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Emotional Eating in Young Athletes: Roles of Emotion Regulation and Gender as Moderating Factors

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ABSTRACT

The ability to regulate emotions is crucial for an athlete psychological well-being and performance. Poor emotional regulation may lead to maladaptive behaviors, such as emotional eating—a pattern of food consumption driven by negative emotions. Young athletes experience intense pressure from training, competition, and academic aspects, increasing the risk of emotional eating. This behavior affects not only their physical health but also their endurance and overall performance. This study aimed to examine the effect of emotion regulation on emotional eating in young athletes and the role of gender as the moderating variable. A quantitative approach was used with Structural Equation Modeling-Partial Least Squares (SEM-PLS) analysis via SmartPLS software. Data were collected using questionnaires filled out by 82 young athletes, measuring emotion regulation using IERQ4S and emotional eating based on Van Strien's theory. In this study, accidental sampling was used. The results indicated that emotion regulation negatively affected emotional eating, meaning that better emotion regulation is associated with lower emotional eating tendencies. However, gender did not have a significant effect, either directly or as a moderator. These findings emphasize the importance of emotion regulation in preventing emotional eating in young athletes. The results of the study can be used to design interventions to strengthen emotion regulation, such as Acceptance and Commitment Therapy (ACT) and mindfulness-based approaches, and to support well-being and performance of athletes in training programs. Further research is needed to examine other factors, such as anxiety and stress in emotional eating behavior in young athletes, with a more diverse sample coverage in terms of sport types and age range to enrich understanding.

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INTRODUCTION

Professional athletes are required to have comprehensive competencies in various aspects to achieve optimal performance. An athlete success is not only influenced by their physical and technical abilities, but also by their critical skills such as mental resilience (Durand-Bush et al., 2023) and psychological competencies (Handayan & Alcantara, 2024), which are crucial for ensuring consistent performance (Einarsson et al., 2020). To achieve peak performance, athletes must prepare themselves comprehensively, including their physical, technical, tactical, and social readiness, as well as a strong mastery of psychological skills (Turgut & Yasar, 2019). Among the fundamental psychological skills, motivation, self-confidence, imagery (Dohme et al., 2017), and emotion regulation (Jannah et al., 2023; Tamminen et al., 2021) play important roles in determining an athlete success when facing competitive challenges.

Emotion regulation is an individual effort to use thoughts and behaviours to manage temporary emotions influenced by certain contexts. These emotions can be expressed positively or negatively, depending on the regulation strategy chosen by the individual (McRae & Gross, 2020; Suwartono & Bintamur, 2019). The ability to regulate emotions can occur consciously or unconsciously through automatic or actively attempted mechanisms (Shriver et al., 2020). In athletes, the mastery of emotion regulation plays an important role in providing a significant positive impact on performance, especially when dealing with competitive pressures (Aliyas et al., 2024).

Gross (2020) developed two concepts of emotion regulation, namely antecedent focused or cognitive reappraisal and response-focused or expressive suppression. Reappraisal is an emotion regulation strategy that emphasizes the change in the way one looks at situations that trigger emotions before an emotional response is fully formed. This strategy allows individuals to reinterpret their experiences in a positive and adaptive manner, thereby having a constructive impact on emotional management (Luo et al., 2024). For example, reappraisal can be used to reinterpret potential failure as a learning opportunity, which reduces fear of failure and facilitates a growth mindset. Repeated reappraisal can reduce negative emotional states, especially in stressful situations, thus demonstrating its protective role against health decline due to life stress (Roos & Bennett, 2023; Tsai et al., 2024).

On the other hand, suppression is a strategy that focuses on suppressing or avoiding the expression of emotions, both positive and negative, by suppressing behavioural responses to these emotions. Previous research has shown that when emotions are suppressed, individuals tend to experience increased physiological stress responses, including increased cortisol levels, which can negatively impact their mental and physical health (Roos et al., 2018). For athletes, greater cognitive reappraisal and less expressive suppression are associated with improved well-being and performance (Kim & Tamminen, 2023).

Although emotion regulation has been widely studied in the context of sports, many athletes still have difficulty in managing their emotions adaptively, including young athletes (Allan et al., 2016). In young athletes, difficulties in regulating emotions are often influenced by complex psychological challenges in an effort to achieve peak performance (Schinke et al., 2018). Challenges in regulating emotions can be complicated by various existing pressures, including pressures in skill development, pressures in competition, and pressures from academics and social aspects that are in line with their career journey (Xanthopoulos et al., 2020). Since young athletes are still in the development stage of the emotion regulation

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capacity, young athletes are ultimately more vulnerable to stress and anxiety that arise in a competitive environment (Schäfer et al., 2017). This vulnerability not only has a significant impact on their career life as athletes, but also on maladaptive behaviours in everyday life, including emotional eating which has the potential to harm long-term health (Vandewalle et al., 2016).

