*Journal of Sports Psychology Association of Nigeria*
Vol. 15, 2022, 83-93

HIS LINEAGE PUBLISHING HOUSE

# Assessing Trait and State Anxiety Experiences of Selected Ghanaian Student-Athletes

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## Abstract

*Emotions play an important role in the context of sport. Yet, studies examining the influence and interaction of gender, age and performance level on competition anxiety is sparse. Therefore, this study examined the relationship between competition trait anxiety and competition state anxiety and how state and trait anxiety are related. The study also examined whether the intensity of the state anxiety (somatic and cognitive) can be predicted from the intensity of the trait anxiety (somatic and cognitive). Selected Ghanaian student-athletes (N = 53) completed the competition anxiety inventory at one-time measurement using an online means. Pearson correlation showed a high correlation between the intensity of the somatic trait and state anxiety and the intensity of the cognitive state and trait anxiety. A standard (linear) multiple regression revealed that the state anxiety can be predicted out of trait anxiety. Multivariate Analyses of Variance revealed no significant interactions for between-subject factors of gender, age and performance level for intensity of competition anxiety. Findings suggest that a first determination of the characteristic anxiety is reasonable in sports practice in order to integrate preventive intervention measures and that further research is required for interaction effects.*

**Keywords:** anxiety, competition anxiety, competition anxiety trait, competition anxiety state

## Introduction

Emotions play an important role, not only in life in general, but also in the context of sport, for athletes, spectators and fans. For example, the joy of defeating the opponent, the anger at a foul of the opponent, the grief of a defeat or the anxiety of failure. Sport without emotions is inconceivable (Zajonc, 1998), every action in sport is accompanied to a great extent by emotions (Baumann, 2015) and sport occupies a great place in our society (Kober, 2013). However, the emotions of the athlete can be an essential criterion for victory or defeat in decisive situations, i.e., the outcome of the sporting competition, especially in performance and top-class sport (Craft, Magyar, Becker & Feltz, 2003). Here, top-level sport is more than just a game and sporting success is very important (Jones, 1995). The

principle of victory and defeat is an essential element of sport and characteristic of sporting competition. As a result, the athlete is subjected to a certain pressure to perform, so that the competition can become an emotionally affected event (Cachay & Gahai, 1989). In the competition "it's about something", for the athlete himself or for others. Often spectators are present and a bad performance or a mistake cannot be easily corrected. In these situations, athletes experience the emotion of anxiety (Ehrlenspiel, Geukes & Beckmann, 2018).

Several definitions of anxiety have been given within the sciences. Spielberger (1972) defines anxiety as " an emotional response to the recognition or perceived recognition of a danger, regardless of whether this danger is also objectively present". This definition emphasizes the subjective perception of anxiety. Hackfort and Schwenkmezger (1985) also define anxiety as a "subjective uncertainty" and the triggering stimulus is determined by the perception of a dangerous situation. However, they also differentiate or expand the term of anxiety in their definition by using anxiety as a "cognitive, emotional and physical response to a dangerous situation or to the expectation of a danger or threat situation". With regard to the emergence of anxiety, an influential cognitive-theoretical model of origin is the Interactional Stress Model by Lazarus (1991). Particularly athletes who compete in competitions are confronted with the aforementioned anxiety problem. In the specific case of the sporting competition situation, the phenomenon of competition anxiety is described (Martens, Vealey & Burton, 1990). According to Martens et al. (1990), competition anxiety is an unpleasant state of arousal, which is triggered by sporting competition situations and is accompanied by feelings of tension, concern and nervousness. According to them, competition anxiety also consists of two subcomponents: cognitive and somatic competition anxiety. Schwarzer (1981) established that competition anxiety is a sports-related anxiety, which he categorizes as a special variant of performance and evaluation anxiety.

