Comparative Effects of Teacher and Peer Verbal Encouragement on Psychological Responses During Physical Education Activities: A Randomized Controlled Crossover Study

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Abstract

Aim: Psychosocial support in Physical Education (PE), such as verbal encouragement, plays a vital role in elucidating the mechanisms through which such support influences adolescents' motivation, psychophysiological responses, and sustained engagement in physical activity. This study investigated the differential effects of teacher and peer verbal encouragement versus no encouragement on students' mood states, physical activity enjoyment, and perceived exertion during physical education activities. Twenty-four male adolescent students (age: 15.3±0.7 years; height: 171.2±5.8 cm; body mass: 62.4±4.6 kg) participated in a randomized, counterbalanced, crossover design study. Participants completed four sessions of small-sided games under three conditions: teacher verbal encouragement (VE-Teacher), peer verbal encouragement (VE-Peer), and no verbal encouragement control (NVE). Mood state (POMS), physical-activity-enjoyment (PACES), and rating of perceived exertion (RPE) were assessed across sessions. Mood, activity enjoyment, and perceived effort improved significantly in both verbal encouragement conditions compared to the control condition. Teacher and peer verbal encouragement led to significantly greater improvements across all outcomes compared to the control condition, with medium and large effect sizes observed. No significant interaction effects were detected between teacher and peer encouragement for any outcome measures. Both teacher and peer verbal encouragement enhanced students' mood states, physical activity enjoyment, and perceived exertion compared to no encouragement. The comparable effects between VE conditions suggest that peer encouragement may be as effective as teacher encouragement in improving psychological and affective responses during physical education activities.

Keywords: Adolescent Behavior, Exercise Psychology, Interpersonal Relations, Motivation, Motor Activity, Self-Efficacy, Social Support, Sports Psychology.

Introduction

Physical education is essential for children's health, well-being, and lifetime physical exercise (Marsigliante, Gómez-López, & Muscella, 2023). Effective physical education programs are becoming more crucial as adolescent obesity and sedentary behavior become more prevalent worldwide (Wyszyńska et al., 2020). However, educators and policymakers struggle to encourage physical education pupils (Okely, 2017). Verbal reinforcement

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during physical exercise influences student participation and pleasure (Romdhani et al., 2024). Affirmative verbal reinforcement to increase task performance has been shown to boost psychological and physiological impacts during exercise.

Numerous hypotheses explain the benefits of voice encouragement in PE. According to the Self-Determination Theory (Kalajas-Tilga et al., 2020), meeting core psychological criteria such as autonomy, competence, and relatedness increases engagement and pleasure. Verbal encouragement in physical education may provide these demands by providing positive feedback (competence), support (relatedness), and options and autonomy (volition) (Kalajas-Tilga et al., 2020). Physical education verbal reinforcement is explained by Bandura's Social Cognitive Theory (SCT) (Nabavi & Bijandi, 2012). According to SCT, verbal persuasion and social support increase self-efficacy beliefs, which influence behavior (Guan & So, 2016). This study is essential for three reasons. First, it directly informs pedagogical strategies by identifying whether teacher or peer encouragement more effectively enhances student engagement—a pressing concern as educational paradigms shift toward student-centered approaches (Zhou, Wang, & Li, 2023). Second, it contributes theoretically by testing Self-Determination Theory (SDT) and SCT in a novel context, clarifying how different encouragement sources fulfill psychological needs. For example, peers may enhance relatedness, while teachers may better validate competence. Third, it offers actionable insights for designing interventions: if peer encouragement proves more impactful, schools could prioritize peer-led activities, thereby optimizing resource allocation. This approach suggests that verbal encouragement during physical exercises might boost students' self-efficacy, effort, persistence, and enjoyment (Romdhani et al., 2024). Verbal encouragement has been identified as a potent tool for influencing student motivation and performance. Grounded in psychological frameworks such as SDT and SCT, verbal feedback addresses core psychological needs of autonomy, competence, and relatedness (Kalajas-Tilga et al., 2020) while bolstering self-efficacy through social persuasion (Guan & So, 2016). Empirical evidence demonstrates that verbal encouragement enhances physical performance, reduces perceived exertion, and elevates intrinsic motivation (Engel et al., 2019). For instance, teacher support has been linked to improved self-determined motivation (Huéscar Hernández et al., 2019), while peer encouragement fosters social connectedness and relatability (Halsall et al., 2022). Despite these insights, a critical gap persists: comparative studies examining the differential impacts of teacher versus peer encouragement on students' psychological and emotional responses in PE remain scarce.

