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ความวิตกกังวลก่อนการแข่งขันของนักกีฬาเชียร์ลีดดิ้งระดับมหาวิทยาลัย: การศึกษาแบบภาคตัดขวาง

PRE-COMPETITION ANXIETY AMONG UNIVERSITY CHEERLEADING ATHLETES: A CROSS-SECTIONAL STUDY

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บทคัดย่อ

กีฬาเชียร์ลีดดิ้งเป็นกีฬาประเภททีมที่ตัดสินโดยกรรมการ ซึ่งต้องอาศัยความแม่นยำทางเทคนิค การควบคุมจังหวะ การแสดงออกทางท่าทาง และการประสานงานของทีม อย่างไรก็ตาม หลักฐานเกี่ยวกับความวิตกกังวลก่อนการแข่งขันของนักกีฬาเชียร์ลีดดิ้งระดับมหาวิทยาลัยในประเทศจีนยังมีอยู่อย่างจำกัด การศึกษาแบบภาคตัดขวางนี้มีวัตถุประสงค์เพื่อตรวจสอบความวิตกกังวลทางความคิด ความวิตกกังวลทางกาย และความเชื่อมั่นในตนเองของนักกีฬาเชียร์ลีดดิ้งระดับมหาวิทยาลัยในมณฑลกว่างซี ประเทศจีน กลุ่มตัวอย่างแบบสะดวกประกอบด้วยนักกีฬา 213 คน จากมหาวิทยาลัย 12 แห่งที่เข้าร่วมการแข่งขัน National Cheerleading League 2025 (Guangxi) และตอบแบบวัด Competitive State Anxiety Inventory-2 ใช้การทดสอบทีสำหรับกลุ่มตัวอย่างอิสระสำหรับตัวแปรเพศ ประสบการณ์การฝึกซ้อม ระดับกีฬา ระดับการศึกษา และประเภทสาขาวิชา ใช้การวิเคราะห์ความแปรปรวนทางเดียวร่วมกับการทดสอบภายหลังของทูคีย์สำหรับตัวแปรประสบการณ์การแข่งขัน และใช้การวิเคราะห์สหสัมพันธ์ของเพียร์สันเพื่อตรวจสอบความสัมพันธ์ระหว่างมิติทางจิตวิทยาทั้งสาม ผลการวิจัยพบว่าไม่พบความแตกต่างอย่างมีนัยสำคัญระหว่างกลุ่มเพศและกลุ่มประสบการณ์การฝึกซ้อมในมิติทางจิตวิทยาทั้งสาม ($p > .05$) นักกีฬาที่ได้รับการจัดอันดับมีความวิตกกังวลทางความคิด ($p = .001$) ความวิตกกังวลทางกาย ($p < .001$) และความเชื่อมั่นในตนเอง ($p = .046$) สูงกว่านักกีฬาที่ไม่มีอันดับอย่างมีนัยสำคัญ พบความแตกต่างอย่างมีนัยสำคัญระหว่างกลุ่มระดับการศึกษาและกลุ่มประเภทสาขาวิชาในด้านความวิตกกังวลทางความคิดและความวิตกกังวลทางกาย แต่ไม่พบความแตกต่างในด้านความเชื่อมั่นในตนเอง กลุ่มประสบการณ์การแข่งขันมีความแตกต่างอย่างมีนัยสำคัญในด้านความวิตกกังวลทางกาย ($p = .014$) และความเชื่อมั่นในตนเอง ($p = .039$) ความวิตกกังวลทางความคิดมีความสัมพันธ์เชิงบวกในระดับสูงกับความวิตกกังวลทางกาย ($r = .762$, $p < .001$) ขณะที่ความเชื่อมั่นในตนเองมีความสัมพันธ์เชิงบวกในระดับต่ำกับความวิตกกังวลทางกาย ($r = .167$, $p < .05$) ผลการวิจัยนี้ชี้ให้เห็นว่าความวิตกกังวลก่อนการแข่งขันของนักกีฬาเชียร์ลีดดิ้งระดับมหาวิทยาลัยควรได้รับการตีความในฐานะการตอบสนองแบบหลายมิติที่แตกต่างกันไปตามบริบทด้านการแข่งขันและการศึกษา

คำสำคัญ: ความวิตกกังวลก่อนการแข่งขัน, ความวิตกกังวลทางความคิด, ความวิตกกังวลทางกาย, ความเชื่อมั่นในตนเอง, นักกีฬาเชียร์ลีดดิ้งระดับมหาวิทยาลัย

