

REVIEW

Psychological factors and performance in women's football: A systematic review

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The amount of research conducted on female football players, compared to male players, is sparse. Even though research on female football players has increased the past decade, there is still a lack of studies of how psychological factors affect their performance. The objective of the current systematic review was therefore to summarize existing quantitative research into the relationship between psychological factors and performance in women's football. Literature was sourced from MEDLINE/PubMed, Embase, and PsychInfo. Two independent reviewers applied the selection criteria and assessed the quality of the studies. A total of 14 studies met the inclusion criteria. The total number of participants was 1449, and 15 psychological factors were examined in relation to football performance. The results revealed a tendency for higher leveled players to score higher on psychological factors like mental toughness, conscientiousness, and executive functions. They also had lower levels of anxiety. Enjoyment and a perceived mastery climate were related to increased levels of performance and perceived competence. Mood was unrelated to performance. Limitations and implications for future research are discussed.

KEYWORDS

female, football, performance, personality, soccer, sport psychology

1 | INTRODUCTION

Soccer (football) is one of the most widespread sports in the world, played globally by amateurs and professionals, in addition to being the most viewed sport on television.¹ Football is still a male-dominant sport, but there has been a good development in female football over the last 10 years, especially regarding match-day attendance and TV audience.² However, there is still little research conducted on female football players compared to male. In a recent article, Kirkendall³ examined the history of research in football and found that only 25% of academic papers included female participants. Kirkendall also showed

that the discrepancy between the number of male and female participants in peer-reviewed articles has increased over the past 10 years.

1.1 | Psychological factors

Even though it is widely accepted that mental strength is highly important to succeed as an athlete, the main body of football literature focus on analytical and technical,^{4,5} physiological,^{6–8} and injury-related parameters.^{9,10} However, a recent scoping review solely examining research on women's football concluded that the most

prominent themes were sports medicine, strength and conditioning, and sociology.¹¹ The relationship between psychological factors and match performance has received less attention.

Sigmundsson et al.¹² examined the merit of grit, defined as passion and perseverance for long-term goals, in Norwegian football players ranging from a young talent group to elite players. They found that the elite players had significantly higher grit scores than the young talents, which is in line with previous research conducted by Duckworth and Quinn,¹³ showing that grit correlates with age and performance. They also compared the scores of the football players with an Icelandic student population whereof football players had significantly higher grit scores than the students.¹⁴ Similar results have been reported for mental toughness in other sports domains. Mental toughness is thought to be one of the most important psychological attributes contributing to the success of athletes. In a recent systematic review, Cowden¹⁵ found that in 88% of the included studies, athletes (from various sport types) who obtained higher scores on mental toughness scales, tended to perform better or compete at higher levels. The same trend has also been shown with age and mental toughness, where older athletes have higher scores than their younger peers,¹⁶ suggesting that mental toughness is developed over time and is related to performance.

Personality and sports performance have long been a research interest for sports psychologists.¹⁷ Allen et al.¹⁸ looked at the differences in personality types between 253 athletes from 34 different sports, competing at international and national level or university and club level. Their results showed that high-level athletes had lower levels of neuroticism and higher levels of conscientiousness and agreeableness than lower-level athletes, although effect sizes between groups were small.¹⁸ Nonetheless, female participants only accounted for 26%, and the sample of athletes was a mix of team and individual sports, thus the results may not be generalizable to female football players. The results from other studies have showed partly inconsistent findings. For example, Egloff and Gruhn¹⁹ found that athletes who engaged in training with higher intensity had higher scores in extroversion, while Mirzaei et al.¹⁷ found that the sole personality predictor of performance was conscientiousness in a study investigating the relation between personality and sport-related performance.

An athletes' motivation is crucial for his or her continuity and performance and motivation is often linked to the athletes' surrounding motivational climate. In an article by Fransen et al.,²⁰ the researchers examined the role of motivational feedback from coaches and athlete leaders within basketball teams. Somewhat surprising, the results

showed that motivational feedback from the coach was equal to the athlete leader (players rated as good leaders by the other teammates in advance) feedback, and both feedback styles increased competence satisfaction, intrinsic motivation, and objective performance. However, the study had a limited number of participants and they used a research confederate to act as the team coach, instead of the team's real coach, thus the results should be interpreted with caution. Pensgaard and Roberts²¹ found that in a sample of 69 winter Olympic athletes the type of perceived motivational climate had an impact on what was perceived as stressors. Athletes who perceived a performance climate experienced external sources of distress, especially the coach and the rest of the team, whereas a perceived mastery climate was a negative predictor of perceiving the coach and team as a stressor. This is an important finding and implication for the success of athletes and teams, as high levels of stress are an inevitable part of being a high-performing athlete. Not only does the athletes have to endure the stress of competitions, they often feel a pressure of always having to perform well, balancing their personal life, the sport, and high-performance expectations.²² High levels of stress have also been linked to burnout and dropout in sports,^{23,24} making it even more important to facilitate a mastery motivational climate to reduce experienced stress related to the team environment.

