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AN ANALYSIS OF SOMATIC ANXIETY, COGNITIVE ANXIETY AND SELF-CONFIDENCE AS COMPONENTS OF SITUATIONAL ANXIETY AMONG YOUTH TABLE TENNIS ATHLETES

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Abstract

This study aimed to analyze the levels of situational anxiety among youth table tennis athletes by examining three psychological dimensions: somatic anxiety, cognitive anxiety, and self-confidence. The population included 151 youth athletes competing in the 33rd National Youth Games, Regional Qualifying Round 3 ("Bueng Kan Games"). A sample of 120 athletes was selected using Taro Yamane's formula (1973) and simple random sampling. The research instrument was the Competitive State Anxiety Inventory–2 Revised (CSAI-2R), translated and adapted by Sakdanin Thamwong, with a reliability coefficient of 0.75. Descriptive statistics mean and standard deviation were used to analyze the data. The findings revealed that overall situational anxiety among youth table tennis athletes was moderate. Specifically, somatic anxiety had a mean score of 18.95 (SD = 5.03), interpreted as low; cognitive anxiety had a mean score of 21.49 (SD = 5.49), interpreted as moderate; and self-confidence had a mean score of 29.56 (SD = 5.26), also at a moderate level. The findings suggest youth athletes tended to experience greater psychological than physiological pressure in competition. The moderate level of self-confidence indicates room for further development. These findings can serve as a basis for designing psychological training programs and mental skill interventions to strengthen competitive capacity and promote mental well-being among youth athletes

Keywords: Situational anxiety, gender differences, youth athletes, table tennis, sport psychology

INTRODUCTION

SpoArt psychology is regarded to be a crucial dimension influencing athletic performance, particularly among young athletes who are still undergoing physical, emotional and social development (Kegelaers et al., 2022. Within this aspect, situational anxiety is common especially during competition and is typically divided into three components: somatic anxiety, cognitive anxiety and self-confidence as proposed by Martens et al. (1990).

Each of these components plays a key role in influencing athletes' behavior and performance outcomes (Woodman & Hardy, 2001; Gillham & Gillham, 2014). Previous studies conducted in individual sports like badminton, tennis, and table tennis have highlighted gender as an important factor. Female athletes often report higher levels of both cognitive and somatic anxiety in comparison to their male counterparts (Correia & Rossado, 2019; Krane & Williams, 1994). Research about youth athletes also indicates that girls tend to experience significantly higher levels of pre=competitive cognitive anxiety than boys (Martinez-Gallego et al., 2022). Despite these findings, studies specifically centered around Thai youth table tennis players remain limited, even though the sport places strong emphasis on self-control and sustained concentration (Apostu et al., 2024). To address this gap, this present study seeks to analyze situational anxiety among youth table tennis athletes and examine gender differences to generate deeper insights that can inform the development of psychological skills appropriate to the characteristics and competitive contexts of both genders.

Youth table tennis players are in the stage of adolescence, having to undergo rapid changes in physical, emotional and psychological development. Such changes make this age group more vulnerable to stress and anxiety compared to others Steinberg & Morris, 2001). The competitive setting further adds to this vulnerability, as athletes must traverse complex circumstances and expectations from themselves, family members, coaches and peers. Woodman & Hardy (2001) have emphasized that competitive anxiety is a critical determinant of performance, especially in sports that place a lot of demand on concentration, precision and speed. Table tennis adds to these demands as players are often required to react to opponents within fractions of a section. Aside from this, gender has also been identified as a factor that may influence the levels of situational anxiety experienced. Several studies have found that female athletes tend to have higher levels of cognitive anxiety, while male athletes often demonstrate greater self-confidence (Martens, Vealey, & Burton, 1990; Weinberg & Gould, 2023). These tendencies are aligned with differences in gender role perceptions and social experiences. As a result, fostering psychological well-being through mental skills training, such as emotion regulation, imagery and goal setting, is regarded as vital for youth table tennis athletes to cope well with competitive pressure and to prepare themselves both physically and mentally in a balanced manner (and Channuwong & Kantatian, 2012; Birrer & Morgan, 2010).

