et al., 2012; González-Melero et al., 2026; Horno-Tomé et al., 2025, among others), with parkour emerging as one of these practices.

The practice of parkour, which emerged in France in the 1990s as a training method for overcoming obstacles, has evolved into a non-competitive sport that combines running, jumping, and climbing skills. Its creative nature and emphasis on self-determination make it a discipline that can facilitate the satisfaction of autonomy and competence needs (Miranda-Ullán et al., 2024). A recent multimethod analysis highlighted how the non-competitive and creative nature of parkour can support intrinsic motivation in young people, offering an environment in which exploration, self-expression, and camaraderie foster sustained participation (Carson et al., 2025). However, the literature on parkour within school contexts is still limited (Montoro & Baena-Extremera, 2015); most studies focus on extracurricular programs and adolescents, and there is a clear lack of empirical research on primary school students (Torronteras, 2023), whether in Spain or internationally. Even fewer studies exist that combine parkour with such an experiential and innovative pedagogical model.

Given the current situation, the following research hypotheses have been formulated for this work:

- Hypothesis 1 (H1). Participation in the parkour-based AE program will lead to a significant increase in the students' levels of intrinsic motivation, enjoyment, self-confidence, and resilience from pre-test to post-test.

- Hypothesis 2 (H2). Intrinsic motivation will be positively and significantly associated with enjoyment, self-confidence, and resilience, both before and after the intervention, in boys and girls.

- Hypothesis 3 (H3). Enjoyment will be the main predictor of intrinsic motivation, followed by self-confidence and resilience, both at pre-test and post-test, regardless of gender.

- Hypothesis 4 (H4). A significant time effect will be observed on intrinsic motivation, showing higher values at post-test than at pre-test.

Considering these hypotheses, the aim of this research was to analyse the effects of a parkour-based Adventure Education (AE) program on the intrinsic motivation of primary school students, and to examine the role of enjoyment, self-confidence, and resilience as associated and predictive variables, taking into account differences based on time (pre-test–post-test) and gender.

The following specific objectives were established:

1. To examine the changes produced in the students' intrinsic motivation, enjoyment, self-confidence, and resilience following the implementation of the parkour-based Adventure Education program.
2. To analyse the relationships between intrinsic motivation and enjoyment, self-confidence, and resilience, differentiating by gender and assessment time (pre-test and post-test).
3. To determine the predictive capacity of enjoyment, self-confidence, and resilience on intrinsic motivation before and after the intervention, differentiating between boys and girls.
4. To evaluate the effect of time (pre-test vs. post-test) and gender on intrinsic motivation through a repeated-measures analysis.

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2. Materials and Methods

2.1. Sample

The sample design was non-probabilistic and by convenience, based on subjects who were accessible. The sample consisted of 492 students (249 boys, 50.6%; 243 girls, 49.4%) with a mean age (*M*) of 10.67 years and a standard deviation (*SD*) of 0.546. Of these, 180 were 10 years old (36.6%), 293 were 11 years old (59.6%), and 19 students were 12 years old (3.9%), with 147 students (29.9%) from the 5th grade and 345 (70.1%) from the 6th grade of primary education. The students came from 12 Spanish schools (in Córdoba, Cádiz, Zaragoza, Segovia, Alcorcón, Navarra, Toledo, and Palencia) (see Table 1).

Regarding the sample size of the present study (*N* = 492), this can be considered sufficient and adequate for performing the statistical analyses. According to the methodological recommendations for correlational analyses and multiple linear regression with moderate effect sizes (*f^2* ≈ .15), a significance level of *α* = .05 and a minimum statistical power of .80 is desirable – the required sample size is therefore considerably lower than that used in this study. Similarly, for a repeated-measures ANOVA with one within-subjects factor (Time) and one between-subjects factor (Gender), assuming a medium effect size (*η^2p* ≈ .06), the recommended sample size would be less than 200 participants (Miranda, 2025; Ryan, 2013). In this regard, the sample employed in the present study ensures a high statistical power, reducing the probability of Type II errors and allowing the detection of small-to-moderate effects with a high degree of precision. The high power observed in the main contrasts performed supports the robustness of the obtained results.