The overall construct of competition anxiety is influenced by personal and situational factors (Cerin et al., 2000; Hanton et al., 2008). The type of sport is discussed as a situation-specific factor (Craft et al., 2003; Mellalieu, Hanton, O'brien, 2004; Hanton, Jones, & Mullen, 2000). A study by Aufenanger (2005) showed that the sport type influences how much anxiety athletes experience and shows a lower somatic competitive anxiety for open-skill sports compared to close-skill sports. According to Aufenanger (2005), these results support the earlier studies of Martens et al. (1990), which found higher competition anxiety among individual athletes compared to team athletes. It is possible that there is more pressure and personal exposure associated with individual sports than with team sports (Woodman & Hardy, 2003).

The Trait-State Theory of Anxiety by Spielberger (1972) differentiates anxiety, as mentioned above, in terms of its time stability. The theory distinguishes between anxiety as a trait and anxiety as a state. Trait anxiety (A-Trait) is postulated as a stable characteristic of a person to react with anxiety in response to varying situations (anxiety as a personality trait) (Ehrlenspiel et al., 2011). Trait anxiety includes both the frequency, defined as the amount of time an athlete spent attending to the symptoms experienced concerning competition (Jones, Swain & Hardy, 1993), as well as the intensity of previous experiences in similar (threatening) situations, which describes the athlete's interpretation of cognitive and somatic symptom intensity as positive or negative for later performance (Jones & Swain, 1992). Persons with a higher level of trait anxiety experience a greater number of situations as threatening (extensity) and also experience higher state anxiety (intensity aspect) (Ehrlenspiel et al., 2011). The Theory of Trait-State Anxiety also assumes that with higher trait anxiety there will be a faster increase in anxiety (Hackfort & Schwenkmezger, 1985; Spielberger, 1972).

Age, gender, level of performance, competitive experience and self-confidence are discussed as personal factors. McEwan (1995) investigated the relationship between

competition anxiety and age and found that competition trait anxiety and cognitive and somatic state anxiety decreased with age. The adult and senior tennis players demonstrated the lowest levels of competition trait anxiety compared to the college tennis team players. Modroño and Guillen (2011) also conducted a study on the correlation of age and cognitive trait anxiety. They report that older windsurfers had lower cognitive anxiety compared to younger windsurfers. However, they did not find any significant gender differences. On the other hand, Milavić, Jurko & Grgantov (2013) found age and gender differences in terms of competition anxiety. They found a significantly lower level of somatic and cognitive anxiety among female junior players compared to female youth players, and male youth and junior players did not show differences in any of the variables analyzed. The research by Jones and Cale (1989) showed that gender moderates the temporal structuring of anxiety. Hagan, Pollmann and Schack (2017) investigated the interaction of gender and performance levels using the time-to-event paradigm but found that elite (international) female athletes were less cognitively anxious, showed more facilitative interpretation towards somatic anxiety symptoms and experienced less frequency of somatic anxiety symptoms than elite male athletes.

Again, Russell, Robb, and Cox (1998) also found higher cognitive and somatic anxiety prior to competition for females as opposed to males. Regarding the performance level Gal-Or, Tenenbaum, and Shimrony (1986) asked whether and how different qualification levels influence state anxiety. Their results show that athletes coped more successfully with pre-competition anxiety by lowering their anxiety to a more moderate level prior to the actual performance. In addition to the significant influence of gender on competition anxiety, Fernandes et al. (2013) reports that athletes with highly competitive experience had lower levels of cognitive and somatic anxiety. Furthermore, male athletes have a higher level of self-confidence compared to female athletes. Gould, Petlichkoff and Weinberg (1984) examined the temporal changes in cognitive anxiety, somatic anxiety, and self-confidence using CSAI. They also checked whether cognitive and somatic anxiety affect performance differently. The results of their study confirm that somatic anxiety increases during the time leading up to competition, while cognitive anxiety and self-confidence remain constant. However, the hypothesis that cognitive anxiety would be a stronger performance predictor than somatic anxiety could only be partially confirmed. Hanton, Thomas and Maynard (2004) also investigated the relationship between self-confidence, intensity of competition anxiety and symptom interpretation in terms of performance. They found that a lack of self-confidence led to an increase in the intensity of competition anxiety and was perceived as debilitating for performance, higher self-confidence led to perceptions of control, and decrease in the intensity of competition anxiety. On the basis of the research situation listed here with different findings regarding competition anxiety, it is important to carry out further empirical studies. The study of Hanton et al. (2004) contradicts the investigation of Gould et al. (1984). Gould et al. (1984) report that self-confidence remains constant. Hanton et al. (2004) grouped this variable into low and high self-confidence and thus achieved contrasting results. The research situation is also contradictory with regard to the gender variable. Jones and Cale (1989) state that there is an increase in the intensity of somatic symptoms and a decrease in self-confidence in women. Hagan, Pollmann and Schack (2017) report that elite female athletes experienced somatic anxiety symptoms less frequency than elite male athletes. So, gender seems to interact with other variables such as performance levels in the time-to-event paradigm.