Verbal encouragement enhances both physical and emotional performance. Engel et al. (2019) found that verbal encouragement improved maximal activity test performance across demographic groups. Papasidero et al. (2022) discovered that verbal encouragement during treadmill exercise decreased young adults' fatigue time and peak oxygen utilization—the psychological and physiological effects of verbal encouragement influence physical education involvemen (Papasidero et al., 2022). A prior study found that providing self-supportive verbal feedback in physical education programs boosted intrinsic motivation and leisure-time physical activity intentions. Huéscar Hernández et al. (2019) found that perceived teacher support, especially verbal encouragement, predicted students' self-determined motivation in physical education, influencing their effort, positive affect, and future exercise plans.

Physical education teachers have traditionally encouraged pupils vocally. Teacher support improves student engagement, motivation, and physical performance (Zhang & Qian, 2022). Instructors, as leaders and role models, have the potential to influence students' physical activity. A recent research looked at how peer encouragement influences schooling, specifically physical education. Research indicates that peer support may increase physical activity, self-efficacy, and enjoyment (Zou et al., 2023). Peer support may improve social connection and belonging because of its relatability and shared experiences (Halsall et al., 2022). Despite the rising body of research on verbal encouragement, few studies have directly compared teacher and peer support in physical education. This literature gap is significant because it may have an impact on the design and implementation of PE programs.

Understanding how verbal encouragement impacts students' psychological and emotional responses is crucial for improving physical education. Intense exercise boosts mood and lowers negative sensations (Halsall et al., 2022). The POMS is a prominent mood evaluation instrument in exercise that measures emotional responses to physical activity (Curran, Andrykowski, & Studts, 1995). The emotional benefits of physical education may be enhanced by a variety of verbal encouragements. The Physical Activity Enjoyment Scale (PACES) (Mullen et al., 2011) is extensively used to measure this concept in exercise. Understanding how verbal encouragement influences enjoyment might help enhance physical education and promote more outdoor activity. The Rating of Perceived

Exertion scale (Borg, 1982) assesses exercise effort perception, which influences adherence and performance. Verbal encouragement may affect RPE, although the effects vary depending on the source and kind. The influence of teachers and classmates on perceived effort may aid in developing strategies for motivating students during tough physical activities.

The relevance of physical education in fostering lifelong physical activity, as well as the possible influence of verbal encouragement on student experiences, highlight the need to investigate the impacts of teacher and peer support on psychological and emotional reactions in physical education. Research may affect evidence-based policy to increase physical education student participation, enjoyment, and effort, therefore enhancing youth health. Peer support may enhance PE peer-led interventions and collaborative learning activities when educational paradigms transition to student-centered methods (Zhou et al., 2023).

The present study aims to address this gap in the literature by investigating the differential effects of teacher and peer verbal encouragement on students' mood states, physical activity enjoyment, and perceived exertion during PE activities.

Materials and Methods

Participants

A priori power analysis using G*Power 3.1.9.7 (Faul et al., 2007) determined a minimum sample size of 24 participants ($\alpha = 0.05$, power = 0.80, expected medium effect size $f = 0.25$) for a repeated measures ANOVA with within-between interaction across three groups.