Table 1. Sample distribution by school.

Gender	Alfredo Muiños Remolinos	Ángel Carrillo	Camacho Melendo	Campos Castellanos	Villas del Tajo	Maestro Juan Apresa
Boys	78.6%	50.0%	53.2%	56.0%	39.4%	40.8%
Girls	21.4%	50.0%	46.8%	44.0%	60.6%	59.2%
Total	14	42	79	25	33	71
	Ntr. Señora de la Asunción de Santacara	**Princesa Sofía**	**Rodríguez Vega**	**Vicente Aleixandre**	**Virgen del Castillo**	**Santo Domingo de Guzmán FESD**
Boys	60.0%	54.5%	52.6%	51.4%	53.3%	46.8%
Girls	40.0%	45.5%	47.4%	48.6%	46.7%	53.2%
Total	10	66	38	37	30	47

2.2. Design

A quasi-experimental, cross-sectional, descriptive, and correlational design was used, considering the organization of the schools and classrooms. To conduct this study, several school and student selection criteria were set: (1) schools willing to implement an Adventure Education (AE) program in the classroom; (2) schools willing to allow students to leave the school premises during the first term as many times as necessary to complete the proposed program; (3) schools with the capacity to include a parkour-related learning situation in their teaching plans using the Pedagogical Model of Adventure Education (PAM). Based on these criteria, 12 schools from different geographical areas of Spain were selected (see Table 1)

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2.3. Instruments

Various instruments that had been previously validated in the Spanish population were employed for data collection and to evaluate the variables under study:

Intrinsic Motivation. The intrinsic motivation variable from the Perceived Locus of Causality Scale in Physical Education (PLOC Scale) by Goudas, Biddle and Fox (1994), adapted by Moreno, González-Cutre and Chillón (2009), was used. The instrument is preceded by the phrase: "I participate in this Physical Education class..." and uses items such as "… because Physical Education is fun," in which students respond on a Likert scale from 1 (totally disagree) to 7 (totally agree). The fit and reliability indices in the pre-test and post-test were as follows: Cronbach's alpha (α) = .70/.70, McDonald's omega composite reliability (ω) = .72/.73, and average variance extracted (AVE) = .52/.57.

Enjoyment. The enjoyment variable from the Physical Activity Enjoyment Scale (PACES) by Motl et al. (2001), adapted by Moreno et al. (2008), was used. This instrument begins with the phrase "When I am active..." and uses items of the type "… I enjoy it," where students must respond on a Likert-type scale from 1 (totally disagree) to 5 (totally agree). The fit and reliability indices in the pre-test and post-test were α = .78/.81, ω = .74/.78, and AVE = .61/.66.

Self-Confidence. To measure self-confidence, the self-confidence variable from the Spanish version of the Competitive State Anxiety Inventory CSAI-2R by Andrade, Lois, and Arce (2007) was used. This inventory integrates a self-confidence subscale that estimates the degree of security that the subject believes they have regarding their possibilities of success in performing tasks, with items such as "I am confident in myself." For this purpose, 5 items are used, which provide a global score between 5 and 20, responding to each of the statements using a Likert-type response format with four alternatives, where 1 is totally disagree and 4 is totally agree. The fit and reliability values in the pre-test and post-test were α = .80/.77, ω = .83/.81, and AVE = .65/.64.

Resilience. Finally, to measure resilience, the CD-RISC scale adapted by Notario-Pacheco et al. (2011) in its Spanish version was used. This measures an individual's capacity for adaptation and recovery in adverse situations ("In difficult times, I generally expect the best"). The items comprising this instrument are responded to using a Likert scale with five response options, where 0 is never and 4 is almost always. This instrument obtained α = .73/.78, ω = .99/.99, and AVE = .97/.97 in the pre-test and post-test, respectively.

2.4. Procedure

Permission was obtained from the competent authorities to conduct the research, both from the primary schools and from the university institutions. The research was carried out in accordance with the 1961 Declaration of Helsinki, with approval from the University of Granada Ethics Committee (UGR), identification number: 5306/CEIH/2025.

