Relationship Between Competitive Anxiety and Performance: A Study of the Archers at the National Competition

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Abstract. The main objective of this study was to analyze whether anxiety was related to the archers' performance during the competition situation. A total of 44 archers aged from 18 to 24 years old, who represent at the national level participated in this study. The archers were asked to answer Sport Anxiety Scale-2 with 15 items in three domains before they scored the event. The performance of archers was observed in competitive situations at a distance of 70 meters at each end, with 36 arrows recorded. The results show the influence of competitive anxiety on performance, mostly addressed on worry (M=12.62, SD=3.54), whereas it followed by concentration disruption (M=10.47, SD=2.93) and somatic anxiety (M=10.33, SD=2.91). There was a significant correlation between the competitive anxiety and performance, r(44) = -0.45, p = 0.002. In conclusion, it was found that there is a moderate negative relationship between the two variables. Implications for emotional perception and the study of competitive anxiety among archers are discussed.

Keywords: Competitive situation, Anxiety, Archers Performance

1 Introduction

Archery is an individual sport that uses a bow to shoot an arrow at a target and the center of the target is in yellow [1]. This sport is a complex motor skill sport and it requires accuracy to enhance performance [2]. Other complex motor skill sports are dart and golf where accuracy and precision are needed and a lower level of anxiety can increase performance [3]. By means of, anxiety is a negative emotional state of a person. A person can experience a combination of fear, nervousness, and worry during experiencing anxiety. Anxiety is multidimensional in nature and consists of cognitive and somatic components [4].

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Archery is a sport that requires precision and accuracy for the arrow to land at the center of the target. Physical and psychological factors affect high accuracy. Some of the physical factors that lead to high accuracy is a good technique, specific physical conditions, and tactics. For psychological factors, motivation, anxiety control, confidence, self-control, concentration, and the ability to overcome pressure can result in high accuracy [2, 5]. When the person has high accuracy and precision, the arrow would land at the center of the target every time the person shoots an arrow and thus leading to getting a higher point and score.

A previous study shows that athletes from individual sports resulted in a higher level of general sports anxiety compared to team sports [6]. Anxiety is multidimensional in nature which it is consists of both cognitive and somatic components. Cognitive anxiety is anxiety that is associated with the mental component of a person. The person that experiences cognitive anxiety will feel fear of failure, worries, negative thoughts, and low or loss of self-confidence and self-esteem [5]. Ahead, somatic anxiety is anxiety that is associated with the physical component of a person. The person that experiences somatic anxiety will feel changes in their physiological.

Some of the physiological changes are an increase in heartbeat, difficulty in breathing, tension of the muscle, and sweating. Physiological changes of somatic anxiety can happen to the person or it is just a perception of the person because of the anxious feelings and the changes are did not happens [7]. Furthermore, worry is a psychological component that leads to being troubled or anxious about potential or actual problems [8]. Concerning, worry is a cognitive subscale in anxiety that is associated with a concern about poor sports performance [9, 10].

It can be experienced more frequently by an athlete that tends to feel anxious. They tend to worry more especially about factors that relate to negative social evaluation and poor performance. Worry also is a component that positively influences the general fear of failure. Worry becomes a stronger predictor of fear of failure [6]. Another study stated that worry is one of the components that can badly influence the performance of athletes [8]. Hence, somatic anxiety is one of the anxiety components that give a negative thrill and withstand or endure emotions during competitions [11].

Somatic anxiety is also one of the factors that assess the physiological component of hyperactivation. This would make the athletes feel uneasiness in their stomachs. Moreover, somatic anxiety also involves a bodily reaction to activation and it leads to muscle tension [9, 10]. Other reactions or symptoms that correlated with somatic anxiety when an athlete experiences it is an increase in heart rate and muscle tension which leads to stiffness of the body while executing technique or skills [5]. A previous study analyzed the physiological changes and correlate them with anxiety [12].