1.2 | Football performance

Football players' performance can be challenging to measure and therefore varies greatly in the type of measurement or indicator used in scientific studies. In physiology research, it is often the players' physical performance during a football match that is measured, like high-intensity runs, sprints, maximum speed, and distance covered in a match.²⁵ When looking at technical performance, researchers often examine successful passes, number of passes individually and as a team, shots, clearances, ball possession, tackles, etc.²⁶ In sport psychology articles, performance is often classified into subjective and objective performance.²⁷ While a subjective performance measure is the player's own rating of achievement (often in a game), objective performance can be measured by performance levels, goals and assists, game outcomes (win, lose, tie) or by using performance analysis tools such as InStat, Stats Perform or ProZone Sports Ltd®. The downside of using game outcomes and player levels' when examining performance is that it relies not only on individual performance, but also to some extent on the rest of the team members, if the game is played on home ground, and the opposing team.

1.3 | The current review

With the relatively small amount of research performed on female football players, alongside with inconsistent results from studies comparing psychological factors in male and female athletes and the large variation in measurement of performance, we argue the need for synthesizing the literature regarding psychological factors and performance specific to female football athletes. This is to provide an overview of existing literature and to provide directions for future research, which in turn may help further professionalization of female football. To the authors' knowledge, there has not been published any similar review on the subject. Based on a run-through of previous research, we expect to find a small amount of studies, with variables explaining a small to medium effect on football performance. The research question for the systematic review is therefore "what psychological factors/ personality traits are associated with performance in female football players?"

2 | METHODS

2.1 | Literature search

A systematic review of available literature was conducted according to the recommendations listed in the Preferred Reporting Items for Systematic Reviews and Meta-analysis Statement—PRISMA.²⁸ The literature search was conducted by the first author in July 2020 with the databases Medline/PubMed, Embase, and PsychInfo. A broad search strategy was chosen, with "women/ladies/girls" and "soccer/football" as the only search terms. The search strategy was developed in collaboration with an experienced librarian at UiT—The Arctic University of Norway. The full search strategy is available in the supplements.

2.2 | Inclusion and exclusion criteria

Inclusion criteria were as follows. Studies had to be: (a) related to performance and psychological factors (eg, mental toughness, grit, hardiness, and personality traits) in football, (b) contain female football samples with an age above 15 years old, (c) written in English or Norwegian, (d) doctoral dissertations or articles published in peer-reviewed journals, and (e) quantitative studies. Because we were aware of the limited amount of studies conducted in the field, we also included studies with a wider definition of performance outcomes, such as turnover intention, motivation, engagement, and well-being. Furthermore, we chose to include doctoral dissertations and studies with

players above 15 years old, because of the limited amount of studies available. Studies were excluded if they had an exclusive male population or if they did not include performance data on female athletes. If the articles contained mixed-gender samples, only female participants and their results were included in the analysis.

The electronic search identified 5979 potentially relevant references in the described databases. References were imported to a web-based software platform for the production of systematic reviews (Covidence Systematic Review Software, Veritas Health Innovation, Melbourne, Australia). A total of 1341 duplicates were eliminated automatically, and the remaining 4640 articles were screened for relevance based on the title and abstract. Overall, 4557 articles were removed due to lack of relevance (did not fulfill the inclusion criteria), one of them was removed because we were not able to retrieve the full text. A total of 83 articles were screened in full text by two of the authors, including two additional studies identified from the references of the included articles. Finally, 14 articles were deemed relevant for the systematic review (Figure 1). Due to a large heterogeneity in both study design and the data reported on performance and psychological factors, a meta-analysis could not be performed.

2.3 | Quality assessment of included studies

An adapted quality assessment tool, as seen in Fosse et al.,²⁹ was used to address the quality and reporting of the included articles. It consisted of selected items from the "JBI Critical Appraisal Checklist for Studies Reporting Prevalence Data"³⁰ and aspects from the validity system outlined by Shadish et al.,³¹ addressing sampling and representativeness, statistical analyses, the quality of measures (reliability and validity), and research design. The rating scale was adopted from the GRADE system,³² where 0 = not reported, 1 = poor, 2 = satisfactory, 3 = good, and 4 = excellent. A total of 40 points were achievable indicating the best possible rating, with ten items assessed in each article. The first author conducted the appraisal of all the 14 articles and the second and third author appraised seven articles each, before a comparison was made. Disagreements were solved by discussion and consensus.

