

Can psychological characteristics, football experience, and player status predict state anxiety before important matches in Danish elite-level female football players?

Madsen, Esben Elholm; Hansen, Tina; Thomsen, Sidsel Damsgaard; Panduro, Jeppe; Ermidis, Georgios; Krstrup, Peter; Randers, Morten B; Larsen, Carsten Hvid; Elbe, Anne-Marie; Wikman, Johan

Published in:
Scandinavian Journal of Medicine & Science in Sports

DOI:
10.1111/sms.13881

Publication date:
2022

Document version:
Final published version

Document license:
CC BY

Citation for published version (APA):

Madsen, E. E., Hansen, T., Thomsen, S. D., Panduro, J., Ermidis, G., Krstrup, P., Randers, M. B., Larsen, C. H., Elbe, A.-M., & Wikman, J. (2022). Can psychological characteristics, football experience, and player status predict state anxiety before important matches in Danish elite-level female football players? *Scandinavian Journal of Medicine & Science in Sports*, 32(Suppl. 1), 150-160. <https://doi.org/10.1111/sms.13881>

Go to publication entry in University of Southern Denmark's Research Portal







Terms of use

This work is brought to you by the University of Southern Denmark.
Unless otherwise specified it has been shared according to the terms for self-archiving.
If no other license is stated, these terms apply:

- You may download this work for personal use only.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying this open access version

If you believe that this document breaches copyright please contact us providing details and we will investigate your claim.
Please direct all enquiries to puresupport@bib.sdu.dk

Can psychological characteristics, football experience, and player status predict state anxiety before important matches in Danish elite-level female football players?

Esben Elholm Madsen^{1,2,3}  | Tina Hansen⁴ | Sidsel Damsgaard Thomsen² |
 Jeppe Panduro¹  | Georgios Ermidis¹ | Peter Krstrup¹  | Morten B. Randers¹  |
 Carsten Hvid Larsen¹ | Anne-Marie Elbe³  | Johan Wikman⁵ 

¹Department of Sports Science and Clinical Biomechanics, University of Southern Denmark, Odense, Denmark

²Department of Midwifery, Physiotherapy, Occupational Therapy and Psychomotor Therapy, University College Copenhagen, Copenhagen, Denmark

³Faculty of Sport Science, Institute of Sport Psychology and Physical Education, Leipzig University, Leipzig, Germany

⁴Physical Medicine and Rehabilitation Research – Copenhagen, Department of Physiotherapy & Occupational Therapy, Amager-Hvidovre Hospital, Hvidovre, Denmark

⁵Sports Science Department, Halmstad University, Halmstad, Sweden

Correspondence

Esben Elholm Madsen, University of Southern Denmark, Campusvej 55, 5230 Odense M, Denmark.
 Email: esem@kp.dk

Funding information

Danish FA (DBU)

Elite football can make players feel nervous, and personality characteristics, as well as experience, affect how well pressure is handled before important games. Studying the psychological characteristics of female football players can provide information on how well psychological pressure is handled and generate knowledge on how to support players in order to improve performance. Based on a sample of 128 female elite football players from 8 top-level teams, the present study investigates whether psychological characteristics and football experience/player status in elite female football players can predict state anxiety before important matches. Our results outline that high age and national team experience negatively predicted most of the trait anxiety subscales. In line with previous research, no psychological differences were found between goalkeepers, defenders, midfielders, and strikers while starting players revealed to have significantly lower trait anxiety. When measuring before important matches, we found that somatic state anxiety was negatively associated with senior national team experience and positively associated with worry trait anxiety and fear of failure. Cognitive state anxiety was negatively associated with hope for success and positively associated with somatic and worry trait anxiety. Self-confidence was positively associated with youth national team experience and negatively associated with worry trait anxiety. It can be concluded that psychological characteristics and national team experience are both important for optimal state anxiety before important matches in elite-level women's football. Implications for practice and future research are discussed.

KEYWORDS

coaching, soccer, sport psychology, training, women's football

Physical Medicine and Rehabilitation Research – Copenhagen website (www.pmr.dk).

This is an open access article under the terms of the Creative Commons Attribution License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2020 The Authors. *Scandinavian Journal of Medicine & Science In Sports* published by John Wiley & Sons Ltd

1 | INTRODUCTION

Elite football poses high mental and physical demands on the players. Many players struggle with anxiety, which can have significant detrimental effects on performance.¹ Elite football players' performance improves with increasing level of arousal (ie, anxiety), but many athletes have experienced deficits in performance, even to the point of choking. If anxiety reaches a certain limit, the player will lose control and their performance will start to decrease.² As anxiety is connected to the expected consequences of success and failure, a focus on the achievement motive is considered important in elite football as it might affect future success and performance.³ Hence, the abilities to perform optimally under pressure and to focus on task-relevant information during performance are considered essential for football performance.⁴ Also, other factors such as football players' experience/player status, positional differences, and age seem to affect performance as these factors have shown to influence anxiety levels.⁵⁻⁹ Hence, it should be investigated whether certain psychological characteristics are important for experiencing anxiety connected to performance. Therefore, the aim of this study was to investigate the association between psychological characteristics and football experience/player status in elite female football players, and to investigate which of these variables can predict state anxiety before important matches.

