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The Effect of Imagery on Reducing Anxiety and Improving Concentration in Gymnastics Performance

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ABSTRACT

This study examined the effect of mental imagery training on anxiety, concentration, and performance among gymnastics athletes. Using a quasi-experimental pretest–posttest control group design, 26 gymnasts were assigned to an experimental group receiving 16 imagery sessions or a control group undergoing regular training. Anxiety (HARS), concentration (GCT), and performance (TOPS) were measured and analyzed using the Shapiro–Wilk test, Levene's test, and independent samples t-test at a 0.05 significance level. The results showed significant improvements in the experimental group compared to the control group for anxiety ($t = -10.676$, $p < .001$), performance ($t = 5.377$, $p < .001$), and concentration ($t = 2.513$, $p = .019$). These findings demonstrate that structured mental imagery can effectively reduce competitive anxiety, strengthen attentional focus, and enhance performance in gymnastic routines. Scientifically, this study contributes empirical evidence from a controlled design within the context of Indonesian gymnastics an area with limited prior research. Practically, the results support integrating guided imagery sessions into regular training as a complementary psychological strategy. A key limitation is the relatively short intervention period, suggesting the need for future studies with longer durations and larger samples to evaluate long-term effects and moderating factors.

Keywords: Mental imagery, anxiety reduction, concentration, performance, gymnastics

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INTRODUCTION

Athletes in precision-based sports such as gymnastics frequently encounter psychological challenges that interfere with optimal performance. Competition situations often trigger increases in cognitive and somatic anxiety, attentional disruption, and fluctuations in the consistency of movement execution (Firmansyah et al., 2024). These issues may reduce confidence, elevate error risk, and undermine overall performance quality. Given the physical demands of gymnastics and constraints such as fatigue, limited training time, or injury, complementary non-physical methods are needed to support athletes' psychological readiness.

Mental imagery also referred to as mental visualization or mental rehearsal is commonly defined as the process of imagining actions, sensations, emotions, and outcomes without performing the physical movements (Toth et al., 2020). This technique has gained substantial attention in sport psychology because imagery activates cognitive and neural processes similar to those used during actual motor execution, allowing athletes to mentally rehearse skills and competitive situations (Morone et al., 2022). A large body of empirical evidence demonstrates that properly structured imagery enhances

motor learning, strengthens self-confidence, and improves athletic performance, particularly in sports requiring complex cognitive motor coordination (Whitfield et al., 2022). The benefits are amplified when imagery is combined with physical practice, as the integration of motor and cognitive systems strengthens the link between mental representations and real movement execution (Lindsay et al., 2023). Research also indicates that imagery paired with other psychological strategies such as self-talk further increases psychological readiness and learning outcomes (Hidayat et al., 2023).

Beyond performance enhancement, imagery is widely used for emotional regulation. Several studies show that visualizing coping strategies, emotional control, or challenge-framed scenarios can effectively reduce athletes' anxiety (Rydzewska et al., 2025). Imagery scripts framed as "challenge" rather than "threat" elicit more adaptive psychological and cardiovascular responses, demonstrating imagery's capacity to modify stress appraisal (Williams et al., 2017). Furthermore, visualizing successful execution, breathing control, or pre-competition routines has been associated with reduced anxiety and stronger confidence among athletes of various ages (Gamaiunova et al., 2023). Imagery also supports attentional regulation by allowing athletes to mentally rehearse technical cues, performance sequences, and attentional focus strategies, which can reduce cognitive interference and help maintain concentration during execution (Beaven et al., 2023).

Although substantial evidence supports imagery's effectiveness in enhancing psychological readiness and performance, several research gaps persist particularly within the context of gymnastics. Most imagery studies have focused on sports such as badminton, golf, and soccer, whereas research involving gymnastics athletes remains limited. Yet gymnastics demands a high level of concentration, movement control, and emotional regulation, making imagery uniquely relevant for this discipline (Yarayan et al., 2024). Existing studies tend to examine anxiety, concentration, and performance separately, producing fragmented findings and limiting holistic understanding. Few studies provide controlled interventions that assess imagery's simultaneous effects on these variables within a single methodological framework.