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Abstract

Cheerleading is a judged team sport that requires technical accuracy, rhythm control, expressive performance, and team synchronization. However, evidence on pre-competition anxiety among university cheerleading athletes in China remains limited. This cross-sectional study examined cognitive anxiety, somatic anxiety, and self-confidence among university cheerleading athletes in Guangxi, China. A convenience sample of 213 athletes from 12 universities competing in the 2025 National Cheerleading League (Guangxi) completed the Competitive State Anxiety Inventory-2. Independent-samples t-tests were used for gender, training experience, sport level, educational level, and major type; one-way ANOVA with Tukey post hoc tests was used for competition experience; and Pearson correlation analysis was used to examine relationships among the three psychological dimensions. No significant differences were found across gender or training-experience groups ($p > .05$). Ranked athletes reported significantly higher cognitive anxiety ($p = .001$), somatic anxiety ($p < .001$), and self-confidence ($p = .046$) than non-ranked athletes. Significant differences were found across educational-level and major-type groups in cognitive and somatic anxiety, but not in self-confidence. Competition-experience groups differed significantly in somatic anxiety ($p = .014$) and self-confidence ($p = .039$). Cognitive anxiety was strongly correlated with somatic anxiety ($r = .762$, $p < .001$), while self-confidence was weakly correlated with somatic anxiety ($r = .167$, $p < .05$). These findings suggest that pre-competition anxiety in university cheerleading should be interpreted as a multidimensional response that varies across competitive and educational contexts.

Keywords: Pre-competition anxiety, Cognitive anxiety, Somatic anxiety, Self-confidence, University cheerleading athletes

Introduction

Cheerleading is a performance-based team sport that requires athletes to demonstrate precise technical movements, effective rhythm control, expressive movement skills, and strong team coordination. In China, cheerleading has developed rapidly within primary, secondary, and university sport systems. According to official data provided by the Cheerleading Branch of the China Trampoline and Acrobatic Association, the number of teams participating in national cheerleading competitions has continued to increase. For example, the 2025 National Cheerleading Championship attracted 225 teams from 26 provinces and municipalities, with more than 6,400 athletes and coaches participating. The youth group, represented by university students, was the largest competition group. These developments indicate that university cheerleading has become an indispensable part of competitive cheerleading in China (Cheerleading Branch of the China Trampoline and Acrobatic Association, 2025).

The competitive characteristics of cheerleading make it a meaningful context for examining athletes' psychological responses before competition. Cheerleading combines athletic execution, aesthetic presentation, and team coordination. Research on cheerleading technique evaluation has emphasized the importance of technical execution and movement quality in performance assessment (Lu et al., 2025). Similar considerations have been noted in cheer sports, where performance evaluation involves difficulty, execution quality, team synchronicity, choreography, and artistic expression (Wesely et al., 2025). Athletes must complete complex routines under judging standards, audience attention, time pressure, and team-based scoring conditions. In this context, errors in timing, formation, or movement execution can affect not only individual performance but also the overall quality of the team routine.

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Pre-competition anxiety is a common psychological state in competitive sport and refers to the state anxiety experienced by athletes before competition. It often involves worry-related thoughts, physical tension, and changes in self-confidence. In the Competitive State Anxiety Inventory-2 framework developed by Martens et al. (1990), these responses are commonly examined through three dimensions: cognitive anxiety, somatic anxiety, and self-confidence. Cognitive anxiety refers to worry, negative expectations, and concerns about performance outcomes. Somatic anxiety refers to perceived physiological arousal, such as bodily tension, nervousness, or discomfort before competition. Self-confidence reflects athletes' belief in their ability to perform successfully. These dimensions should be interpreted separately because they do not necessarily change in the same direction. Meta-analytic evidence has shown that cognitive anxiety, somatic anxiety, and self-confidence may have different relationships with sport performance across competitive contexts (Craft et al., 2003). Therefore, an athlete may experience physical arousal or performance-related worry while still maintaining confidence in the ability to perform.

Previous research suggests that pre-competition anxiety is shaped by both individual characteristics and sport-specific contexts. Competitive pressure may become more evident when athletes perceive an event as important but feel uncertain about meeting performance demands (Li et al., 2025). In judged performance sports such as cheerleading, athletes are evaluated not only on technical completion but also on rhythm, expression, synchronization, and presentation quality. This creates a psychological context in which individual preparation, team coordination, and judged performance demands intersect.