1.1 | Anxiety

There are two forms of anxiety: trait and state. Trait anxiety is regarded as a relatively stable characteristic that prompts an individual to respond to stressful situations in the same manner over time.¹⁰ On the other hand, state anxiety can be defined as an emotional response to a specific situation. It involves feelings of apprehension, fear, tension, and an increase in physiological arousal, and can vary from one situation to the next. As trait anxiety, state anxiety can be divided into two forms, namely somatic and cognitive anxiety.¹¹ Somatic state anxiety is an expression of the physical/physiological state of players, whereas cognitive state anxiety is an expression of the mental state of the player.^{1,10}

When looking into research on anxiety and football, a study found that competitive anxiety and anger trait anxiety were significantly higher for a group of football players than for other population described in the literature.¹² Another study found that high trait anxiety performers responded with significantly greater state anxiety levels than low trait performers.¹³ Looking into elite women's football, a study investigating depression and anxiety in elite German female football teams found that players with more years of playing experience exhibited lower anxiety scores than players with less experience.¹⁴ To summarize, trait-state anxiety

and managing anxiety seem to be important within football, because when there is much at stake, and pressure is high, football player's performance might be negatively affected by high levels of anxiety.

1.2 | Achievement motive

Anxiety is connected to the expected consequences of success and failure. Therefore, achievement motives, the tendency to be motivated by either hope for success or fear of failure, are likely to be connected to anxiety. The achievement motive can be defined by a nonconscious and recurrent preference for affectively rewarding experiences related to improving one's performance.¹⁵ Atkinson's (1957) risk-taking model describes the impact of the situational and the personal components. According to this model, tasks are chosen regarding incentive and probability of success, which are inversely proportionally related to each other.¹⁶ Within football, the achievement motives describe what a player is motivated by in a performance situation, and the literature describes two achievement motives, namely hope for success and fear of failure.¹⁵ If the player is high in hope for success, he/she is motivated by the prospect of achieving success, while if the player is high in fear of failure, he/she is motivated by avoiding failing in the particular performance situation. This affects both a player's ability to handle pressure and to make correct decisions during a performance. According to the risk-taking model, the football players that are primarily motivated by hope for success have the feeling that they can solve the task if they put enough effort into it, and are able to draw conclusions about their football skill level, which will produce effort and development.^{16,17} An individual motivated by fear of failure, on the other hand, may choose achievement goals that are either too easy or too hard,¹⁶ and may be more likely to lose motivation, stagnate in their overall development, and be less satisfied with their sport.¹⁷ According to the risk-taking model, this implies that a football player's goal is to avoid disappointment and being afraid of a negative appraisal of their ability, hence might not solve the task successfully.¹⁶ Research shows that the achievement motive is a relatively stable personality trait, which explains a significant proportion of talented football players' future success and that particularly fear of failure could affect sporting performance.^{3,18} These findings might be a result of a more competitive environment in the later age classes in male football players,¹⁸ and optimal motivational environments/climates might contribute to a positive personality development of talented athletes.¹⁹ As the achievement motive has rarely been studied within women football, one might speculate that hope for success and fear of failure could play a slightly different role in men's and women's elite football and possibly affect anxiety. Stoeber and Becker²⁰ investigated the relationship

between perfectionism, achievement motive, and attribution of success and failure in German female players. The authors found that striving for perfectionism was positively related to hope for success and negatively correlated to fear of failure, whereas negative reactions to imperfection showed a positive correlation to fear of failure. In summary, it seems that high hope for success and low fear of failure seems to be important personality characteristics for successful male footballers; however, the concept needs to be investigated more closely in elite female football.

1.3 | Association of experience/player status, positional differences, and age

Not only the achievement motive but also other factors such as female football players' experience/player status, positional differences, and age seem to be associated with trait and state anxiety. A study with Icelandic elite female football players showed that the national team players had the highest mental toughness scores and lowest trait anxiety scores. However, only the worry and concentration disruption scales showed significant differences between the national team and first division players.⁶ Nonetheless, neither of the mentioned studies investigated whether trait anxiety predicted state anxiety before important matches. When looking into experience and player status in conjunction with matches, a study with Turkish elite female football players found that competition anxiety was negatively correlated with experience and that age was an explanatory factor.⁵ Similarly, a study with female football players in different zones of India found moderate levels of anxiety and a weak negative correlation between pre-competitive anxiety and performance.⁷ When looking into player status and positional differences of being a goalkeeper, defender, midfielder, or striker, a study in youth male Portuguese football found no significant differences in state anxiety and different playing positions.⁹ Regarding player status and being starter vs being a non-starter, a study in female national collegiate football players found that less or no playing time during the game was associated with lower self-confidence among non-starting players. However, the authors did not find cognitive and somatic state anxiety differences between starters and non-starters at pre-game.⁸

To summarize, anxiety levels and achievement motives are important for performance in football.^{1,2,19} Experience, such as having familiarity with the national football team seems to associate with lower trait anxiety scores.⁶ Other factors such as age and player status (starter vs. non-starter) also seem to be associated with lower state anxiety,^{5,8} while playing positional differences (goalkeeper, defender, midfielder, and striker) do not seem to be associated with state anxiety.⁹

However, given the few studies on this topic in women's elite football, the association between psychological characteristics, age, football experience (both senior and youth national team experience), and player status (positional differences and starter vs. non-starters), and how these variables can predict state anxiety before important matches needs to be further investigated in order for us to provide knowledge to coaches and sport psychologist on how to support players in critical moments of the game. Hence, studying the psychological characteristics of female football players is extremely important and can provide insights into the specific nature of women's football. Such knowledge would help coaches and sport psychologist working within top-level female football.

Accordingly, the aim of this study was to investigate the association between psychological characteristics and football experience/player status in elite female football players and to investigate which of these variables can predict state anxiety before important matches. This purpose can be divided into two parts.

The first part describes the association between the players' psychological characteristics, age, playing position, and national team experience (senior and youth). We hypothesized that

- H1.1: Trait anxiety is negatively correlated to sport experience, and age is an explanatory factor⁵ and elite female players make use of psychological skills in accordance with their reached level.⁶ Hence, we expect age and national team experience (both senior and youth) to be associated with psychological characteristics (ie, higher hope for success and lower fear of failure and trait anxiety).
- H1.2: Mouloud (2019) investigated male youth Portuguese football players and found no significant positional differences in state anxiety. We therefore expect playing position to have no association with psychological characteristics in elite female football players (ie, no differences will be found between goalkeepers, defenders, midfielders, and strikers).
- H1.3: As less or no playing time during games has contributed to a decrease of self-confidence among non-starting female players,⁸ we expected the players self-perceived status as a starting player (always, frequently, or seldom) to be associated with trait anxiety (ie, starting players will show lower trait anxiety).

