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The Role of Music in Emotional Regulation During Pre-Competition Preparation Among Adolescent Beginner Pencak Silat Athletes

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ABSTRACT

This study aimed to examine the relationship and magnitude of the contribution of music to emotional regulation during pre-competition preparation among adolescent beginner pencak silat athletes. Emotional regulation is a critical psychological factor influencing competitive readiness, particularly among adolescents whose emotional control systems are still developing. Drawing on sport psychology and affective regulation frameworks, this study conceptualized music as a habitual and self-directed coping resource rather than as a structured intervention. A quantitative correlational design was employed. Participants were adolescent beginner pencak silat athletes from the Serut Sewu Ngawi Silat Club selected through total sampling. Data were collected using validated and reliable questionnaires measuring habitual music utilization and emotional regulation capacities. Statistical analysis was conducted using the Spearman Rank correlation test and coefficient of determination (α = 0.05) with SPSS 22.0. The findings revealed a strong and significant positive correlation between music use and emotional regulation (r = .688; $p < .05$). The coefficient of determination indicated that music contributed 47.3% to the variance in emotional regulation, while 52.7% was explained by other psychological and contextual factors. These results suggest that music functions as a meaningful emotional regulation resource in pre-competition contexts. Practically, music may serve as an accessible, low-cost, and flexible strategy to support mental readiness among beginner athletes in club-based development environments.

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INTRODUCTION

Sports performance is not solely determined by physical capacity and technical skills but is also significantly influenced by psychological factors, particularly emotional regulation. Within the framework of modern sport psychology, emotional regulation is defined as an individual's ability to monitor, evaluate, and modify emotional responses to suit the demands of a competitive situation (Gross, 2015; Assalamy et al., 2023).

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Emotional regulation plays a crucial role in maintaining attentional stability, decision-making, impulse control, and mental readiness prior to competition (Lane et al., 2017; Uphill et al., 2019). Athletes with good emotional regulation tend to be able to maintain optimal performance even under competitive pressure.

For young athletes starting out in pencak silat a traditional Indonesian martial art that is now gaining international recognition emotional regulation is crucial because their psychological development is still characterized by affective fluctuations and unstable self-control (Steinberg, 2017; Mylsidayu, 2022). The characteristics of pencak silat competitions, which demand quick responses, courage, and controlled aggression, increase the risk of competitive anxiety, excessive tension, and loss of focus if emotions are not managed adaptively (Hanin, 2016; Wahyudi et al., 2021). This can directly impact tactical errors, delayed reactions, and decreased offensive and defensive effectiveness.

The pre-competitive phase is the period most vulnerable to psychological stress. Adolescent athletes often face demanding coach expectations, anxiety about match outcomes, and social comparisons with peers (Nicholls et al., 2016; Rice et al., 2019). If these pressures are not balanced with effective emotional regulation strategies, mental readiness will be compromised and performance potential will not be achieved optimally. Therefore, practical, accessible support strategies are needed that can be used independently by athletes without relying entirely on clinical interventions or complex psychological programs.

In the context of developing a local club like the Serut Sewu Ngawi Silat Club, a simple yet effective approach is urgently needed. Beginner athletes generally do not receive the same structured psychological training as elite athletes. Thus, exploring natural, habit-based emotion regulation strategies is relevant for empirical research.

Sport psychology literature over the past decade has shown that emotion regulation is a significant predictor of athletic performance (Campo et al., 2017; Lane et al., 2017). Gross's (2015) process model of emotion regulation emphasizes the importance of antecedent-focused and response-focused strategies in managing affective reactions before and during competition. Empirical research shows that cognitive reappraisal and impulse control skills are positively correlated with athlete performance and resilience (Uphill et al., 2019; Kopp & Jekauc, 2018).

One medium widely studied as a tool for emotion regulation is music. Neuropsychologically, music is known to activate the limbic system, including the amygdala and nucleus accumbens, which play a role in emotional processing and dopamine release (Koelsch, 2018; Tan et al., 2024). Music has also been shown to lower cortisol levels and increase positive mood and intrinsic motivation (Terry et al., 2020; Chong et al., 2024). In the context of sport, music is used to increase arousal, improve focus, and reduce pre-competition anxiety (Bishop et al., 2018; Karageorghis et al., 2021).