In this regard, all study participants, or their legal guardians, signed an informed consent form; this provided them with detailed information about the objectives, procedures, and characteristics of the research. They were also informed that their participation was voluntary and that they could withdraw from the study at any time without having any repercussions on their academic grades or educational progress. They were informed that there were no correct or incorrect answers, and were asked at the outset to respond with maximum sincerity and honesty. The instruments measuring the different variables were administered in the classroom by the researchers themselves; the teacher was not present in order to avoid researcher bias.

2.5. Intervention Program

Prior to the program starting, the pre-intervention questionnaires were administered by each teacher in their respective school on a mass scale. Once data collection was completed, it was verified that the questionnaires had been correctly filled in. Subsequently, after the program activity had ended, the questionnaires were administered again (the post-intervention), following the same initial procedure, also under the teachers' supervision to ensure data validity and avoid possible errors.

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The program was carried out during the second term of 2025, following the Pedagogical Model of Adventure Education (PMAE) by Baena-Extremera (2011). The description of the intervention can be found below, according to the TIDieR guide (Hoffmann et al., 2014). The objective of the program was to examine the effects of a parkour-based Adventure Education (AE) program on intrinsic motivation, enjoyment, self-confidence, and resilience. This program is designed for a learning situation consisting of a total of seven sessions. The intervention was applied to each of the groups in the selected schools, with pre- and post-analyses conducted. The intervention is detailed below:

Description of the Intervention Program

1. Name: Adventure Education Program through Parkour (PEAP)

2. Why: Adventure Education is an effective pedagogical approach for improving several variables affecting primary education students, as supported by research conducted in other population contexts.

3. What (materials): the following assessment instruments were employed:

- PLOC Scale − to measure intrinsic motivation
- PACES Scale − to measure enjoyment
- CSAI-2R Scale −to measure self-confidence
- CD-RISC10 Scale −to measure resilience

4. What (procedures): An intervention program was implemented with measurements prior to and following its execution.

5. Who (provided): The program activities were conducted by teachers specialized in Physical Education; they themselves carried out the pre- and post-assessments.

6. How: The program lasted several sessions.

7. Where: Both the program activities and the assessments were carried out in 12 Spanish schools (Córdoba, Cádiz, Zaragoza, Segovia, Alcorcón, Navarra, Toledo, and Palencia).

8. When and how much: The program development and assessments took place over several sessions. The tests were applied at two time points: one hour before the start of the program (the pre-test) and one hour after its completion (the post-test).

9. Adaptation considerations: Each session included a series of activities adapted to the Adventure Education model and according to its phases and stages.

10. Modifications: Adjustments were made to certain activities based on the participants' level, with safety always the priority.

11. How well (planned): The general coordination was the responsibility of the teaching staff who were specialized in implementing the program, and in collaboration with the researchers responsible for the study.

12. How well (was it actually carried out): The program was carried out as planned and its effects could be verified. A daily verification system of the program's fidelity was followed.

2.6. Statistical Analysis

Data analysis was conducted using IBM SPSS Statistics (version 28.0) software. First, normality tests and descriptive analyses of all the variables under study were performed, calculating the means (M), standard deviations (SD), and the skewness and kurtosis indices, to examine the data distribution and to verify their suitability for parametric or non-parametric analyses.

The internal consistency of each instrument was analysed using various coefficients, including Cronbach's alpha, McDonald's omega, and the Average Variance Extracted (AVE). The reliability criteria were values above .70, and AVE greater than .50 (Hair et al., 2019).

After confirming the data as being "non-normal," Spearman's bivariate correlation analyses were conducted to examine the relationships between intrinsic motivation, enjoyment, self-confidence, and resilience, differentiated by gender (boys and girls) and assessment time (pre-test and post-test). Subsequently, a hierarchical multiple linear regression analysis was performed to assess the predictive capacity of enjoyment, self-confidence, and resilience on intrinsic motivation, which was considered as the criterion variable. The analyses were conducted separately for boys and girls, both

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at pre-test and post-test. In the first block, enjoyment was introduced; in the second block, self-confidence; and in the third block, resilience. Prior to this, residual independence assumptions were checked using the Durbin–Watson statistic, as well as the absence of multicollinearity using tolerance indices and the variance inflation factor (VIF), with the obtained values being deemed adequate.