3 | RESULTS

3.1 | Descriptive findings

An overview of the included studies and main findings are presented in Table 1. The total sample included 1449

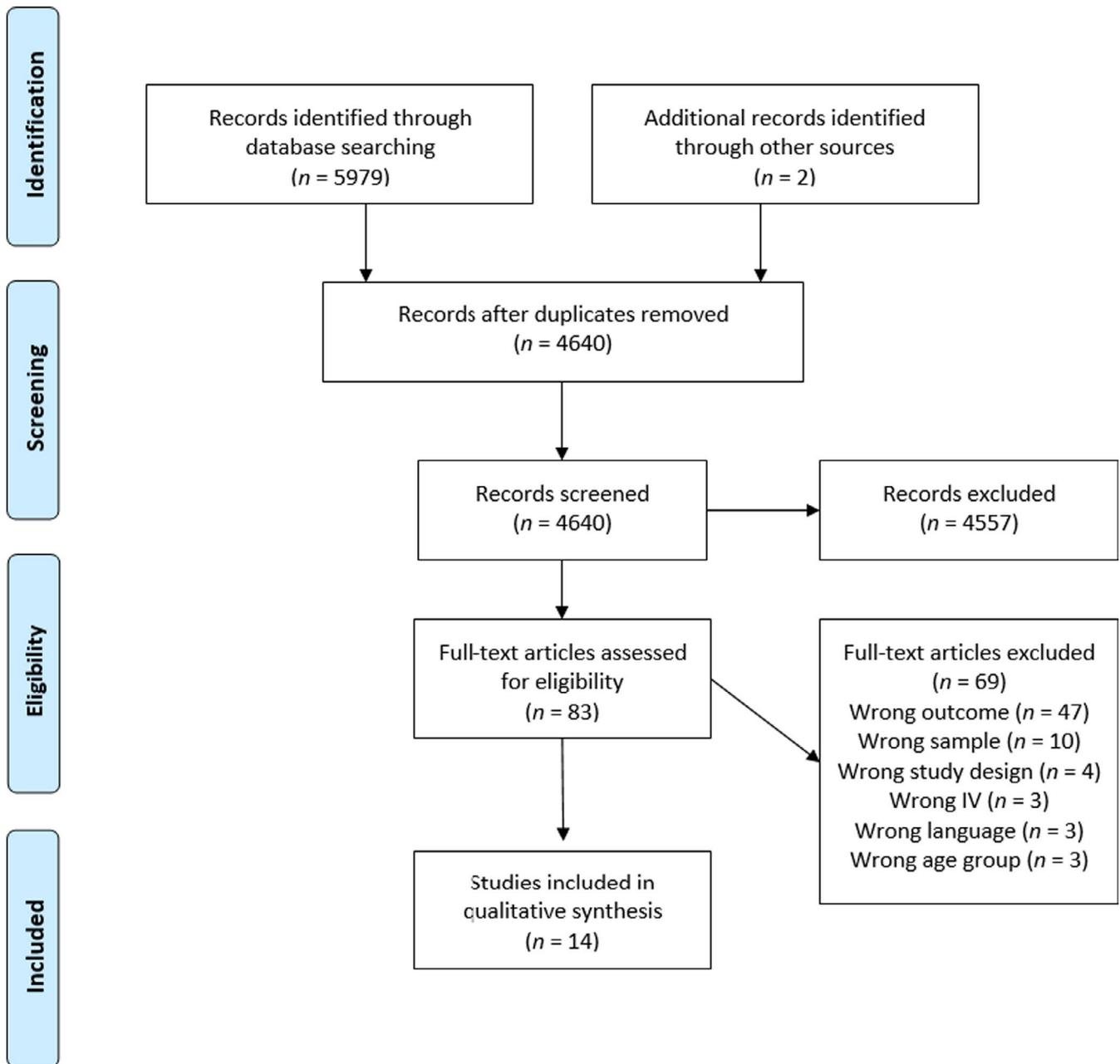


FIGURE 1 Flow diagram of the literature search

female football players, with levels ranging from amateur to national top-league. Mean number of participants per study was 111.1 (SD = 96.42), ranging from 9 to 305. Studies were published between 1995 and 2019, with 79% of studies published after 2009. Three of the studies were unpublished PhD dissertations, while the remaining 11 were published as peer-reviewed articles. The studies included participants from: Sweden ($n = 2$), Norway ($n = 2$), United States ($n = 7$), Spain ($n = 1$), Iceland ($n = 1$), and Finland ($n = 1$). Four of the studies used a quasi-experimental design, where of three of them were intervention studies, while the remaining ten studies used a cross-sectional design.

3.2 | Appraisal of studies

The fourteen included articles were rated using a quality assessment tool where the maximum score obtainable was 40 (see Appendix 1 for full Table A1). The scores ranged from 14 to 28, with a mean score of 22.79 (SD = 3.81). For the 10 cross-sectional studies, the scores ranged from 14 to 28 ($M = 23.00$, SD = 3.94) and for the four quasi-experimental studies the scores ranged from 19 to 28 ($M = 22.25$, SD = 3.95). Overall, the representativeness of the samples was good to excellent, and all but one received a score of 3 (good) for the appropriateness for statistical methods. The quality assessment revealed

that there was substantial lack of description and analysis of response rates and discussion of dropout and/or missing values. Moreover, there was little justification of sample sizes, with only one of the studies reporting a power analysis.³³

3.3 | Descriptive results

Football performance was reported in 9 different ways, and the most used method was grouping players by their level of league. Performance was assessed directly in 11 articles, that is, player and coach ratings of match performance, players' levels, goals and assists, and game outcomes. The remaining three articles used different outcomes like enjoyment, mindful engagement in sport, and changes after a strength- and conditioning program.