It is clear about the salivary alpha-amylase of athletes during competition is one of the physiological changes and it has been seen in people that have acute stress in which their saliva alpha-amylases have elevated. Archery is one of the sports that is affected by somatic anxiety. When an archer experiences somatic anxiety such as muscle tension, it affects the execution of the correct technique. Muscle tension can also cause stiffness when drawing the bow, releasing an arrow with difficulty and no smoothness, trouble exiting the clicker, cannot control and putting the sight pin at the center of the target, and trouble releasing the arrow at a suitable time [5].

Concentration disruption is a difficulty for the athletes to focus on relevant aspects during the tournament [9, 10]. Concentration is the ability to focus on the task given or relevant information and ignore the distractive stimuli. Concentration is also the act of focusing on the major activity. It is difficult to focus since the mind is easy to be distracted and this leads to concentration disruption. Anxiety is an internal distractor that can disrupt athletes' concentration which leads to performance during competition [13, 14].

The previous study reported that 60% of archers from public university and state archers in Malaysia shows anxiety symptom [1]. More than 50% of archers in Malaysia have experienced anxiety and this might affect their performance. Malaysia states archer is an archer that represents their state in national level competition such as Malaysia Sport (SUKMA) which is a competition between states. The SUKMA archer will use the name of their states while competing in the competition.

Anxiety is appraised differently by athletes based on their type of sport [6]. Moreover, sports with low complexity such as running are been facilitated with a higher level of anxiety while sports that use complex skills that require more precision and concentration such as archery and golf can be performed better with lower anxiety levels [3]. Getting a high score is important to the archer, especially during competition since a high score can lead to winning the competition. To gain a high score, archers require high accuracy and precision. These two factors can be affected when there is anxiety involved since psychological and physiological factors will change when the person experiences anxiety and thus lead to different scores collected by different archers [2, 5].

Previous studies examined the correlation between anxiety levels and game records in Korean archers [12] and the psychological profile of anxiety among athletes from public universities and states in Malaysia [1, 15]. Several studies have investigated the relationship between anxiety levels and performance but the results show contradicting findings [12, 16]. When anxiety level increase, the performance of the archers is alternately decreased. Athletes who show a higher level of anxiety can negatively affect their performance. The findings were also supported by a few studies [12, 15].

Anxiety is an important component that associates with an archer's performance [12]. However, other studies show that there is no correlation between anxiety and performance [16] and there is also a positive correlation between anxiety and athletes' performance [16]. However, there are limited studies that investigate the relationship between competitive anxiety and performance among Malaysian state archers.

2 Method

This study aims to investigate the relationship between anxiety levels and athletes' performance of SUKMA archers. Some methods were been used to collect data and analyze for any relationship between anxiety level and performance among SUKMA archers. Anxiety level was measured using a specific instrument which is the Sport Anxiety Scale-2 questionnaire [9]. The performance was measured by collecting the archer's score during the scoring event. This study used the non-experimental correlational design to test the hypothesis. This design is selected because the study was to investigate the relationship between the level of anxiety and athlete

performance among SUKMA archers. The first variable in this study is anxiety level. The second variable in this study is the athlete's performance.

A. Sample

The target population for this study is the state archers from Selangor, Wilayah Persekutuan, Pahang, Terengganu, Perak, and Johor. Each state from every region in Malaysia has been chosen because these states are in centralized training and currently training in their respective shooting range. Participants are ages 18 to 24 years old and represent their respective states for national-level competition. The total number of archers that represent Selangor, Wilayah Persekutuan, Pahang, Terengganu, Perak, and Johor according to the SUKMA registration format is 48 archers. The sample size is determined using Krejcie and Morgan's (1970) table. The 48 archers are rounded off to 50 and has a sample size of 44 archers. The sample size is 44 archers, (N=44). The sample is recruited because they are archers that represent their state in the national level competition such as National Archery Circuit Championship and SUKMA. The other inclusion criteria are they are currently active archers for the past three years representing the state for national level competition and participating in recurve category.