The second part investigates whether the players' psychological characteristics, age, playing position, and national team experience (senior and youth) can predict state measures of anxiety before important matches. The achievement motive and trait anxiety are fairly stable personality characteristics, but can still develop over time in competitive environments.^{10,19} We hypothesized that

- H2.1: Somatic state anxiety is negatively predicted by hope for success, national team experience (both youth and senior), and age, and positively predicted by fear of failure and trait anxiety.
- H.2.2: Cognitive state anxiety is negatively predicted by hope for success, national team experience (both youth and senior), and age, and positively predicted by fear of failure and trait anxiety.
- H2.3: Self-confidence is positively predicted by hope for success, national team experience (both youth and senior), and age, and negatively predicted by fear of failure and trait anxiety.

2 | MATERIALS AND METHODS

2.1 | Participants

The study sample consisted of 180 players playing on 8 teams in the elite-level female league in Denmark. Of the eligible 180 players, 128 players responded to the baseline survey, which is a response rate of 71.1%. The response rate from state measures at the games differed between 35.7% for one team at one game and 100% for another team at another game, with an average of 80.5%. Each player completed the state questionnaire before at least 2 games, with an average of 2.4 games. The playing positions were distributed as follows: goalkeeper ($n = 21$, 11.7%), defender ($n = 59$, 32.8%), midfielder ($n = 56$, 31.1%), and striker ($n = 44$, 24.4%). Thirty (15.6%) of the players had national team experience (23.5%), while 122 players had youth-team national experience (70.4%).

2.2 | Measurements

A combination of Danish- and English-language instruments was used in this study because gatekeepers confirmed that both domestic and foreign players at the clubs exhibited a high command of both the Danish and English language. In many of the clubs, the head coach used a combination of Danish and English to communicate with the players.

The questionnaire battery included questions on age, whether or not they had national team experience (both senior and youth), their self-perceived status as a starting player (always, frequently, or seldom), and playing position (goalkeeper, defender, midfielder, or striker), as well as three questionnaires measuring the psychological variables of interest—these are described below.

The English 30-item Achievement Motive Scale—Sport (AMS-S)¹⁶ was used to measure sport-specific hope for success (HS) (items 1-15) and fear of failure (FF) (items 16-30). The scale has a Likert-scale answering format ranging from 0

(not true for me at all) to 3 (exactly true for me). An example of an item from the hope for success scale is “I like being confronted with a difficult athletic task,” while an example from the fear of failure scale is “I find it unsettling to do something in sport, when I am not sure I can accomplish it.” To calculate the values for the hope for success scale and the fear of failure scale, the scores from the items in each scale are added together, resulting in a range from 0 (very low) to 45 (very high). Norm tables exist for the German version of this scale. The English version of the AMS-S was used in this study. Earlier work has showed good internal consistency (HS = 0.92 for $n = 79$; FF = 0.93 for $n = 65$) and retest reliability (HS = 0.71**; FF = 0.69**) for this version.²¹

The Danish version of the Competitive Trait Anxiety-Questionnaire (CTA-Q) (Elbe & Ørngaard, 2008), based on the Wettkampf-Angst-Inventar-Trait (WAI-T)²² was used to measure somatic anxiety (four items), worry (four items), concentration disturbance (four items), and cognitive anxiety (two items) before a competitive situation. The questions have a Likert-scale answering format ranging from 1 (not at all) to 4 (very much). To calculate the values for the 3 scales, the scores from the items are added together, resulting in a range from 4 to 16. An example from the somatic anxiety scale is “I feel jittery,” while an example of the worry scale is “I have self-doubts.” The cognitive anxiety score is analyzed independently from the above scales and gives information about if anxiety is perceived as performance enhancing or inhibiting.

The English version of the Competitive State Anxiety Inventory-2 (CSAI-2) was used to measure three components of anxiety: cognitive anxiety (9 items), somatic anxiety (9 items), and a related component self-confidence (9 items). The questions have a Likert-scale answering format ranging from 1 (not at all) to 4 (very much so).² An example from the somatic anxiety scale is “I feel nervous,” while an example of the self-confidence scale is “I feel at ease.”

To calculate the values for the three components, all the scores for each item are added together with the exception of item 14, where the score is reversed. The scores for each component will range from 9 to 36, with 9 indicating low anxiety confidence and 36 indicating high anxiety confidence. As some players were measured more than once and as to not skew the weight of sample size in the three different state anxiety scales, the average scores for each variable for each player were initially calculated resulting in three mean state variables for each player (som, cog, and self).

2.3 | Procedure

The Danish FA (DBU) initially approved the study. The coaches and staff members from the teams were informed about the study at a pre-season meeting held at DBU. The

study followed APA ethical standards. After the pre-season meeting information about the study was sent to the players, and written consent was hereafter obtained. After this, the questionnaire battery was sent to the players via link using the Analyzer electronic questionnaire tool one week prior to the season. The questionnaire battery took approximately 15-20 minutes to complete. The players were asked to first answer questions related to biographical information, followed by completion of the AMS-S and CTA. After completing the questionnaire battery, data were sent via Analyzer to a secure university server and transferred to SPSS Statistics 25 (IBM). If the players replied yes to having national team experience the exact number of both senior and youth national team games were initially registered.