Emotional eating is related to an individual response to soothe emotions rather than to physiological hunger (Gonçalves et al., 2024). Individuals who engage in emotional eating often believe that eating can help cope with emotional stress, which in turn leads to problematic eating behaviours (Guvendi et al., 2022). This phenomenon is particularly evident in athletes experiencing pressures from performance and competition that can exacerbate emotional states, leading to an increased incidence of emotional eating (Suel, 2020). Another study on female athletes found that the main predictor of eating disorders was difficulty in effectively regulating emotions (Shriver et al., 2016).

Studies on emotion regulation and emotional eating have been extensively conducted, but discussions focusing on the role of emotion regulation on emotional eating and gender as a moderator in young athletes are limited. Young athlete group is an important group to study the impact of emotion regulation on eating behaviours due to their unique developmental stage and the specific pressures they face. Adolescence is characterized by high emotional fluctuations and identity formation, making effective emotion regulation crucial for this group (Oktafiani & Jannah, 2023). In addition, adolescence is a time full of stress and is also a crucial period in the development of weight gain (Vandewalle et al., 2016). Furthermore, a competitive sport environment can exacerbate stress and emotional challenges, as young athletes often face tremendous pressure to perform at a high level while balancing their social interactions (Leguizamo et al., 2021; Molina et al., 2018). Understanding these dynamics is crucial because emotional eating can lead to negative health outcomes and hinder athletic performance.

In this study, emotional regulation is operationalized as an individual conscious and unconscious efforts to manage emotional experiences through cognitive and behavioural strategies, especially in dealing with stressful competitive situations. Meanwhile, emotional eating is operationalized as an individual tendency to eat in response to negative emotions, not because of biological hunger.

Based on the previous description, this study formulated two main questions: (1) does emotion regulation affect emotional eating, and (2) does gender moderate the effect of emotion regulation on emotional eating. Therefore, this study aimed to fill the gap in the literature by exploring how emotion regulation influences emotional eating among young athletes and how gender factors may moderate this relationship. The results of this study are expected to provide insights for sports and psychology practitioners in designing more effective psychological interventions to help young athletes manage their emotions and eating patterns more adaptively.

METHODS

This study employed a quantitative approach with statistical analysis to examine the influence of emotion regulation on emotional eating, considering gender as a moderating factor among young athletes.

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Participants and Sampling Procedures

Participants of this study were 82 young athletes from the Special Sport School of East Java, aged 14–19 years. The participants included 46 women and 36 men from various sport disciplines who had achieved successes at the regional, national, or international levels. As presented in Table 1, the largest age group among participants was 16 years (n=37), followed by 17 years (n=24). Additionally, 12 participants were 18 year old, 7 were 15 year old, and only 1 participant was 14 or 19 year old.

Table 1. Age of Participants

		Freq	Percent	Valid Percent	Cumulative Percent
Valid	14	1	1.2	1.2	1.2
	15	7	8.5	8.5	9.8
	16	37	45.1	45.1	54.9
	17	24	29.3	29.3	84.1
	18	12	14.6	14.6	98.8
	19	1	1.2	1.2	100.0
	Total	82	100.0	100.0	

Table 2. Gender of Participants

		Freq	Percent	Valid Percent	Cumulative Percent
Valid	Male	46	56.1	56.1	56.1
	Female	36	43.9	43.9	100.0
	Total	82	100.0	100.0	

Material and Instrument

This study had one independent variable, emotion regulation, and one dependent variable, emotional eating, with gender serving as the moderating variable.

Emotional Eating

Emotional eating was measured by using an instrument created based on the theory by Van Strien, structured around two aspects, including as an emotion dampener and as a response to explicit emotions. This instrument demonstrated strong reliability, with a Cronbach's alpha score of 0.844, which exceeded the threshold of 0.70 (Kilic, 2016). Consisting of 13 items, responses were evaluated by using a 5-point Likert scale, ranging from "never," "rarely," "sometimes," "often," to "very often."