Gender may influence how athletes perceive and respond to pre-competition pressure, but previous findings remain inconsistent. Ahmedov et al. (2025) reported gender-related differences in pre-competition anxiety, whereas do Nascimento et al. (2023) found no significant gender differences among handball athletes. These mixed findings suggest that gender should be examined within sport-specific contexts. In university cheerleading, where athletes perform under shared judging criteria and team-based conditions, gender is therefore a relevant variable for examining possible differences in pre-competition psychological responses.

Training experience is another factor that may influence athletes' psychological responses before competition. Longer participation in systematic training may increase familiarity with technical demands, competition procedures, and performance expectations. It may also support perceived preparedness and confidence. However, training duration does not necessarily reduce all dimensions of anxiety. In judged and aesthetic sport contexts, experience and perceived preparedness have been identified as relevant factors in athletes' pre-competitive psychological states (Aliberti et al., 2024). In addition, psychological preparation may vary according to athletes' competitive backgrounds and exposure to mental training (Kelemen et al., 2024). These findings suggest that training experience may help explain variation in cognitive anxiety, somatic anxiety, and self-confidence, although its effects may differ across psychological dimensions.

Sport-related characteristics may also contribute to differences in pre-competition anxiety. Athletes with higher sport status or greater competition exposure may have stronger perceived competence, but they may also face higher expectations and greater responsibility. Studies involving high-level athletes and college athletes have shown that competitive state anxiety and self-confidence are important psychological variables in sport performance contexts (Conde-Ripoll et al., 2024; Wu et al., 2025). These findings indicate that sport-related variables such as sport level and competition experience should be examined in relation to each psychological dimension rather than treated as general background variables. For university cheerleading athletes, sport level and competition experience may be especially relevant because competitive routines require synchronization, role responsibility, and visible execution under judging

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conditions.

In addition to sport-related factors, university athletes may experience pressure arising from academic and developmental demands. Collegiate athletes often need to manage training, competition, academic work, and personal development simultaneously, which may increase psychological strain during competitive periods (Lopes Dos Santos et al., 2020). Research on dual-career student-athletes has also highlighted challenges related to time management, institutional support, and psychological adaptation (De Maio et al., 2025). These considerations make educational level and major type relevant variables when examining pre-competition anxiety among university athletes. For sport-related major students, competition may also be connected with professional identity and future development, whereas non-sport-related major students may experience competition more as an extracurricular or team-based activity.

Although pre-competition anxiety has been studied across a range of sports, evidence specific to university cheerleading athletes in China remains limited. This research gap is important because university cheerleading combines judged performance, team synchronization, music rhythm, formation changes, and collective responsibility. These characteristics may produce psychological responses that differ from those observed in individual or non-judged sports. Moreover, as university cheerleading continues to expand within China's national competition system, it becomes increasingly necessary to understand how athletes' demographic, sport-related, and educational characteristics may differentiate cognitive anxiety, somatic anxiety, and self-confidence before competition.

Accordingly, this study examined pre-competition anxiety among university cheerleading athletes in Guangxi, China. It compared cognitive anxiety, somatic anxiety, and self-confidence across gender, training experience, sport level, competition experience, educational level, and major type. It also examined the correlations among the three psychological dimensions. As shown in Figure 1, the conceptual framework presents the demographic and sport-related characteristics used for group comparisons and the correlations examined among cognitive anxiety, somatic anxiety, and self-confidence. The findings may help clarify how pre-competition psychological responses vary across competitive and educational groups in university cheerleading and provide a basis for more targeted psychological support in university cheerleading training and competition.

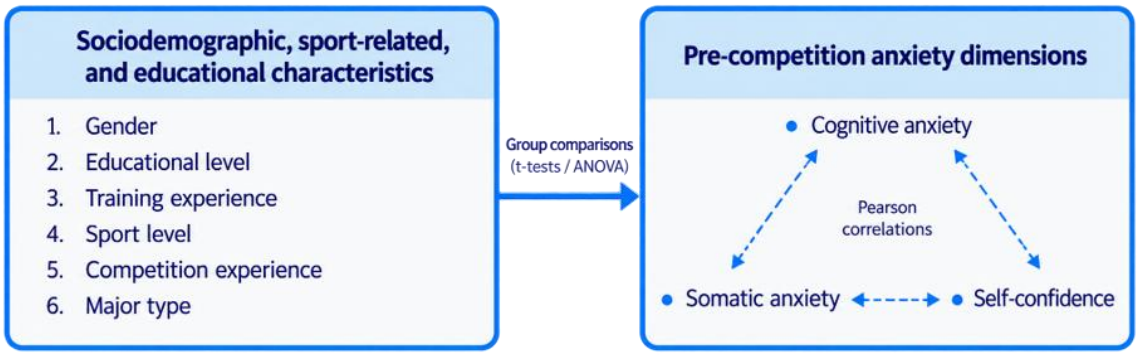


Figure 1. Conceptual Framework of Pre-Competition Anxiety among University Cheerleading Athletes