Youth table tennis athletes are also considered a psychologically vulnerable group because they are still honing their skills while facing increasing levels of competition. This vulnerability is particularly evident in major regional events like the National Youth Games, which require high levels of physical and psychological preparedness. A study by Chaliawsil, Boonseng, and Thaesungnern (2024) examined situational anxiety among athletes in the Sports Hero Project, Region 5, who competed in the 34th National Youth Games in Nan Province. The results indicated that most athletes experienced moderate to high levels of situational anxiety, largely due to pressure from self-expectations and coaches, which negatively affected their self-confidence. Within the specific context of table tennis, which requires exceptional emotional regulation and concentration. It was further found by Channuwong et al. (2022) and Hengsukho (2022) that youth athletes reported low levels of somatic anxiety, while cognitive anxiety and self-confidence were at moderate levels. Notably, significant gender differences were observed, suggesting that gender influences how athletes perceive and respond to the competitive situations. These findings highlight the need of targeted research to understand the psychological characteristics of youth table tennis athletes in depth, particularly in regional competition contexts. Such evidence provides a

foundation for designing training strategies tailored to the needs of athletes across both gender and experience levels.

Accordingly, this study displays an analytical investigation into situational anxiety among youth table tennis athletes, with a focus on differences by age and gender. The study evaluates three primary components: somatic anxiety, cognitive anxiety and self-confidence, following established approaches in sport psychology (Martens, Burton, Vealey, Bump & Smith, 1990; Woodman & Hardy, 2001). The CSAI-2R instrument, adapted for the Thai youth context, was employed to assess these dimensions. The results will reveal statistically significant differences across age and gender, offering insights into the distinct psychological responses of athletes. The findings will also be interpreted to provide practical guidance for coaches, athletes, parents and sport psychology practitioners in designing mental skills training programs aligned with the characteristics of each sport, age group and gender. Academically, this research contributes to closing a knowledge gap pertaining to Thai youth table tennis athletes by analyzing age-and-gender-related differences in situational anxiety, a dimension that has been underexplored in previous Thai studies. In practical terms, the outcomes may be applied to the design of gender-sensitive training programs that are developmentally appropriate, thereby supporting both psychological well-being and sustainable competitive performance among youth athletes.

OBJECTIVES OF THE STUDY

1. To examine the levels of situational anxiety among youth table tennis athletes across three components: somatic anxiety, cognitive anxiety, and self-confidence.
2. To analyze the levels of situational anxiety in each of these dimensions among youth table tennis athletes.

LITERATURE REVIEW

1.International Studies

Research on competitive anxiety has consistently shown that it is a multidimensional construct comprising somatic anxiety, cognitive anxiety, and self-confidence (Martens et al., 1990). These factors are intimately related to athletic performance, especially in individual sports that require precision and attention, such as table tennis (Woodman and Hardy, 2001). Studies have shown that female athletes experience higher levels of cognitive and somatic anxiety than male athletes (Correia and Rosado, 2019; Krane and Williams, 1994; Martínez-Gallego et al., 2022). Additionally, there are significant gender differences among youth tennis players. In the case of table tennis, Apostu et al. (2024) found that male athletes had higher self-confidence, emphasizing the significance of gender in developing competitive behaviors. Several theoretical models provide frameworks for analyzing these dynamics. The inverted-U theory (Yerkes & Dodson, 1908) demonstrates how performance increases with anxiety until it reaches an optimal level, after which it drops. Martens et al. (1990) developed a multidimensional anxiety model that underlines the varied consequences of cognitive and physical anxiety, with self-confidence acting as a protective factor. These models are supported by empirical research such as Acharjee, Dutta, and Devchoudhury (2025), who found gender-based differences in anxiety levels and coping mechanisms among athletes, and Kou et al. (2003), who discovered that male Taiwanese weightlifters had more stable somatic anxiety and higher self-confidence than female athletes. Wang (2021) found that self-reflection and resilience strongly predict pre-competition anxiety in Chinese teenage table

tennis players. Aside from this, Mohd. Sofian Omar-Fauzee (2009) highlighted the effectiveness of imagery and coping strategies in boosting self-confidence and reducing anxiety during competition.