The type of psychological factors measured varied greatly, with a total of 15 different factors (Table 1). The measurement tools used were, for the most part, validated instruments. The following section describes the results from the included articles, divided by type of psychological factors. Articles who contained several factors are mentioned more than once. Effect sizes are labeled according to Cohen's rule of thumb/criterion.³⁴ Corresponding labels for Hedges g are small, moderate, and large (0.2, 0.6, and 0.8). All participants were female football players if nothing else is mentioned.

3.4 | Psychological traits

Danielsen, Rodahl, Giske, Høigaard³⁵ examined whether mental toughness was different between three leagues in Norwegian female football. They found that the total mental toughness score of the top-league players was significantly higher than the third league scores. Based on the reported means in the article, the calculated Hedges' g was 0.36 between the two groups which represents a small difference. The first league scores, however, did not differ significantly from either the top-league or the third league scores. Kristjánssdóttir et al.³⁶ also found differences in total mental toughness between leagues. A one-way analysis of variance revealed that there were significant differences between national team players, first league and second league players. Further follow-up tests showed that the national team players had significantly higher scores than the first league players ($g = 1.48$), and the second league players ($g = 0.74$). The same trend was found for grit scores between collegiate level I and II, with level I players obtaining higher grit scores when adjusting for age ($g = 0.51$).³⁷ No difference was detected between

the other levels (professional players and collegiate level III). Regarding the Big Five personality traits and performance, conscientiousness emerged as the sole predictor explaining 8% of the variance in performance statistics.³⁸ On the other hand, when coaches' ratings of performance were analyzed, both neuroticism ($\beta = -0.38$, $p < 0.001$) and conscientiousness ($\beta = 0.25$, $p < 0.001$) emerged as significant predictors of performance (adjusted $R^2 = 0.23$).

Regarding anxiety, Kristjánssdóttir, et al.³⁶ found that national team players had lower total anxiety scores than both top-league ($g = 0.73$) and second league players ($g = 1.14$). Barnicle³⁹ performed a 12-week mental skills training program on eight players of a collegiate level I team. The author found a decrease in the trait anxiety subscale concentration disruption in the intervention group, while the comparison group experienced an increase. This decrease in trait anxiety was associated with an increase in performance (goals and assists). In another context, Björkstrand and Jern⁴⁰ found that situational anxiety was not associated with penalty-taking performance in two junior girls' teams.

3.5 | Executive functions and psychological defense mechanisms

Vestberg et al.⁴¹ found that players from the Swedish top league obtained higher scores on all executive function tests, than the second league players. The primary test measured response inhibition and cognitive flexibility, while the other two measured general executive functions as a control to the main test. Basevitch³³ also examined what can be categorized as executive functions, anticipation, and situational assessment. He found that high-skilled players (playing at or above collegiate level) were able to anticipate the opponent's actions better than low-skilled players (never played above high school level). The anticipation task had six different conditions, with effect sizes ranging from medium to large ($g = 0.54$ – 1.19). The high-skilled players also generated less task-irrelevant options ($g = 0.29$ – 0.55) and prioritized the relevant options in the situational assessment better ($g = 0.01$ – 0.54). Sivertsen, et al.⁴² examined if psychological defense mechanisms and reaction time differed between high-ranked and low-ranked football players on the same team. They found that the highest-ranked players had significantly lower scores on the measure assessing psychological defense mechanisms compared to the three lower class ranks. They also found that players with high scores on psychological defense mechanisms had longer reaction times than players with low scores.