Emotion Regulation

Emotion regulation was assessed by using the Indonesian Emotion Regulation Questionnaire for Sport Settings (IERQ4S) developed by Jannah et al. (2023) and created on the context of sports in Indonesia. The instrument is based on two dimensions, reappraisal and suppression, and comprises 10 items. The reliability value of the IERQ4S reached 0.824, which is greater than the threshold of 0.70, so it can be categorized as reliable (Kilic, 2016). The responses were assessed by using a 5-point Likert scale with options: "never," "rarely," "sometimes," "often," and "very often."

Procedures

This study used a cross-sectional design, a research approach that collects data at a certain point in time without any intervention or manipulation of variables. This approach allowed researchers to identify the influence of gender on emotion regulation and emotional eating in young athletes over a specific period. Data collection was carried out through a questionnaire distributed by using Google Forms. Before filling out the questionnaire, participants were instructed to read the provisions carefully, including the terms and

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conditions of participation. Participants were also asked to fill out and agree to the informed consent as a form of voluntary agreement to participate in this study. Furthermore, participants were asked to answer each question according to their current condition. After all questions were answered, the participants were directed to submit their responses. After the data were collected from all participants, the data were processed and analyzed.

Data Analysis

This study utilized Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS software to analyze the effects of emotional eating, emotion regulation, gender, and their interactions. This method was selected because of its reliability in handling small sample sizes and suitability for exploring complex models with latent variables. The analysis was conducted in two primary stages, namely the evaluations of the measurement model (outer model) and the structural model (inner model).

The measurement model was evaluated to confirm the reliability and validity of the constructs, which included the assessments of convergent validity (using AVE) and discriminant validity (applying the Fornell-Larcker criterion). The structural model was then evaluated to examine path coefficients, R-square values, and the significance of the hypothesized relationships. This approach allowed an in-depth exploration of the direct and moderating effects of the studied variables on emotional eating.

RESULTS

Of the total 82 participants involved in this study, the majority came from sepak takraw, namely 25 people (30.5%). It shows that this sport is the largest representation of the research sample. Other sports that are also quite widely represented are athletics (19.5%) and wrestling (14.6%). Meanwhile, beach volleyball, fencing, and judo have relatively balanced proportions, ranging from 11% to 12.2%. This distribution illustrates the diversity of the sport backgrounds of the participants in this study.

Table 3. Characteristics of Sports

Sports	Freq	Percent (%)
Sepak Takraw	25	30.5
Athletics	16	19.5
Wrestling	12	14.6
Beach Volleyball	10	12.2
Fencing	10	12.2
Judo	9	11.0
Total	**82**	**100.0**

Table 4. Construct Validity

	Cronbach's Alpha	rho_A	CR	(AVE)
Emotional Eating	1.000	1.000	1.000	1.000
Gender	1.000	1.000	1.000	1.000
Emotion Regulation	1.000	1.000	1.000	1.000
Emotion Regulation*Gender	1.000	1.000	1.000	1.000

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Based on the results of the construct validity testing, the Composite Reliability (CR) and Average Variance Extracted (AVE) values were obtained at 1,000 for all constructs, including emotional regulation, emotional eating, gender, and the interaction of emotional regulation*gender. These values indicate very high reliability and convergent validity, which in the context of Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis, indicates that the indicators in the construct consistently well measure the intended construct.

Table 5. Descriptive Statistics

	N	Min	Max	Mean	Std. Deviation
Emotional Eating	82	14.00	51.00	29.7195	7.62594
Emotion Regulation	82	22.00	50.00	35.5976	5.24666
Valid N	82				

Table 5 presents the statistical analysis results of the two variables studied, namely emotional eating and emotion regulation. Based on the provided data, emotional eating had a mean score of 29.71, with a standard deviation of 7.62, a minimum value of 14, and a maximum value of 51. For the emotion regulation variable, the mean score was 35.59, with a standard deviation of 5.24, the minimum value of 22, and the maximum value of 50.

Tabel 6. Latent Variable Correlations & AVE

	EE	Gender	ER	RE*Gender
EE	1.000			
Gender	0.088	1.000		
ER	-0.368	-0.026	1.000	
ER*Gender	-0.086	-0.006	0.234	1.000

Table 6 presents the results of the outer model testing by testing the discriminant validity. Discriminant validity can be achieved by comparing the AVE root value of each construct with the correlation between the constructs. Based on Table 6, the AVE root value (diagonal numbers in the table) is higher than the correlation between the constructs, indicating that each construct demonstrates adequate discriminant validity.