2.Thai Studies

Across Thailand, studies on situational anxiety in sport have been limited, however there are several studies that provide crucial insights. The CSAI-2R for Thai athletes was validated by Sakdarin Thamwong (2005),, with this becoming an established reliable tool for evaluating cognitive anxiety, somatic anxiety and self-confidence in competitive contexts. This work laid the methodological foundation for later studies in the Thai setting. Building on this foundation, Chaliawsil, Boonseng, and Thaesungnern (2024) investigated the psychological characteristics that contribute to athletic success among Physical Education Games competitors. They found that athletes frequently experienced moderate to high levels of anxiety, with self- and coach-imposed pressures being major sources of stress. More recently, Ekasak Hengsukho (2022) studied young table tennis players and discovered low levels of somatic anxiety but moderate levels of cognitive anxiety and self-confidence, implying that while physical control remained stable under pressure, psychological readiness needed to be improved.

In summary, the literature review highlighted that situational anxiety is an important psychological factor influencing athletic performance, with somatic anxiety, cognitive anxiety and self-confidence emerging as core components. International research has shed light on consistent patterns of gender and age differences and theoretical models like the inverted U-theory and the multidimensional anxiety framework, which explains how anxiety interacts with performance. Thai studies verified similar results, but also indicated that youth athletes, particularly those competing in table tennis, frequently suffer moderate degrees of cognitive anxiety and self-confidence despite low somatic anxiety. These findings highlight a deficit in applied sport psychology research for Thai youth athletes, emphasizing the need for focused interventions that boost self-confidence and reduce cognitive anxiety in high-pressure competition settings.

RESEARCH METHODOLOGY

1. Population and Sample

The population in this study consisted of 151 youth table tennis athletes who participated in the 33rd National Youth Games, Regional Qualifying Round 3 "Bueng Kan Games" representing 20 provinces. The sample size was determined using the Taro Yamane's formula (1973) with a 95% confidence level and a margin of error of 0.05 resulting in 110 participants. To ensure appropriateness for data analysis, the researcher expanded the sample to 121 athletes The sample was obtained through simple random sampling from the list of registered competitors with cooperation from the competition organizers in each province.

2. Research Instruments

The instrument used for data collection was a questionnaire comprising two parts: Part 1 gathered demographic information of the athletes. Part 2 employed the Competitive State Anxiety Inventory-2 Revised (CSAI-2R), translated and adapted by Sakdanin Thamwong (2005) with a reliability coefficient of 0.75. The questionnaire measured three components: somatic anxiety (items 1, 4, 6, 9, 12, 15, 17), cognitive anxiety (items 2, 5, 8, 11, 14) and self-confidence (items 3, 7, 10, 13, 16). Scores for each dimension were calculated by summing

the responses for the respective items, dividing by the number of items in that dimension, and multiplying by 10. The resulting scores ranged from 10 to 40, with interpretation as follows:

10–19 = Low level of anxiety or self-confidence
20–30 = Moderate level of anxiety or self-confidence
31–40 = High level of anxiety or self-confidence

3. Data Collection

The data collection process followed these steps. Permission was obtained from the Research and Development Institute of Ubon Thani Rajabhat University and the respective provincial sports associations. Coordination was carried out with competition officials to obtain the list of registered athletes and the schedule for data collection. Athletes were given questionnaires an hour before their matches. The researcher and research assistants supervised the process to ensure completeness of responses, and all questionnaires were checked for accuracy and completeness before being used for data analysis.

4. Data Analysis

Data was analyzed using a statistical software package. The analysis was done on two levels. Descriptive statistics was used to calculate the mean and standard deviation for each dimension of situational anxiety and self-confidence.