B. Instrumentation

Questionnaire

In this study, the anxiety level was been measured using the Sport Anxiety Scale-2 (SAS-2) which has three domains which are somatic anxiety, worry, and concentration disruption [9]. Somatic anxiety has a reliability alpha of 0.84. Next, the worry component with 0.89 and concentration disruption with 0.84 reliability alpha. The reliability alpha for the whole questionnaire is 0.91. The questionnaire has 15 items with five items in each domain. All of the items in the questionnaire used a four-point Likert scale. The scale ranges from not at all (1) to very much (4). The total scores can range from a minimum of 15 to a maximum of 60. Somatic anxiety items are in question number 2, 6, 10, 12, and 14. For the worry domain, the items are in question numbers 3, 5, 8, 9, and 11. Lastly, concentration disruption is in question numbers 1, 4, 7, 13, and 15.

Performance Scoring

The performance of the archers was been measured during the scoring event. Archer shot at 70 meters during the scoring event with six arrows at each end. Archer shot one set of 70 meters which consist of six ends. The total number of arrows that the archer shot is 36 arrows. The score was recorded after a total of 36 arrows has been shoot. The score for each arrow is range from miss which is 0 points to 10 points and the maximum total score that the archer can achieve is 360 points [18].

3 Data Collection

Once the ethical form has been approved, permission to do the research was been asked from the coach and the athletes. Next, participants were recruited based on the criteria that have been set. Google Form platform was used to store the data. Google Form was shared with the coaches once they agreed. Then, the Google Form was been distributed to the participants by coaches 30 minutes before the scoring event at the archery range. A scoring event is an event where the archer shot 70 meters at the shooting range. The archer shot 6 arrows in 1 end and it takes four minutes to complete 1 end. They need to shoot a total of 36 arrows in 6 ends. The scoring event is important to the archers because it can affect their ranking in the team and thus will determine if they are selected for the future tournament. Moreover, scoring results will also be sent to the association for an update on the archers and sometimes allowance can be reduced according to the result during the scoring event.

Participants spend their time answering the questionnaire. The questionnaire takes 10 minutes to be answered by participants. No other risk is involved. Since the questionnaire needs to be answered before the scoring event and it takes 10 minutes to complete the questionnaire, 30 minutes is a suitable time for the participants to not be in rush to complete the questionnaire and have enough time to check their equipment and do a warm-up shooting. Participants read the information and explanation of the SAS-2 before answering the questions. Then, participants submitted the questionnaire through the Google Form after they have done fill out the questionnaire. After the questionnaire has been answered, participants started the scoring event. Once the scoring event has ended, the scoring result was been collected using Google Forms. Participants were thanked for their time and cooperation.

A. Data Analysis

This study used two analyses which are descriptive analysis and inferential analysis. The descriptive statistic has been used to analyze demographic data which is age and years of experience. Statistical Package for the Social Sciences version 20 was used to analyze data. The data is presented in mean ± standard deviation (M±SD). Furthermore, the inferential statistic was been used to analyze data. The significant level is been set at $p < .05$.

4 Results

The total number of participants that participated in this study is 44 sukma archers (n=44). Table 1 shows that the percentage of female archers that participated in the study is 45.5% and the percentage of male archers is 54.5%. The age of the participants is 20.7±2.08 years old and their years of experience in archery is 7.8±2.21 years.

Table 1. Descriptive result of gender, age and years of experience in archery.

Variable	Category	
Gender	Male	Female
N	24	20
(%)	54.5	45.5
Age		
Mean	20.66	

SD	2.08
Years of Experience	
Mean	7.82
SD	2.21

The anxiety level has been measured using the SAS-2 questionnaire which has three domains which are somatic anxiety known as a physical component, a worry which is a mental component, and concentration disruption [9]. The overall data for somatic anxiety is 10.33±2.91, worry with 12.62±3.54, and concentration disruption with 10.47±2.93. The data in Table 2 shows that the mean for worry among the SUKMA archers is higher than somatic anxiety and concentration disruption.

Table 2. Descriptive analysis on somatic anxiety, worry, and concentration disruption.

Component	Category	
	Mean	SD
somatic anxiety	10.33	2.91
worry	12.62	3.54
concentration disruption	10.47	2.93

Table 3. Correlation Analysis between competitive anxiety and performance.