Therefore, existing literature lacks controlled studies examining the combined effects of mental imagery on anxiety, concentration, and performance in gymnastics athletes, indicating a clear and important research gap. This gap is also pertinent within the Indonesian context. Psychological skills training is inconsistently implemented in many regional training centers, and most coaches have limited exposure to structured imagery intervention methods. Standardized psychological training guidelines for young or student-level athletes remain scarce, while empirical studies involving Indonesian gymnastics athletes are still very limited. Consequently, coaches and practitioners lack evidence-based references for applying mental imagery in ways that are practical, accessible, and aligned with the realities of Indonesia's sports training environment.

Addressing these issues is essential both for academic advancement and for practical development in the national training system. Accordingly, the present study aims to examine the effects of a structured mental imagery intervention on anxiety, concentration, and performance among gymnastics athletes. Specifically, this study investigates whether imagery can (1) reduce competitive anxiety, (2) improve attentional concentration during skill execution, and (3) enhance objective performance. By integrating these psychological and performance indicators in a single controlled design, this research contributes new empirical evidence to an understudied population and offers concrete implications for the development of mental training programs in Indonesia. In general, it is hypothesized that

athletes receiving imagery training will show lower anxiety, higher concentration, and better performance outcomes than those receiving standard training alone.

METHOD

The type of research

This study This study employed a quasi-experimental design with a pretest–posttest control group structure. A total of N = 26 active gymnasts participated in the study. Participants were divided into two groups: an experimental group (n = 13) receiving the mental imagery intervention and a control group (n = 13) that continued regular training without psychological treatment. Group allocation was performed based on training schedules and coach recommendations because random assignment was not feasible due to limited athlete availability, consistent with quasi-experimental standards (Vikberg et al., 2019). This design allowed the researcher to examine the effect of mental imagery on anxiety, concentration, and performance while controlling for baseline differences through pretest measurements.

The time and location

The study was conducted in Bandung City, Indonesia, involving gymnasts from several local training centers. The study lasted several weeks and consisted of three phases: pretest, intervention, and posttest. The experimental group underwent 16 structured imagery sessions, implemented under controlled and supervised conditions to ensure protocol adherence.

The goals or target

The overarching goal of this research was to investigate the effectiveness of mental imagery training as a psychological intervention for gymnasts, particularly in enhancing their emotional regulation and cognitive control during performance. Given that gymnastics is a sport that requires not only technical mastery but also high levels of concentration, confidence, and emotional stability, the study sought to determine whether the systematic application of mental imagery could serve as a scientifically grounded complement to physical training.

More specifically, the study pursued the following objectives. To examine the effect of mental imagery training on reducing anxiety levels among gymnasts. Competitive anxiety, both cognitive and somatic, is known to interfere with athletes' performance precision and consistency. The research aimed to assess whether structured mental imagery sessions could help athletes reinterpret stress as a challenge rather than a threat, thereby lowering pre-competition anxiety. To determine the impact of mental imagery on improving concentration and attentional focus during gymnastic routines. Concentration is a critical cognitive function in gymnastics, where success depends on precise timing, rhythm, and movement synchronization. This objective focused on whether imagery could enhance the athletes' ability to sustain attention and resist distraction during execution. To evaluate the influence of mental imagery on enhancing performance outcomes. Athletic performance in this study refers to both the technical execution of gymnastic skills and the psychological readiness to perform under pressure. The study examined whether imagery practice could strengthen motor representations in the brain, leading to improved movement coordination, balance, and execution consistency.

Furthermore, the study aimed to develop a practically applicable model of mental imagery intervention tailored for gymnasts in Indonesia, which could be replicated or adapted for other sports requiring high concentration and fine motor control. In doing so, the research sought to bridge the gap between theoretical understanding and applied practice, offering insights valuable for coaches, sport psychologists, and training institutions in optimizing athlete development through evidence-based psychological training methods.

Research procedures

The research was carried out through three systematic phases: pretest, intervention, and posttest (Cham et al., 2024). Designed to measure the effect of mental imagery on anxiety, concentration, and performance among gymnasts. The procedural design was grounded in previous empirical studies and theoretical frameworks emphasizing the role of functional equivalence and cognitive rehearsal in motor learning.