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Research methodology

This study used a quantitative cross-sectional survey design. The study was approved by the Human Research Ethics Committee of Mahasarakham University, approval number 652-609/2025.

Study design and background

This study used a quantitative cross-sectional survey design to examine pre-competition anxiety among university cheerleading athletes in Guangxi, China. The study focused on three psychological dimensions of the CSAI-2: cognitive anxiety, somatic anxiety, and self-confidence. Data were collected during the 2025 National Cheerleading League (Guangxi), held from 7 to 9 November 2025. Participants completed the questionnaire on the day of competition, approximately 30–60 minutes before their scheduled performance. This administration period was selected to capture their immediate pre-competition psychological states.

Participants and sampling

The target population comprised 665 university cheerleading athletes from 12 universities in Guangxi, China. Athletes were eligible to participate if they: (1) were enrolled university students and members of a university cheerleading team; (2) participated in the 2025 National Cheerleading League (Guangxi); and (3) voluntarily agreed to complete the questionnaire.

The minimum sample size was calculated using G*Power software. Based on an effect size of 0.25, a significance level of .05, and statistical power of .80, the required minimum sample was 211 participants (Faul et al., 2009). A convenience sampling approach was used. With assistance from competition organizers and team coaches, eligible athletes who were present and accessible at the competition venue were invited to participate. Recruitment continued until 230 questionnaires had been distributed. Participation was voluntary and anonymous, and the athletes were informed that they could decline or discontinue participation without penalty. Following data screening, 17 questionnaires were excluded because they contained incomplete or invalid responses. Specifically, questionnaires with one or more unanswered CSAI-2 items or incomplete essential demographic and sport-related information were removed from the analysis. A total of 213 valid questionnaires were retained, yielding an effective response rate of 92.6%.

Data collection tools and techniques

The research instruments comprised two sections. The first section was the demographic and sport-related information form, which gathered background data including gender, educational level, training experience, sport level, competition experience, and major type.

The second section was the Competitive State Anxiety Inventory-2 (CSAI-2), developed by Martens et al. (1990), which was used to assess the pre-competition psychological state of university cheerleading athletes. The scale comprised three dimensions, including (1) cognitive anxiety (9 items), (2) somatic anxiety (9 items), and (3) self-confidence (9 items), with a total of 27 items. Responses were rated on a 4-point Likert scale: 1 = Not at all, 2 = Slightly, 3 = Moderately, and 4 = Very much so. Higher scores indicated higher levels of the corresponding psychological dimension.

Before the main data collection, the complete Chinese-language questionnaire used in this study was reviewed by five external experts. The review covered the translated wording of the 27 CSAI-2 items, their suitability for assessing pre-competition anxiety among university cheerleading athletes, and the relevance of the demographic and sport-related items to the research objectives. Each expert rated the congruence of each item with the research objectives using scores of −1 (not congruent), 0 (uncertain), and +1 (congruent). Thus, the experts evaluated the translated and contextually reviewed questionnaire used

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in the present study rather than the original English-language CSAI-2 alone. The average IOC score for the complete questionnaire was .888, indicating satisfactory content congruence. A pilot test was subsequently conducted with 30 university cheerleading athletes whose characteristics were similar to those of the main study participants. The overall Cronbach's alpha coefficient was .917, indicating good internal consistency.

Data analysis

The questionnaire data were analyzed using IBM SPSS Statistics version 29.0 and scored according to the CSAI-2 scoring criteria. Descriptive statistics, including frequencies and percentages, were used to summarize the participants' demographic and sport-related characteristics. Means and standard deviations were calculated for cognitive anxiety, somatic anxiety, and self-confidence.

