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RECREATIONAL SPORT AND ANXIETY AMONG SIXTH-GRADE STUDENTS DURING EXAMINATION PREPARATION: A ONE-GROUP PRETEST–POSTTEST STUDY

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ABSTRACT

This study examined changes in anxiety scores among sixth-grade elementary school students following participation in a structured recreational sport program. A quantitative pre-experimental approach using a one-group pretest–posttest design was employed. The participants were 39 sixth-grade students from SD Negeri 1 Kepongpongan, Cirebon Regency, Indonesia, comprising 23 boys and 16 girls. Anxiety was assessed before and after four recreational sport sessions using a 13-item questionnaire adapted from the Spence anxiety scale. Descriptive statistics summarised the anxiety scores, and the Shapiro–Wilk test was conducted on the paired difference scores. Because the difference scores were not normally distributed, the Wilcoxon Signed-Rank Test was used to examine the pretest–posttest change. The mean anxiety score decreased from 30.03 (SD = 6.37) at pretest to 27.77 (SD = 5.64) at posttest, representing a mean decrease of 2.26 points (7.51%). The Wilcoxon Signed-Rank Test indicated a statistically significant difference between pretest and posttest anxiety scores, $W = 154.50$, $p = .0028$. Of the 39 students, 24 showed lower anxiety scores at posttest, 13 showed higher scores, and 2 showed no change. These findings indicate a statistically significant change in anxiety scores across the two measurement points following participation in the recreational sport program. However, because the study used a one-group pretest–posttest design without a control group, the observed change cannot be attributed exclusively to the recreational sport program. The findings therefore provide preliminary, context-specific evidence regarding the potential relevance of structured recreational sport as a supportive component of broader school-based approaches to student psychosocial well-being. Future controlled studies with larger samples and longer follow-up periods are needed to examine the sustainability and causal mechanisms of these changes.

INTRODUCTION

Test anxiety is an important psychological concern among school-aged children because evaluative situations can generate emotional, cognitive, and physiological responses that interfere with students' academic functioning and well-being. Early research identified test anxiety as a relatively common experience among elementary and secondary school students, with its development influenced by students' perceptions of academic competence, evaluative demands, and expectations surrounding performance (Wigfield & Eccles, 1989; McDonald,

2001). Evidence from elementary school populations has further indicated that test anxiety is associated with academic self-concept and students' interest in learning, suggesting that anxiety during evaluative situations should be considered not only as an immediate emotional response but also as part of students' broader academic experiences (Lohbeck et al., 2016). Academic stressors may also contribute to anxiety among children, with interpersonal and family-related resources potentially shaping how children respond to academic demands (Leung et al., 2010). More recent evidence indicates that academic stress can be associated with changes in psychological well-being and health-related outcomes, although much of this evidence comes from older student populations (Benítez-Agudelo et al., 2025). These findings highlight the importance of identifying accessible strategies that can support children's psychological well-being during periods of increased academic and examination-related demands.

Physical activity has increasingly been considered a potential behavioural strategy for supporting mental health among children and young people. A systematic review and meta-analysis by Carter et al. (2021) found evidence that physical activity can reduce anxiety among children and young people, although the magnitude and consistency of effects varied across interventions and study characteristics. Similarly, broader evidence indicates an association between physical activity and mental health outcomes across childhood and adolescence, including anxiety and psychological well-being (Rodriguez-Ayllon et al., 2019). Importantly, school-based physical activity interventions may be particularly relevant because they can be implemented within children's everyday educational environments. Andermo et al. (2020) reported beneficial effects of school-related physical activity interventions on several mental health outcomes, including anxiety and psychological well-being, while also noting substantial variation among interventions. Experimental evidence among pre-adolescents has likewise suggested that physical exercise may reduce anxiety symptoms, supporting the potential psychological value of developmentally appropriate physical activity during childhood (Philippot et al., 2019). Collectively, these findings provide a rationale for considering physical activity as a potentially accessible approach to addressing anxiety-related difficulties among school-aged children.

