Gymnastics Performance Analysis: The Role of Anxiety and Concentration in Gymnasts' Success

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Article Info	Abstract
	Gymnastics is a sport that requires a high level of precision and technical skill, which can be affected by psychological factors. Unfortunately, in many cases, gymnastics training often focuses on developing physical and technical aspects, with little attention paid to psychological factors that may affect athlete performance. This study aims to reveal the role of anxiety and concentration on the performance of gymnastics athletes. The method used in this study was correlational. The study involved thirty-seven young gymnastics athletes (20 girls and 17 boys; mean age 19.03 ± 3.88 years) who regularly participated in or were preparing for competitions. The instruments used in this study include the Competitive State Anxiety Inventory-2R (CSAI-2R), Concentration Grid Test and gymnastics performance based on the assessment of professional judges. The results of this study indicate that anxiety and concentration have a significant influence on the performance of gymnastics athletes. Athletes who are able to manage anxiety stably and concentrate for a long time during competition tend to achieve higher scores in gymnastics performance. These findings underscore the importance of paying attention to psychological aspects in the training of gymnastics athletes. In addition to physical and technical skill development, coaches and administrators should pay special attention to anxiety management and concentration enhancement. Further research could explore specific strategies that can help athletes manage anxiety and improve their concentration to achieve optimal performance in gymnastics competitions.

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INTRODUCTION

Gymnastics is a sport with a complex movement structure (Firmansyah, 2011). Basic movement patterns in gymnastics are important for athletes to improve their endurance, strength, flexibility, agility, coordination, and body control (Adi, 2018). The successful performance of each movement skill in gymnastics requires an accurate muscle activity with the intensity and coordination of whole body movements (Ana-Maria & Ionuț, 2014).

Athletes are required to have high achievements, where it requires physical and psychological aspects that must be considered (Winda & Miftakhul, 2015). Gymnastics requires athletes to be able to focus, be confident, calm, have good motor coordination, and concentrate fully even if there are distractions at the competition venue, such as wind, noise, or other things. Some of these things can disturb athletes who experience emotional disorders. Many factors can influence achievements in gymnastics. One of the factors is the psychological factor, including anxiety and concentration (Mulyana, 2013; Pratama, 2019).

Anxiety is a normal psychological aspect experienced by a person (Jannah, 2017). Anxiety is a factor that plays a role at various sport levels. Anxiety is not necessarily a bad thing. It can help athletes focus and be alert in their performance. In the competition, most of young or inexperienced athletes become anxious, thus affecting their performance (Khan, 2017). They need to overcome and avoid such situations to occur in sports activities. In general, anxiety is reported when athletes are not sure they can cope with stressful situations and their concentration levels decrease (Kumbara et al., 2019; Palazzolo, 2020).

Concentration is a state where a person consciousness is focused on a particular object for a longer time (Pratama, 2019; Weinberg & Gould, 2011). In gymnastics, high levels of patience and concentration are required to perform a series of complex gymnastic movements (Langenati, 2015; Yazid et al., 2016). Athletes must have awareness, knowledge, and attention controls to concentrate effectively (Oliver et al., 2020). Athletes might feel that the physical and mental training has been optimal and show a high motivation to achieve the expected achievements during the training, but the athletes find it difficult to concentrate and become less confident before the competition, affecting their movement performance (Sholichah & Jannah, 2015).

A consistent performance supports the competitive success in gymnastics (Dallas et al., 2019). A gymnastics performance is influenced by the athlete training and experience (Bobo-Arce & Méndez-Rial, 2013; Klatt & Smeeton, 2021) and can also be affected by the athlete previous performance (Damisch et al., 2006). The loss of concentration and high anxiety level are related to the athlete own movement performance (State et al., 2016).

Research results (Allen et al., 2013) showed that the cognitive trait anxiety was associated with a greater impairment in concentration. Athletes reported greater levels of impaired concentration when experiencing high levels of anxiety. Other research found that anxiety affected the athlete concentration so that athletes experienced concentration problems followed by a decrease in performance (Grossbard et al., 2009). It explains that, to show a good performance, every athlete must be able to prepare psychological aspects and good physical conditions so that it can influence the athlete performance (Minarni et al., 2019).