Experimental research shows that tempo and musical preferences can influence athletes' psychophysiological states. Ilsya et al. (2022) found that music with a moderate tempo and motivational lyrics effectively reduced pre-competition anxiety. Another study reported improved emotion regulation after a classical music intervention during

competition preparation (Peters et al., 2024). Furthermore, Tan et al. (2024) showed that exposure to music tailored to individual preferences improves mood stability and stress management.

In combat sports, managing arousal and emotions is a crucial determinant of performance success (Hanin, 2016; Slimani et al., 2018). However, most research positions music as a structured intervention within an experimental design, rather than as a natural habit that grows out of an athlete's personal preferences. However, self-determination theory suggests that activities based on intrinsic preferences have more sustained emotional regulation effects than external interventions (Ryan & Deci, 2017).

Although empirical evidence demonstrates the effectiveness of music as a medium for emotion regulation, several significant research gaps remain. First, most studies use experimental designs with controlled treatments, thus positioning music as therapy or treatment (Terry et al., 2020; Peters et al., 2024). This approach does not fully describe how music functions in the context of athletes' daily lives as a personal habit.

Second, studies on the contribution of music-based habitual listening behavior to emotion regulation in the pre-competition phase are still limited. The existing literature emphasizes acute effects rather than medium-term, habit-based contributions (Karageorghis et al., 2021). However, the habit of listening to music before training or competition can be a more natural and sustainable emotion regulation strategy.

Third, research specifically focusing on novice adolescent pencak silat athletes in the context of local club development is relatively rare. Most studies focus on elite athletes or popular sports such as soccer and basketball (Rice et al., 2019; Slimani et al., 2018). In fact, pencak silat has unique psychological characteristics that require high levels of aggressive control and emotional stability.

Therefore, there is a need to explore the relationship and contribution of music as a personal habit to emotional regulation in novice adolescent pencak silat athletes, particularly in the pre-competition phase.

Based on this gap, this study aims to analyze the relationship and extent of music's contribution to emotional regulation in the pre-competition preparation phase of novice adolescent pencak silat athletes at the Serut Sewu Ngawi Silat Club. The research questions posed are: (1) Is there a significant relationship between music listening habits and emotional regulation in the pre-competition phase, and (2) How significant is the contribution of music to athletes' emotional regulation?

The novelty of this study lies in two main aspects. First, it conceptualizes music not as a structured intervention, but rather as an athlete's personal habit or preference in everyday life. This approach provides a new perspective on emotional regulation based on intrinsic and self-managed strategies. Second, this study focuses on a population of novice adolescent pencak silat athletes within the context of local club development, a population that has received little attention in international sport psychology literature.

Theoretically, the results of this study are expected to enrich the study of emotional regulation in martial arts by incorporating musical habits as a contextual factor. Practically, the findings of this study can provide a basis for coaches to recommend

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simple, self-directed strategies to support athletes' mental readiness prior to competition. Thus, this research not only contributes to the development of sport psychology but also provides practical implications for the development of adolescent athletes at the club level.

METHODS

This study employed a quantitative approach using a correlational design to examine the relationship and magnitude of the contribution of music to emotional regulation during pre-competition preparation among adolescent beginner pencak silat athletes. A correlational framework was selected because it allows the identification of naturally occurring associations between psychological variables without experimental manipulation, thereby preserving ecological validity (Creswell & Creswell, 2018; Field, 2018). In sport psychology research, correlational designs are widely used to explore relationships affect between active strategies and performance-related psychological constructs (Lane et al., 2017; Uphill et al., 2019). This approach is particularly relevant when examining habitual behaviors, such as music listening, that develop organically within athletes' daily routines (Karageorghis et al., 2021).

The participants were adolescent beginner pencak silat athletes from the Serut Sewu Ngawi Silat Club. Total sampling was applied, whereby all athletes meeting the inclusion criteria were recruited. The criteria included: (1) adolescents aged within the developmental stage of early to middle adolescence, (2) classified as beginner-level athletes within the club system, and (3) actively involved in regular training and pre-competition preparation. Total sampling is recommended when population size is limited and when comprehensive representation is necessary to reduce sampling bias (Etikan & Bala, 2017). Research on youth sport contexts emphasizes the importance of capturing entire team or club populations to better reflect psychosocial dynamics within developmental environments (Rice et al., 2019; Nicholls et al., 2016).