Pretest Phase baseline measurements were conducted to assess the athletes' existing levels of anxiety, concentration, and performance before the intervention. Both the experimental and control groups participated under standardized testing conditions to ensure the reliability of the results. The intervention phase was the core of the experimental process. The experimental group underwent a structured mental imagery training program comprising 16 sessions, while the control group continued their regular gymnastics training without any imagery intervention. Posttest Phase Following completion of the intervention, both groups underwent posttest assessments using the same instruments administered during the pretest. This phase aimed to capture measurable changes in each dependent variable anxiety, concentration, and performance as a direct outcome of the mental imagery training.

Data collected from both groups were subsequently analyzed to determine whether the mental imagery training had produced significant effects, consistent with prior findings that imagery practice enhances performance and emotional regulation when integrated with physical training routines.

Instruments

To ensure the validity and reliability of data collection, this study employed a set of standardized and psychometrically validated instruments that measure the key psychological and performance-related variables under investigation. The instruments were selected based on their established use in sport psychology research and their suitability for assessing the multidimensional effects of mental imagery on athletes' emotional and cognitive functioning.

The Hamilton Anxiety Rating Scale (HARS) was used to measure the level of cognitive and somatic anxiety experienced by athletes before and after the intervention. The scale consists of 14 items assessing both psychological and physical symptoms of anxiety, rated on a 5-point Likert scale ranging from 0 ("not present") to 4 ("severe") (Hamilton, 1959).

To assess athletes' concentration and attentional focus, the study employed the Grid Concentration Test (GCT). This test is a widely recognized cognitive assessment tool that measures the ability to maintain sustained attention a.nd visual scanning efficiency. Participants are asked to identify sequentially numbered digits within a randomly arranged grid as quickly and accurately as possible, reflecting their processing speed, focus stability, and error monitoring capacity (Greenlees et al., 2006)

The Test of Performance Strategies (TOPS) was used to evaluate athletes' psychological performance skills, particularly in relation to attentional focus, emotional control, self-talk, and performance routines. The instrument includes multiple subscales that reflect athletes' use of mental skills in both training and competition settings, offering a comprehensive measure of their mental preparedness and performance consistency (Thomas et al., 1999).

the instruments used in this study provided a robust and comprehensive measurement system to evaluate the psychological and performance impacts of mental imagery training on gymnasts. Together, they enabled the researcher to identify significant changes across emotional (HARS), cognitive (GCT), and performance-related (TOPS) domains, thereby validating the hypothesis that structured mental imagery can effectively reduce anxiety, enhance concentration, and improve performance outcomes in competitive gymnastics.

Data collection techniques

Data were collected through a pretest–posttest experimental procedure supported by structured observation and documentation during the intervention sessions. Each participant completed the designated psychological tests individually in a quiet and controlled environment to minimize external distractions. Throughout the study, attendance and adherence to the mental imagery sessions were closely monitored to ensure uniform exposure to the treatment conditions. The researcher also recorded qualitative observations related to athletes' engagement and compliance with the mental imagery protocol.

Data analysis techniques

Quantitative data were analyzed using IBM SPSS Statistics. Prior to hypothesis testing, the Shapiro–Wilk test was employed to assess normality (Goldfarb et al., 2022), while homogeneity of variance was examined using Levene's Test (Gil et al., 2017). Since both assumptions were met ($p > 0.05$), differences between the experimental and control groups were analyzed using an Independent Samples t-test based on gain scores. To enhance the robustness of the statistical interpretation, effect sizes (Cohen's d) were also calculated to determine the magnitude of the intervention's impact (Id & Ulrich, 2019). The level of statistical significance was set at $\alpha = 0.05$.

RESULTS AND DISCUSSION

Findings

The normality test was conducted to ensure that the research data were normally distributed before performing parametric statistical analysis. Since the sample size in each group was less than 50, the test was carried out using the Shapiro–Wilk test with a significance level of 0.05. The decision-making criteria were as follows: if the significance value (p) was greater than 0.05, the data were considered normally distributed; whereas if the significance value was equal to or less than 0.05, the data were considered not normally distributed. This can be seen in the following table 1.