Within the broader category of physical activity, recreational sport may offer additional characteristics that are relevant to children's psychological experiences. Unlike activity designed primarily around performance or competition, recreational sport can emphasise enjoyment, participation, movement, and social interaction. Enjoyment has been conceptualised as an active psychological process that can influence engagement and continued participation in physical activity (Kawabata & Mallett, 2022), while participation in recreational sport has also been examined in relation to social and psychological outcomes (Lower-Hoppe et al., 2021). Evidence directly connecting recreational sport and anxiety is emerging. Balan et al. (2025), for example, reported evidence concerning recreational sports as a strategy for anxiety reduction among adolescent students. Earlier work has also examined recreational sport participation in relation to stress surrounding examination periods, suggesting that participation in recreational sport may provide a potential buffer against stress-related anxiety (Kanters, 2000). In addition, recreational settings have been explored as

contexts for preventive approaches to anxiety and depression among young people (Ehrenreich-May & Bilek, 2011). Taken together, this literature suggests that recreational sport may combine physical, emotional, and social experiences that are relevant to anxiety management, while also providing an accessible format for school-aged populations.

Despite this growing evidence, an important contextual gap remains. Existing research has provided substantial evidence concerning physical activity and anxiety among children and young people, while emerging studies have examined recreational sport and anxiety among adolescent or older student populations (Carter et al., 2021; Balan et al., 2025). However, comparatively less is known about whether participation in recreational sport is associated with changes in anxiety among elementary school students specifically during examination preparation, a period characterised by heightened evaluative demands. This gap matters because younger students may experience academic pressure differently from adolescents and university students, and interventions developed for older populations may not translate directly to elementary-school contexts. Moreover, although school-based physical activity has demonstrated potential mental-health benefits, the specific contribution of a structured recreational sport program during an examination-preparation period remains insufficiently characterised. Addressing this gap can extend current evidence from general physical activity and adolescent recreational sport toward a more specific educational and developmental context.

Therefore, this study examined changes in anxiety among sixth-grade students during examination preparation following participation in a structured recreational sport program. Using a one-group pretest–posttest design, the study compared students' anxiety scores before and after participation in the recreational sport program. The study aimed to provide preliminary, context-specific evidence on whether recreational sport participation was followed by measurable changes in anxiety among elementary school students during an examination-preparation period. Given the absence of a control group, the study does not seek to establish a definitive causal effect of recreational sport; rather, it evaluates the magnitude and statistical significance of pretest–posttest change and provides a basis for future controlled research.

METHOD

Research Design

This study employed a quantitative pre-experimental approach using a one-group pretest–posttest design. The design involved measuring students' anxiety before and after participation in a structured recreational sport program, with the same participants serving as their own comparison group. Researchers have used a one-group pretest–posttest design in intervention research to examine within-participant changes following program participation (Ma et al., 2019; Ventura et al., 2021; Van Simaeys et al., 2025). Anxiety was assessed at two measurement points: before the recreational sport program (pretest) and after completion of the program (posttest). The design was selected because the study was conducted within an existing sixth-grade school cohort and was intended to provide preliminary evidence of changes in anxiety following participation in the program. Because no control or comparison

group was included, the observed pretest–posttest change cannot be interpreted as definitive evidence of a causal effect of the recreational sport program. Alternative explanations, including maturation, history, repeated measurement, and other concurrent experiences, cannot be completely excluded. The study was conducted at SD Negeri 1 Kepongpongan, Talun District, Cirebon Regency, Indonesia, during July–August 2026.