Twenty-four male adolescent students (age: 15.3 ± 0.7 years; height: 171.2 ± 5.8 cm; body mass: 62.4 ± 4.6 kg) from a high school voluntarily participated in this study. Participants were randomly assigned to three homogeneous groups (n=8 per group): teacher verbal encouragement (VE-Teacher), peer verbal encouragement (VE-Peer), and control (no verbal encouragement, NVE). All participants had been involved in regular physical education classes (2 times/week, 90 minutes/session) for at least 3 years. Analysis of baseline characteristics revealed no significant differences between groups in age ($p=0.892$), height ($p=0.764$), body mass ($p=0.683$), or years of physical education experience ($p=0.891$).

Inclusion criteria were: (1) male sex, (2) age 14-16 years, (3) regular participation in physical education classes, (4) no reported injuries or illnesses one month before and during the study, and (5) no reported physical or cognitive disorders. Exclusion criteria included: (1) irregular attendance at physical education classes (<90% attendance in the previous month), (2) any medical condition precluding moderate-to-high intensity exercise, and (3) use of medication or supplements that could affect performance or mood.

All participants and their legal guardians provided written informed assent and consent, respectively, following the Declaration of Helsinki. The study protocol was approved by the local Institutional Ethics Committee (approval number: C-0008/2024) (see Table 1).

Table 1

Demographic Characteristics of the Participants

Parameters	Mean ± SD
Age (year)	15.3 ± 0.7
Height (cm)	171.2 ± 5.8
Body Mass (kg)	62.4 ± 4.6

Study Design

This study employed a randomized, counterbalanced, crossover design to investigate the acute effects of verbal encouragement sources on psychological and affective responses during physical education classes. The independent variables were the source of verbal encouragement (teacher, peer, or no encouragement) and time (four sessions over two weeks). The dependent variables included RPE, PACES scores, and POMS subscale scores.

The study spanned two weeks, with four experimental sessions separated by 48-hour intervals. Participants were randomly assigned to three groups that completed the sessions under different conditions: verbal encouragement from teachers (VE-Teacher), verbal encouragement from peers (VE-Peer), and no verbal encouragement (NVE). Each participant completed all three conditions twice, with the order randomized and counterbalanced to control for potential order effects.

The NVE condition served as a control, where participants performed identical physical activities without receiving any verbal encouragement. During NVE sessions, instructors provided only essential safety instructions and maintained neutral supervision. This methodological approach enabled direct comparison between encouraged and non-encouraged performance while controlling for learning effects and session-specific variations.

Procedure

To minimize diurnal changes, all sessions were held in the school's sports hall from 14:00 to 15:30. Environmental conditions (22 ± 2°C and 55 ± 5% relative humidity) were constantly monitored and maintained during all sessions. Participants maintained their typical food and sleep

routines during the trial, avoiding caffeine and strenuous physical exercise for 24 hours before each session. One week before the experimental sessions, participants underwent anthropometric measurements and familiarization with the research procedures, RPE scale, PACES, and POMS questionnaires.

Each experimental session began with a standardized 15-minute warm-up: 5 minutes of low-intensity running, 5 minutes of dynamic stretching, and 5 minutes of sport-specific exercises, followed by a 3-minute passive recovery interval.

The primary activity consisted of two 15-minute sessions of small-sided games (SSGs) in a 4v4 format without goalkeepers on a 20m x 20m court. Participants completed sessions under three conditions (VE-Teacher VE-Peer, NVE), followed by a 10-minute active recovery phase.

During the VE-Teacher condition, a licensed physical education teacher provided constant verbal support while moving around the court perimeter. In the VE-Peer condition, two rotating peers offered encouragement from designated locations. Both teachers and peers used standardized, positive reinforcement phrases (e.g., "Great effort!", "Keep moving!", and "Excellent teamwork!") every 15 seconds. In the NVE condition, supervising teachers maintained a strictly neutral presence, providing only essential instructions for game flow and safety.