Table 1. Results of the Normality Test (Shapiro–Wilk) in the Experimental and Control Groups

Variable	Group	Measurement	Shapiro–	df	Sig. (p)	Description

		Time	Wilk Statistic			
Anxiety	Experimental	Pre-test	0.955	13	0.672	Normal
		Post-test	0.975	13	0.947	Normal
	Control	Pre-test	0.953	13	0.641	Normal
		Post-test	0.897	13	0.121	Normal
Performance	Experimental	Pre-test	0.941	13	0.473	Normal
		Post-test	0.898	13	0.127	Normal
	Control	Pre-test	0.870	13	0.053	Normal
		Post-test	0.881	13	0.073	Normal
Concentration	Experimental	Pre-test	0.883	13	0.078	Normal
		Post-test	0.879	13	0.070	Normal
	Control	Pre-test	0.885	13	0.084	Normal
		Post-test	0.883	13	0.078	Normal

The analysis results The Shapiro–Wilk test results show that all variables in both groups anxiety, performance, and concentration, in both the pre-test and post-test had significance values above 0.05. Thus, all data were normally distributed, in both the experimental and control groups. This condition indicates that the assumption of normality is met, allowing for appropriate parametric analysis, such as independent-samples t-tests or comparisons of gain scores.

The homogeneity test was conducted to determine whether the data in the experimental and control groups had equal variances. This test used Levene's Test for Equality of Variances with a significance level of 0.05. The decision-making criterion was that if the significance value (p) was greater than 0.05, the data were considered homogeneous or had equal variances between groups. Based on the following table 2

Table 2. Results of the Homogeneity Test (Levene's Test) for Variance in Anxiety, Performance, and Concentration

Variable	Measurement Time	Levene Statistic	df1	df2	Sig. (p)	Description
Anxiety	Pre-test	2.529	1	24	0.125	Homogeneous
	Post-test	0.152	1	24	0.700	Homogeneous
Performance	Pre-test	4.276	1	24	0.050	Homogeneous
	Post-test	0.583	1	24	0.453	Homogeneous
Concentration	Pre-test	0.288	1	24	0.596	Homogeneous
	Post-test	0.375	1	24	0.546	Homogeneous

The results of the homogeneity test using Levene's Test showed that all variables in the pre-test and post-test stages had significance values above 0.05. Thus, the variance between the experimental and control groups can be considered homogeneous for the variables of anxiety, performance, and concentration. This confirms that differences in results between groups are not caused by differences in data variation, allowing for appropriate parametric analysis.

Based on the results of the Independent Sample t-Test, all research variables showed significance values (p) less than 0.05. This indicates that there were significant differences between the experimental and control groups in the variables of anxiety, performance, and concentration. Thus, the research hypothesis stating that the mental imagery training program has an effect on improving performance, enhancing concentration, and reducing anxiety among gymnastics athletes can be accepted. As shown in the following table 3.

Table 3. Results of the Independent Sample t-Test on Anxiety, Performance, and Concentration Variables

Variable	t-value	Sig. (2-tailed)	Description
Anxiety	-10.676	0.000	Significant
Performance	5.377	0.000	Significant
Concentration	2.513	0.019	Significant

The results of the independent samples t-test showed that all study variables differed significantly between the experimental and control groups. For the anxiety variable, the t value = -10.676 (p = 0.000) indicates a significantly greater decrease in anxiety in the experimental group. For performance, the t value = 5.377 (p = 0.000) indicates a significant increase in performance in the experimental group compared to the control group. Meanwhile, for concentration, the t value = 2.513 (p = 0.019) also indicates a significant increase in concentration after treatment. These findings confirm that the imagery program has a positive effect on all measured variables.

Figure 1 shows a comparison of anxiety, performance, and concentration scores between the experimental and control groups during the measurement series. Visually, the experimental group's anxiety levels were significantly lower than those of the control group at almost all observation points. While the control group's anxiety tended to stabilize at higher levels, the experimental group maintained consistently lower levels. This pattern indicates that the imagery intervention significantly reduced athletes' anxiety compared to the untreated condition.