Hereafter, the state measures using the CSAI-2 were completed at 15 games involving the eight teams (11 league games, 2 Champions League games, and 2 cup games) during the first half of the 2019/2020 season. The state measures were again administered electronically using Analyzer approximately 1 hour before the games as recommended in other studies.²³ The CSAI-2 took about 3-5 minutes to complete. The measures were collected by university staff members on game sight in close collaboration with the clubs.

2.4 | Data analysis

The data analysis was conducted with SPSS Statistics 25 (IBM) and Microsoft Excel (2016).

2.4.1 | Reliability

Cronbach's alpha was used to test internal consistency reliability of the subscales, in which $\geq .70$ was used as threshold for acceptable reliability.

2.4.2 | First part—the association between the players' psychological characteristics, age, playing position, national team experience (senior and youth), and self-perceived status as a starting player

Means and standard deviations were calculated for each subscale. To test the effect of age on psychological characteristics, a linear regression model was used. To test the relationship between national team experience (both senior and youth) and psychological characteristics, independent-samples *t* tests were used. When testing the distribution between the players' psychological characteristics, playing position (goalkeeper, defender, midfielder, and striker), and

TABLE 1 Descriptive statistics and major study variables

Variable	Items	Cronbach's alpha	n/missing	Mean (SD)
Hope for success	15	.81	102/94	33.56 (5.39)
Fear of failure	15	.90	102/94	17.25 (7.84)
Somatic trait anxiety	4	.74	128/68	7.52 (2.28)
Worry trait anxiety	4	.85	128/68	8.05 (2.70)
Concentration Disturbance trait anxiety	4	.72	128/68	5.56 (2.11)
Somatic state anxiety	9	.76	133/63	19.47 (5.50)
Cognitive state anxiety	9	.90	133/63	17.62 (3.43)
Self-confidence state	9	.89	133/63	23.20 (5.21)

self-perceived status as a starting player (always, frequently, and seldom a starting player), an independent-Kruskal-Wallis test was used to investigate the distribution across these categories.

2.4.3 | Second part—psychological characteristics, age, playing position, and national team experience (senior and youth) predicts state measures of anxiety before matches

To investigate this, three backward elimination regression analyses were used, one for each state measure, in which the variables age, national team experience, youth national team experience, hope for success, fear of failure, somatic trait anxiety, worry trait anxiety, and concentration disturbance trait anxiety were included. The least significant independent variable was then omitted from the next regression analysis, and this step was repeated until only significant variables were left. Given the small sample size, we decided to include variables with *P*-values below .1.

3 | RESULTS

Table 1 shows the mean, standard deviations, and reliability estimates for all study measures. The players' age ranged from 16 to 34 ($M = 21.14$ $SD = 3.61$). Following Sharma,²⁴ Cronbach's alphas for the AMS-S can be classified as good for the subscales HS and FF. For the CTA, Cronbach's alpha can be classified as acceptable for the somatic and concentration disturbance trait anxiety, and good for the worry trait

anxiety. For the state measures, Cronbach's alpha can be classified as acceptable for somatic state anxiety and good for cognitive state anxiety and self-confidence.

The players' mean score for hope for success is higher than fear of failure. For the subscales on trait anxiety, worry trait anxiety showing the highest value while concentration disturbance trait anxiety showing the lowest (Table 1).

3.1 | First part—the association between the players' psychological characteristics, age, playing position, self-perceived status as a starting player, and national team experience (senior and youth)

H1.1. was confirmed as high age was positively associated with psychological characteristics and negatively predicted two subscales of trait anxiety (somatic and worry) ($P = .006$ and $P = .024$), but not concentration disturbance trait anxiety and the achievement motive. Also, national team experience, both senior and youth, revealed to have a positive association with psychological characteristics and negatively predicted all subscales of trait anxiety, but not the achievement motive. The associations were; Somatic trait anxiety; senior national team experience; $P < .01$, youth national team experience; $P < .01$, worry trait anxiety; senior national team experience; $P < .01$, youth national team experience; $P = .001$, and concentration disturbance trait anxiety; senior national team experience; $P = .013$, and youth national team experience; $P = .011$ (Table 2).

H1.2 was confirmed, as we did not find any relationship between playing position (goalkeeper, defender, midfielder, and striker) and psychological characteristics (Table 3).

H1.3 was confirmed, as we found that the self-perceived status as (always, frequently, or seldom) being a starter was statistically related to all subscales of trait anxiety in the way that players who perceived themselves as seldom starters had highest trait anxiety, followed by frequent starters and then always starters with the lowest.

3.2 | Second part—psychological characteristics, age, and national team experience (senior and youth) predicts state anxiety before matches

H2.1 was partly confirmed as we found that somatic state anxiety was negatively predicted by senior national team experience ($P = .060$) and positively predicted by fear of failure ($P = .007$) and worry trait anxiety ($P \leq .001$). However, we did not find any statistically significant prediction on somatic state anxiety from age, youth national team experience, hope for success, somatic trait anxiety, and concentration disturbance trait anxiety (Table 4).

H2.2 was partly confirmed as we found that cognitive state anxiety was negatively predicted by hope for success ($P = .067$) and positively predicted by somatic trait anxiety ($P = .035$) and worry trait anxiety ($P = .063$). However, we did not find any prediction of cognitive state anxiety by age, fear of failure, and concentration disturbance trait anxiety.

H2.3 was partly confirmed as we found that self-confidence was positively predicted by youth national team experience ($P = .009$) and negatively predicted by worry trait anxiety ($P \leq .001$). However, we did not find any prediction of self-confidence by age, senior national team experience, achievement motive, somatic trait anxiety, and concentration disturbance trait anxiety.