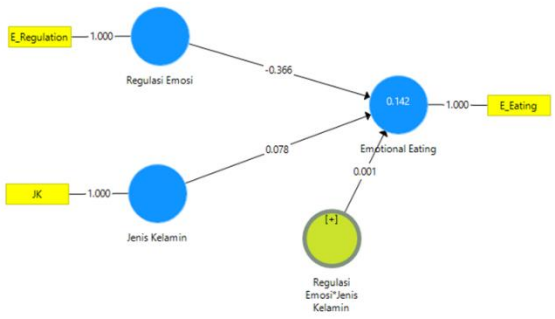

Figure 1. Structural Model

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Inner model or structural model testing is conducted to determine the relationship between the variables, significance values, and R-square of the research model. The structural model was evaluated by using R-square for the dependent construct, t-test, and the value of the structural path parameter coefficient. Model assessment using PLS begins with examining the R-square for each dependent latent variable. Variations in R-squared values can be used to evaluate the impact of a particular independent latent variable on a dependent latent variable and determine whether the effect is substantial. Table 5 shows the results of the R-square estimation using SmartPLS.

Table 7. R Square Value

	R Square	R Square Adjusted
Emotional Eating	0.142	0.109

As shown in table 7, the R-square value for the emotional eating variable is 0.142, indicating that emotional eating is explained by the variables of emotion regulation, gender, and the interaction of emotion regulation and gender together at a rate of 14.2%. This suggests that 85.8% of the variance is likely affected by other factors not examined in this study, such as depression, socio-economic status, and impulsivity, which have been examined in several previous studies (Decker et al., 2021; Hernandez-Florez et al., 2023; Ljubičić et al., 2023).

The assessment of inner weight, which also shows the results of hypothesis testing, can be administered by examining the relationship between latent constructs and paying attention to the results of the path parameter coefficient estimation and its level of significance. The magnitude of the t-statistic value can be determined to test the proposed hypothesis. If the t-statistic value > t table or sig value <0.05, then the hypothesis will be accepted. The results of the t-statistic estimation can be seen in table 8.

Table 8. Path Coefficient

	Original Sample (O)	Sample Mean (M)	Std. Deviation	T Statistics (|O/STDEV|)	P Values
Gender -> EE	0.078	0.078	0.103	0.759	**0.448**
ER -> EE	-0.366	-0.375	0.088	4.172	**0.000**
ER*Gender -> EE	0.001	-0.007	0.100	0.006	**0.995**

Based on data presented in table 8, the research hypothesis can be tested. Hypothesis testing used a significance level of 5% with a t table of 1.990 (N = 82). The results of the parameter coefficient test between emotion regulation and emotional eating showed a coefficient value of -0.366 and a t-value of 4.172, with a significance value of 0.000. At a significance level (α) of 0.05, the t-value was greater than the critical t-value of 1.990, and the significance value was less than 0.05. This finding indicates that emotion regulation affects emotional eating. The coefficient value is negative, meaning that higher levels of emotion regulation are linked with lower levels of emotional eating, and conversely.

The parameter coefficient test between gender and emotional eating showed a coefficient value of 0.078 and a t-value of 0.759, with a significance value of 0.448. At a significance level (α) of 0.05, the t-value was smaller than the critical t-value of 1.990, and the significance value was greater than 0.05. This suggests that gender does not affect emotional eating.

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The results of the parameter coefficient test between emotion regulation* gender and emotional eating showed a coefficient value of 0.001 and a t-value of 0.006 with a significance value of 0.995. At a significance level (α) of 0.05, the t-value was smaller than the critical t-value of 1.990 and the significance value was greater than 0.05. This indicates that gender does not moderate the relationship between emotion regulation and emotional eating.

DISCUSSION

This study examined the influence of emotion regulation on emotional eating. These findings indicate that emotion regulation has a significant negative effect on emotional eating. This finding is in line with previous studies revealing that individuals with better emotion regulation skills tend to avoid emotional eating behavior (Shriver et al., 2019). In addition, a study also showed that emotion regulation plays an important role in an individual eating patterns, where those who are able to manage their emotions well tend to avoid unhealthy eating patterns (Lu et al., 2016). In athletes, difficulties in emotion regulation can contribute to increased symptoms of eating disorders, one of which is emotional eating (Shriver et al., 2016). Although athletes have high physical activity levels, which in theory can reduce emotional eating patterns due to increased serotonin levels, various psychological factors, such as fear of failure, risk of injury, and stress, can trigger negative emotions that ultimately impact their emotional eating patterns (Guvendi et al., 2022).