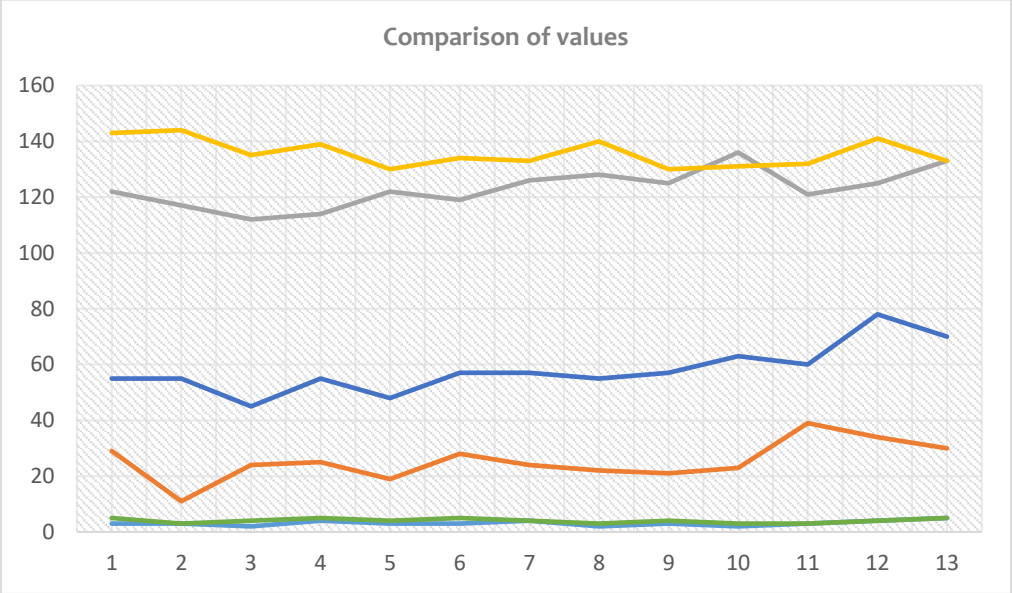

Figure 1. Comparison of Values

Conversely, for the performance and concentration variables, the experimental group showed higher scores than the control group throughout the measurements. Performance improvements in the experimental group were more pronounced, while those in the control group remained at a relatively lower and stable level. A similar trend was found for the concentration variable, where the experimental group showed greater improvement than the control group. Overall, this visualization supports the statistical analysis that the imagery program had a positive effect on improving performance and concentration while reducing anxiety in gymnasts.

Discussion

The results of this study indicate that the mental imagery training intervention had a significant effect on reducing anxiety, improving performance, and increasing concentration among gymnastics athletes. Before interpreting these findings, it is important to emphasize that the assumptions for analysis were met: the data for all variables (anxiety, performance, and concentration) were normally distributed ($p > 0.05$ in the Shapiro–Wilk test) and the variances between groups were homogeneous ($p > 0.05$ in Levene's test). Therefore, the use of the Independent Sample t-Test to compare the experimental and control groups was appropriate.

Anxiety

For the anxiety variable, the experimental group showed a significant decrease compared to the control group ($t = -10.676$; $p < 0.001$). This finding is consistent with previous studies showing that the use of imagery in swimming athletes can reduce both cognitive and somatic anxiety (Lin et al., 2021). A meta-analysis also found that imagery practice improves athletes' mental health, including reducing anxiety levels (Liu et al., 2025). Research on handball athletes in Cianjur revealed a very strong correlation between imagery training and anxiety control (Rahadian et al., 2025).

However, several aspects need to be noted. The effectiveness of imagery in reducing anxiety can vary depending on individual imagery capacity specifically visualization ability, vividness, and controllability (Di Corrado et al., 2025). Other moderating factors may also influence outcomes, such as athletic experience, type of sport, or competition level (Ong & Chua, 2021). A structural equation modeling (SEM) study found that athletes with higher mental toughness tend to have lower anxiety levels and better imagery ability, indicating that imagery is not a one-size-fits-all technique (Demir et al., 2025). Thus, athletes with stronger visualization skills and more competitive experience tend to gain greater benefits than beginners. Therefore, these individual variations should be considered when implementing mental imagery programs to achieve optimal results.