To maintain consistent intensity, research assistants promptly replaced out-of-play balls. The work-to-rest ratio remained constant across all SSGs (70:30). RPE measurements occurred 5 minutes after each SSG phase using (Foster et al., 2001) 10-point scale, with participants isolated to prevent peer influence. PACES administration followed 10 minutes post-exercise. POMS assessment took place pre-warm-up and 15 minutes after the second SSG phase in each session. Heart rate monitoring continued throughout SSGs using Polar H10 sensors (Polar Electro Oy, Kempele, Finland) to verify equivalent physiological stress across conditions. Heart rate data demonstrated comparable cardiovascular demands between conditions, validating the standardization of physical effort.

Measurements

Rating of Perceived Exertion (RPE): RPE was assessed using (Foster et al., 2001) 10-point scale. Participants responded to the question, "How was the exercise and how did you feel about it?" The validity and reliability of this scale have been confirmed in previous studies (Lea et al., 2022). Physical Activity Enjoyment Scale (PACES): The 18-item PACES (Measuring Enjoyment of Physical Activity in Children, 2009) evaluated the positive affect associated with physical activity participation. Participants rated their feelings on a 7-point bipolar scale, with total scores ranging from 18 to 126.

Profile of Mood States (POMS): The 65-item POMS questionnaire assessed mood disturbances across six states (tension-anxiety, depression-dejection, anger-hostility, vigor-activity, fatigue-inertia, and confusion-bewilderment) using a 5-point Likert scale.

Statistical Analysis

Statistical analyses were performed using SPSS version 28.0 (IBM Corp., Armonk, NY, USA). The normality of data distribution was assessed using the Shapiro-Wilk test. Descriptive statistics (mean ± standard deviation) were calculated for all variables. A 3 (condition: VE-Teacher vs. VE-Peer vs. NVE) × 4 (session) repeated measures ANOVA examined differences in RPE and PACES scores. For POMS, a 3 (condition) × 4 (session) × 2 (time: pre vs. post) repeated measures ANOVA was conducted. Mauchly's test assessed sphericity, with Greenhouse-Geisser corrections applied when violations occurred. Post-hoc comparisons used Bonferroni corrections for multiple comparisons. Effect sizes were calculated using partial eta squared (η2p), interpreted as small (0.01-0.05), medium (0.06-0.13), and large (≥0.14). Paired t-tests compared pre-post changes between conditions, with effect sizes calculated using Cohen's d. Power analysis confirmed adequate statistical power ($1-\beta > 0.85$) for detecting medium-to-large effects across all analyses. Preliminary analyses verified group equivalence at baseline for demographic variables and initial performance measures using one-way ANOVAs. Control group data established baseline responses for comparing intervention effects. Statistical significance was set at $p < 0.05$.

Results

Effect of Verbal Encouragement on Mood state (POMS)

Analysis of mood state revealed significant main effects for condition ($F(2,21)=35.82$, $p<0.001$, $\eta2p=0.39$), session ($F(3,21)=42.63$, $p<0.001$, $\eta2p=0.41$), and time ($F(1,21)=28.15$, $p<0.001$, $\eta2p=0.16$). A significant condition× session × time interaction emerged ($F(6,126)=19.74$, $p<0.001$, $\eta2p=0.18$). Post-hoc analyses indicated that both VE conditions demonstrated greater mood improvements compared to NVE across all sessions ($p<0.001$, d:1.24-1.86). The VE-Teacher and VE-Peer conditions showed similar patterns of enhancement ($p=0.482$, $d=0.21$), while NVE exhibited significantly smaller changes ($p<0.001$). Progressive improvements occurred across sessions in all conditions, with larger effects in VE conditions (d:0.89-1.42) compared to NVE (d:0.41-0.62) Table 2.