TABLE 1 Overview of included studies

Authors (alphabetical)	Participants	Mean age (years)	Data collection(s)/method(s)
Barnicle ³⁹	American football players from collegiate level I ($N = 19$)	Not reported	Sources of Enjoyment in Youth Sport Questionnaire, Competitive Motivational Style Questionnaire, Sport Anxiety Scale, Sport Confidence Inventory, Test of Performance Strategies –2,
Basevitch ³³	American male ($n = 40$) and female football players, females divided into high skill ($n = 21$) and low skill ($n = 24$)	High skill 22.41 Low skill 19.80	Task-Specific Self-Efficacy
Björkstrand & Jern ⁴⁰	Girls from two junior girls' teams in Finland ($N = 29$)	15.74	The Finnish Athletic Coping Skills Inventory –28, Self-Efficacy, Situational Anxiety
Danielsen et al. ³⁵	Female Norwegian football players from the top league ($n = 96$), second league ($n = 80$) and third league ($n = 122$)	20.63	Sports Mental Toughness Questionnaire
Hassmén & Blomstrand ⁴⁶	Female football players playing in Sweden's top league ($N = 9$)	22.00	Profile of Mood States Test (measuring depression/ dejection, tension/ anxiety, anger/ hostility, confusion/bewilderment, fatigue/inertia, and vigor/activity)
Iwasaki ⁴⁴	Study 2: Female football players, playing at different levels of high school teams in the US ($N = 190$)	15.59	Caring Climate Scale, Perceived Motivational Climate, Task and Ego Orientation in Sport Questionnaire
Jones et al. ⁴⁵	Athletes from collegiate level III in the US. Female participants practicing football ($n = 28$), field hockey ($n = 28$) and soft ball ($n = 19$)	Not reported	Performance (maximum strength, lower-body power, and speed) Profile of Mood States Test, Psychological Self-Perception Profile (PSP)
Kristjansdottir et al. ³⁶	Female Icelandic football players, playing on the national team, the top league and second league ($N = 142$)	23.50	Test of Performance Strategies Questionnaire, Sport Mental Toughness Questionnaire, Sport Anxiety Scale 2
Meyer et al. ³⁷	Female American football players from a professional league/world cup/ Olympic level and three collegiate levels ($N = 305$)	21.50	Grit-O (encompassing items from both Grit-O and Grit-S).
Olmedilla et al. ⁴⁷	Female players playing in the National Championship of Autonomic Selections of Spain, in the category's under–16 and under–18 ($N = 108$)	15.53	Psychological Characteristics Related to Sport Performance Questionnaire (measuring stress control, influence of performance evaluation, motivation, team cohesion, and mental skills)
Piedmont et al. ³⁸	Female American football players from the collegiate level I ($N = 79$)	Not reported	Bipolar adjective scale (personality traits)

Performance outcome(s)	Key findings/outcomes	Publication type	Quality assessment score ^a
Goals and assists	The intervention group, which underwent 12 individual mental skills training sessions, showed increased sports enjoyment and football performance compared to the comparison group. They also showed decreased trait anxiety, increased self-confidence, and motivation.	Dissertation	19
Anticipation skills, situational assessment	High-skill players had better anticipation skills, they generated less irrelevant options and prioritized relevant options better than low-skill players.	Dissertation	28
Penalty-taking abilities	The intervention group completed a one-week PETTLEP-based imagery intervention on penalty-taking ability in football. No difference in the mean number of goals scored by either group pre-or post-intervention, no significant associations between pre-test self-efficacy or situational anxiety and penalty-taking ability.	Peer-reviewed article	21
Player levels	The players from the top league had a higher mental toughness score than the third league, but not the second league.	Peer-reviewed article	25
Game results	Players demonstrated significantly lower tension, depression, anger, and confusion scores when they won the games than when they lost or tied. Fatigue did not differ with regards to results, and vigor was significantly higher when the team won, compared to when they lost or tied.	Peer-reviewed article	27
Cognitive and Affective Mindfulness Scale—Revised, Practice Strategy Use Questionnaire, Peaking Under Pressure.	A caring/task-involving climate and task orientation had a positive effect on mindful engagement, practice strategy use, and peaking under pressure.	Dissertation	25
Athlete's Improvements	All sports improved in 1RM bench and squat and reported increases in perceived physical strength on the PSPP. The mood states test did not show a significant main effect, nor interaction effect.	Peer-reviewed article	21
Player levels	Significant difference in mental toughness (except the subscale control) and anxiety (except the subscale somatic anxiety) between all the leagues. In psychological skills, there were generally few variables differentiating the national team and first league players.	Peer-reviewed article	21
Player levels	There was generally no difference in grit scores across performance levels, except a small difference between college level I and II.	Peer-reviewed article	27
Age groups, subjective performance reported by the players and objective performance reported by the coach	The under-16 players scored significantly higher on team cohesion, compared to the under-18 players. Coaches reported better match performance than the player's themselves.	Peer-reviewed article	24
Coaches' ratings, goals, assists, shots on goal, and games played	Conscientiousness and neuroticism were the only personality traits which explained approximately 23% of the variance in performance (rated by coaches). Conscientiousness was the only predictor of game statistics (8% variance).	Peer-reviewed article	22

(Continues)

TABLE 1 (Continued)

Authors (alphabetical)	Participants	Mean age (years)	Data collection(s)/method(s)
Sivertsen et al. ⁴²	Female Norwegian football players, playing at the top league in Norway ($N = 18$)	23.60	Defense Mechanism Test, Posner's cueing Paradigm (reaction time)
Vestberg et al. ⁴¹	Swedish male ($n = 31$) and female football players, with female participants from the top league ($n = 15$) and the second league ($n = 11$)	23.89	Assorted tests from the D-KEFS test battery: Design fluency, Stroop test, and Trail making test
Weiss et al. ⁴³	Female football players from nine high school teams in the US ($N = 141$)	16.00	Perceived Motivational Climate, Perceived Coaching Behavior Scale

^aMaximum quality score =40.