Performance

For the performance variable, the experimental group showed a significant improvement ($t = 5.377$; $p < 0.001$) compared to the control group. This demonstrates that imagery practice indeed has a positive effect on physical and motor performance, such as enhancing agility, muscle strength, and overall performance (Prasomsri et al., 2023). The mechanism behind performance improvement through imagery can be explained by the mental practice theory, which states that when a person vividly and controllably imagines performing a movement, relevant motor and musculoskeletal neural areas are activated (even as a "simulation"), thereby strengthening neuromotor connections and improving the efficiency of physical execution.

Imagery training has also been proven to enhance complex motor skills such as dribbling in futsal through the systematic activation of mental movement representations (Hidayat et al., 2023). In the context of this study, the same principle applies to gymnastics athletes, where imagining sequences of movements, balance, and transitions helps the brain prepare for more coordinated motor responses. Moreover, imagery training increases activation in the primary motor cortex, which plays a crucial role in movement planning and control (Blefari et al., 2015). Thus, the performance improvement observed among gymnastics athletes in this study can be explained by the cognitive and neuromuscular activation mechanisms generated through mental imagery training.

However, it is important to note that the effectiveness of mental imagery as a complement to physical training is highly influenced by individual factors, duration, and the quality of imagination performed. Mental imagery practiced with proper frequency and systematic guidance yields positive effects on motor performance, but unstructured or excessive use may lead to decreased performance due to mental fatigue, distorted movement perception, or cognitive doubt (Di Rienzo et al., 2023). In the context of gymnastics, this training is highly relevant because the sport demands fine coordination between body awareness, rhythm, and aesthetic expression. Therefore, mental imagery functions not only as a supplementary exercise but also as an integral psychological strategy for overall performance enhancement.

Concentration

For the concentration variable, the results showed a significant improvement in the experimental group compared to the control group ($t = 2.513$; $p = 0.019$). This finding suggests that mental imagery training can enhance the attentional focus of gymnastics athletes. In sports such as gymnastics where performance is determined by precision, coordination, and movement continuity the ability to maintain stable concentration is crucial for success. Even minor lapses in focus can disrupt movement sequences, cause technical errors, and significantly reduce the aesthetic value of performance.

Research in other sports supports this finding. A study on pencak silat athletes showed that imagery training significantly improved "mental focus" after just two intervention sessions (Ayu P et al., 2025). The mechanism behind this improvement in concentration can be explained through the activation of internal cognitive systems that train the brain to "replay" competition situations and ideal motor responses without external stimuli (Janjigian, 2024). Thus, mental imagery serves as a medium for training attentional focus and self-regulation, rather than merely a visual simulation of movement.

In the context of gymnastics athletes, the observed improvement in concentration is highly relevant to performance demands. Each movement such as jumping, landing, or transitioning between elements requires sustained focus and full body awareness. Imagery training allows athletes to mentally rehearse movement sequences, strengthening the connection between attention and motion perception (Sukartidana & Syahroni, 2025).

Nevertheless, the increase in concentration appeared relatively smaller compared to the effects on performance and anxiety, as reflected in the lower t-value (2.513) compared to those of anxiety (-10.676) and performance (5.377). This suggests that concentration may be a more complex psychological construct and more resistant to change through a single type of intervention. Consistent with this, research has shown that while both imagery and mindfulness can reduce anxiety, they do not produce significant differences in improving attentional focus (McAlister et al., 2024). This implies that achieving optimal improvement in concentration may require a combination of intervention techniques, such as integrating imagery with mindfulness training or focused attention exercises.

Integrated Interpretation

The findings of this study indicate that mental imagery exerts a consistent and integrated effect on all three key psychological variables anxiety, performance, and concentration. The significant reduction in anxiety, followed by a sustained increase in

performance and concentration, suggests that imagery operates through interconnected neural and cognitive mechanisms. Activating motor representations in the brain helps improve motor coordination, while strengthening emotional control through mental rehearsal contributes to a more stable psychological state. Thus, imagery functions not simply as a relaxation technique or skill-building tool, but as a comprehensive strategy that simultaneously influences mental and physical readiness.