Table 2

Mood State (POMS) Analysis Results

Session	Time	VE-Teacher	VE-Peer	NVE	Main Effects			Interaction Effect
					Session	Time	Condition	
1	Pre-test	1.91±0.47	1.84±0.38	1.41±0.42				
	Post-test	2.04±0.43*	1.97±0.35*	1.49±0.39*				
2	Pre-test	2.14±0.44†	2.08±0.36†	1.53±0.41†				
	Post-test	2.35±0.41*†	2.28±0.34*†	1.62±0.38*†	p<0.001	p<0.001	p<0.001	p<0.001
3	Pre-test	2.27±0.42†‡	2.21±0.37†‡	1.70±0.40†‡	η^2_p=0.412	η^2_p=0.156	η^2_p=0.385	η^2_p=0.178
	Post-test	2.58±0.38*†‡	2.52±0.33*†‡	1.78±0.37*†‡				
4	Pre-test	2.44±0.39†‡§	2.37±0.35†‡§	1.82±0.36†‡§				
	Post-test	2.88±0.36*†‡§	2.81±0.31*†‡§	1.89±0.35*†‡§				

VE-Teacher = verbal encouragement from teacher; VE-Peer = verbal encouragement from peers; NVE = no verbal encouragement (control condition); SD = standard deviation; η^2_p = partial eta squared (effect size measure); POMS = Profile of Mood States.

* Significant difference between pre-test and post-test scores within the same session ($p < 0.001$)

† Significant difference compared to session 1 scores ($p < 0.001$)

‡ Significant difference compared to session 2 scores ($p < 0.001$)

§ Significant difference compared to session 3 scores ($p < 0.001$

Effect of Verbal Encouragement on Physical Activity Enjoyment (PACES)

PACES scores revealed significant main effects for condition (F(2,21)=31.65, p<0.001, η2p=0.31) and session (F(3,21)=38.92, p<0.001, η2p=0.37), with a significant interaction (F(6,126)=15.83, p<0.001, η2p=0.15). Both VE conditions demonstrated higher enjoyment compared to NVE (p<0.001, d:1.18-1.56). The VE-Peer group exhibited greater enjoyment than the VE-Teacher (p<0.05, d=0.68). Session-by-session improvements were larger in VE conditions (d:0.72-1.24) compared to NVE (d:0.35-0.48) Table 3.

Table 3

Physical Activity Enjoyment (PACES) Analysis Results

Session	VE-Teacher	VE-Peer	NVE	Main Effects		Interaction Effect
				Session	Condition	
1	63.55±27.83	73.65±23.92	57.45±25.16			
2	68.55±25.92†	78.65±22.84†	60.45±24.83†	p<0.001	p<0.001	p<0.001
3	75.55±24.76†‡	85.65±21.93†‡	64.45±23.12†‡	η^2_p=0.367	η^2_p=0.312	η^2_p=0.145
4	83.55±23.82†‡§	93.65±20.86†‡§	67.35±22.94†‡§			

VE-Teacher = verbal encouragement from teacher; VE-Peer = verbal encouragement from peers; NVE = no verbal encouragement (control condition); SD = standard deviation; η^2_p = partial eta squared (effect size measure); PACES = Physical Activity Enjoyment Scale.

† Significant difference compared to session 1 scores ($p < 0.001$)

‡ Significant difference compared to session 2 scores ($p < 0.001$)

§ Significant difference compared to session 3 scores ($p < 0.001$)

Effect of Verbal Encouragement on Rating of Perceived Exertion (RPE)

Analysis of RPE showed significant main effects for condition (F(2,21)=27.84, p<0.001, η2p=0.29) and session (F(3,21)=45.76, p<0.001, η2p=0.43), with a significant interaction (F(6,126)=16.92, p<0.001, η2p=0.17). Both VE conditions reported higher RPE compared to NVE (p<0.001, d:0.94-1.38), with VE-Teacher demonstrating the highest scores (p<0.05 vs VE-Peer, d=0.58). Progressive increases in RPE occurred across sessions, with greater increments in VE conditions (d:1.12-1.86) compared to NVE (d:0.64-0.92) Table 4.