METHODS

This study used the correlation research method.

Participants

The method used in this research was the correlational method. The participants were thirty-seven gymnastics athletes (age 19.03 ± 3.88 years) who regularly participated in or were preparing for competitions selected randomly. Before the data collection, the sample consent was given without any feeling of coercion. The sample was in a good health and could take part in the provided activities. The physical characteristics of the samples are presented in Table 1.

Table 1. Physical Characteristics of The Subjects

Data	Mean ± Sd	Min	Max	N
Age	19.03 ± 3.88	10	25	
Height (cm)	155.1 ± 8.07	135	171	
Weight (kg)	50.51 ± 8.56	28	67	37
Body Mass Index	20.78 ± 2.18	15	25	

Instruments and Procedures

Anxiety

The questionnaire used was the Competitive State Anxiety Inventory-2 (CSAI-2) which had been translated and validated in Indonesia language [22]. This questionnaire is based on the theory of competitive anxiety first developed by Martens, Vealey, and Burton, which explores dimensions of anxiety related to sports performance, including cognitive anxiety, somatic anxiety, and self-confidence.

Concentration

The concentration was measured using the Concentration Grid Test (CGT) (see Weinberg & Gould, 2018) which had been validated in several studies (Greenlees et al., 2006; Hendrayana et al., 2020; Komarudin et al., 2021; Negara et al., 2021). The CGT is a concentration measurement tool in the form of a table with a 10x10 grid marked with a two-digit number from 00 to 99. To carry out this test, several tools and facilities are required, including a comfortable indoor room, a concentration test grid drawing sheet, stationery (such as pens or pencils), and a stopwatch. The test process began with the participant sitting comfortably and relaxed in the prepared area, with a minimum distance of 2 meters between one participant and another. Then, participants were asked to fill in their biodata in the form that had been provided before starting the test. Every participant sorted the numbers from the smallest value (00) to the largest (99) by connecting the numbers with horizontal, vertical, or diagonal lines.

Gymnastics Performance

We included judges who had experiences in judging gymnastics or had a specific knowledge of the judging guidelines referred to the Code of Points (Fédération Internationale de Gymnastique, 2022). In gymnastics, there are two judges who have an important role in assessing athlete performances, namely Judge D (Difficulty Judge) and Judge E (Execution Judge) (Dallas & Kirialanis, 2010). Judge D is responsible for assessing the level of difficulty, group elements, and relationships between movements performed by athletes, as well as giving additional points for the success of these relationships. Meanwhile, Judge E is responsible for assessing the athlete overall performance, including the technical and artistic aspects. Judge E also evaluates the quality of the movements performed by the athletes, including the body position, speed, and smoothness of the movements. After Judge D and Judge E complete their tasks, the athlete difficulty and performance scores are combined to determine the final score for each athlete.

Data Analysis

The data analysis used the Statistical Package for Social Sciences - Version 25.0 (SPSS 25.0) for analyzing the statistical data. The data normality test was carried out using the Shapiro-Wilk test. It concluded that the data were normally distributed. Therefore, the Linear Regression Test was used to see the contribution of the independent variables, anxiety and concentration, to the dependent variable, gymnastics performance. The statistical significance was set at $p < 0.05$ to determine whether the contribution of the independent variables to the dependent variable was significant.

RESULT

The data obtained after carrying out this research were anxiety, concentration, and performance of the gymnastics athletes (see table 2). Specifically, for anxiety, the mean value was 69.37, the standard deviation was 5.88, the maximum value was 78, and the minimum value was 57. For concentration, the mean value was 7.86, the standard deviation was 2.85, the maximum value was 14, and the minimum value was 3. Then, for gymnastics performance, the mean value was 10.98, the standard deviation was 1.27, the maximum value was 13.4, and the minimum value was 9.10.