4 | DISCUSSION

The aim of this study was to investigate the association between psychological characteristics and football experience/ player status in elite female football players and to investigate which of these variables could predict state anxiety before important matches. We chose to divide the study into two parts. First, we investigated the association between the players' psychological characteristics, age, playing position, self-perceived status as starting player, and national team experience (youth and senior). Secondly, we investigated how

TABLE 2 The elite female players' psychological traits according to age, and senior and youth national team experience

	Hope for success	Fear of failure	Somatic trait anxiety	Worry trait anxiety	Concentration disturbance trait anxiety
Age B (SE)	n.s.	n.s.	-0.15 (0.06)**	-0.15 (0.07)*	n.s.
National team experience Mean diff. (SE)	n.s.	n.s.	-1.93 (0.50)**	-2.23 (0.46)**	-1.24 (0.27)**
Youth national team experience Mean diff. (SD)	n.s.	n.s.	-1.59 (0.43)**	-1.76 (0.52)**	-1.01 (0.42)*

Abbreviation: n.s., non-significant.

**Significant at the .01 level.

*Significant at the .05 level.

TABLE 3 Comparison of psychological characteristics and self-perceived status as a starting player

	Always	Frequently	Seldom
Hope for success	n.s.	n.s.	n.s.
Fear of failure	n.s.	n.s.	n.s.
Somatic trait anxiety**	51.82 (56)	55.27 (30)	82.86 (37)
Worry trait anxiety*	52.37 (56)	62.95 (30)	75.81 (37)
Concentration disturbance anxiety*	52.54 (56)	62.67 (30)	75.78 (37)

Note: Results are presented as mean rank (n).

**Significant at the .01 level.

*Significant at the .05 level.

the players' psychological characteristics, age, and national team experience (youth and senior) predicted state anxiety before important matches.

4.1 | First part—the association between players' psychological characteristics, age, playing position, self-perceived status as a starting player, and national team experience (senior and youth)

To summarize the descriptive statistics, the elite female player's scores in hope for success are higher than fear of failure which is in line with earlier mentioned study by Stoeber and Becker²⁰ suggesting that elite-level female players usually perceive athletic situations as a positive challenge and do not worry much about possible failure. The results concerning trait anxiety show highest levels in worry and lowest levels in concentration disturbance. These results are similar to those of both Icelandic female football players and handball players.^{6,25}

H1.1. was partly confirmed as high age and national team experience (both senior and youth) associated with psychological characteristics and negatively predicted two subscales of trait anxiety, but not the achievement motive. Our findings concerning trait anxiety are somehow different from a study in male and female elite handball players which concluded that age (however measured in group categories from U15 forward to A team) did not seem to associate with trait anxiety.²⁵ Turning back to elite football and bearing in mind that age and experience are two different things, our findings can also be considered in line with Junge and Prinz (2019) who computed match experience based on the number and level of matches played. They found that female players with more match experience exhibited lower anxiety scores than players with less experience. In conjunction with our results, these findings could indicate that when elite female players are being exposed to high-pressure games such as national team football trait anxiety will decrease. Therefore, one could speculate that experience might be considered somewhat in line with Kristjánsdóttir et al (2019) who found Icelandic national team players to have significantly lower levels of worry and concentration disruption trait anxiety, but not somatic trait anxiety, when being compared with first and second division players. However, as male youth football players have the possibility to get selected for an academy at a very young age, most female players on the contrary are most frequently part of grassroots teams until approximately 16 years of age.²⁶ This need to be considered when interpreting our results since more female players with high anxiety are able to reach elite-level football simply because there are fewer registered female football players and fewer semi-professional and professional players than in men's football.²⁷

Moving on to the achievement motive, we found high hope for success and low fear of failure, but neither high age

	Somatic state anxiety	Cognitive state anxiety	Self-confidence
Age	0.03 (0.17)	0.05 (0.09)	0.12 (0.11)
Senior national team experience	-2.27 (1.18)	0.02 (1.04)	0.76 (1.42)
Youth national team experience	-1.24 (1.27)	-0.94 (0.84)	2.60 (1.00)**
Hope for success	0.13 (0.11)	-0.12 (0.06)	0.02 (0.11)
Fear of failure	0.19 (0.07)*	-0.01 (0.05)	-0.10 (0.62)
Somatic trait anxiety	-0.10 (0.30)	0.41 (0.19)*	0.11 (0.28)
Worry trait anxiety	0.99 (0.20)**	0.27 (0.14)	-0.84 (0.15)**
Concentration disturbance trait anxiety	0.17 (0.35)	0.19 (0.23)	-0.24 (0.31)

Note: Results are presented as β (SE).

**Significant at the .01 level.

*Significant at the .05 level.

TABLE 4 The elite female football player's state anxiety and the relationship with age, senior and youth national team experience, and psychological characteristics

nor senior and youth national team experience seemed to be associated with the achievement motive. As the achievement motive has been found to explain a significant proportion of talented football male football players' future success,¹⁸ our results might indicate that high hope for success and low fear of failure could also be considered a natural psychological prerequisite for elite female players at this level. According to Atkinson's (1957) risk-taking model being a part of a homogeneous group of elite-level female football players in a top-level team, the ongoing situational impact and personal components might be mediated by the time invested and through successful experiences in a competitive environment (ie, winning games, being selected for and playing senior and/or youth national team football). This might explain our results as the achievement motive is considered a fairly stable personality disposition, in which changes can occur through experience, personal growth, and interventions.²⁸

H1.2. was confirmed, as we did not find any association between playing position (ie, goalkeeper, defender, midfielder, and striker) and the elite female players' psychological characteristics. These findings are similar to the findings by Mouloud (2019) who found no significant positional differences with regard to state anxiety in male youth Portuguese football players, and also Jooste et al,²⁹ who found no differences between psychological skills scores of talented male African football players in different positions. Hence, it seems that playing position in elite-level female football is not associated with the psychological characteristics investigated in this study.