Independent-samples t-tests were used to examine differences in cognitive anxiety, somatic anxiety, and self-confidence according to gender, training experience, sport level, educational level, and major type. One-way ANOVA was used to compare the three psychological dimensions across the competition-experience groups. Before conducting the one-way ANOVA, normality was assessed using the Shapiro–Wilk test together with skewness and kurtosis values, while homogeneity of variance was examined using Levene's test. Although several subgroup distributions showed statistically significant departures from normality in the Shapiro–Wilk test, the skewness and kurtosis values did not indicate severe non-normality. Levene's test indicated that the homogeneity of variance assumption was satisfied. Tukey's post hoc test was conducted when the overall ANOVA result was statistically significant. Pearson correlation analysis was used to examine the correlations among cognitive anxiety, somatic anxiety, and self-confidence. Statistical significance was set at $p < .05$.

Results

This study investigated pre-competition anxiety among university cheerleading athletes across three dimensions: cognitive anxiety, somatic anxiety, and self-confidence. The results are presented in the following sections, including participant characteristics, group differences in pre-competition anxiety, and correlations among the three psychological dimensions.

1. Results of participant characteristic analysis

A total of 213 university cheerleading athletes were included in the analysis. Table 1 shows the demographic and sport-related characteristics of the participants. Most participants were female (67.61%), undergraduates (54.93%), and had 1–3 years of training experience (66.67%). Most athletes were non-ranked (79.34%) and were from non-sport-related majors (75.12%). Regarding competition experience, the largest proportion had participated in 1–2 competitions (37.09%), followed by those with no previous competition experience (29.11%), five or more competitions (18.31%), and 3–4 competitions (15.49%).

Table 1. Presents the demographic and sport-related characteristics of the participants.

Variable	Category	Frequency	Percent (%)
Gender	Male	69	32.39
	Female	144	67.61
Educational Level	Vocational College	96	45.07
	Undergraduate	117	54.93
Training Experience	1-3 years	142	66.67
	4-7 years	71	33.33

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Table 1. (Continued)

Variable	Category	Frequency	Percent (%)
Sport Level	Non-ranked	169	79.34
	Ranked	44	20.66
Competition Experience	0 times	62	29.11
	1–2 times	79	37.09
	3–4 times	33	15.49
	≥ 5 times	39	18.31
Major Type	Sport-related	53	24.88
	Non-sport-related	160	75.12
Total		213	100.00

2. Analysis of differences by gender and training experience

The results of the independent samples t-tests for gender and training experience are presented in Table 2. Gender showed no significant differences in cognitive anxiety, somatic anxiety, or self-confidence ($p > .05$). Training experience also showed no significant differences across the three psychological dimensions ($p > .05$).

Table 2. Differences in pre-competition anxiety by gender and training experience.

Variable	Group	Cognitive anxiety	Somatic anxiety	Self-confidence
Gender	Male (n=69)	20.81 ± 5.67	20.01 ± 5.30	23.83 ± 2.86
	Female (n=144)	20.81 ± 5.30	19.12 ± 5.10	24.10 ± 4.39
	t	-0.008	-1.185	0.54
	p value	.994	.237	.59
Training experience	1–3 years (n=142)	20.67 ± 5.53	19.61 ± 5.24	23.87 ± 3.92
	4–7 years (n=71)	21.08 ± 5.18	19.01 ± 5.04	24.28 ± 4.03
	t	-0.528	0.786	-0.71
	p value	.598	.433	.478

Note. *$p < .05$ indicates statistical significance.

3. Analysis of differences by educational level

Educational level was also associated with significant differences in cognitive anxiety and somatic anxiety, as shown in Table 3. Undergraduate athletes had higher cognitive anxiety scores than vocational college athletes ($t = 2.014$, $p = .045$), and they also reported higher somatic anxiety scores ($t = 3.417$, $p = .001$). However, no significant difference was found in self-confidence between the two educational groups ($t = -1.683$, $p = .094$).

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Table 3. Differences in pre-competition anxiety by educational level.

Variable	Group	Cognitive anxiety	Somatic anxiety	Self-confidence
Educational level	Vocational college (n = 96)	19.99 ± 5.54	18.10 ± 4.68	24.51 ± 3.96
	Undergraduate (n = 117)	21.48 ± 5.23	20.48 ± 5.33	23.60 ± 3.92
	t	2.014	3.417	-1.683
	p value	.045*	.001*	.094

Note. *p < .05 indicates statistical significance.