Shrivers et al. (2020) explained in detail the dynamics of emotional eating in adolescents, who have similar characteristics to the subjects of this study. Based on his study, emotional eating in adolescents is related to emotion regulation skills, where adolescents with high reactivity to anger and anxiety are more susceptible to this behavior. Difficulty in managing negative emotions often makes them use food as a coping strategy to relieve stress and social pressures (Shriver et al., 2019). In young athletes, greater demands and pressures can increase the risk of emotional eating in response to the stress they experience in a competitive sport environment.

This study also aimed to determine the effect of gender on emotional eating, both directly and as a moderation. Based on these findings, gender does not affect emotional eating. In addition, gender did not moderate the influence of emotion regulation and emotional eating. This means that gender differences do not strengthen or weaken the influence of emotion regulation on emotional eating.

The results of this study show a different direction from several previous studies. For instance, a study conducted by Gonçalves et al. (2024) showed that stress as a negative emotion has a stronger relationship with emotional eating behavior in women than in men. In addition, research conducted by Zare et al. (2024) revealed gender differences in how individuals cope with emotions through eating patterns. In general, women are more likely to engage in emotional eating in response to negative feelings, such as anxiety and depression, than men (McAtamney et al., 2021).

Differences in emotion regulation between men and women may stem from both neurobiological and cognitive factors. While physiological distinctions exist, such as variations in amygdala response, cognitive strategies like reappraisal also play a crucial role (McRae et al., 2018). Previous study by Stoica et al., (2021) showed that although there were differences in brain activation patterns during the use of emotion regulation strategies, such as reappraisal, both men and women were able to reduce negative emotions. This means that cognitive strategies can overcome biological limitations and allow both genders to regulate emotions effectively. In the context of this study, uniform environments such as dormitories and athlete schools also help suppress differences in gender-based emotional eating behaviours, thus strengthening the dominant role of cognitive and environmental factors

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rather than physiological factor alone. In the other hand, in the context of athletes, Mutiek et al. (2021) explained that emotional eating is not solely determined by gender, but is more influenced by other factors, such as stress levels and physical activity, which contribute more than the role of gender in the relationship between emotion regulation and emotional eating.

Referring to research results showing the effect of emotion regulation on emotional eating, an intervention strategy is needed for athletes to manage emotions effectively. Juarascio (2020) proposed two main approaches to improve emotion regulation and reduce emotional eating. The first approach, Acceptance and Commitment Therapy (ACT), has been shown to be effective in treating various psychological problems, including anxiety and eating disorders. ACT emphasizes psychological flexibility and acceptance of negative emotions, helps individuals manage emotions more adaptively, and reduces the tendency to eat triggered by emotions. Furthermore, mindfulness-based interventions aim to increase individual awareness of emotional experiences without judgment, thereby reducing the urge to eat in response to negative emotions (Juarascio et al., 2020).

This study can provide significant implications for athletes, coaches, and policy makers in understanding the relationship between emotion regulation, gender, and emotional eating in young athletes so that they can determine the right intervention. However, further research on other factors that contribute to the emergence of emotional eating behavior in young athletes, such as anxiety and stress, is needed. In addition, to broaden the understanding of emotion regulation and emotional eating in athletes, research with a wider scope of subjects in terms of number, sports, and age range is also needed.

Furthermore, the use of accidental sampling in this study becomes a methodological limitation that needs to be noted. Because participants were not randomly selected, the findings of this study cannot be widely generalized to the entire population of young athletes. This non-probability approach also has the potential to introduce selection bias that can affect the representativeness and external validity of the study results. Therefore, future studies are expected to use more stringent sampling techniques to strengthen the validity and generalizability of the findings.

CONCLUSION

This study confirmed the significant role of emotion regulation in reducing emotional eating among young athletes, showing that individuals with better emotion regulation skills are less likely to engage in emotional eating. In addition, this study found that gender did not significantly influence or moderate the relationship between emotion regulation and eating. These findings highlight that other factors may contribute to emotional eating behaviours.

Specific interventions are needed to help athletes effectively manage their emotions and reduce their likelihood of emotional eating. Coaches can integrate mental skill trainings, such as acceptance and commitment therapy (ACT) and mindfulness-based approaches, into training programs. Policymakers must establish mental health programs within a structured athlete development framework. For example, in general periodization, the material can focus on strengthening positive attitudes. In special periodization, it can discuss positive self-talk techniques. Meanwhile, in the pre-competition period, it can emphasize emotional management.

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