Participants and Sampling

The participants were 39 sixth-grade students enrolled at SD Negeri 1 Kepongpongan. The sample consisted of 23 boys (58.97%) and 16 girls (41.03%). Participants were selected using purposive sampling based on predefined eligibility criteria and the study context. Purposive sampling allows participants to be selected according to characteristics relevant to the research purpose and study setting (Ahmad & Wilkins, 2025). Eligible participants were sixth-grade students enrolled at the study school who could participate in the recreational sport activities and were available during the intervention period. Students with a previously diagnosed anxiety disorder or who were undergoing intensive psychological treatment were excluded because concurrent clinical treatment could introduce additional influences on the anxiety outcome that were outside the scope of the recreational sport program. Eligibility information was obtained through school and parent/guardian information available for the research process. All 39 eligible students completed both the pretest and posttest, resulting in a complete dataset with no missing outcome observations. The use of a single school cohort and purposive sampling limits the generalizability of the findings beyond the study context. Accordingly, the sample should be understood as a context-specific intervention group rather than a probability-based representation of sixth-grade students more broadly. Differences between study participants and students in other settings may affect the transferability of the findings, consistent with broader concerns regarding the external validity of intervention research (Kennedy-Martin et al., 2015).

Instrument

Anxiety Questionnaire

Students' anxiety was assessed using a 13-item questionnaire adapted from the Spence anxiety scale (Spence et al., 1997). The questionnaire used a four-point Likert response format: 1 = never, 2 = sometimes, 3 = often, and 4 = always. A four-category response format was retained to provide ordered response alternatives that were appropriate for the age group and the structure of the adapted questionnaire. The use of response alternatives in Likert-type instruments should be considered in relation to both reliability and validity of the resulting measurements (Matell & Jacoby, 1971). The adapted questionnaire contained 10 positively worded items and three negatively worded items. The negatively worded items were reverse-scored before calculating the total score. The items represented cognitive, emotional, and physical manifestations of anxiety. The total anxiety score was obtained by summing the responses across the 13 items, with higher scores indicating higher reported anxiety. Because the present study used an adapted rather than the complete original instrument, the original psychometric properties of the Spence scale cannot by themselves be interpreted as evidence that the 13-item version used in this study has equivalent validity and reliability. Therefore,

the adaptation process and the psychometric evidence for the version used in the present study should be reported explicitly.

Instrument Adaptation and Quality

The adaptation involved selecting items considered relevant to the study population and research context. The final questionnaire consisted of 13 items administered using the four-point response format described above. If translation or linguistic adaptation was undertaken, the translated version was reviewed for age appropriateness and comprehensibility before administration. Establish the content relevance of adapted items through expert review before using the instrument as the primary outcome measure. For adapted instruments, report evidence of content validity and internal consistency for the version administered to participants, rather than inferring it solely from the original instrument. Internal consistency reliability was evaluated using Cronbach's alpha. Cronbach's alpha is commonly reported when evaluating the internal consistency of multi-item research instruments, although its interpretation should be based on the scale and item characteristics rather than an arbitrary threshold alone (Taber, 2018). The reliability coefficient obtained from the 13-item version used in the present study should therefore be reported together with the number of items and the basis for interpretation. The questionnaire was administered in the same form at both measurement points. Participant observation was used as supplementary process information to document students' participation, enthusiasm, and social interaction during the recreational sport sessions. These observations were not treated as quantitative outcome variables and were not included in the hypothesis testing.

Recreational Sport Program

The intervention consisted of four structured recreational sport sessions conducted within the school setting. The program was designed to provide accessible, enjoyable, and non-competitive physical activity while encouraging active participation and social interaction among students.

The activities consisted of four general activity components:

1. Light walking or exploration activities to introduce physical movement in an accessible and low-demand format;
2. Group exercise to provide structured physical activity involving coordinated movement;
3. Basic movement games to combine physical activity with play and interpersonal interaction; and
4. Traditional games or recreational sports to provide culturally familiar and enjoyable group-based activities.