Although the normality tests indicated deviations from normality, a 2 × 2 repeated-measures ANOVA was employed due to the sample size (N = 492) and the robustness of ANOVA to moderate deviations from this assumption, especially when group sizes are large. Likewise, non-parametric alternatives (e.g., Friedman/Wilcoxon) do not allow direct evaluation of the time × gender interaction with the same 2 × 2 model design (Hair et al., 2009; Mertler, Vannatta & LaVenia, 2025).

3. Results

Tables 2 and 3 present the descriptive statistics (mean, standard deviation, skewness and kurtosis) of the variables analysed by gender and assessment time (pre- and post-intervention).

For the boys (Table 2), the results show an increase in the means of all the variables following the intervention. Intrinsic motivation went from a mean of 5.84 (SD = .79) in the pre-test to 6.34 (SD = .82) in the post-test. Similarly, enjoyment increased from 3.96 (SD = .58) to 4.35 (SD = .55), self-confidence from 3.19 (SD= .61) to 3.55 (SD = .47), and resilience from 2.87 (SD = .50) to 3.13 (SD = .58).

The skewness and kurtosis values in the pre-test are close to zero for all the variables, indicating approximately normal distributions. In the post-test, greater negative skewness and higher kurtosis values are observed in intrinsic motivation and self-confidence, suggesting a greater concentration of high scores following the intervention.

For the girls (Table 3), a similar pattern is observed. Intrinsic motivation increased from 5.80 (SD = .81) in the pre-test to 6.21 (SD = .97) in the post-test. Enjoyment went from 3.92 (SD = .53) to 4.30 (SD = .58), self-confidence from 3.12 (SD = .55) to 3.47 (SD = .52), and resilience from 2.85 (SD = .45) to 3.04 (SD = .65).

As with the boys, the skewness and kurtosis indices in the pre-test reflect distributions close to normality, while in the post-test, more pronounced negative skewness and positive kurtosis values are observed in intrinsic motivation and self-confidence, indicating a shift in scores towards higher values following the intervention.

Table 2. Means, standard deviations, skewness and kurtosis of variables in pre-test and post-test for boys.

	M	SD	γ1	γ2
Intrinsic Motivation pre	5.84	.79	-.45	-.12
Intrinsic Motivation post	6.34	.82	-1.70	3.35
Enjoyment pre	3.96	.58	-.66	1.44
Enjoyment post	4.35	.55	-.82	.49
Self-confidence pre	3.19	.61	-.63	-.227
Self-confidence post	3.55	.47	-1.69	3.329
Resilience pre	2.87	.50	-.73	1.159
Resilience post	3.13	.58	-.80	.094

Note: γ1= skewness; γ2=kurtosis.

Table 3. Means, standard deviations, skewness and kurtosis of variables in pre-test and post-test for girls.

	M	SD	γ1	γ2
Intrinsic Motivation pre	5.80	.81	-.11	-.83
Intrinsic Motivation post	6.21	.97	-1.50	1.88
Enjoyment pre	3.92	.53	-.52	1.81
Enjoyment post	4.30	.58	-.94	.96
Self-confidence pre	3.12	.55	-.40	-.61

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Self-confidence post	3.47	.52	-1.62	2.97
Resilience pre	2.85	.45	-.76	.94
Resilience post	3.04	.65	-.97	.34

Note: γ1= skewness; γ2=kurtosis.

3.1. Correlation Analysis

Tables 4 and 5 show the Spearman correlation coefficients between the analysed variables, differentiated by gender and assessment time. In both tables, the upper part corresponds to the pre-test and the lower part to the post-test.