3.6 | Motivational climate and enjoyment

Two of the articles examined how the perceived motivational climate in a team affected performance. The results of Weiss et al.⁴³ showed that a greater emphasis placed on a mastery climate compared to a performance climate was positively associated with higher ability perceptions, enjoyment, and intrinsic motivation among female high school football players. Iwasaki too examined a sample of high school football players and also found that a mastery (ie, task-involving) climate and task orientation were positively associated with mindful engagement, practice strategy use, and peaking under pressure.⁴⁴

3.7 | Mood and motivation

Jones et al.⁴⁵ examined if mood states affected a 12-week strength and conditioning program but found no significant effect or interaction with the physiological improvements. Hassmén and Blomstrand⁴⁶ examined mood scores of a single team playing in the Swedish top league ($N = 9$) 2 h before, immediately after and 2 h after a game. No significant difference was found in pre-game mood scores, but there were significant after-game effects. When the team won matches, their tension, depression, anger, and confusion scores were significantly lower after the game compared to when they lost or tied. Fatigue scores did not vary with game outcomes.

Olmedilla et al.⁴⁷ examined whether psychological characteristics were associated with the player's and coaches' perception of performance. The authors examined two Spanish female teams, under-16 (U-16) and under-18 (U-18) and their performance in two matches. The only significant result was a higher score in team cohesion

for the U-16 team, which was somewhat surprisingly negatively correlated to players' perceptions of performance. The coaches rated the players' performance higher in the second match, than the players themselves.

3.8 | Intervention studies

Three of the articles contained evaluations of interventions aimed at improving performance. Jones et al.⁴⁵ performed a 12-week strength and conditioning program with female participants from football, field hockey, and softball. In addition to the physiological tests, they included psychological measurements of mood states and physical self-perceptions. Overall, football players improved most on the physiological tests, but they found no main effect for mood states or physical self-perceptions. Björkstrand and Jern⁴⁰ performed a 1-week imagery intervention to improve penalty-taking skills in two junior girl's football teams. The intervention consisted of half the participants imagining four sports-specific scenarios 10 times a day for 5 days. Results revealed that there were no significant differences between the two groups at post-test, indicating that the intervention did not have any impact on the specific skill that is penalty taking. They found no significant relationship between pre-test self-efficacy and penalty-taking ability, or situational anxiety and penalty-taking ability, but it should be noted that the measurement of these variables was one question each, in addition to the sample being underpowered with only 14 players in the intervention group and 19 in the control group. Barnicle³⁹ performed a mental skills training (MST) program aimed at improving sports enjoyment and its consequences on psychosocial outcomes and athletic performance in a collegiate level 1 football team. Eight members of the team received the intervention

Performance outcome(s)	Key findings/outcomes	Publication type	Quality assessment score ^a
Player's levels and ability to orient the pitch	The highest-ranked athletes had significantly lower defense mechanisms measured with DMT. The athletes who had a higher score on DMT, had longer reaction times.	Peer-reviewed article	14
Player levels	High-level athletes performed better on all tests for executive functions, than low-level players.	Peer-reviewed article	23
Self-Perception Profile for Adolescents, Enjoyment, Motivational Orientation in Sport Scale	Positive and informational feedback, alongside with mastery and performance climates, were significantly related to athletes' perceptions of competence, enjoyment, and intrinsic motivation.	Peer-reviewed article	21

training, consisting of twelve 45-min individual sessions focusing on the individual needs of the athlete. Results showed that after the intervention, the intervention group had an increase in both sport enjoyment and performance outcomes, while the comparison group reported a decrease in sport enjoyment which was also reflected in their performance outcomes. This result is promising, yet not generalizable as the sample size was rather low.

4 | DISCUSSION

The aim of this systematic review was to examine and summarize which psychological factors are associated with performance among female football players. Our findings suggested that there are several psychological factors that are potential predictors for individual and team performance, in addition to variables that may work as mediators/ moderators of performance.

4.1 | Performance

Performance measurements consisted of subjective and objective measures. Some of the objective measurements have a high risk of bias. When using goals or assists as a performance measure, many dimensions of game performance are lost; attempts, finishing, interceptions, and passes into the penalty area. Football is a low-scoring game, compared to other sports such as handball or basketball, and on occasions matches will end in a draw without any goals being scored. In the 2020 season in the top league for women in Norway, 22 out of 90 games ended with either none or only one goal scored.⁴⁸ In addition, defense players will inevitably score fewer goals than forward players. When using goals and

assist as a performance measure, authors risks losing other dimensions of the game, like defense abilities and building up an attack. Another issue arises when using all players as whole groups in the analysis and comparing them to different leveled teams. While average score of how team performance correlates with psychological factors is obtained, any variance within the groups is lost since all players are assigned the same level of performance. However, it may give a good indication of the differences in scores between player leagues. Coaches ratings' can also be affected by bias, for example, favoritism of players as is common when the coach tends to have a performance focused motivational climate.⁴⁹ Coaches can also be affected by leniency bias, the tendency to rate players higher than they would rate themselves, resulting in inflated ratings.⁵⁰ One might also hypothesize that coaches' ratings rely heavily on their experience, education, and tactical style in their respective sport.