4. Analysis of differences by sport level

Sport level was associated with significant differences in cognitive anxiety, somatic anxiety, and self-confidence, as shown in Table 4. Ranked athletes had higher cognitive anxiety scores than non-ranked athletes (t = -3.507, p = .001), and they also reported higher somatic anxiety scores (t = -6.598, p < .001). In addition, ranked athletes showed higher self-confidence than non-ranked athletes (t = -2.009, p = .046).

Table 4. Differences in pre-competition anxiety by Sport level.

Variable	Group	Cognitive anxiety	Somatic anxiety	Self-confidence
Sport level	Non-ranked (n=169)	20.34 ± 5.78	18.32 ± 5.01	23.73 ± 3.76
	Ranked (n=44)	22.59 ± 3.06	23.59 ± 3.35	25.07 ± 4.52
	t	-3.507	-6.598	-2.009
	p value	.001*	< .001*	.046*

Note. *p < .05 indicates statistical significance.

5. Analysis of differences by sport level

Major type was also associated with significant differences in cognitive anxiety and somatic anxiety, as shown in Table 5. Sport-related major athletes had higher cognitive anxiety scores than non-sport-related major athletes (t = 2.254, p = .025), and they also reported higher somatic anxiety scores (t = 4.596, p < .001). However, no significant difference was found in self-confidence between the two major groups (t = 1.103, p = .271).

Table 5. Differences in pre-competition anxiety by Sport level.

Variable	Group	Cognitive anxiety	Somatic anxiety	Self-confidence
Major type	Sport-related (n = 53)	22.25 ± 5.11	22.11 ± 5.18	24.53 ± 4.34
	Non-sport-related (n = 160)	20.33 ± 5.44	18.51 ± 4.86	23.84 ± 3.81
	t	2.254	4.596	1.103
	p value	.025*	< .001*	.271

Note. *p < .05 indicates statistical significance.

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6. Differences in pre-competition anxiety by competition experience

As shown in Table 6, one-way ANOVA revealed significant differences among competition-experience groups in somatic anxiety, $F(3, 209) = 3.612$, $p = .014$, partial $\eta^2 = .049$, and self-confidence, $F(3, 209) = 2.837$, $p = .039$, partial $\eta^2 = .039$. No significant group difference was observed in cognitive anxiety, $F(3, 209) = 1.605$, $p = .189$, partial $\eta^2 = .023$. Tukey post hoc comparisons (see Table 6) indicated that athletes with five or more competition experiences reported significantly higher somatic anxiety than those with no experience and those with 1–2 experiences.

Table 6. Differences in Pre-Competition Anxiety by Competition Experience.

Variable	Group	Cognitive anxiety	Somatic anxiety	Self-confidence
Competition experience	0 times (n = 62)	20.95 ± 5.36	18.63 ± 4.94^{b}	23.52 ± 3.32^{a}
	1–2 times (n = 79)	20.11 ± 5.71	18.92 ± 5.47^{b}	23.41 ± 4.00^{a}
	3–4 times (n = 33)	20.36 ± 5.58	19.21 ± 4.61^{ab}	25.18 ± 4.66^{a}
	≥5 times (n = 39)	22.36 ± 4.49	21.79 ± 4.85^{a}	25.03 ± 3.88^{a}
	F	1.605	3.612	2.837
	p value	.189	.014*	.039*
	Partial η^2	.023	.049	.039

Note. Values are presented as mean ± SD. *p < .05. Partial η^2 indicates effect size. One-way ANOVA was used for group comparisons. Tukey's post hoc test was applied for multiple comparisons. Different superscript letters indicate significant differences between groups, while shared letters indicate no significant difference. Post hoc p-values are not reported because significance is indicated by superscript letters.

7. Analysis of correlations among psychological dimensions

Statistical analyses revealed significant correlations among selected dimensions of pre-competition anxiety (Table 7). A strong positive correlation was found between cognitive anxiety and somatic anxiety ($r = .762$, $p < .001$), indicating that athletes who experienced greater worry-related thoughts also reported stronger physiological symptoms. Self-confidence showed no significant correlation with cognitive anxiety ($r = .028$, $p > .05$), whereas a weak positive correlation was observed between self-confidence and somatic anxiety ($r = .167$, $p < .05$). These correlation patterns partially support the conceptual framework presented in Figure 1, particularly the expected association between cognitive anxiety and somatic anxiety, while the relationships involving self-confidence were weaker and less consistent.

Table 7. Correlations among cognitive anxiety, somatic anxiety, and self-confidence.