Data were collected using a survey method with structured questionnaires. The music variable instrument was developed to measure habitual listening behavior, frequency, timing (e.g., before training or competition), perceived functional use (e.g., calming, motivating, focusing), and personal preference alignment. This operationalization aligns with contemporary models of music use in sport, which emphasize functional and preference-based listening as key determinants of psychological outcomes (Terry et al., 2020; Karageorghis et al., 2021). The emotional regulation instrument was constructed based on Gross's process model (Gross, 2015) and incorporated dimensions such as cognitive reappraisal, emotional control, attentional focus, and response modulation—constructs empirically linked to competitive readiness and stress management in athletes (Campo et al., 2017; Kopp & Jekauc, 2018).

Both instruments underwent content validation by sport psychology experts and pilot reliability testing prior to formal administration. Internal consistency reliability was assessed using Cronbach's alpha, consistent with psychometric standards in sport

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psychology research (Taber, 2018). Valid and reliable measurement is critical when examining emotional constructs, as measurement error may attenuate correlation estimates (Field, 2018). Responses were recorded using a Likert-scale format, producing quantitative scores for subsequent statistical analysis.

Preliminary assumption testing indicated non-normal data distribution; therefore, nonparametric inferential statistics were applied. The Spearman Rank correlation test was used to determine the degree and direction of association between music habits and emotional regulation. Spearman correlation is appropriate for ordinal data and non-normally distributed psychological measures (Conover, 2017). To estimate practical significance, the coefficient of determination (R^2) was calculated to identify the magnitude of music's contribution to emotional regulation, consistent with recommendations in behavioral science research (Cohen et al., 2018). All statistical analyzes were conducted using SPSS version 22.0 with a significance level of 0.05 and a 95% confidence interval.

Through this methodological framework, the study seeks to provide an ecologically grounded and statistically rigorous examination of the role of habitual music use in supporting emotional regulation during pre-competition preparation among adolescent pencak silat athletes.

RESULTS AND DISCUSSION

Result

The results of the data analysis indicate a statistically significant relationship between music and emotional regulation among adolescent beginner pencak silat athletes during the pre-competition preparation phase. The Spearman Rank correlation test was employed to examine the direction and strength of the association between the two variables, as this nonparametric test is appropriate for data that do not meet normality assumptions. The findings demonstrate that music is meaningfully associated with athletes' ability to manage, control, and stabilize their emotional responses prior to competition.

Furthermore, the correlation analysis provides empirical evidence that psychological readiness in beginner athletes is influenced not only by internal emotional maturity but also by external supportive factors such as music exposure and listening habits. This highlights the relevance of incorporating simple psychological resources into athletes' preparation routines to foster emotional balance and reduce pre-competition anxiety. The detailed results of the correlation analysis are presented in Table 1, which summarizes the correlation coefficient and level of statistical significance between music utilization and emotional regulation.

Table 1.
Results of the spearman rank correlation test between music and emotional regulation

Column 1	Column 2	Column 3
Music-Emotional Regulation	r =.688	p <.05
Total	**.688**	**Significant**

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Table 2.
Coefficient of Determination of Music on Emotional Regulation

Column 1	Column 2
Correlation Coefficient (r)	.688
Coefficient of Determination (r^2)	.473
Contribution (%)	47.3
Other Factor (%)	52.7

Based on Table 1, the obtained correlation coefficient was r = .688 with a significance level of p < .05, indicating a strong and statistically significant relationship between music and emotional regulation among adolescent beginner pencak silat athletes. The positive direction of this relationship suggests that more effective and consistent utilization of music during the pre-competition preparation phase is associated with better emotional regulation abilities in athletes. In practical terms, athletes who habitually use music as part of their preparation tend to experience greater emotional stability, improved focus, and reduced psychological tension when approaching competition.