4.2 | Psychological factors

The studies of Iwasaki⁴⁴ and Weiss et al.⁴³ supported the notion that a perceived mastery climate is important for engagement and enjoyment in female football. However, a previous study conducted by Møllerlökken et al.⁵¹ suggested that there was a discrepancy between how coaches and young football players perceived the motivational climate. The players ($N = 256$) specifically perceived the climate to be significantly more performance-oriented compared to the coaches' perception. As other studies have shown how important a mastery climate is for performance,⁵²⁻⁵⁴ Møllerlökken's results are important findings of coaches' understanding of players' perceptions.

The results from the current review indicate that higher leveled players have higher scores on executive functions,

conscientiousness, and mental toughness and lower scores on anxiety. Because of the research design used in these studies, it is not clear whether high-leveled players develop these skills or if these qualities aided their success as football players. The findings are consistent with literature involving the same psychological factors with athletes from other sport types and male football players.^{55,56} On the contrary, the study of Olmedilla et al. found that the U-16 team had higher scores on all performance-related psychological factors, although only team cohesion was deemed statistically significant. These results might be due to the low mean age of the U-16 team, with adolescent participants still developing their self-awareness and self-evaluation skills.⁵⁷

4.3 | Interventions

As the three intervention studies by were relatively heterogeneous, it is challenging to summarize the findings. Björkstrand and Jern's⁴⁰ penalty intervention did not yield significant improvement in performance and did not show any significant association between anxiety and penalty abilities. However, the anxiety measure used was only one question made by the authors themselves. A similar study conducted on men indicated that participants with high scores on trait anxiety performed significantly worse on penalty taking, than those with low scores.⁵⁸ One should note that this study too had a low number of participants ($N = 16$) and thus it remains unclear to what extent anxiety has a predictive value for penalty-taking performance. Barnicle's³⁹ enjoyment intervention yielded promising results as both enjoyment and performance increased in the intervention group compared to the comparison group. As there are no similar studies conducted on football players, future research might seek to replicate enjoyment interventions with more participants. It will also be interesting to replicate similar studies with an elite-athlete population. Jones et al.⁴⁵ performed a strength and conditioning intervention and looked at the association between mood, physical self-perceptions, and progress. The only significant increase from pre- to post-test was an increase in perceived physical strength, which is not that surprising. Mood did not seem to affect the progress in strength and conditioning.

Interventions in football are quite common, although most studies are directed at improving strength and conditioning or preventing injury. The interventions found in this review indicate that some factors, like enjoyment, seem to be trainable. Others, like penalty-taking ability, did not yield significant results. However, this was only represented with one study and other interventions have shown contrary results. Ramsey et al.⁵⁹ performed an imagery interventions leading to better performance at penalty taking in a mixed-gender study with older and

more experienced participants. The within-group effects in the two intervention groups were not significant; however, there was a clear trend and the sample was small. Additionally, they did not find a significant decrease in anxiety which has previously been linked with penalty taking.⁶⁰ One reason for this may be that the test environment did not reflect the high-stress situation of penalty taking in a match where the outcome may depend solely on the penalty. Research has also shown that scores on factors like grit⁶¹ and mental toughness⁶² can be increased through structured psychological interventions on male football players. This is important findings and practical implications for the future, as top-leveled female players seem to exhibit higher scores on these psychological traits.

4.4 | Limitations of current research

Overall, the number of studies available on the subject was limited, with only 14 studies included. These findings are in line with Kirkendall's³ review article on football as a research topic. The sample sizes were generally low with eight of 14 studies operating with under 100 participants. In addition, the sample size was only justified with a power analysis in one of the articles.³³ Only one of the studies described how they dealt with missing values³⁶ and one described dropout rates.⁴⁰ Three of the studies did not report the age of the participants. Most of the studies included were cross-sectional and observational studies only, making it difficult to provide information of the causal relationship between psychological characteristics and performance. Also, these studies cannot advise whether the elevated psychological factors like executive functions and mental toughness are developed through participation in sports, or if participants start playing sports and continue to do so because of inherent elevated psychological characteristics. Furthermore, psychological factors, including traits and motivation, were in most studies assessed with self-report measures which may be biased due to people lacking sufficient insight, or responding in a socially desirable way.^{63,64} Also, as indicated in a review by McClelland et al.⁶⁵ measures of self-attributed and implicit motives seldom correlate significantly which suggests that the measurement method may impact the findings, at least for some personal characteristics.

Seven of the articles had satisfying discussions of study limitations, while four had poor quality regarding reporting limitations. One article included only one sentence describing limitations, while two articles did not discuss their limitations at all. This raises concerns, as the exclusion of an adequate limitation section might disguise weaknesses that influence the conclusion of the research.⁶⁶ Another concern is the narrow geographical area the articles represent, with the majority originating in the

US and Nordic countries. This is supported by an article who found that 90% of literature published in psychiatric journals is derived from European and American societies.⁶⁷ This notion makes generalizing the results challenging, as football is played by females globally.