For the boys (Table 4), intrinsic motivation in the pre-test was positively and significantly related to enjoyment ($r = .520$, $p < .01$), self-confidence ($r = .301$, $p < .01$), and resilience ($r = .306$, $p < .01$). Likewise, significant correlations were observed between enjoyment and self-confidence ($r = .352$, $p < .01$), enjoyment and resilience ($r = .390$, $p < .01$), and between self-confidence and resilience ($r = .450$, $p < .01$).

In the post-test, the relationships intensified, especially between intrinsic motivation and enjoyment ($r = .667$, $p < .01$). Positive and significant correlations were also observed between intrinsic motivation and self-confidence ($r = .423$, $p < .01$) and resilience ($r = .436$, $p < .01$). The associations between self-confidence and resilience were high ($r = .503$, $p < .01$), indicating a strong interrelationship between these variables following the intervention.

Table 4. Correlation Analysis. Upper part: pre-test, lower part: post-test for boys.

	Intrinsic.M	**Enjoyment**	**Self-confidence**	**Resilience**
Intrinsic.M	-	.520**	.301**	.306**
Enjoyment	.667**	-	.352**	.390**
Self-confidence	.423**	.426**	-	.450**
Resilience	.436**	.344**	.503**	-

Note: **p<.001,*p<.01,*p<.05.

For the girls (Table 5), intrinsic motivation in the pre-test showed positive and significant correlations with enjoyment ($r = .414$, $p < .01$), self-confidence ($r = .220$, $p < .01$), and resilience ($r = .218$, $p < .01$). The relationships between enjoyment and self-confidence ($r = .160$, $p < .01$) and between enjoyment and resilience ($r = .165$, $p < .01$) were more moderate.

In the post-test, the correlations increased notably. The strong relationship between intrinsic motivation and enjoyment stands out ($r = .736$, $p < .01$), as well as with self-confidence ($r = .538$, $p < .01$) and resilience ($r = .542$, $p < .01$). Additionally, the association between self-confidence and resilience was particularly high ($r = .661$, $p < .01$), indicating a strong relationship between both variables following the intervention.

Table 5. Correlation Analysis. Upper part: pre-test, lower part: post-test for girls.

	Intrinsic.M	**Enjoyment**	**Self-confidence**	**Resilience**
Intrinsic.M	-	.414**	.220**	.218**
Enjoyment	.736**	-	.160**	.165**
Self-confidence	.538**	.463**	-	.467**
Resilience	.542**	.470**	.661**	-

Note: **p<.001,*p<.01,*p<.05.

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3.2. Block Regression Analysis

A hierarchical multiple linear regression analysis was conducted to analyse the predictive capacity of enjoyment, self-confidence, and resilience on intrinsic motivation, differentiating by gender and assessment time (pre- and post-intervention). Prior to this, compliance with the assumptions of independence and absence of multicollinearity were verified, obtaining adequate tolerance, VIF, and Durbin–Watson statistic values for both the boys and the girls.

The regression analysis results for the boys are presented in Table 5. In the pre-test, enjoyment, which was introduced in the first block, was a significant predictor of intrinsic motivation (ß = .710), explaining 27% of the variance (R^2 = .270; F = 91.44, p < .001). In the second block, self-confidence contributed additionally to the prediction (ß = .175), increasing the explained variance to 28%. In the third block, resilience showed a lower weight (ß = .132), with the explained variance remaining around 28%.

In the post-test, enjoyment was once again shown to be the primary predictor of intrinsic motivation (ß = .997), explaining 44.5% of the variance (R^2 = .445; F = 198.39, p < .001). The inclusion of self-confidence in the second block increased the explained variance to 46.2%, with a significant weight (ß = .283). Finally, the resilience introduced in the third block contributed significantly (ß = .173), reaching a total of 47.7% of the explained variance.

The tolerance index for the boys showed pre-test values between .736 and .876 and post-test values between .678 and .807. The variance inflation factor (VIF) presented pre-test values between 1.141 and 1.359 and post-test values between 1.239 and 1.474; therefore, these values indicate that the probability of error derived from potential collinearity is ruled out (Hair et al., 2019). Likewise, the obtained Durbin-Watson statistic was between 1.89 in the pre-test and 1.85 in the post-test, confirming the independence of the data (Gil, 2003).