Furthermore, as presented in Table 2, the coefficient of determination was .473, which means that music accounts for 47.3% of the variance in athletes' emotional regulation. This finding demonstrates that music provides a moderate-to-substantial contribution to emotional regulation during pre-competition preparation. Nevertheless, the remaining 52.7% is influenced by other factors not examined in this study, such as psychological maturity, competitive experience, coaching support, coping strategies, personality traits, and the social environment surrounding the athletes.

Overall, these results reinforce the notion that music represents an important psychological resource that can support emotional regulation in beginner athletes. Although it is not the sole determinant, its relatively large contribution highlights the practical value of integrating music into athletes' mental preparation routines in a simple, flexible, and self-directed manner.

Discussion

The findings of this study demonstrate that music has a strong and statistically significant relationship with emotional regulation among adolescent beginner pencak silat athletes during pre-competition preparation. The coefficient of determination (47.3%) indicates that music contributes substantially to athletes' ability to manage emotional responses prior to competition. This result underscores the psychological relevance of music as a functional stimulus capable of supporting emotional stability in competitive sport contexts. In line with contemporary sport psychology frameworks, emotional regulation is recognized as a key determinant of performance consistency, particularly under conditions of evaluative stress and competitive uncertainty (Lane et al., 2017; Uphill et al., 2019). The present findings therefore reinforce the growing consensus that psychological readiness is inseparable from effective emotional management.

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From a theoretical standpoint, the influence of music on emotional regulation can be explained through affective neuroscience and self-regulation models. According to Gross's (2015) process model, emotional regulation involves cognitive reappraisal, attentional deployment, and response modulation. Music may facilitate these processes by altering emotional appraisal and redirecting attentional focus away from anxiety-inducing stimuli. Neurophysiological studies indicate that music activates the limbic system including the amygdala and nucleus accumbens while stimulating dopaminergic pathways associated with reward and positive affect (Koelsch, 2018; Tan et al., 2024). Simultaneously, music exposure has been shown to reduce cortisol levels and sympathetic nervous activation, thereby promoting relaxation responses (Chong et al., 2024; Terry et al., 2020). These mechanisms help athletes maintain emotional balance and optimal arousal prior to competition.

The present findings are consistent with empirical evidence suggesting that music reduces competitive anxiety and enhances mood regulation in athletes. Ilsya et al. (2022) reported that music listening prior to competition significantly decreased emotional tension among youth athletes. Similarly, Karageorghis et al. (2021) demonstrated that self-selected music improved affective valence and perceived readiness before performance tasks. Peters et al. (2024) further found that music exposure enhanced emotional control and reduced anticipatory anxiety in competitive settings. These studies collectively support the argument that music functions as an adaptive emotional regulation strategy in sport.

Importantly, the population examined in this study adolescent beginner pencak silat athletes represents a developmental stage characterized by ongoing emotional maturation. Adolescence is associated with heightened emotional reactivity due to ongoing neurodevelopmental processes in the prefrontal cortex and limbic system (Steinberg, 2017). Consequently, beginner athletes may be more vulnerable to emotional dysregulation when facing competitive pressure (Rice et al., 2019). In such contexts, accessible coping resources become crucial. Music appears to serve as an external regulatory scaffold that supports emotional stability while intrinsic regulatory capacities continue to develop.

The relatively large contribution (47.3%) identified in this study suggests that music is not merely a complementary factor but may represent a dominant coping resource during pre-competition preparation. In line with the Individual Zones of Optimal Functioning (IZOF) model, optimal performance depends on maintaining individualized arousal and emotional states (Hanin, 2016). Music can help athletes regulate arousal upward or downward depending on situational demands. Calming music may reduce excessive arousal, whereas energizing music may enhance activation when lethargy is present (Bishop et al., 2018; Slimani et al., 2018). This flexibility makes music particularly suitable for dynamic combat sports such as pencak silat, which require controlled aggression, tactical awareness, and rapid decision-making.

Another important consideration is attentional control. Pre-competition anxiety often disrupts attentional focus and increases cognitive interference (Nicholls et al.,

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2016). Rhythmic and melodic components of music may facilitate attentional synchronization and cognitive alignment, enabling athletes to mentally rehearse movements and tactical sequences. Research by Karageorghis and colleagues (2021) highlights that rhythm can entrain neural timing mechanisms, thereby enhancing perceptual-motor coordination. For pencak silat athletes, such synchronization may assist in preparing timing accuracy, reaction speed, and tactical anticipation.