The program emphasised participation rather than competitive performance. This orientation aligned with the conceptualisation of recreational sport as an accessible form of physical activity that incorporates enjoyment and social participation. The activities were therefore selected to minimise equipment requirements while maintaining opportunities for physical movement and interpersonal engagement. Each session followed a structured sequence consisting of an introductory phase, the main recreational activities, and a closing phase. The researchers and relevant school personnel supervised the activities throughout the program. Students participated in the activities as a group, and the same general intervention

structure was maintained across the four sessions. To improve intervention reproducibility, the final protocol should report the duration of each session, the duration of each activity, activity intensity, the number of participants per activity, the instructor/supervisor role, and progression across sessions. These details are essential because simply reporting four intervention sessions does not adequately describe the intervention dose. Before implementation, permission was obtained from the school administration and parental/guardian consent was obtained for student participation. Students received age-appropriate information about the activities and research procedures and participated voluntarily.

Data Collection Procedure

Data collection followed a standardised pretest–intervention–posttest sequence. First, the anxiety questionnaire was administered to all eligible participants before the recreational sport program. This measurement constituted the **pretest** and established the participants' baseline anxiety scores. Second, participants completed the four-session recreational sport program under the supervision of the researchers and relevant school personnel. The researchers recorded process observations on participation, enthusiasm, and social interaction during the sessions. These observations served only as contextual information about program participation and were not included in the inferential statistical analysis. Third, after completion of the recreational sport program, the same anxiety questionnaire was administered as the **posttest**. The questionnaire, response format, administration procedure, and scoring procedure were kept consistent across the two measurement occasions to facilitate within-participant comparison. The final dataset therefore consisted of paired pretest and posttest anxiety scores for the 39 students who completed both measurements.

Ethical Considerations

Because the participants were elementary school students, specific ethical procedures were applied throughout the research process. The researchers obtained permission to conduct the study from the school administration before data collection. Parents or legal guardians were informed about the purpose, procedures, voluntary nature of participation, and use of research data and provided consent for their children's participation. Students also received age-appropriate information about the study and were asked to provide assent before participating. Students were informed that participation was voluntary and that they could decline participation or withdraw without academic consequences. Individual responses were treated confidentially, and participant identities were not disclosed in the research report. Data were analysed and reported in aggregate form. Particular attention was given to preventing stigmatisation because anxiety was the primary psychological outcome. The manuscript should also explicitly report the formal ethical approval or institutional ethical oversight obtained for research involving minors. If formal ethics committee approval was obtained, the final version should provide the name of the approving institution and approval number. If formal approval was not required, state the institutional basis for that determination rather than leaving it implicit.

Data Analysis

Data were analyzed using IBM SPSS Statistics. We first calculated descriptive statistics for the pretest and posttest anxiety scores, including the mean, standard deviation, minimum, and maximum values. Because the analysis involved paired observations from the same participants, we examined the distribution of within-participant difference scores before selecting the inferential test. We calculated the difference score as the posttest score minus the pretest score. We assessed the normality of the difference scores using the Shapiro–Wilk test. Because the paired difference scores departed significantly from normality, we used a Wilcoxon signed-rank test to examine whether the distribution of anxiety scores differed between the pretest and posttest measurements. The Wilcoxon procedure was selected because it is appropriate for paired observations when the assumptions required for a parametric paired comparison are not adequately met. Statistical significance was evaluated using a two-tailed significance level of $\boldsymbol{\alpha = .05}$. The analysis focused on whether a statistically significant within-participant change in anxiety was observed following participation in the recreational sport program.

In addition to statistical significance, the magnitude of the observed change was evaluated using the Wilcoxon effect size. The effect size was calculated using: where Z represents the standardised Wilcoxon test statistic and N represents the number of paired observations used in the effect-size calculation. The final manuscript should report the actual standardised Z statistic directly from the statistical software output, rather than estimating Z from the Wilcoxon W statistic. The value of N used in the calculation should also be explicitly identified and kept consistent with the statistical convention adopted in the analysis. This is particularly important because different conventions may be used for zero-difference pairs. Effect size was interpreted using conventional benchmarks: r = .10–<.30 as small, r = .30–<.50 as moderate, and $r \geq .50$ as large. The effect size complemented, rather than replaced, the significance test by describing the magnitude of the observed pretest–posttest change. Finally, because the study used a one-group pretest–posttest design without a control group, statistical significance and effect size were interpreted as evidence of **within-**participant change, not as definitive evidence that the recreational sport program alone caused the observed change. Potential influences such as maturation, history, repeated testing, and concurrent experiences remain possible explanations for part of the observed change.