Table 2. Descriptive Data on Anxiety, Concentration, and Performance of Gymnastic Athletes

Variable	Mean	Min	Max	N
Anxiety	69.37 ± 5.88	57	78	
Concentration	7.86 ± 2.85	3	14	37
Gymnastics Performance	10.98 ± 1.27	9.10	13.40	

The contribution of anxiety and concentration to gymnastics performance can be seen in Table 3. The significance of the contribution of anxiety reached (R = 0.377 x 100%, p = 0.000), so the anxiety variable contributed 37.7% (see Figure 1). The significance of the concentration contribution reached (R = 3.85 x 100%, p = 0.000), so the concentration variable contributed 38.5% (see Figure 2). Then, the significance of the simultaneous contribution of anxiety and concentration

reached (R = 4.50 x 100%, p = 0.000), so that the anxiety and concentration variables simultaneously contributed 45% (see Figure 3).

**Table 3.** Linear Regression Test on Gymnastics Performance

Variable	Contributions		%	p	Description
	r	R			
Anxiety	- 0.614	0.377	25%	0.000	Significant
Concentration	0.620	0.385	38.5%	0.000	Significant
Anxiety and Concentration	0.671	0.450	45%	0.000	Significant
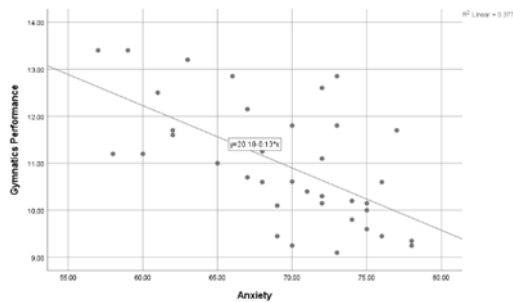
Figure 1. Scatter Plot of Anxiety on Gymnastics Performance
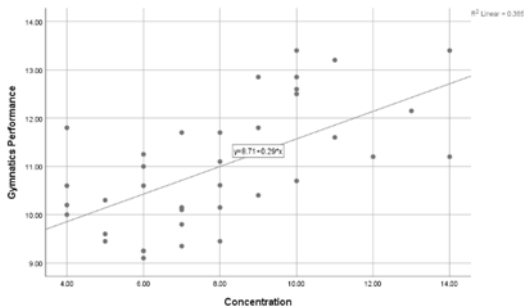
Figure 2. Scatter Plot of Concentration on Gymnastics Performance
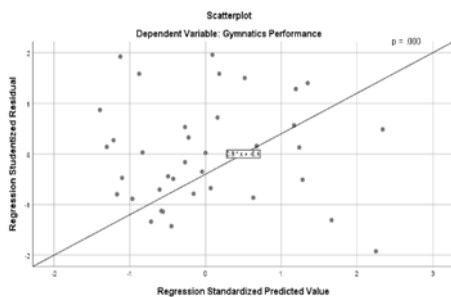
Figure 3. Scatter Plot of Anxiety and Concentration on Gymnastics Performance

DISCUSSION

When processing the data using the Multiple Regression Test reinforced with Scatter Plots, the results found a significant contribution of r = -0.614 at (p = .000) with a contribution of 37.7%. This is in accordance with the researcher predictions that the higher the athlete anxiety level, the lower the athlete performance when competing. If anxiety is low, performance will increase. This is in line with the research conducted by Khan et al. Anxiety is not always bad, but it can also help athletes focus and be alert in performing movements. In competitions, most young or inexperienced athletes appear to feel anxious which can affect their performance (Khan, 2017). This is in line with the research conducted by Jannah stating that the correlation coefficient value obtained was -0.779 and was included in the strong category. Apart from that, from the correlation coefficient value, the direction of the correlation was negative, meaning that every increase in anxiety would be accompanied by a decrease in the archery athlete concentration level or a decrease in the anxiety level would be followed by an increase in the archery athlete concentration (Jannah, 2017). This opinion is in line with the research conducted by Ilsya & Komarudin which stated that the higher the relationship between anxiety and athlete performance, the greater the influence on the athlete performance. It means that the higher the level of anxiety, the worse the athlete performance. The emergence of anxiety in an athlete during a match, both before and after, has many indicators.