RESEARCH RESULTS

1. Frequency and Percentage of Demographic Information of Youth Table Tennis Athletes in the 33rd National Youth Games, Regional Qualifying Round 3 "Bueng Kan Games".

Table 1 Frequency and Percentage of Demographic Information of Youth Table Tennis Athletes in the 33rd National Youth Games, Regional Qualifying Round 3 “Bueng Kan Games”

General Information	Frequency	Percentage
1. Gender		
- Male	67	55.4
- Female	54	44.6
2. Age		
- 8-11 Years	16	12.3
- 12-15 Years	42	34.7
- 16-19 Years	63	53.0
3. Experience in Playing Table Tennis		
- 1-3 Years		
- 4-6 Years	66	54.5
- 7-10 Years	40	33.1
- 10 Years and above	8	6.6
	7	5.8
4. Overall Experience in Playing Table Tennis		
- Successful		
- Unsuccessful	41	33.9
- About the Same	25	20.7
Have You Ever Trained in Sport Psychology Skills Before?	55	45.5

- Yes		
- No	39	32.2
5. Have You Ever Sought Advice from a Coach on Sport Psychology for Training or Competition?	82	67.8
- Yes		
- No		
6. Do You Think the Use of Sport Psychology Skills Affects Your Table Tennis Performance?	69	57.0
	52	43.0
- Yes		
- No		
	89	73.6
	32	26.4

From Table 1, it can be observed that the majority of athletes were male (55.4%) and most were aged between 16 and 19 years (53.0%). Most had 1-3 years of table tennis experience. Regarding the overall competitiveness experience, most athletes reported outcomes that were both successful and unsuccessful (45.5%). The majority had never trained in sport psychology skills (67.8%). However, more than half had sought advice from their coaches on sport psychology for training and competition (57.0%). In addition, most athletes believed that the use of sport psychology skills had an effect on their table tennis performance (73.6%).

2. Mean and Standard Deviation of Situational Anxiety Levels of Youth Table Tennis Athletes in the 33rd National Youth Games, Regional Qualifying Round 3 "Bueng Kan Games"

Table 2 Mean and Standard Deviation of Situational Anxiety Levels of Youth Table Tennis Athletes in the 33rd National Youth Games, Regional Qualifying Round 3 "Bueng Kan Games"

Situational Anxiety (State Anxiety)	N	**Mean**	Standard Deviation
Somatic Anxiety	121	18.95	5.03
Cognitive Anxiety	121	21.49	5.49
Self-confidence	121	29.56	5.26

From Table 2, it can be observed that the situational anxiety levels of youth table tennis athletes in the 33rd National Youth Games, Regional Qualifying Round 3 "Bueng Kan Games" were as follows. Somatic Anxiety had a mean score of 18.95 with a standard deviation of 5.03. Cognitive Anxiety had a mean score of 21.49 with a standard deviation of 5.49. Self-confidence had a mean score of 29.56 with a standard deviation of 5.26.

3. Mean and Standard Deviation of Situational Anxiety Levels of Youth Table Tennis Athletes in the 33rd National Youth Games, Regional Qualifying Round 3 "Bueng Kan Games," Compared with the Interpretation Criteria of Situational Anxiety

Table 3 Mean and Standard Deviation of Situational Anxiety Levels of Youth Table Tennis Athletes in the 33rd National Youth Games, Regional Qualifying Round 3 “Bueng Kan Games,” Compared with the Interpretation Criteria of Situational Anxiety

Situational Anxiety (State Anxiety)	$\bar{X}$	S.D.	Low Anxiety / Low Arousal (10–19)	Moderate Anxiety / Moderate Arousal (20–30)	High Anxiety / High Arousal (31–40)
Somatic Anxiety	18.95	5.03			
Cognitive Anxiety	21.49	5.49			
Self-confidence	29.56	5.26			

From Table 3, it can be seen that the mean situational anxiety levels of youth table tennis athletes in 33rd National Youth Games, Regional Qualifying Round 3 "Bueng Kan Games" when compared with the interpretation criteria of situational anxiety were as follows. Somatic Anxiety was at a low level. Cognitive Anxiety was at a moderate level. Self-confidence was also at a moderate level.