H1.3 was confirmed as we found trait anxiety to be associated with the players' self-perceived status as a starter in a way that players who perceived themselves as seldom starters showed the highest trait anxiety. This somewhat confirms the aforementioned study by Haneishi et al (2007), who found that lack of playing time affected the degree of self-confidence in female national collegiate players. Our findings are also somewhat in line with Kristjánsdóttir et al's study (2018) which successfully predicted between 65.2% and 100% of the elite female handball players into starters or non-starters based on their psychological skills and strategies, mental toughness, and anxiety levels. Hence, our results might indicate that players with national team experience and with a self-perceived status as being closer to the starting eleven seem to have a more robust self-confidence.

4.2 | Second part—psychological characteristics, age, and national team experience (senior and youth) predicted state measures of anxiety before matches

Moving on to the second part of our study, H2.1 was partly confirmed, as we found somatic state anxiety to be

negatively predicted by senior national team experience, and positively predicted by fear of failure and worry trait anxiety. However, we did not find any statistically significant prediction of somatic state anxiety by age, youth national team experience, hope for success, somatic trait anxiety, and concentration disturbance trait anxiety. Having senior national team experience might imply having the experience to be less affected and therefore have a lower somatic state anxiety before important matches. According to Bandura,³⁰ experiences of mastery have proven to be the most influential, as they convey to the subject the evidence of his or her ability to fulfill a task. Repeated success like being selected for national team football increases and builds a robust belief in personal efficacy, while repeated failures diminish the individual's expectations of efficacy, which might decrease somatic state anxiety. Our ambiguous findings regarding the negative prediction from somatic trait anxiety on somatic state anxiety are surprising and somewhat contradict the theoretical competitive anxiety trait-state relationship, as low trait concentration disruption performers perceive state responses as more facilitating than their high trait counterparts.¹³ The relationship between trait and state anxiety is not always straightforward as state anxiety is also influenced by the situation.³¹ However, our cross-sectional design combined with our relatively small sample size might also be an explanation for this. However, our findings contribute nevertheless to the limited number of studies in elite female football, underlining that worry trait anxiety has a positive significant prediction on somatic state anxiety.

H.2.2: was partly confirmed as we found cognitive state anxiety to be negatively predicted by hope for success, and positively predicted by somatic trait anxiety and worry trait anxiety. However, we did not find any prediction on cognitive state anxiety from age, national team experience (both senior and youth), fear of failure, and concentration disturbance trait anxiety. As elite football players are found to have higher task orientation than non-elite players,³² it is not surprising that we found hope for success negatively associated with cognitive state anxiety, but at the same time surprising that fear of failure was not. As athletes with high levels of trait anxiety normally respond with high levels of state anxiety, it was expected to find cognitive state anxiety to be significantly positively associated with somatic trait anxiety and worry trait anxiety. Despite not finding any statistically significant association for disturbance concentration trait anxiety, the positive direction between trait and state anxiety somewhat supports the theoretical trait-state relationship.¹³ These findings might to some extent be explained by a potential situational influence derived at games in elite female football and is somewhat supported in a study examining the influence on playing venue on psychobiological responses in youth male football players,

suggesting that higher levels of stress were experienced by home players in their home matches.³³

H2.3 was also partly confirmed as we found self-confidence to be significantly positively predicted by youth national team experience and negatively predicted by worry trait anxiety. However, we did not find any prediction of self-confidence by age, senior national team experience, achievement motive, somatic trait anxiety, and concentration disturbance trait anxiety. Altogether, it is surprising to find a positive association between self-confidence and somatic trait anxiety, as it somewhat contradicts the aforementioned theoretical trait-state relationship.¹³ An additional explanation for this could be that self-confidence within football is found to be more fluctuating but relevant for performance.³⁴ In other studies, self-confidence was found to be linked to mental toughness,³⁵ and within other team, sports such as beach handball self-confidence and self-efficacy were positively related.³⁶ Therefore, it is interesting to find that only youth national team experience positively predicts self-confidence, and surprising that senior national team experience did not. This finding could potentially be related to the relatively limited number of players with senior national team experience playing in the league at the time of the study ($n = 27$). Nevertheless, these findings point to the fact that having youth national team experience impacts self-confidence when playing top-level female club football. This is to some extent supported in both male and female football studies, as players playing in higher leagues showed more confidence than players playing in lower leagues.^{37,38}

4.3 | Methodological issues

Even though interesting results emerged from our study, the following limitations must be considered when making inferences.

1. We experienced having very different response rates for the state measures before the games. Especially when conducting state measures before a game in the women's Champions, we were not able to distribute the state measure at the venue. This game resulted in a response rate of 50.0%, which might have influenced our results. Another league game also resulted in a low response rate of 35.7%, which might also have influenced our results. However, the average overall response rate for all state measures was 80.5%, which is satisfying given the somehow stressful context of elite women football.
2. A sample size is considered an important ingredient of quality research as it determines statistical power of a test.³⁹ Therefore, we acknowledge that our sample of 128 players is limited when looking at general recommendations.³⁹ This implies that our results need to be interpreted

with a cross-sectional design and a small sample size in mind. However, when investigating Danish elite-level female football, our study sample included all teams, in which all players were pre-selected by the clubs and coaches. When interpreting our results, it should therefore not be forgotten that a small but highly homogeneous sample might produce scores that are somewhat different from larger but less homogeneous groups.

3. Regarding the psychological characteristics, we acknowledge the self-attributed measures of assessing psychological characteristics (as oppose to implicit) can have the tendency to portray the respondents in a positive light and can lead to different outcomes. This is a substantial limitation of our study because implicit, unconscious motives are better than self-reported motives at predicting long term behavior, such as participating in a challenging and competitive sport as elite football.

4.4 | Future research

The study design did not allow the direction of the relationship to be established; therefore, future research should investigate trait-state anxiety to establish causality in elite female football. In addition, and to some extent, our study demonstrated nomological validity of the scales for achievement motive and trait-state anxiety.