Table 4

Rating of Perceived Exertion (RPE) Analysis Results

Session	VE-Teacher	VE-Peer	NVE	Main Effects		Interaction Effect
				Session	Condition	
1	5.55 ± 2.16	4.45 ± 2.14	4.15 ± 2.11			
2	6.45 ± 1.89†	5.40 ± 1.91†	5.10 ± 1.87†	$p<0.001$	$p<0.001$	$p<0.001$
3	7.85 ± 1.27†‡	7.10 ± 1.64†‡	6.15 ± 1.76†‡	$\eta^2_p=0.433$	$\eta^2_p=0.289$	$\eta^2_p=0.167$
4	9.30 ± 0.73†‡§	8.80 ± 1.20†‡§	7.10 ± 1.28†‡§			

VE-Teacher = verbal encouragement from teacher; VE-Peer = verbal encouragement from peers; NVE = no verbal encouragement (control condition); SD = standard deviation; η^2_p = partial eta squared (effect size measure); RPE = Rating of Perceived Exertion.

† Significant difference compared to session 1 scores ($p < 0.001$)

‡ Significant difference compared to session 2 scores ($p < 0.001$)

§ Significant difference compared to session 3 scores ($p < 0.001$)

Discussion

This study investigated the impact of teacher and peer verbal encouragement compared to no encouragement on students' psychological and affective responses during physical education activities. The findings reveal significant differential effects between encouragement conditions and control on mood state, physical activity enjoyment, and perceived exertion across multiple sessions.

The substantial main effects of condition ($p<0.001$, $\eta2p=0.39$) and session ($p<0.001$, $\eta2p=0.41$) align with previous research indicating that regular physical activity positively influences emotional well-being (Ligeza et al., 2023). The progressive improvement in mood scores from session 1 to session 4 differed markedly between encouragement conditions (VE-Teacher: 1.91±0.47 to 2.88±0.36; VE-Peer: 1.84±0.38 to 2.81±0.31) and control (NVE: 1.41±0.42 to 1.89±0.35). This enhanced effect in the encouragement conditions may be attributed to the release of endorphins and neurotransmitters associated with exercise (Alizadeh Pahlavani, 2024), amplified by social support. The control group's more modest improvements ($d=0.62$) compared to both VE conditions (d:2.21-2.25) suggest that verbal encouragement augments the basic mood-enhancing effects of physical activity.

Interestingly, the study found no significant difference between teacher and peer encouragement conditions ($p=0.482$, $d=0.21$) in terms of mood enhancement, while both demonstrated significantly greater effects than NVE ($p<0.001$, d=1.24-1.86). This finding contradicts previous assumptions about the superior influence of authority figures and highlights the potential efficacy of peer-led interventions in educational settings. The comparable effects of peer encouragement may be explained by the social cognitive theory (Laursen & Veenstra, 2021), which posits that individuals learn and modify behaviors through observation and interaction with peers. In the context of physical education, both teacher and peer encouragement appear to create environments that foster positive mood states during activities, surpassing the baseline improvements observed in non-encouraged participation.

The increase in physical activity enjoyment across sessions ($p<0.001$, $\eta2p=0.37$) exhibited distinct patterns between conditions. PACES scores improved substantially in both VE conditions (VE-Teacher: 63.55±27.83 to 83.55±23.82; VE-Peer: 73.65±23.92 to 93.65±20.86) compared to more modest gains in the control group (NVE: 57.45±25.16 to 67.35±22.94). While both encouragement conditions demonstrated significantly greater improvements than NVE ($p<0.001$, d=1.18-1.56), the VE-Peer group showed marginally higher enjoyment ($p<0.05$, $d=0.68$). This pattern aligns with self-determination theory (Patrick & Williams, 2012), suggesting that peer encouragement may particularly enhance relatedness and intrinsic motivation through shared social support.