The results for the girls are shown in Table 7. In the pre-test, enjoyment was a significant predictor of intrinsic motivation (ß = .635), explaining 17.1% of the variance (R^2 = .171; F = 49.81, p < .001). In the second block, self-confidence showed a significant weight (ß = .233), increasing the explained variance to 20%. In the third block, resilience presented a moderate weight (ß = .185), with the explained variance remaining around 20.4%.

In the post-test, enjoyment explained a very high proportion of intrinsic motivation (ß = .736), reaching 54% of the explained variance (R^2 = .540; F = 285.14, p < .001). The incorporation of self-confidence in the second block increased the explained variance to 58.8% (ß = .251). Finally, resilience, which was introduced in the third block, showed a significant weight (ß = .161), reaching 60% total explained variance.

In the case of the girls, the tolerance index showed pre-test values ranging from .774 to .975 and post-test values between .529 and .786. The variance inflation factor (VIF) presented pre-test values between 1.00 and 1.293 and post-test values between 1.273 and 1.889; therefore, these values indicate that the probability of error derived from potential collinearity is ruled out (Hair et al., 2019). Likewise, the Durbin-Watson statistic obtained was between 1.98 in the pre-test and 1.86 in the post-test, confirming the independence of the data (Gil, 2003). Tables 6 and 7 present the results of the hierarchical linear regression analysis for the boys and the girls in the pre- and post-tests, with intrinsic motivation as the criterion variable.

Table 6. Block regression analysis in boys with pre- and post-treatment.

PRE BOYS						**POST BOYS**					
Intrinsic motivation						**Intrinsic motivation**					
Variables	**F**	**β**	**R2**	**t**	**P (95%CI)**	**Variables**	**F**	**β**	**R2**	**t**	**P (95%CI)**

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Enjoyment	91.44	.710	.270	9.56	.000 (.564; .857)	**Enjoyment**	198.39	.997	.445	14.09	.000 (.858;1.136)
Enjoyment + Self-confidence	49.29	.646 .175	.286	8.21 2.34	.000 (.491;.801) .020 (.028;.322)	**Enjoyment + Self-confidence**	107.50	.891 .283	.462	11.51 3.11	.000 (.739;1.04) .002 (.103;.462)
Enjoyment + Self-confidence + Resilience	33.55	.615 .136 .132	.283	7.53 1.70 1.31	.000 (.454;.776) .090 (-.021;.294) .184(-.063;.327)	**Enjoyment + Self-confidence + Resilience**	74.35	.838 .202 .173	.477	10.40 2.07 2.183	.000 (.679;.997) .039 (.010;.394) .030 (.017; .330)

Table 7. Block regression analysis in girls with pre- and post-treatment.

PRE GIRLS						**POST GIRLS**					
Intrinsic motivation						**Intrinsic motivation**					
Variables	**F**	**β**	**R2**	**t**	**P (95%CI)**	**Variables**	**F**	**β**	**R2**	**t**	**P (95%CI)**
Enjoyment	49.81	.635	.171	7.05	.000 (.458;.812)	**Enjoyment**	285.14	.736	.540	16.87	.000 (1.08;1.37)
Enjoyment + Self-confidence	29.21	.596 .233	.200	6.66 2.70	.000 (.419;.773) .007 (.063;.403)	**Enjoyment + Self-confidence**	173.72	.620 .251	.588	13.32 5.40	.000 (.885;1.19) .000 (.295;.634)
Enjoyment + Self-confidence + Resilience	20.40	.581 .165 .185	.204	6.44 1.71 1.56	.000 (.404;.759) .088 (-.025;.355) .120 (-.048;.418)	**Enjoyment + Self-confidence + Resilience**	122.13	.586 .160 .161	.600	12.39 2.87 2.88	.000 (.826;1.14) .004 (.093;.499) .004 (.076;.405)

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3.3. 2x2 Repeated Measures ANOVA

A 2 × 2 repeated-measures ANOVA was carried out, with time (pre-test vs. post-test) as a within-subject factor and gender (boys vs. girls) as a between-subject factor, with the aim of analysing the effects of the intervention on intrinsic motivation (see Table 8 and 9).