Variable	Mean ± SD	Cognitive anxiety	Somatic anxiety	Self-confidence
Cognitive anxiety	20.81 ± 5.41	1	-	-
Somatic anxiety	19.41 ± 5.17	.762***	1	-
Self-confidence	24.01 ± 3.95	.028	.167*	1

Note. *p < .05, **p < .01, ***p < .001 indicates statistical significance.

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Discussion

This study examined pre-competition anxiety among university cheerleading athletes across three dimensions: cognitive anxiety, somatic anxiety, and self-confidence. Consistent with the CSAI-2 framework, these dimensions were interpreted as related but distinct components of athletes' pre-competition psychological states. Recent research has similarly treated competitive anxiety and self-confidence as separate indicators of psychological readiness and performance-related responses (Castillo-Rodríguez et al., 2022; Domínguez-González et al., 2024). In the present study, significant group differences were concentrated in sport level, competition experience, educational level, and major type, whereas no significant differences were found across gender or training-experience groups. This pattern supports the need to interpret each psychological dimension separately rather than relying on a single general anxiety score. Recent measurement research also supports treating anxiety and self-confidence as distinct but related psychological constructs in high-stakes sport situations (Trpkovici et al., 2023).

No significant differences in cognitive anxiety, somatic anxiety, or self-confidence were found between male and female athletes. This finding suggests that gender did not distinguish pre-competition psychological responses in the present sample, although gender differences have been reported in some team-sport settings (Šadrincevaitė & Griciūtė, 2023). One possible explanation is that male and female university cheerleading athletes perform under the same judging criteria, team routines, rhythm requirements, and shared performance pressure. Previous research has also suggested that gender differences may depend on skill level, sport context, and psychological resources rather than gender alone (González-Hernández et al., 2020; Hagan et al., 2017). Similarly, no significant differences were found between the two training-experience groups. Training duration may not fully represent psychological preparation, as athletes with similar years of participation may differ in training quality, competitive roles, perceived preparedness, and team responsibility. This interpretation is consistent with evidence that playing experience and sport characteristics do not produce uniform differences in competitive anxiety and self-confidence (Chatterjee et al., 2025).

Sport level produced the clearest group differences in the present study. Ranked athletes reported higher cognitive anxiety, somatic anxiety, and self-confidence than non-ranked athletes. This combination is understandable when competitive anxiety is viewed as multidimensional rather than uniformly negative. Research in dancesport has shown that athletes from different competitive classes and levels of preparedness may display different patterns of anxiety and self-confidence (Aliberti et al., 2024). Differences in anxiety profiles have also been observed across competitive levels in other sports (Karim et al., 2019). In the present sample, the higher self-confidence reported by ranked athletes may reflect stronger perceived competence and previous successful competitive experience, whereas their higher anxiety scores may reflect greater performance expectations and responsibility. Instead, competition experience appeared to distinguish physical activation more clearly than worry-related thoughts in this sample. Ranked cheerleading athletes may be expected to perform more difficult movements, maintain rhythm accuracy, support team synchronization, and minimize visible errors under judging conditions. Their higher anxiety scores may therefore indicate greater awareness of performance demands rather than poorer psychological readiness. Similar differences in anxiety and confidence have been observed across competitive levels in other sport contexts (Castillo-Rodríguez et al., 2022).

The overall ANOVA indicated differences across competition-experience groups in somatic anxiety and self-confidence, but not in cognitive anxiety. Tukey's post hoc comparisons showed that athletes who had participated in five or more competitions reported significantly higher somatic anxiety than those with

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no previous competition experience and those who had participated in 1–2 competitions. No other pairwise differences in somatic anxiety were significant. Although the overall ANOVA for self-confidence was statistically significant, the post hoc comparisons did not identify any significant pairwise differences between the competition-experience groups. These results should therefore be interpreted cautiously and do not support a simple linear conclusion that greater competition experience consistently increases self-confidence or reduces anxiety. Instead, competition experience appeared to distinguish physical activation more clearly than worry-related thoughts in this sample. Familiarity with competition procedures, team coordination, and judging expectations may coexist with stronger somatic activation when experienced athletes face greater expectations or more visible team roles. Previous research has similarly shown that pre-competition situations involve both psychological and physiological responses (Souza et al., 2019), while evidence from judged performance sports suggests that anxiety profiles may vary across experience and preparedness groups (Aliberti et al., 2024).