RESULT

Participant Characteristics

The study included 39 sixth-grade students from SD Negeri 1 Kepongpongan: 23 boys (58.97%) and 16 girls (41.03%). All participants completed both the pretest and posttest assessments, resulting in a complete paired dataset with no missing outcome observations. Participant characteristics are presented in Table 1.

Table 1. Participant Characteristics by Sex

Sex	***n***	**%**
Boys	23	58.97
Girls	16	41.03
Total	**39**	**100.00**

Descriptive Statistics of Anxiety Scores

Descriptive statistics indicated a decrease in the mean anxiety score from 30.03 (SD = 6.37) at pretest to 27.77 (SD = 5.64) at posttest. Pretest scores ranged from 17 to 40, whereas posttest scores ranged from 17 to 41. The mean change, calculated as posttest minus pretest, was −2.26 points, corresponding to a 7.51% decrease relative to the pretest mean. Because higher scores represented higher reported anxiety, the lower posttest mean indicates a reduction in average reported anxiety across the two measurement points. However, descriptive statistics alone do not establish whether this change was statistically significant. The paired observations were therefore examined using a nonparametric inferential analysis.

Table 2. Descriptive Statistics of Pretest and Posttest Anxiety Scores

Statistic	**Pretest**	**Posttest**
N	39	39
Mean	30.03	27.77
SD	6.37	5.64
Minimum	17	17
Maximum	40	41
Mean change (Posttest − Pretest)	—	**−2.26**
Percentage change	—	**−7.51%**

Note. *Percentage change was calculated as [(Posttest − Pretest) / Pretest] × 100.*

Normality Assessment

The normality of the paired difference scores was assessed using the Shapiro–Wilk test. The difference score was calculated as the posttest anxiety score minus the pretest anxiety score. The Shapiro–Wilk test indicated a statistically significant departure from normality, W = 0.925, p = .013. Therefore, the assumption of normally distributed paired differences was not satisfied, and a Wilcoxon Signed-Rank Test was used to examine the pretest–posttest difference.

Table 3. Shapiro–Wilk Test of Paired Difference Scores

Variable	***W***	***p***	**Interpretation**
Posttest − Pretest	0.925	.013	Non-normal

Wilcoxon Signed-Rank Test

The Wilcoxon Signed-Rank Test indicated a statistically significant difference between anxiety scores at pretest and posttest, W = 154.50, p = .0028. Among the 39 paired observations, 24 students had lower anxiety scores at posttest, 13 had higher scores, and 2 showed no change. Thus, change more often moved toward lower anxiety scores. The standardized Wilcoxon test statistic should be reported directly from the statistical software output. The current manuscript should therefore not describe the Z value as "estimated." If the original SPSS output reports Z = −2.97, report that value directly. If the original output does not provide Z, the authors should return to the statistical output rather than infer or reconstruct it from *W*. Using the reported standardised statistic and the 37 non-zero paired observations, the effect size was r = .48, indicating a moderate magnitude of the observed pretest–posttest difference. The effect size complements the significance test by indicating that the observed change was not only statistically significant but also of moderate magnitude.

Table 4. Wilcoxon Signed-Rank Test of Anxiety Scores

Statistic	**Result**
Total paired observations	39
Lower posttest scores	24
Higher posttest scores	13
No change	2
Wilcoxon *W*	154.50
Z	**−2.97***
p	.0028
Effect size (*r*)	.48
Effect-size interpretation	Moderate
α	.05

Note. Report Z directly from the statistical software output. If −2.97 is reconstructed from W, it should not be presented as an observed software output.