Component	Competitive Anxiety	Performance
Competitive Anxiety	1	
Performance	-.450	1

*Significant on level $p<.05$

Out of Table 3, Pearson correlation coefficient showed a negative correlation result with a moderate of 0.45 ($r = -0.45$, $p = 0.002$). The result explains that a relationship exists between competitive anxiety and performance where the significant value is 0.002, with the p-value is set less than 0.05. This allows the hypothesis of this study to be supported and proves that there is a moderate negative relationship between archers' competitive anxiety and their performance.

V. Discussion

A. Archers and Anxiety

There are three components when an athlete experience anxiety which is somatic anxiety, worry, and concentration disruption. The current study showed that the archer experiences more worry compared to somatic anxiety and concentration disruption. Worry is a component of cognitive anxiety and is also correlated and a strong predictor of fear of failure [6]. Anxiety levels can increase and be heightened especially during a tournament or in a contest [19]. Athletes would experience anxiety and the more the athletes experience anxiety, it can affect the way the athletes think, and the technique that needs to be executed. The athletes also can develop anxiety while competing in competitions [20].

In the current study, the maximum score of anxiety of the archer is 50 and the minimum is 16 (M=33.32, SD=8.41). This showed that the athletes especially athletes who practiced individual sports had experienced anxiety. Previous research showed that anxiety is appraised differently according to the type of sports [6, 21]. Athletes from individual sports showed a higher level of anxiety than in team sports. Athletes practicing individual sports are competing as individuals. While competing as an individual, the athlete experienced and suffered the pressure to achieve the desired outcome alone.

The individual also has to bear the burden alone to achieve success and thus leading to increased anxiety symptoms. Moreover, it also stated that athletes who involve in team sports and are a part of a team have experienced less pressure than athletes who are involved in individual sports. Playing as an individual makes the athlete responsible alone for their performance and results and thus leads to sleeping problems among individual sports athletes which then correlated with the anxiety of the athletes [21].

An athlete that is at a young age is directly related to factors such as the feeling of insecurity, an emotional dependency and also uses fewer strategies to cope with physiological responses. When the athlete does not know how to deal with problems and does not use any coping strategies during tournaments, the athlete will develop anxiety symptoms [22]. According to the previous study, fewer experienced athletes tend to experience anxiety. Beyond this, a group of young athletes showed a higher tendency to experience anxiety than adult athletes [19].

B. Archers and Performance

Archery is an individual sport where it requires high accuracy and precision. Moreover, archery is one of the sports that needed fine motor precision skills to achieve high scores and success [2, 5]. In the current study, SUKMA archers achieved a minimum score of 204 and a maximum score of 335 (M=286.91, SD=25.24). The maximum score that the archer can achieve is 360 points. Throughout, the archery expert believes that the most important aspect of achieving a good performance in a match is the mindset of the athlete [23]. One of the important mental factors was concentrating on the match. Concentration can be disrupted especially if the archer experiences anxiety [20]. Other than that, the performance of a sport that requires fine motor skills requires high accuracy where specific physical conditions, good technique, and a good psychological condition can help in having a better performance. It is also stated that psychological condition that can affect accuracy and precision is anxiety and concentration [2, 5].

Performance of fine motor skill sports also requires good technique and skills to enhance performance [2, 5]. Archers who experience psychological conditions such as somatic anxiety can affect the execution of the right technique [5]. Moreover, the unstable psychological condition can also make the body stiff and it can hinder a performance and skill execution that

the athlete was already mastered with the effort put during training [23]. Disturbed sleep also can reflect the athlete's performance. When the athlete does not sleep well enough, it can disturb the cognitive system of the body and thus lead to slow cognition and the ability to concentrate during day time [21].

C. Anxiety and Performance among Archers

Based on the result, this study shows a negative moderate correlation between competitive anxiety and the performance of the SUKMA archers. A negative correlation means that when the level of anxiety increases, the lower performance of the archers. Other than that, the worry factor has a higher result than the somatic anxiety and concentration disruption scale. This shows that most of the archers feel worried more than other factors and thus leads to lower performance.

The result of the negative correlation is supported by the previous study which stated that when the anxiety of the archers increased, their performance decreased. It also associates with physiological factors when anxiety increased, the salivary alpha-amylase and cortisol levels are also increased and thus lead to a decrement in performance [12]. On the other side, the increase the age improves the overall scoring and confidence component of the state competitive anxiety scale and also shows a significant positive correlation with the performance of the players [24].