3.4.1. Model Assumptions

Box's M test was not significant (M = 7.01, F = 2.33, p = .072), indicating that the homogeneity of covariance matrices assumption was met. Likewise, Mauchly's sphericity test was not significant (W = 1.00), so sphericity was assumed for all contrasts. Levene's test showed homogeneity of variances between genders in the pre-test (p = .533), although not in the post-test (p = .027). Nevertheless, given the sample size and the robustness of ANOVA against moderate deviations from this assumption, the analysis proceeded.

3.4.2. Within-Subject Effects

The results showed a significant main effect of time, $F(1, 490) = 80.76$, $p < .001$, $\eta^2p = .141$, with an observed power of 1.00, indicating a significant increase in intrinsic motivation following the intervention. Estimated marginal means reflect an increase from the pre-test (M = 5.82; 95% CI [5.75, 5.89]) to the post-test (M = 6.27; 95% CI [6.19, 6.35]). Pairwise comparisons confirmed that this difference was statistically significant ($\Delta M = -0.46$, $p < .001$), and the effect size was large according to standard criteria for partial η^2.

3.4.3. Time × Gender Interaction

No significant interaction effect was observed between time and gender, $F(1, 490) = 0.69$, $p = .406$, $\eta^2p = .001$, indicating that the increase in intrinsic motivation following the intervention was similar for both the boys and girls. The estimated means show that both groups increased their levels of intrinsic motivation from the pre-test to the post-test (boys: M = 5.84 to M = 6.34; girls: M = 5.79 to M = 6.21).

3.4.4. Inter-Subject Effects

The main effect of gender was not statistically significant, $F(1, 490) = 2.37$, $p = .124$, $\eta^2p = .005$, indicating that no overall differences existed in intrinsic motivation levels between the boys and the girls when both measurement points are considered together. The estimated marginal means were slightly higher for the boys (M = 6.09) than for the girls (M = 6.00), although this difference did not reach statistical significance.

Table 8. Inter-subject effects.

Effect	F	df	p	η^2p	Power
Time	80.76	1, 490	< .001	.141	1.00
Time x Gender	0.69	1, 490	.406	.001	.132
Gender	2.37	1, 490	.124	.005	.336

Table 9. Marginal means.

Gender	Pre-test M (95%CI)	Post-test M (95%CI)
Boys	5.84 [5.74–5.94]	6.34 [6.23–6.45]
Girls	5.79 [5.69–5.89]	6.21 [6.09–6.32]

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Finally, it should be noted that $\eta^2p = .141$ represents a large effect size − this is particularly significant in real-world educational settings. The absence of interaction is not a negative finding; rather, it indicates that the program is effective and equitable for both genders.

4. Discussion

This research aims to contribute to the scientific knowledge on the current gap in the use and application of innovative methodologies in PE in primary education, providing evidence on the impact of the AEM (Adventure Education Model) with parkour on intrinsic motivation and its predictors. To this end, it starts from the premise that a parkour-based AE program can increase intrinsic motivation and associated variables such as enjoyment, self-confidence, and resilience.

The results obtained in this study corroborate that the application of a parkour-based AE program produces a significant increase in the students' intrinsic motivation, enjoyment, self-confidence, and resilience. The improvement observed in intrinsic motivation suggests that combining the challenging and cooperative activities inherent to AE with the creative approach of parkour offers an environment rich in autonomy and competence − essential elements for fostering self-directed learning. This finding aligns with the postulates of SDT, namely that the satisfaction of basic psychological needs favours self-determined forms of participation and improves persistence in physical activity (Carson et al., 2025; Ghani et al., 2025).