The aim of this study was to investigate the relationship between competition trait anxiety and competition state anxiety, based on Ehrlenspiel et al. (2011). The study also investigated how state and trait anxiety are related and whether the intensity of the state anxiety (somatic and cognitive) can be predicted from the intensity of the trait anxiety

(somatic and cognitive). This would be to prove the Trait-State Theory of Spielberger (1972) also in the context of competitive sports and to support Schwenkmezger (1985) and Ehrlenspiel et al. (2011) investigations and to expand the research situation. It is expected that trait and state anxiety would be correlated, and that the trait anxiety will predict the state anxiety (hypothesis 1). Considering the background described above, that the personal factors gender, age and performance level are influencing and interacting variables on competition trait anxiety and on competition state anxiety, for which research has different results, it should be determined to what extent these influence the intensity of trait anxiety and state anxiety (somatic and cognitive) and how they interact. It is also expected that there will be main and interaction effects of the variables on the trait and state anxiety (hypothesis 2).

## Methods

### Participants

In this study, the descriptive research design was employed. The study consisted of 53 male (n = 33) and female (n = 20) students of sport between ages 17 and 31 years ($M$ = 25.40; $SD$ = 7.41). The most frequently reported sport types were soccer (52.8%), dancing (11.3%), fitness (7.5%) and triathlon (5.7%). Also, 9.4% stated they compete at the premier league (PL) level, 20.8% stated national level, 43.4% at district league and 26.4% at no league or recreational sports. Moreover, 32.1% indicated that they train 1 to 2 times per week whereas 49.1% indicated that they train 3 to 4 times per week.

### Instrumentation

The competition anxiety inventory was used in gathering data. As a result of the corona virus pandemic, the inventory or scale was transformed into an online questionnaire (i.e., google forms). The competition trait anxiety inventory or questionnaire (Brand et al., 2009) was used to record the intensity of competition trait anxiety. The athletes were informed that this questionnaire records experiences and thoughts about competition situations in general, and this means how they usually feel before a competition or what they think about. The competition trait anxiety inventory measures competition anxiety in the dimensions of "somatic anxiety" ("Before competitions ... I feel shaky"), "concern" ("... I have self-doubt") and "concentration disorders" ("... I am prone to distractions") (Brand et al., 2009; Ehrlenspiel et al., 2011). The dimension "somatic anxiety" describes the noticeable physical component of anxiety, e.g., a queasy feeling in the stomach. "Concentration disorders" describes the tendency of athletes to be distracted by external influences, e.g., spectator reactions. Each of these dimensions contains 4 items (so a total of 12 statements) for which the participants are to indicate whether they disagree at all (1), agree a little (2), quite agree (3) or totally agree (4) with the statement (i.e., 4-Likert scaling). The overall subscale intensity scores ranged from 12 to 48. It also contains 2 items for which the participants should indicate whether they agree with the statement as promoting (1) or inhibiting (5) (i.e., 5-Likert scaling). So the total subscale intensity scores ranged from 14 to 58. Regarding the hypotheses to be examined the values recorded for the dimension "concentration disorders" were not included in the analyses. Comparable to the values reported in the test manual provided the verification of the internal consistency of the two other scale's "concern" and "somatic competition trait anxiety" also in the present sample yielded a reliability value of Cronbach's $\alpha$ = .788. The third subscale "concentration disorders" Cronbach's $\alpha$ had a value of .795.