Finally, one area for future research is to investigate the specific influence from trait anxiety on performance in female elite football, and how state pressure is handled in youth and senior national team football level. Hence, future research could adopt a more mixed-method design and investigate the interplay between psychological characteristics and national team experience in conjunction with matches to fully understand elite female players' experience and to draw causal inferences on how pressure is handled.

4.5 | Applied perspectives

Based on our findings, we identified factors in elite female football, that might affect performance, and could have implications for coaches and sport psychologists. This is especially true for trait anxiety and national team experience which seem to impact state anxiety before games. It is recommended that coaches and sports psychologists be observant in targeting players with high state anxiety and support them in critical moments. Thus, it is recommended that coaches and sports psychologists help each other to address such issues to help players address potential anxiety issues to handle game-related pressure. Another recommendation is to help players to develop coping skills. This implies, to decrease the level of trait anxiety by increasing self-efficacy through

positive, reinforcing feedback and creating an atmosphere of trust an openness about game-related pressure. Lastly, to improve diagnosis and given the relevance that psychological characteristics appear to have for football players, it seems indispensable to target sport psychological resources into monitoring these characteristics. As anxiety levels can be influenced by the coaching style, and in order to ensure a diagnostic sound assessment, it is crucial to include coaches' external rating of players in this process in addition to standardized self-reported questionnaires.⁴⁰

ACKNOWLEDGEMENTS

We would like to thank the elite female players and the clubs in the Danish league for their cooperation and participation. We would also like to thank the Danish FA (DBU), especially Søren Bennike, Kenneth Grønlund Rasmussen, Peter Møller, and Women's National team coach Lars Søndergaard, and the Danish women's premier league (Gjensidige Ligaen) for implementation of and collaboration related to the study. Finally, we would like to thank the Danish FA (DBU) for funding this study. Open access funding enabled and organized by Projekt DEAL.

ORCID

Esben Elholm Madsen  <https://orcid.org/0000-0001-7601-5645>

Jeppe Panduro  <https://orcid.org/0000-0002-8887-8875>

Peter Krustrup  <https://orcid.org/0000-0002-1461-9838>

Morten B. Randers  <https://orcid.org/0000-0002-0192-8981>

Anne-Marie Elbe  <https://orcid.org/0000-0002-8392-2451>

Johan Wikman  <https://orcid.org/0000-0002-5177-8002>

REFERENCES

1. Slimani M, Nikolaidis PT. Anthropometric and physiological characteristics of male soccer players according to their competitive level, playing position and age group: a systematic review. *J Sport Med Phys Fit.* 2019;59(1):141. <https://doi.org/10.23736/S0022-4707.17.07950-6>
2. Martens R, Vealey R, Burton D, eds. Competitive anxiety in sports. Champaign, IL.: Human Kinetics; 1990. Sports achievement motivation and sports competition anxiety: a relationship study. *J Educ Prac.* 2011;2(4):1-5.
3. Höner O, Feichtinger P. Psychological talent predictors in early adolescence and their empirical relationship with current and future performance in soccer. *Psychol Sport Exerc.* 2016;2016(25):17-26. <https://doi.org/10.1016/j.psychsport.2016.03.004>
4. Coetzee B, Grobbelaar W, Gird CC. Sport psychologist skills that distinguish successful from less successful soccer teams. *Hum Movement Sci.* 2006;51:383-401.
5. Bozkus T, Turkmen M, Kul M. The effects of age, sports experience, and physical self perception on competition anxiety levels of female football players. *Int J Acad.* 2013;5(4):509-513. <https://doi.org/10.7813/2075-4124.2013/5-4/B.72>
6. Kristjánsdóttir H, Johannsdóttir KR, Pic M, Saavedra JM. Psychological characteristics in women football players: skills, mental toughness, and anxiety. *Scand J Psychol.* 2019;60:609-615. <https://doi.org/10.1111/sjop.12571>
7. Singh V, Punia S. Impact of pre-competition anxiety on performance of university level female football players in different zone of India. *Int J Physiol Nutr Phys Educ.* 2018;3(1):1498-1500.
8. Haneishi K, Fry AC, Moore CA, Schilling BK, Li Y, Fry M. Cortisol and stress responses during a game and practice in female collegiate soccer players. *J Strength Cond Res.* 2007;21(2):583-588.
9. Mouloud K. Level of state anxiety among youth football players according different playing positions. *Sport Mont.* 2019;17(1):33-37. <https://doi.org/10.26773/smj.190206>
10. Singh V, Prakash S, Punia S, Kulandaivelan S. Relationship between pre-competition anxiety and performance levels in inter-university women football teams. *J Phys Educ.* 2017;4(5):135-138.
11. Cox RH. *Sport Psychology: Concepts and Applications.* New York, NY: McGraw Hill; 2002.
12. Junge A, Dvorak J, Rösch D, Graf-Baumann T, Chomiak J, Peterson L. Psychological and sport-specific characteristics of football players. *Am J Sports Med.* 2000;28(5):22-28. https://doi.org/10.1177/28.suppl_5.s-22
13. Hanton S, Mellalieu SD, Hall R. Re-examining the competitive anxiety trait-state relationship. *Pers Individ Differ.* 2002;33(7):1125-1136. [https://doi.org/10.1016/S0191-8869\(02\)00003-X](https://doi.org/10.1016/S0191-8869(02)00003-X)
14. Junge A, Prinz B. Depression and anxiety symptoms in 17 teams of female football players including 10 German first league teams. *Br J Sports Med.* 2019;53(8):471-477.
15. Atkinson JW. Motivational determinants of risk-taking behavior. *Psychol Rev.* 1957;64(6):359-372.
16. Elbe AM, Wenhold F. *Manual for the Achievement Motives Scale – Sport.* Potsdam, Germany: Humanwissenschaftliche Fakultät Institut für Sportwissenschaft Arbeitsbereich Sportpsychologie; 2005.
17. Elliot AJ, Harackiewicz JM. Approach and avoidance achievement goals and intrinsic motivation: a mediational analysis. *J Pers Soc Psychol.* 1996;70(3):461-475. <https://doi.org/10.1037/0022-3514.70.3.461>
18. Feichtinger P, Höner O. Talented football players' development of achievement motives, volitional components, and self-referential cognitions: a longitudinal study. *Eur J Sport Sci.* 2015;15(8):748-756. <https://doi.org/10.1080/17461391.2015.1051134>
19. Elbe AM, Wikman J. Psychological factors in developing high performance athletes. In: Baker J, ed. *Handbook of Talent Identification and Development in Sport.* London: Routledge; 2017:169-180.
20. Stoeber J, Becker C. Perfectionism, achievement motives, and attribution of success and failure in female soccer players. *Int J Psychol.* 2008;43(6):980-987. <https://doi.org/10.1080/00207590701403850>
21. Elbe AM, Wenhold F. Cross-cultural test-control criteria for the achievement motives scale-sport. *Int J Sport Exerc Psychol.* 2005;3(2):163-177. <https://doi.org/10.1080/1612197X.2005.9671765>
22. Brand R, Graf K, Ehrlenspiel F. Das Wettkampfangst-Inventar-trait (WAI-T) zur Messung von Wettkampfangstlichkeit von Sportlerinnen und Sportlern. <http://www.sport.uni-stuttgart.de/wettkampfangst>. Accessed August 21, 2020.
23. Jones G, Hanton S. Pre-competitive feeling states and directional anxiety interpretations. *J Sports Sci.* 2001;19(6):385-395. <https://doi.org/10.1080/026404101300149348>
24. Sharma B. Focus on reliability in developmental research through Cronbach's alpha among medical, dental and paramedical