Significant differences across educational-level and major-type groups were found in cognitive anxiety and somatic anxiety, but not in self-confidence. Undergraduate athletes reported higher cognitive and somatic anxiety than vocational college athletes, while athletes in sport-related majors reported higher anxiety scores than those in non-sport-related majors. The observed group differences were therefore confined mainly to the anxiety dimensions rather than self-confidence. University athletes may experience different combinations of academic demands, professional expectations, training responsibilities, and perceptions of competition depending on their educational level and major. Research among university athletes has shown that cognitive anxiety, somatic anxiety, and self-confidence should be interpreted within a broader motivational and educational context (Mercader-Rubio et al., 2023). Cognitive and somatic anxiety have also been linked to sport performance among student-athletes (Parnabas et al., 2013). Nevertheless, the present findings only demonstrate differences between educational and major groups and should not be interpreted as evidence that educational background directly causes anxiety.

The correlation findings further support the need to interpret the three CSAI-2 dimensions separately. Cognitive anxiety was strongly and positively correlated with somatic anxiety, indicating that athletes who reported more worry-related thoughts also tended to report stronger physical anxiety responses. This finding is consistent with research showing that cognitive and somatic components of pre-competition anxiety may occur together (Šadrincevaitė & Griciūtė, 2023). Pre-competition periods may also involve physiological changes alongside self-reported anxiety responses (Souza et al., 2019). In contrast, self-confidence was not significantly correlated with cognitive anxiety, suggesting that worry-related thoughts did not necessarily correspond to lower confidence in the present sample. Self-confidence was only weakly and positively correlated with somatic anxiety. Some athletes may therefore experience physical activation while continuing to believe that they are capable of performing successfully. Research involving basketball players has similarly shown that sport confidence and competitive anxiety may operate through distinct psychological processes (Chun et al., 2022). Somatic anxiety should not automatically be interpreted as low self-confidence; in this sample, it may represent competition-related activation that athletes need to regulate rather than eliminate.

Conclusions and Recommendations

This study examined pre-competition anxiety among university cheerleading athletes across cognitive anxiety, somatic anxiety, and self-confidence. No significant differences were found across gender or training-experience groups. In contrast, the three psychological dimensions differed between ranked and

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non-ranked athletes. Differences across competition-experience groups were found in somatic anxiety and self-confidence, although Tukey's post hoc comparisons identified significant pairwise differences only in somatic anxiety. Educational-level and major-type groups differed in cognitive and somatic anxiety but not in self-confidence. Cognitive anxiety was strongly and positively correlated with somatic anxiety, while self-confidence was weakly correlated with somatic anxiety and was not significantly correlated with cognitive anxiety. These findings support interpreting pre-competition anxiety as a multidimensional psychological response that may vary across competitive and educational groups.

1. Practical Implications

1) Coaches may consider monitoring cognitive anxiety, somatic anxiety, and self-confidence separately, particularly among ranked athletes and athletes with greater competition exposure. Higher self-confidence does not necessarily indicate the absence of worry-related thoughts or physical activation before competition.

2) Psychological preparation may focus on helping athletes recognize the distinction between cognitive worry and physical activation. This may allow coaches to provide support that is more responsive to athletes' specific pre-competition psychological states.

3) Strategies such as breathing regulation, relaxation, body awareness, attentional control, and competition simulation could be considered as possible components of psychological preparation. However, these strategies were not directly tested in the present study and should therefore be regarded as potential practical applications rather than conclusions established by the current findings.

4) Because cheerleading requires synchronization, rhythm control, and performance under judging conditions, teams may explore integrating psychological preparation into technical training and full-routine rehearsals. The effectiveness of this integrated approach should be evaluated in future intervention studies.

2. Recommendations for Future Research

1) Longitudinal studies are needed to examine changes in cognitive anxiety, somatic anxiety, and self-confidence across different competition stages, including training periods, the pre-competition period, immediately after competition, and recovery.

2) Future research could combine questionnaire data with physiological indicators, such as heart rate variability, heart rate, and salivary cortisol, to clarify the correspondence between self-reported anxiety and physiological activation.

3) Future studies should consider athletes' team roles, performance ranking, routine difficulty, and positions within the team, as these factors may provide a more detailed explanation of group differences in pre-competition psychological responses.

4) Because the present sample was limited to university cheerleading athletes in Guangxi, China, future studies should include athletes from other regions, competitive levels, and cheerleading categories to examine the generalizability of the findings.

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