The competition state anxiety inventory or questionnaire (Brand et al., 2009) was used to record competition state anxiety. The athletes were informed that this questionnaire

reflects current experience and current thoughts recorded in relation to the upcoming competition. So, the competition state anxiety inventory measures the level of anxiety towards an upcoming competition and it is completed approximately one hour to fifteen minutes before the start of the competition. This was also not feasible due to the corona pandemic. Therefore, the participants were instructed to imagine that a competition was imminent. The competition state anxiety inventory measures competition anxiety in the dimensions of "somatic anxiety" ("Now, at this moment ... my heart is beating"), "concern" ("... I have concerned that others will be disappointed with my performance"), and "confidence" ("... I am confident that I will be satisfied with my performance"). The dimension "confidence" describes the athlete's perception of being confident and well prepared. The competition state anxiety inventory also comprises 12 items, of which each 4 can be assigned to the named subscales. The test subjects indicate whether they disagree at all (1), agree a little (2), quite agree (3) or totally agree (4) with the statement (i.e., 4-Likert scaling). The overall subscale intensity scores ranged from 12 to 48. For the same reason as described for the competition trait anxiety, the scale "confidence" was not taken into account in the analyses. The check of the internal consistency of the scales of the competition state anxiety inventory indicated good values for both "somatic competition anxiety" and for "concern" (Cronbach's $\alpha = .779$).

**Procedure**

The competition anxiety inventory data was collected over a period of about six weeks. At one-time measurement the athletes completed the questionnaires online by receiving an invitation link from the researchers for recording competition state and trait anxiety. By clicking on the link the participants were carefully instructed how to fill out the questionnaires and then completed the competition trait anxiety inventory and the competition state anxiety inventory one after the other. So both inventories were processed separately but as a single questionnaire. This concept was chosen to ensure that data from both questionnaires were available from one test person because it was an online survey. Filling out the questionnaires took 5-10 minutes per questionnaire for the test subject. Additionally, personal data such as age and gender, and sport-related data such as type of sport, level of performance and training frequency was collected.

**Data Analysis**

To examine the relationship between the competition trait and competition state anxiety and to ascertain the prediction of the trait anxiety out of state anxiety (hypothesis 1) a correlation was computed, and a multiple regression was performed. To examine the influence, interaction and main effects of the personal factors: gender, age and performance level on the intensity of competition anxiety (hypothesis 2) a two-way multivariate analysis of variance (MANOVA) was conducted. In order to carry out the statistical data analyses the statistical requirements were first tested.

**Results**

**Data Pre-screening**

For the correlation, preliminary analyses were performed to ensure that there was no violation of the assumptions of normality, linearity and outliers are present. There was a normal distribution, the relationship between the two variables was linear and no significant outliers were identified. In addition, the variables to be examined were scaled metrically (continuous). The multiple (linear) regression assumptions were also met. According to Aguinis and Harden (2010), the sample size was sufficient ($N > 15$). The residuals were

normally distributed, had a linear relationship, there were no outliers and there was no multicollinearity and singularity. Assumptions of multivariate analyses including missing cases and distributions were tested. No missing cases and univariate or multivariate outliers were identified. In addition, assumptions of normality, linearity, multicollinearity, homogeneity of variance-covariance matrices, and singularity were deemed satisfactory.

**Correlational Analysis and Multiple Regression**

A Pearson correlation analysis was used to examine the relationship between the cognitive and somatic state and trait anxiety. Results indicated a significant positive relationship between cognitive state anxiety and somatic state anxiety ($r$ (53) = .638, $p < .001$), somatic trait anxiety and somatic state anxiety ($r$ (53) = .779, $p < .001$), somatic trait anxiety and cognitive state anxiety ($r$ (53) = .481, $p < .001$), cognitive trait anxiety and cognitive state anxiety ($r$ (53) = .790, $p < .001$), cognitive trait anxiety and somatic state anxiety ($r$ (53) = .710, $p < .001$) and between cognitive trait anxiety and somatic trait anxiety ($r$ (53) = .666, $p < .001$). Thus, a high (Cohen, 1988) linear relationship exist between cognitive state anxiety and somatic state anxiety, somatic trait anxiety and somatic state anxiety, cognitive trait anxiety and cognitive state anxiety, cognitive trait anxiety and somatic state anxiety and cognitive trait anxiety and somatic trait anxiety. There is a mean or moderate (Cohen, 1988) linear relationship between somatic trait anxiety and cognitive state anxiety. The results are summarized in Table 1.