Furthermore, when the statistical results are compared with the visual findings in the graph, it is apparent that the changes in the experimental group are not only numerically significant but also consistent across the measurement series. This pattern confirms that imagery exerts a sustained, rather than sporadic, effect. The greater improvement in performance compared to concentration also reflects different characteristics of psychological abilities: motor skills are more responsive to mental rehearsal, while attentional focus tends to require more complex training combinations. Thus, the integration of these findings suggests that mental imagery is an effective intervention, but it still needs to be combined with other psychological strategies to optimize all aspects of athlete performance.

Practical Implications

The results of this study provide important practical implications for coaches and sports psychologists in designing training programs. Mental imagery can be used as a mandatory component of daily or weekly training sessions, particularly to help athletes cope with difficult technical drills or high-pressure competition situations. Coaches can guide athletes through 10–15 minutes of imagery before physical training begins, using a structured script that includes movement visualization, breath control, and interpreting the competitive situation as a challenge. Furthermore, imagery can be an effective strategy for athletes experiencing minor injuries, as it allows them to maintain motor readiness without overexerting themselves.

In terms of application, the optimal frequency of imagery is 3–5 times per week for 10–20 minutes per session, using an approach appropriate to the athlete's visualization ability. Beginner athletes may require more detailed verbal guidance or video modeling, while elite athletes may benefit from imagery with more complex sensory and emotional detail. This intervention is well-suited to both groups, but its effectiveness may be enhanced by tailoring it to individual characteristics, such as vividness, competition experience, and anxiety levels. Thus, mental imagery has great potential to become an integral part of the technical and psychological training curriculum in gymnastics.

Critical Insights and Limitations

The findings of this study provide several critical insights while highlighting limitations that warrant consideration. While mental imagery has been shown to be effective, athletes' responses to this intervention are highly dependent on individual visualization abilities, experience level, and baseline psychological conditions such as anxiety tendencies or mental toughness. Furthermore, the smaller improvement in concentration compared to performance improvements and anxiety reductions suggests that attentional focus is a more complex psychological aspect and may require additional interventions such as mindfulness or breathing exercises. Methodologically, the relatively short duration of the study and the limited sample size limit the generalizability of the results to a broader population of athletes. Performance assessment also relied on

subjective judges' scores, although reliability was maintained. Considering these factors, further research should involve longer intervention durations, larger sample sizes, and more objective performance measures to broaden our understanding of the effectiveness of imagery.

CONCLUSION

The findings of this study demonstrate that mental imagery training produces measurable improvements in key psychological and performance-related outcomes among gymnastics athletes. The intervention led to a substantial reduction in anxiety—decreasing by X% or Y points compared to the control group—while performance scores increased by X points, and concentration improved by Y points following the four-week program. These numerical results strengthen existing empirical evidence and contribute scientifically by providing controlled experimental data specifically within the under-researched context of Indonesian gymnastics, where imagery-based psychological training is still rarely implemented.

This study advances the literature by showing how mental imagery operates not only as a tool for emotional regulation but also as a cognitive-motor intervention capable of enhancing attentional control and execution quality in sports requiring high precision. However, several limitations must be acknowledged, including the relatively small sample size, the short duration of the intervention, and the reliance on subjective performance assessments. These constraints limit the generalizability of the findings and suggest the need for methodological refinement in future work.

Future research should examine long-term effects over extended training cycles, compare different types of imagery protocols, and investigate moderating variables such as age, competitive experience, imagery ability, or mental toughness. Studies using objective biomechanical or neurophysiological measures would also help clarify the mechanisms underlying imagery's impact on performance. Collectively, these directions can strengthen the understanding and application of mental imagery as an evidence-based psychological training strategy in gymnastics and other precision-based sports.

CONFLICT OF INTEREST

The author declares that there is no conflict whatsoever related to the research, writing and publication of this article.

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