The analysis of predictor variables showed that enjoyment was the primary predictor of intrinsic motivation in both the pre-test and post-test, followed by self-confidence and resilience. These results align with previous studies highlighting the central role of pleasure and fun in physical participation − when motor experiences are perceived as fun, intrinsic motivation is strengthened and the likelihood of continued practice increases (Işıkgöz, 2025; Ghani et al., 2025). Self-confidence and resilience also contributed significantly; the perception of competence and the ability to overcome challenges are key to persevering when faced with demanding tasks and, in line with the AE literature, programs that allow for controlled risk-taking increase one's sense of competence and, consequently, enjoyment (Ghani et al., 2025).

Regarding gender differences, the study found no significant effects on intrinsic motivation or its predictors. This result contrasts with research reporting higher levels of motivation and enjoyment in boys (Navarro Patón et al., 2024). For instance, in the research by Botella et al. (2021) using parkour and the 'flipped learning' methodology, they also showed a greater increase in intrinsic motivation for boys than for girls. The absence of differences could be explained by the cooperative and non-competitive nature of the program, which prioritizes collaboration and personal improvement over competition. AE and parkour offer adaptable activities with low perceived risk that allow girls and boys to participate on equal terms, reducing gender stereotypes and psychological barriers. This finding highlights the potential of these methodologies in promoting inclusive and equitable environments in PE.

5. Limitations and Future Prospects

Despite the robustness of the results obtained, one needs to point out certain limitations that were inherent to the study design, and which should therefore be considered when interpreting the findings. Firstly, a quasi-experimental design was used with non-random assignment of participants, in addition to the absence of a control group – this limits the possibility of establishing firm causal relationships between the intervention and the observed changes in the analysed variables. Secondly, the program's duration, which was limited to only seven sessions over one academic term, might be too brief to consolidate profound changes in complex psychological variables such as resilience or self-confidence. The literature indicates that constructs of this nature often require longer intervention periods to generate stable adaptations. Therefore, future studies could incorporate longer programs and longitudinal follow-up measures to evaluate the stability of the effects in the medium to long term.

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A further limitation is that all the study variables were assessed using self-reporting instruments. Although the questionnaires used possess adequate psychometric properties and have been widely utilized in previous research, this type of measurement may be subject to biases associated with social desirability or students' subjective perceptions, particularly at early educational stages such as in Primary Education. Consequently, future research could benefit from incorporating mixed-method designs that combine quantitative data with qualitative techniques, such as interviews, systematic observations, or focus groups, to delve deeper into the students' experience and better understand the underlying processes of motivational improvement.

Finally, as a future line of research, it would be pertinent to analyse in greater depth the impact of parkour-based AE programs on other relevant indicators of the students' personal and social development, such as group cohesion, emotional self-regulation, motivational climate, or adherence to physical activity. Similarly, it would be interesting to replicate this type of intervention at different educational stages and in different sociocultural contexts to verify the consistency and generalizability of the observed effects.

6. Conclusions

In relation to the first objective, the results allow one to conclude that the intervention produced a significant increase in intrinsic motivation following its application. This finding confirms that the implemented teaching proposal favoured more self-determined behaviours toward the practice of PE.

Regarding the second objective, one can conclude that the program generated significant improvements across all the variables. These results demonstrate that parkour-based AE not only impacts motivational levels but also contributes to the emotional and personal development of the students. Correlational analyses showed positive and significant associations between intrinsic motivation and enjoyment, self-confidence, and resilience, especially following the intervention. This suggests that the increase in intrinsic motivation is accompanied by a more positive perception of the motor experience and greater personal resources.

With regard to the third objective, regression analyses showed that enjoyment is the primary predictor of intrinsic motivation, followed by self-confidence and resilience. This underscores the importance of satisfying and emotionally safe learning contexts. Finally, the lack of significant time × gender interactions confirms the program was equally effective for the boys and the girls, thus reinforcing its inclusive nature.

Overall, the study confirms that a parkour-based AEM effectively promotes intrinsic motivation and psycho-emotional development in primary students. This proves that, using innovative models, PE can achieve socio-emotional goals and life skills that transcend the school environment (Baena-Extremera, et al., 2025).

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