**Table 1: Pearson correlations between cognitive and somatic trait and state anxiety**

| | cognitive trait anxiety | cognitive state anxiety | somatic state anxiety | somatic trait anxiety |
|---|---|---|---|---|
| cognitive trait anxiety | | | | |
| cognitive state anxiety | .790** | | | |
| somatic state anxiety | .710** | .638** | | |
| somatic trait anxiety | .666** | .481** | .779** | |

N = 53, ** $p < .001$

A standard (linear) multiple regression was performed to assess the prediction of the somatic state anxiety out of the trait anxiety. In the regression analysis with the factors cognitive state anxiety, somatic and cognitive trait anxiety the correlation coefficient was R = .837, which means that there is a high correlation and a grade of .681 (adjusted R-square) was achieved. This means that cognitive state anxiety, somatic and cognitive trait anxiety explained 68.1% of the variance in somatic state anxiety. In order to be able to assess the statistical significance of the result, the table of the analysis of variance (ANOVA) was used. This shows that a statistically significant result is available (F = 38.082, $p < .05$). A significant positive effect could be determined for the factors cognitive state anxiety (B = .279, SE = .131, $p < .05$) and somatic trait anxiety (B = .447, SE = .082, $p < .05$). Here, somatic trait anxiety with a higher regression coefficient turned out to be stronger (beta = .571). The non-standardized regression coefficient shows that when somatic trait anxiety is high, somatic state anxiety is also high and when cognitive state anxiety is high, somatic state anxiety is high. The results are summarized in Table 2.

**Table 2: Multiple regression analysis of predictors of somatic state anxiety**

| | B | Std. Error | Beta | Sig. |
|---|---|---|---|---|
| Constant | .468 | .760 | | .541 |
| cognitive state anxiety | .279 | .131 | .273 | .039 |
| somatic trait anxiety | .447 | .082 | .571 | .000 |
| cognitive trait anxiety | .111 | .146 | .114 | .452 |

Another standard (linear) multiple regression was performed to assess the prediction of the cognitive state anxiety out of trait anxiety. In the regression analysis with the factor's somatic trait anxiety, cognitive trait anxiety and somatic state anxiety the correlation coefficient was R = .812, which means that there is a high correlation and a grade of .638 (adjusted R-square) was achieved. This means that somatic trait anxiety, cognitive trait anxiety and somatic state anxiety explained 63.8% of the variance in cognitive state anxiety. In order to be able to assess the statistical significance of the result, the table of the analysis of variance (ANOVA) was used. This shows that a statistically significant result is available ($F = 31.598$, $p < .05$). A significant positive effect could be determined for the factor's cognitive trait anxiety (B = .698, SE = .116, $p < .05$) and somatic state anxiety (B = .303, SE = .142, $p < .05$). Here, cognitive trait anxiety with a higher regression coefficient turned out to be stronger (beta = .737). The non-standardized regression coefficient shows that when cognitive trait anxiety is high, cognitive state anxiety is also high and when somatic state anxiety is high, cognitive state anxiety is high. The results are summarized in Table 3.