CONCLUSION AND DISCUSSION

1) The findings highlight that young table tennis athletes in the 33rd National young Games, Regional Qualifying Round 3 "Bueng Kan Games," had a mean somatic anxiety of 18.95, a mean cognitive anxiety of 21.49, and a mean self-confidence of 29.56. Compared to the instrument's interpretive criteria, somatic anxiety was low, but cognitive anxiety and self-confidence were considerable. This distribution indicates an overall suitable level of competitive activation, which is compatible with the Yerkes and Dodson (1908) inverted-U theory, which states that performance improves when arousal or anxiety reaches an optimal level and subsequently decreases after that point.

The pattern is also in line with Martens and associates' multidimensional concepts of competitive state anxiety. In this concept, cognitive anxiety indicates concerns and negative expectations, somatic anxiety reflects physiological responses such as muscle tightness, perspiration, and higher heart rate, and self-confidence reflects belief in one's own abilities. The theory identifies distinctive relationships with performance: cognitive anxiety having a negative linear correlation with performance, somatic anxiety has an inverted-U relationship, and self-confidence has a positive linear association with performance.

Empirical evidence supports these mechanisms. Mohd. Sofian Omar-Fauzee et al. (2009) found that effective imagery and methods of coping improve stress management, which improves self-confidence. In general, competitive anxiety occurs frequently in both team and individual sports, influencing physical, psychological, and athletic performance. In the present situation, where somatic anxiety is low but cognitive anxiety and self-confidence are moderate, athletes who engage in mental skills training can expect performance gains,

particularly through reductions in both somatic and cognitive anxiety, which are accompanied by increases in self-confidence.

The findings emphasize the importance of stress management among young athletes. Many of the participants in this study had not received official sport psychology instruction, which can put athletes at risk in high-pressure circumstances and contribute to stress, discontinuation of sport participation, or burnout when coping options are limited. Athletes who have the opportunity to train psychological skills benefit more than those who do not, which is consistent with Ekasak Hengsukho (2022) findings in youth table tennis, where somatic anxiety was low while cognitive anxiety and self-confidence were moderate, indicating strong bodily control despite pressure.

Wang (2021) found that self-insight predicts somatic and cognitive anxiety, and self-confidence, among Chinese young table tennis players. This supports focused interventions that promote mental control, such as self-reflection and psychological resilience, which can significantly lower cognitive anxiety and increase self-confidence. Overall, the current findings support the use of structured mental skills programs for young table tennis players to improve anxiety profiles and competitive preparation.

2) The findings further showed differences between genders in situational anxiety among young table tennis players competing in the 33rd National Youth Games, Regional Qualifying Round 3 "Bueng Kan Games." Male athletes' mean scores for Somatic Anxiety were 18.92 (SD = 4.87), Cognitive Anxiety was 21.65 (SD = 5.48), and Self-confidence was 29.75 (SD = 5.79). Compared to the standard criteria, male athletes had low somatic anxiety, moderate cognitive anxiety, and moderate self-confidence. Female athletes' mean scores for Somatic Anxiety were 19.87 (SD = 5.10), Cognitive Anxiety was 21.97 (SD = 5.76), and Self-confidence was 28.87. According to the criteria, female athletes had low somatic anxiety, moderate cognitive anxiety, and moderate self-confidence.

These findings are corresponding with those of Seeley et al. (2002), who examined anxiety levels and gender differences in volleyball competitors before and during competition in the Australian league. Their study evaluated three dimensions: cognitive anxiety, physical anxiety, and self-confidence, and found no substantial differences in anxiety levels between male and female athletes. Similarly, Kou et al. (2003) evaluated how cognitive anxiety, physical anxiety, self-confidence, and trait anxiety affected the performance of Taiwanese weightlifters. Their findings revealed gender variations in somatic anxiety and self-confidence, with male athletes exhibiting more consistent somatic anxiety and stronger self-confidence than female athletes. However, there were no significant differences in cognitive anxiety, physical anxiety, self-confidence, or trait anxiety between genders.