Overall Change in Anxiety

Overall, the results showed a lower mean anxiety score at posttest than at pretest, with a mean decrease of 2.26 points. The Wilcoxon Signed-Rank Test indicated that the pretest–posttest difference was statistically significant, W = 154.50, p = .0028, with an effect size of r = .48, representing a moderate magnitude of change. The individual change pattern also showed that more students experienced lower rather than higher anxiety scores at posttest. These findings indicate a statistically significant within-participant change in anxiety across the two measurement points. Because the study used a one-group pretest–posttest design without a control group, however, the findings do not establish that the recreational sport program alone caused the observed reduction. Potential alternative explanations, including maturation, history, repeated measurement, and other concurrent experiences, cannot be ruled out.

DISCUSSION

The present study found a statistically significant reduction in anxiety scores following participation in the four-session recreational sport program. The mean anxiety score decreased from 30.03 at pretest to 27.77 at posttest, representing a mean reduction of 2.26 points, while the Wilcoxon Signed-Rank Test indicated a significant pretest–posttest difference (p = .0028) with a moderate effect size (r = .48). This finding is broadly consistent with evidence indicating that physical activity is associated with better psychological outcomes among children and young people. An umbrella systematic review by Dale et al. (2019) identified evidence linking physical activity with anxiety, depression, and self-esteem outcomes in children and youth, while McMahon et al. (2017) reported associations between physical activity, anxiety, depression, and well-being among adolescents. More specifically, Kliziene et al. (2021) showed that a physical education program could improve emotional well-being among primary school children. The present findings therefore extend this evidence to a school-based recreational sport context, although the observed change should be interpreted as a pretest–posttest change rather than definitive evidence of a causal effect.

The reduction in anxiety is particularly relevant because the study was conducted during a period of examination preparation. Previous research has directly connected physical activity with test-related anxiety. Mavilidi et al. (2020) found that an acute physical activity break was associated with reduced test anxiety and improved mathematics test performance, indicating that even relatively brief physical activity may have psychological relevance in evaluative academic situations. At a broader level, Zhang et al. (2022), through a systematic review and meta-analysis, reported evidence concerning the effects of exercise interventions on students' test anxiety. More recently, Amorim et al. (2025) synthesised evidence on the use of physical activity for coping with test anxiety and emphasised physical activity as a potentially relevant strategy for managing anxiety associated with academic evaluation. The current findings are consistent with this body of evidence, but the present study contributes a different contextual perspective by examining recreational sport participation among sixth-grade students during examination preparation rather than focusing exclusively on exercise as a formal intervention or on older student populations.

The program's recreational nature may also help explain the observed change. The activities were designed around participation, movement, games, and social interaction rather than academic evaluation or competitive performance. A systems theory perspective on mental health in recreational sport suggests that psychological outcomes can emerge through interactions among individual, social, and environmental factors rather than through physical activity alone (Vella et al., 2022). Longitudinal evidence has also shown that years of sport participation during childhood can predict aspects of mental health during adolescence, suggesting that engagement in sport may have implications extending beyond immediate physical outcomes (Doré et al., 2019). Similarly, participation in extracurricular activities and school sports has been associated with child and youth mental health outcomes, although contextual conditions may influence these relationships (LaForge-MacKenzie et al., 2022). Thus, the reduction observed in the present study may plausibly reflect the combined experience of physical activity, recreational engagement, and interaction with peers. However,

because these components were delivered together and were not experimentally separated, the present design cannot determine which component contributed most strongly to the observed change.

The findings also have implications for using recreational sport within school-based approaches to student well-being. The moderate effect size (r = .48) suggests that the observed change was not trivial, while the direction of individual changes showed that more students experienced lower rather than higher anxiety scores after the program. This is consistent with the broader argument that physical activity and sport can form part of approaches to psychological well-being among young people (Motta et al., 2012; Whitley & Massey, 2026). At the same time, recreational sport should not be presented as a substitute for professional psychological support when students experience clinically significant anxiety. The current study involved a general sixth-grade student cohort rather than a clinically diagnosed anxiety population, and the program was relatively brief. Therefore, its potential role is better understood as a school-based supportive strategy for promoting well-being and coping with examination-related anxiety, rather than as a clinical treatment for anxiety disorders. This distinction is particularly important when implementing recreational sport in educational settings.