The research conducted by Kumbara et al., found that 63% of athletes (13 people) experienced anxiety before competing and 37% of athletes (7 people) did not experience anxiety before competing, including the competitive anxiety, cognitive anxiety, and somatic anxiety. Then, the research conducted by Pristiwa & Nuqul concluded that there was no difference between the male athletes with a percentage of 63.00% and female athletes with a percentage of 66.89%. Individual sports gained a percentage of 67.12% and group sports gained a percentage of 63.64%, hence the difference of anxiety of the athlete type of sport was not significant, meaning that athletes in both Sports Unit had anxiety problems when competing. Many athletes experience failure in competitions due to experiencing feelings of worry when competing (Hagan et al., 2017). They need to overcome and avoid the kind of situations to occur in

sports activities. In general, anxiety is reported to happen when athletes are not sure they can handle stressful situations and concentration levels decrease (Kumbara et al., 2019; Palazzolo, 2020). It can be interpreted that the higher the level of anxiety, the lower the exercise performance. If the anxiety is lower, the exercise performance will increase.

The second hypothesis found that the concentration variable contributed significantly and positively to gymnastics performance. The correlation of research results was r = .620 (p = .000) < 0.05 with a contribution of 38.5%. This is in accordance with the researcher predictions that increasing the concentration can affect the exercise performance. This is in line with Langenati and Yazid statement that concentration is an important aspect because, when athletes compete, they need high levels of patience and concentration to perform a series of complex gymnastics movements (Langenati, 2015; Yazid et al., 2016). Athletes must have an awareness, knowledge, and attention control to concentrate effectively (Oliver et al., 2020).

The research results in the third hypothesis found that the variables contributed significantly and positively. The correlation of the research results was r = 0.635 with a contribution of p-value (0.027) < 0.05 and a contribution of 40.3%. In this way, this is in line with the results found by George, explaining that a consistent performance could support the athlete success in competing so that the athletes could compete in gymnastics (Tsopani et al., 2011). The gymnast performance is influenced by their training and experience (Bobo-Arce & Méndez-Rial, 2013; Klatt & Smeeton, 2021) and can also be influenced by the gymnast previous performance (Dallas et al., 2019).

According to Helmy Firmansyah, the West Java gymnastics coach, performance is related to the athlete concentration and anxiety because athletes with a low anxiety can concentrate for a long time so they will remain focused when performing movements in difficult and complex gymnastics. Another opinion expressed by athletes is that psychological factors influence performance. Of course, it requires physical and psychological aspects as they are important to carry out movement activities without experiencing significant fatigue. Fatigue or lack of focus when competing can cause decreased concentration and reactions in athletes. Therefore, athletes need to pay attention to psychological and physical aspects to remain optimal in their movement performance and support their achievements.

From this explanation, the researchers found the suitability of the theory explained. As an example, it proves that the psychological aspect is important to support athletes to achieve achievements. Anxiety can have a big impact on reducing a person concentration level and reactions. Increased anxiety and decreased concentration can result in non-optimal movement activities being carried out, which can be dangerous and cause wrong movements and even unwanted injuries.

It concludes that to support athletes to achieve their achievements, coaches and athletes must pay attention to psychological and physical aspects to achieve achievements and reduce the risk of injury when carrying out training activities or when competing which is confirmed by the research results of Allen et al., explaining that athletes can concentrate well when anxiety levels are low, which can affect their performance (Allen et al., 2013). For this reason, to show a good performance, every athlete must be able to prepare psychological aspects and good physical conditions that can have an influence on their performance (Minarni et al., 2019).

CONCLUSION

This study revealed the important role of psychological factors, especially anxiety and concentration, in the performance of gymnasts. The results of this study indicate that anxiety and concentration have a significant relationship with the performance of gymnastics athletes. Athletes who are able to manage anxiety stably and can concentrate well during the competition tend to achieve higher scores in their gymnastics performances. These findings highlight the importance of paying special attention to psychological aspects of gymnastics athletes in the training. In addition to developing physical and technical skills, coaches and administrators should focus on managing anxiety and improving concentration. Additionally, further research could explore specific strategies that can help athletes manage anxiety and improve their concentration to achieve an optimal performance in gymnastics competitions. The results showed that the variation in the athlete performance could be explained by anxiety (about 38%), concentration level (about 38.5%), and a combination of anxiety

and concentration (about 45%). In conclusion, psychological factors play a key role in the success of gymnastics athletes. Efforts to understand and manage these factors can help improve the quality of their performance in competitions.

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CONFLICT OF INTEREST

The authors declared no conflict of interest.

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