**Table 3: Multiple regression analysis of predictors of cognitive state anxiety**

| | B | Std. Error | Beta | Sig. |
|---|---|---|---|---|
| Constant | 1.683 | .757 | | .031 |
| somatic trait anxiety | -.191 | .105 | -.250 | .075 |
| cognitive trait anxiety | .698 | .116 | .737 | .000 |
| somatic state anxiety | .303 | .142 | .310 | .039 |

***Multivariate Analysis of Variance***

A two-way between-groups multivariate analysis of variance was performed to investigate gender, age and performance level differences on competition trait and state anxiety (3 × 2). A total of four dependent variables was used: somatic and cognitive trait anxiety and somatic and cognitive state anxiety (2 trait anxiety × 2 state anxiety). The independent variables were gender, age and performance level (2 gender × age × 4 performance level). The two-way multivariate analysis of variance (multivariate tests) showed that there was no statistically significant interaction effect for gender and age (gender × age) ($F (4, 10) = .270$, $p > 0.05$, Wilks '$\Lambda = .903$), gender and performance level (gender × performance level) ($F (11.5)$, $p > 0.05$, Wilks '$\Lambda = 1.00$), age and performance level (age × performance level) ($F (32, 38.473) = 1.137$, $p > 0.05$, Wilks '$\Lambda = .086$) and gender, age and performance level (gender × age × performance level) ($F (11.5)$, $p > 0.05$, Wilks '$\Lambda = 1.00$) for somatic and cognitive trait and state anxiety. In addition, no significant main effects of gender ($F (4, 10) = .233$, $p > 0.05$, Wilks '$\Lambda = .915$), age ($F (68, 52) = 1.297$, $p > 0.05$, Wilks' $\Lambda = .008$) and

performance level (F (12, 26.749) = 1.335, $p > 0.05$, Wilks' Λ = .289) could be identified. A visual analysis of the mean values of the interaction of gender, age and performance level turned out to be impossible due to the size of the table. But further inspections of the mean values (estimated marginal means) of the interaction effects of gender and performance level (gender × performance level) for somatic and cognitive trait and state anxiety showed that female recreational athletes (M = 10.143, SEM = .690) have about twice as high of an intensity value for somatic anxiety as male recreational athletes (M = 5.000 SEM = .773). Overall, women at this performance level show higher mean values in somatic and cognitive trait and state anxiety (M = 8.500, SEM = .826, M = 12.929, SEM = .876, M = 8.000, SEM = .982, M = 9.929, SEM = .967). This is also evident at the premier level, but here the differences between male and female athletes and the mean values are not as high as at the recreational sports level. This tendency was also evident when the third subscale was taken into account. It should be noted that using the Roy´s Largest Root instead of the Wilks Lambda a significant interaction effect of age and performance level and significant multivariate main effects can be determined (see Table 4). The test of between-subjects effects showed that age and performance level had a significant impact on somatic trait anxiety (F (8, 13) = 3.068, $p < .05$, ηp2 = .654) and that age had a significant impact on somatic state anxiety intensity (F (17, 13) = 9.106, $p < .05$, ηp2 = .768).

**Table 4: Two-way between-groups multivariate analysis of variance**

| Effect | | Value | F | Hypothesis df | Error df | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|---|
| gender * age | Wilks 'Λ | .903 | .270 | 4.000 | 10.000 | .891 | .097 |
| | Roy´s L. Root | .108 | .270 | 4.000 | 10.000 | .891 | .097 |
| gender * performance level | Wilks 'Λ | 1.000 | | .000 | 11.5000 | | |
| | Roy´s L. Root | .000 | .000 | 4.000 | 9.000 | 1.000 | .000 |
| age * performance level | Wilks 'Λ | .086 | 1.137 | 32.000 | 38.473 | .349 | .459 |
| | Roy´s L. Root | 2.102 | 3.416 | 8.000 | 13.000 | .024 | .678 |
| gender * age * performance level | Wilks 'Λ | 1.000 | | .000 | 11.500 | | |
| | Roy´s L. Root | .000 | .000 | 4.000 | 9.000 | 1.000 | .000 |