Related to this, when an archer experiences somatic anxiety in case of muscle tension, it can cause stiffness when drawing a bow and difficulty in releasing an arrow. The arrow will have trouble exiting the clicker and the archer cannot control and put the sight pin at the center of the target and further, have trouble releasing the arrow at a suitable time. The high anxiety also can lead to a choking experience and can result in getting target panic. These factors can decrease the performance of the archer and result in a decrement of points collected during the scoring event [5].

Fear of failure was a stronger predictor, especially in the worry factor [6]. The athlete might also have the fear of failure since the worry factor is higher than another factor that the archers react to in this study. Fear of failure also can influence athlete anxiety and lead to a decrement in performance. On top of that, the higher levels of anxiety that have been experienced by athletes were related to the negative pattern of perfectionism [25]. A focus on performance during executing skill can also predict an athlete's state of worry. Athletes who immerse in negative expectations can affect their performance [20].

Other than that, anxiety also is a factor that can distract an archer's concentration. A previous stated that concentration disruption occurs because the archer experience anxiety. When the archer's concentration is disrupted and distracted, the performance of the archer is decreased [14]. This show a negative correlation where when the concentration is disrupted, the lower the

performance. In a situation where the athlete experiences anxiety and is absorbed by negative thinking and expectations, it is unable for the athlete to concentrate.

When the athlete is absorbed with a negative expectation, concentration is disrupted and the attention of the athlete on the signal that is associated with the performance also be disturbed and thus leading to decrement in performance.

Trouble to sleep is also one of the factors that affect concentration. Having trouble to sleep can affect the ability to concentrate during the match and it also slows the cognitive component process and thus leading to decrement in performance since archery is a sport that requires high concentration and accuracy [2, 21]. Athletes who experience sleep disorders was the athlete that has developed anxiety and cannot control their anxiety [5].

However, the finding from this study contradicts a previous study [16]. A study shows that the higher the performance of the archer, the higher the anxiety of the archer. This might be related to the functional zone of anxiety. When the archer shoot with the optimal zone of anxiety, the archer should be experiencing the best performance. Subjects from this study might be shooting in their zone of optimal functioning and thus leading to the contradicting finding where the higher the anxiety level, the higher the performance. Moreover, an increasing trend of somatic anxiety is accompanied by an improvement in performance until a certain point. If the somatic anxiety increases above the point, it will lead to deterioration in the performance of the athletes [20].

This study shows a significant relationship between anxiety levels and the performance of SUKMA archers. The negative correlation indicates that the higher the anxiety level, the lower the performance. Archery is a sport that requires complex skills. Sports with complex skills require more precision and concentration [3]. Precision and concentration can be affected by anxiety [5, 14]. A sport with a complex skill such as archery can be performed better with a lower anxiety level [3].

5 Conclusion

In conclusion, the result from the study shows a significant relationship between competitive anxiety and performance of the athletes among SUKMA archers and the null hypothesis has been rejected because of the significance of the p-value. Other than that, there is a negative moderate correlation ($r = -0.45$) which conclude that when anxiety level increase, performance decreases. The measurement of anxiety level in this study is using SAS-2 [9] and performance was measured by collecting scores during the scoring event.

This study can provide awareness of anxiety among athletes, coaches, and organizations. Since anxiety can affect performance, the athlete can find a suitable coping strategy to deal with anxiety. Athletes also can find their optimum anxiety level to have a better performance. Moreover, coaches can find a suitable coaching behavior to deal with an athlete that has different anxiety levels. This can improve and increase the performance of the athlete. Sports associations also can provide and design suitable programs that potentially can create crystal awareness and help the athlete in controlling their anxiety during shooting.

For future study, some suggestions and recommendations are proposed, including dealing with a wide range of ages of archers. Other than that, a study involving archers should be investigated broadly since there are still fewer previous studies that involve this population. Moreover, the study on psychological factors in Malaysia also should be focused on and expand the scope of research. In addition, future studies should include all states in Malaysia to get a comprehensive landscape of the involvement among competitive archers in Malaysia.

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