With performance measures varying greatly and the high risk of bias in these measurements, future research will benefit from using more unbiased objective measures. The use of objective verified performance analysis measures like Stats Perform (previously known as Opta Sportsdata), ProZone Sports Ltd®, InStat, etc. will likely increase the validity and reliability of studies examining football performance. The inter-rater reliability of these analysis measures has shown to be high^{68–70}; however, it is problematic that some of their algorithms are kept from the public due to commercial interests.

4.5 | Strengths and limitations of this review

The main strength of this systematic review is that it provides original, new input to the research field on female football performance. This is especially important as women's football is rapidly becoming more popular and professionalized.

However, there are some limitations to the current study. One limitation regards the literature search itself. Even though the chosen databases Medline, PsychInfo, and Embase contain a vast number of articles, we did not have access to SPORTDiscus, which is the leading database for sports and sports medicine research. This may have resulted in fewer identified articles. Moreover, we only included studies in Norwegian and English, which may have excluded relevant literature published in other languages. This systematic review was also limited to published articles and dissertations, as these types of scholarly material are either peer-reviewed or approved by dissertation committees. A systematic review was chosen above of other forms of reviews, for example, a scoping review, because the authors wanted to examine a specific research question. Since our systematic review also excludes otherwise relevant literature, like conference abstracts, working papers, and presentations, future research could consider performing more exploratory forms of reviews, for example, scoping review.

4.6 | Perspective

The current review found results indicating there are several psychological factors connected with performance in female football. The most prominent results suggest mental toughness, motivational climate, executive functions,

and conscientiousness may have a predictive function of performance level. Enhancing these factors or adapting the team surroundings may help further the performance of players. However, the literature is sparse and of varying quality. With 75% of the available literature being cross-sectional and descriptive research designs, it limits the grounds for drawing causal relationships between psychological factors and football performance. Future research should focus on developing well-designed longitudinal studies in addition to exploring if interventional design can influence psychological factors. The field should also strive to provide adequate sample sizes or justification through power analysis. However, it is important to acknowledge the limited number of female football players available, especially elite players, and the challenges this entails for conducting quantitative studies with sufficient samples sizes. Performance measurements would benefit from using validated objective measurement systems, in combination with subjective performance and coaches' ratings. Future research would also benefit from sound theoretical frameworks as there is a lack of an overall theory connecting psychological factors to (football) performance.

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CONFLICTS OF INTEREST

No potential conflict of interest was reported by the authors.

AUTHOR CONTRIBUTIONS

This systematic review was designed by FA and MM. The screening and quality assessment were completed by all authors. SDP drafted the review, and further drafts were reviewed by MM and FA.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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APPENDIX 1

TABLE A1 Checklist for Quality Assessment (methodological and reporting quality)

Female football		Kristjansdottir, 2019 ³⁶	Barnicle, 2013 ³⁹	Basevitch, 2013 ³³	Bjorkstrand, 2013 ⁴⁰	Hassmen, 1995 ⁴⁶
Sampling and representativeness						
1	Was the response rate reported? (0–40, 41–60, 61–80, 81–100)	0	0	3	1	2
2	Are the individuals selected to participate in the study likely to be representative of the target population? (age, sport, level)	4	3	4	4	4
3	Where the study subjects and the setting described in detail?	2	2	3	3	3
4	Are dropout/missing values described, analyzed, and discussed	0	0	0	0	3
Statistical analyses						
5	Is the sample size adequate for establishing relationships or group differences (assumption of statistical power)	3	1	4	1	1
6	Are the statistical methods appropriate for the study design?	3	3	3	3	3
Measurements (reliable and valid)						
7	How was independent variables measured (reliable and valid measures)	3	3	3	1	3
8	How was the outcome measured, for example, sports performance (reliable and valid)	1	2	3	3	3
Design and fidelity						
9	Appropriate design used given the research q. (crosssectional, longitudinal, intervention study)	2	3	3	2	3
10	Relevant discussion of study limitations	3	2	2	3	2
SUM		21	19	28	21	27

Note: Scale: 0 = Not Reported/Unsatisfactory, 1 = Poor, 2 = Satisfactory, 3 = Good, 4 = Excellent.

Iwasaki, 2017 ⁴⁴	Jones, 2010 ⁴⁵	Olmdilla, 2019 ⁴⁷	Sivertsen, 2003 ⁴²	Vestberg, 2012 ⁴¹	Weiss, 2009 ⁴³	Danielsen, 2017 ³⁵	Meyer, 2017 ³⁷	Piedmont, 1999 ³⁸
0	0	0	0	0	0	1	0	0
4	4	3	3	4	3	4	4	3
2	2	4	2	4	2	3	4	2
0	0	0	0	0	0	0	0	1
4	1	3	0	2	3	3	3	2
3	3	3	2	3	3	3	3	3
3	4	3	2	3	3	3	4	4
3	3	2	3	3	2	3	2	4
3	4	3	2	2	2	2	3	2
3	0	3	0	2	3	3	4	1
25	21	24	14	23	21	25	27	22