**Discussion**

The Pearson correlational analysis proves a statistically significant positive relationship between somatic and cognitive trait anxiety and somatic and cognitive state anxiety and between somatic trait anxiety and cognitive state anxiety and between cognitive trait anxiety and somatic state anxiety. As expected, there is a high correlation between the intensity in the somatic trait and state anxiety and in the cognitive state and trait anxiety. The higher correlation between trait and state anxiety is in the cognitive dimension. However, the difference is not great and, contrary to what Schwenkmezger (1985) assumed, there is practically no difference between the dimensions. The standard (linear) multiple regression confirms hypothesis 1. It shows that somatic state anxiety can be predicted from somatic trait anxiety. It was also found that cognitive state anxiety can be predicted from cognitive trait anxiety. In summary, these results support Spielberger's and Schwenkmezger's assumption that trait anxiety influences state anxiety and that state anxiety based on the trait

anxiety can be predicted. Thus, persons with a higher level of trait anxiety experience higher state anxiety. The present study expands the research situation and supports the validity of the assumption in continuation of the work of Ehrlenspiel et al. (2011), whose results are in agreement with this study. However, contrary to the results in this study, the researchers found a higher correlation of somatic trait and state anxiety (r = .62) compared to cognitive trait and state anxiety (r = .59). No statements can be made on the increase in somatic anxiety, the variability, due to the one-time measurement.

Another aim of this study was the examination of the intensity of somatic and cognitive competition anxiety from an interaction perspective. Contrary to expectation (hypothesis 2), findings indicated no significant interactions for between-subjects factors such as gender, age and performance level for intensity of cognitive and somatic trait and state anxiety. Thus, male and female athletes, at low or high performance levels and of different ages, do not differ in cognitive and somatic state and trait anxiety. Surprisingly, no main effects could be detected either. Neither gender, age nor performance level had a significant main effect on the variables cognitive and somatic state and trait anxiety. The results of this study contradict earlier research (e.g. Hagan et al., 2017), which report significant between-subjects gender and performance level interaction effects for anxiety intensity. According to the Hagan et al. (2017), elite (international) female athletes were less cognitively anxious and experienced less frequency of somatic anxiety symptoms than their male counterparts. Possibly, the type of sport (not homogeneous) may have influenced the above results in this study. Because different types of sport make different demands on the athlete. For example, athletes from individual sport types may be exposed to more pressure than players from team sport (Woodman & Hardy, 2003). It therefore seems sensible and necessary to examine the interaction effects of gender, age and performance level within a type of sport. Another plausible explanation for these findings could be a too low and too few contrasting numbers of performance levels and an unfavorable distribution of male and female athletes within the sample. Further research with high and low performance level of athletes and an equal distribution of gender is needed to enhance the understanding of interaction effects on competition anxiety. It is also possible that no interaction and main effects for competition anxiety could be ascertained because this was an online study that collected values of state and trait anxiety simultaneously and with regard to an imaginary (artificial) competition, so no correct values for the state fear could be collected. The study by Bies (2020) also found no age-specific difference in the intensity of competition anxiety and explained this with the experience of the athletes. Therefore, not only gender or performance level, but also the duration of practicing the competitive sport and experience should be considered as it can be assumed that experienced and inexperienced athletes differ at a high level of performance, just like athletes who have competed for a long time and those who have competed less in competitions. However, the results of this study are also similar to the results of the comparable study by Modroño and Guillen (2011). They also included the variable age and found no connection between gender and competition start, but they report that age was related to cognitive anxiety and that cognitive anxiety was higher among younger participants.

Limitations

Due to the small sample size, the results should be interpreted with caution. Future studies should consider using large sample and across different sport to provide generalizable and valid findings. Similarly, the cross-sectional nature of the study design restricts causality and the data generated from self-reporting is also prone to social desirability concerns (e.g., recall bias leading to over-or under-reporting). Despite these limitations, the study has practical implications for coaches who work with athletes in different sports and the consequences of their trait anxiety experiences.

## Conclusion

Cognitive and somatic state anxiety predicted cognitive and somatic trait anxiety. This prediction can be important in sports practice in order to deal appropriately with the athlete anxiety experiences by designing effective coping measures such as the psychological skills interventions, especially against trait anxiety. Therefore, a first determination of the trait anxiety is key. The present results on the interaction of gender, age and performance level for competition anxiety require further investigations in order to gain a better understanding of the effects of these variables.

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