- professionals. *Asian Pac J Health Sci.* 2016;3(4):271-278. <https://doi.org/10.21276/apjhs.2016.3.4.43>
25. Kristjánisdóttir H, Erlingsdóttir AV, Sveinsson G, Saavedra JM. Psychological skills, mental toughness and anxiety in elite handball players. *Pers Individ Differ.* 2018;134:125-130. <https://doi.org/10.1016/j.paid.2018.06.011>
26. Jonker L, Huijgen BC, Heuvingh B, Elferink-Gemser MT, Visscher C. How youth football players learn to succeed. In: Konter E, ed. *Football Psychology: From Theory to Practice.* New York, NY: Routledge; 2019:297-312.
27. UEFA. Women's football across the national associations 2016/17. https://www.uefa.com/MultimediaFiles/Download/OfficialDocument/uefaorg/Women%27sfootball/02/43/13/56/2431356_DOWNLOAD.pdf. Accessed October 10, 2020
28. Wikman JM, Stelzer R, Melzer M, Hauge MLT, Elbe AM. Effects of goal setting on fear of failure in young elite athletes. *Int J Sport Exerc Psychol.* 2014;12(3):185-205. <https://doi.org/10.1080/1612197X.2014.881070>
29. Jooste J, Steyn B, Van Den Berg L. Psychological skills, playing positions and performance of African youth soccer teams. *S Afr J Res Sport Ph.* 2014;36(1):85-100.
30. Bandura A. The explanatory and predictive scope of self-efficacy theory. *J Soc Clin Psychol.* 1986;4:359-373. <https://doi.org/10.1521/jscp.1986.4.3.359>
31. Mouloud K, El-Kadder BA. Self-efficacy, achievement motivation and anxiety of elite athletes. *J Sport Phys Educ.* 2016;3(4):45-48. <https://doi.org/10.9790/6737-03044548>
32. Kavassanu M, White S, Jowett S, England S. Elite and non-elite male footballers differ in goal orientation and perceptions of parental climate. *J Sport Exerc Psychol.* 2011;9(3):284-290. <https://doi.org/10.1080/1612197X.2011.614854>
33. Fothergill M, Wolfson S, Neave N. Testosterone and cortisol responses in male soccer players: the effect of home and away venues. *Physiol Behav.* 2017;177:215-220. <https://doi.org/10.1016/j.physbeh.2017.04.021>
34. Reilly T, Williams AM, Franks A. A multidisciplinary approach to talent identification in soccer. *J Sports Sci.* 2000;18(9):695-702. <https://doi.org/10.1080/02640410050120078>
35. Diment GM. Mental toughness in soccer: a behavioral analysis. *J Sport Behav.* 2014;37(4):317-331.
36. Reigal RE, Vázquez-Diz JA, Morillo-Baro JP, Hernández-Mendo A, Morales-Sánchez V. Psychological profile, competitive anxiety, moods and self-efficacy in beach handball players. *Int J Environ Res Public Health.* 2019;17(241):1-13. <https://doi.org/10.3390/ijerph17010241>
37. Bozkurt O, Koruc Z, Arslan N, Kocaeksi S. A comparison of football players' sport confidence and self-efficacy beliefs according to their league level in Turkey. *J Phys Educ Sci.* 2012;3(6):349-356.
38. Danielsen L, Rodahl S, Giske R, Høigaard R. Mental toughness in elite and sub-elite female soccer player. *Int J Appl Sports Sci.* 2017;29(1):77-85. <https://doi.org/10.24985/ijass.2017.29.1.77>
39. Schweizer G, Furley P. Reproducible research in sport and exercise psychology: the role of sample sizes. *Psychol Sport Exerc.* 2016;23:114-122. <https://doi.org/10.1016/j.psychsport.2015.11.005>
40. Musculus L, Lobinger BH. Psychological characteristics in talented soccer players – recommendations on how to improve coaches' assessment. *Front Psychol.* 2018;9:1-6. <https://doi.org/10.3389/fpsyg.2018.00041>