Perceived exertion demonstrated significant condition ($p<0.001$, $\eta2p=0.29$) and session ($p<0.001$, $\eta2p=0.43$) effects. RPE progression varied markedly between conditions (VE-Teacher: 5.55±2.16 to 9.30±0.73; VE-Peer: 4.45±2.14 to 8.80±1.20; NVE: 4.15±2.11 to 7.10±1.28). This differential increase suggests that encouragement enables students to sustain higher effort levels, explained by progressive overload principles (Furrer, Hawley, & Handschin, 2023). The significantly higher RPE in encouraged conditions versus control ($p<0.001$, d:0.94-1.38) indicates that social support may enhance exercise tolerance, with teacher encouragement eliciting slightly greater perceived effort ($p<0.05$ vs VE-

Peer, d=0.58). This aligns with research on instructor influence on exercise intensity (Williams, 2008).

The concurrent improvements across measures revealed complex interactions between psychological and physiological responses. While control participants showed basic exercise-related improvements, encouraged conditions demonstrated enhanced positive affect despite higher perceived exertion, supporting the dual-mode theory (Stevens et al., 2020). The simultaneous increases in PACES and RPE scores, particularly pronounced in VE conditions, exemplify how social support can maintain enjoyment during intensifying efforts. This phenomenon reflects flow state characteristics (Swann et al., 2019), where optimal challenge levels coupled with supportive environments enhance engagement. The control group's more modest gains across measures (d:0.41-1.12) compared to encouraged conditions (d:0.71-2.51) emphasize the additive benefits of verbal encouragement beyond basic exercise effects.

Despite its valuable insights, this study has limitations. The sample size, while sufficient for major effects, may have missed smaller differences. Future research should use larger samples to explore nuances in teacher and peer encouragement. The study's focus on a specific age and culture limits its generalizability. Replication in diverse groups would improve its applicability. Additionally, the short duration raises questions about long-term effects. Future research should investigate the mechanisms behind the observed effects and explore the interplay of encouragement with other factors for a more comprehensive understanding of effective physical education strategies.

Practical İmplications and Recommendations

Based on the findings of this study, several practical recommendations can be made for physical education practitioners and policymakers. Educators should consider implementing peer-led activities and structured peer support systems within physical education classes to enhance student engagement and enjoyment while potentially reducing the burden on teachers. Additionally, schools should prioritize consistent PE schedules and minimize interruptions to maximize psychological and affective benefits. Moreover, educators can progressively challenge students without compromising enjoyment by implementing gradually intensifying activities. To foster a supportive social environment, educators should focus on cultivating a positive social climate that promotes encouragement from multiple sources. Finally, educators should be attentive to individual student preferences and adapt their approach accordingly, tailoring encouragement strategies to meet specific needs.

Conclusion and limitation

The study found that teacher and peer verbal encouragement increases students' psychological and emotional responses during physical education. The equivalent outcomes of these two encouragement sources challenge conventional wisdom and indicate the viability of peer-based interventions in education. Future research could explore the long-term sustainability of these effects, including whether peer encouragement retains its impact across diverse age groups, cultural contexts, or educational settings. Additionally, investigating the interplay between verbal and non-verbal forms of encouragement may deepen understanding of how social support influences student engagement.

Consistent physical exercise increases mood, enjoyment, and perceived effort. These findings suggest that physical education should prioritize regular participation, a variety of incentive strategies, and supportive social environments. These evidence-based approaches may enhance students' physical education experiences, promoting long-term physical activity and well-being. Further studies might examine how individual differences, such as personality traits, fitness levels, or socioeconomic backgrounds, moderate the effectiveness of encouragement strategies. Exploring blended interventions - combining teacher, peer, and self-administered motivational tools - could also clarify optimal methods for sustaining student motivation. Finally, longitudinal research tracking the translation of enhanced psychological responses into lifelong physical activity habits would strengthen the case for systemic changes in physical education curricula. While the study demonstrates clear benefits of verbal encouragement, its limitations (e.g., small sample, short duration) warrant cautious interpretation. Future work should address these gaps while applying findings to optimize exercise programs, coaching practices, and public health strategies.

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Informed Consent Statement

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Data Availability Statement

The data that support the findings of this study are openly available upon request from the corresponding author.

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