The findings also highlight the ecological validity of music as a self-directed emotional regulation tool. Unlike structured psychological interventions that require professional facilitation, music listening is accessible, low-cost, and easily integrated into daily routines. This is particularly relevant in local club development settings where access to sport psychologists may be limited. Ryan and Deci's (2017) self-determination theory emphasizes that behaviors rooted in personal preference and intrinsic motivation yield stronger and more sustainable psychological outcomes. The present study supports this view by demonstrating that habitual, self-selected music contributes meaningfully to emotional regulation.

The novelty of this research lies in conceptualizing music not as an externally imposed intervention but as a habitual and preference-based behavior embedded in athletes' everyday lives. Most previous studies have examined music within experimental or therapeutic frameworks (Terry et al., 2020; Peters et al., 2024). While valuable, such approaches may overlook how music naturally functions in real-world training contexts. By focusing on habitual listening practices, this study expands the conceptual framework of sport psychology from intervention-centered paradigms toward everyday self-regulation strategies.

Moreover, the substantial contribution identified suggests that emotional regulation in beginner athletes is shaped not only by developmental maturity but also by contextual and environmental supports. Campo et al. (2017) argue that emotional competencies can be strengthened through repeated exposure to adaptive coping mechanisms. Music may serve as one such mechanism, reinforcing positive emotional patterns over time. Regular use prior to competition may condition athletes to associate specific musical cues with feelings of calmness or confidence, thereby strengthening emotional resilience.

Practically, these findings carry significant implications. Coaches may intentionally incorporate music into pre-competition routines by guiding athletes to identify songs aligned with desired emotional states. For example, slower-tempo music may be recommended for anxiety reduction, while upbeat rhythms may enhance motivational arousal (Karageorghis et al., 2021). However, individual preference should remain central, as emotional responses to music are highly subjective (Terry et al., 2020). Encouraging athletes to experiment with personalized playlists may optimize emotional outcomes.

Despite its contributions, this study also acknowledges that music accounts for 47.3% of emotional regulation variance, indicating that other factors—such as coaching support, competitive experience, personality traits, and coping skills—also play roles (Uphill et al., 2019; Rice et al., 2019). Future research may integrate these variables into

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multivariate models to obtain a more comprehensive understanding of emotional regulation dynamics in combat sports.

In conclusion, the findings affirm that music functions as a powerful and ecologically valid emotional regulation resource for adolescent beginner pencak silat athletes during pre-competition preparation. By bridging neuroscience, sport psychology, and developmental perspectives, this study demonstrates that simple, self-directed strategies can significantly enhance psychological readiness. Music, when habitually and intentionally utilized, holds substantial potential to strengthen emotional stability, reduce pre-competition anxiety, and support optimal competitive performance in youth combat sport contexts.

CONCLUSION

This study confirms that music has a strong and statistically significant relationship with emotional regulation among adolescent beginner pencak silat athletes during pre-competition preparation. The Spearman Rank analysis ($r = .688$; $p < .05$) indicates a robust positive association, meaning that more effective and intentional use of music corresponds with higher levels of emotional control and stability. Furthermore, the coefficient of determination (47.3%) demonstrates that music represents a substantial contributing factor to emotional regulation, although more than half of the variance remains influenced by other psychological and contextual variables such as competitive experience, coping skills, coaching climate, and individual personality traits.

Conceptually, these findings strengthen contemporary sport psychology perspectives that emphasize the importance of affective self-regulation in optimizing performance readiness. Empirically, this study extends previous intervention-based research by positioning music as a habitual, self-directed coping resource embedded in athletes' everyday routines rather than as a structured therapeutic treatment. This ecological perspective highlights music as an accessible, low-cost, and sustainable psychological support tool within real training environments.

However, the study's scope was limited to one local club and a specific developmental group. Future research should involve broader samples, cross-sport comparisons, and multivariate models to further clarify the interactive role of music within comprehensive emotional regulation frameworks.

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