The present findings are also aligned with Apostu et al. (2024), who evaluated adult table tennis competitors and found that gender influenced both anxiety and self-confidence, with male athletes showing stronger self-confidence in competitive situations.

New Knowledge and Contributions

1. Key Conclusions and New Knowledge

This study provides a new perspective on situational anxiety among youth table tennis players by examining three dimensions: physical anxiety, cognitive anxiety, and self-confidence. Key findings can be summarized as follows. Youth athletes competing in table tennis competitions reported low levels of physical anxiety, whereas cognitive anxiety and self-confidence were moderate. These findings indicate that cognitive anxiety is the most important factor

influencing performance and competitive behavior among early- to mid-adolescent athletes, a developmental stage defined by considerable emotional and psychological changes.

2. Based on the research findings, the researcher was able to develop a preliminary framework for a "Model to Enhance Self-confidence and Reduce Cognitive Anxiety in Youth Athletes," which consists of three components: (1) self-reflection, (2) psychological goal-setting, and (3) personalized relaxation training. This new information implies that the development of psychological abilities in table tennis should prioritize mental rather than physical components and use approaches adapted to the individual characteristics of gender, age, and sport type.

Implications and Applications

1. Academic Implications

The findings of this study can be used as a database to construct specialized sport psychology training models for table tennis, which are currently limited in Thailand. Academic institutions and instructors in subjects such as physical education, sport psychology, and sport science might use these findings to develop curricula or course content for mental skills training in individual sports.

2. Practical Implications in the Sports Field

Table tennis coaches can use the data to create training programs tailored to athletes of all genders and ages, with a focus on increasing confidence and lowering pre-competition anxiety. Coaches can also plan mental skills training (MST) activities based on the principles stated in this study, such as creating specialized youth training camps, such as a "Confidence-Building Camp for Individual Sport Athletes."

3. Community and Policy Implications

Youth and sports organizations at the provincial or regional levels might use these data to help construct long-term youth athlete development programs. Furthermore, practical courses for local coaches should be developed to help them better grasp sport psychology, supporting more methodical and integrated approaches to athlete development.

RECOMMENDATIONS

1. Recommendations from the Research

1.1 It is recommended that youth table tennis athletes receive mental skills training (MST), particularly in relaxation techniques, imagery, and mindfulness. Such training can minimize cognitive stress and improve self-confidence before competition.

1.2 A greater emphasis should be made on assessing athletes' psychological states before competition. Coaches should observe and use situational anxiety assessment instruments (such as the CSAI-2R) to modify training regimens or create competitive strategies that are tailored to each athlete.

2. Policy Recommendations / Recommendations for Application of the Research

2.1 The Table Tennis Association of Thailand should encourage the incorporation of "sport psychology" into coaching training programs at all levels, with an emphasis on anxiety in individual sports with distinct characteristics.

2.2 Relevant organizations, such as the Ministry of Tourism and Sports or Thailand's Sports Authority, should support programs aimed at improving the "psychological well-being" of youth athletes, particularly in individual sports where competitive pressure is usually high.
2.3 Secondary schools or sports schools should incorporate sport psychology knowledge into physical fitness-promoting activities to fully develop athletes in both physical and psychological aspects.
3**.** Recommendations for Future Research
3.1 Future research could analyze situational anxiety in solo and team sports to investigate differences in competitive pressure and athletes' psychological reaction patterns.
3.2 Further research should investigate the impact of programs to promote self-confidence and reduce cognitive anxiety by applying them with youth athletes over an extended period of time.
3.3 Future research ought to investigate additional variables like competitive experience, training time, and social environment to provide a deeper understanding of athletes' psychological development.

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