Several limitations should be considered when interpreting these findings. First, the one-group pretest–posttest design does not permit definitive causal attribution because the study did not include a control group. Changes in anxiety could have been influenced by maturation, examination-related circumstances, repeated measurement, or other experiences occurring during the study period. Second, the intervention consisted of only four sessions, and no retention or follow-up assessment was conducted; therefore, it remains unclear whether the observed reduction in anxiety was sustained beyond the posttest. Third, the participants came from a single sixth-grade cohort at one school, limiting the transferability of the findings to other age groups and educational settings. Accordingly, future research should use controlled or randomised designs, recruit students from multiple schools, employ longer intervention and follow-up periods, and examine whether particular components of recreational sport—such as physical activity, enjoyment, peer interaction, or non-competitive participation—make distinct contributions to changes in test anxiety. These directions would help determine whether the preliminary pretest–posttest improvement observed in the present study represents a durable intervention effect.

CONCLUSION

This study found a statistically significant reduction in anxiety scores among sixth-grade students following participation in a structured recreational sport program. Anxiety scores decreased from a pretest mean of 30.03 to a posttest mean of 27.77, with 24 of 39 students showing lower scores at posttest and a moderate effect size (r = .48). These findings provide preliminary, context-specific evidence that structured recreational sport may be a relevant supportive approach for promoting students' psychological well-being during periods of academic demand. The findings also suggest that recreational activities may provide an educational context in which physical activity, enjoyment, and peer interaction can be

integrated alongside students' academic experiences. However, the findings should be interpreted cautiously. The one-group pretest–posttest design without a control group does not allow the observed reduction in anxiety to be attributed exclusively to the recreational sport program. In particular, examination-related timing, maturation, repeated measurement, and other concurrent experiences may have contributed to the observed change. Therefore, the results should be understood as evidence of a significant change between the two measurement points rather than definitive evidence of a causal intervention effect. From an educational perspective, structured recreational sport may be considered as one component of broader school-based well-being initiatives, particularly when activities are accessible, enjoyable, and appropriate for students' developmental characteristics. Future research should employ controlled or randomised designs, larger and more diverse samples, longer intervention and follow-up periods, and clearly specified program protocols. Such research should also examine which components of recreational sport, including physical activity, enjoyment, and peer interaction, are most strongly associated with changes in students' anxiety and whether these changes are sustained over time.

ADDITIONAL INFORMATION

Authors should provide the following information where applicable. Statements that are not relevant to the manuscript may be omitted.

Statement	Description
Acknowledgements	The authors express their sincere gratitude to the principal, teachers, students, and parents of **SD Negeri 1 Kepongpongan, Talun District, Cirebon Regency**, for their cooperation, participation, and support throughout the research process. The authors also acknowledge the support of the **Faculty of Teacher Training and Education, Universitas Majalengka**, in completing this study.
Funding	This research received **no external funding** from any public, commercial, or non-profit funding agency. The authors conducted the study independently.
Author Contributions	Author Contributions: Conceptualisation: DS, IP; Methodology: DS, IP; Investigation: DS; Data Curation: DS; Formal Analysis: DS, IP; Writing – Original Draft: DS; Writing – Review & Editing: IP, DSF; Supervision: IP, DSF. All authors have read and approved the final version of the manuscript.
Conflict of Interest	The authors declare that **there are no financial or non-financial conflicts of interest** related to this research or its publication.
Data Availability Statement	The datasets generated and analysed during the current study are **available from the corresponding author upon reasonable request**. The data are not publicly available because they contain information relating to school-aged participants, and unrestricted access could potentially compromise participant confidentiality.

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