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Video Assistant Referee (VAR), gender and football refereeing: a scoping review

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ABSTRACT

The increasing use of VAR globally affects the refereeing role and may have unintended gendered consequences for referees. This scoping review 1) summarizes and maps the research on refereeing, gender, and VAR in football, 2) identifies and analyzes knowledge gaps in the field, and 3) suggests recommendations for practice, and future research. The review indicates that the combination of gender and technology, and how they impact the refereeing role, is not featured in research. Instead, VAR studies mainly focus on the outcome of decisions, while research on gender and refereeing concerns individual experiences of female referees. The review further shows the implementation of certain technologies in football, and their consequences for male and female referees, has not received the scholarly attention it deserves. Future studies should utilize organizational, intersectional, and medial perspectives to understand how VAR and other novel refereeing technologies can be used to achieve gender equity in refereeing.

Introduction

Although the implementation of Video Assistant Referee (VAR) in football has led to debate and controversy, it has also been applauded as a technological innovation for greater transparency and fairness in refereeing. Hence, VAR has been met with both support and resistance by players, fans, and referees.¹ In the 2018/2019 season FIFA included VAR in the “Laws of the Game” for footballing leagues.² The intention is to apply it to a growing number of leagues internationally, as the training and affordability of VAR develops. Elite referees are greatly affected by VAR, however few studies have investigated the impact of VAR on male and female football referees. The use of VAR in football refereeing is a growing research field.³ At the same time, more scholarly attention is given to gender issues in refereeing. This research shows that there is a lack of gender equity in football refereeing, especially in men’s football.⁴ VAR has currently been implemented almost exclusively in the men’s game, where few women act as referees,⁵ impacting female elite referees’ career opportunities.

Feminist studies shows how digital technologies affect gender relations and contribute to the discrimination of women in society.⁶ In other words, technology is not gender-neutral, and VAR is no exception. Technology is developed by someone and for someone to use. There are many male technology creators, which often results in technologies designed by and for men.⁷ The intertwining of technology, men and masculinity helps to explain why technologies are developed in certain ways and lead to a gender polarization where men design technology and women use it,⁸ thus making technologies gendered by association and design.⁹ Technologies used in sport are costly and often

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require expertise.¹⁰ For example, VAR requires technological resources (e.g. up to 12 cameras operating per game), human resources (e.g. a minimum of three people in the VAR operating room) and media resources (TV companies willing to fund VAR by providing cameras and video clips for analysis by referees). As a consequence, novel technologies are mainly used in men's elite sports. VAR is a prime example of this.

From this starting point, the purpose of this scoping review is to map the current research on gender, refereeing, and VAR in football. Specifically, the aim is to: (1) summarize and map the existing research literature on refereeing, gender, and VAR in football, (2) identify and analyse any knowledge gaps in the research field, and (3) make suggestions for practice and future research.

The next section elaborates on the search strategy and procedures of the scoping review, and describes the characteristics of the included literature. The results of the scoping review are then presented. This is followed by a section analysing the current state, emerging trends, and suggestions for future studies, of the research fields of VAR, football refereeing, and gendered issues. Lastly, a concluding section summarizes the main findings.

Methods

This article is based on a scoping review, which is a type of research synthesis aiming to set the course for future research focus. This is done by mapping literature in certain fields on particular topics, and identifying research gaps.¹¹ This part of the article presents the search strategy and review procedures.

Search strategy

This review is limited to peer-reviewed articles searchable in scientific databases in order to ensure the quality of the reviewed literature. I chose Scopus, ISI Web of Science and SportsDiscus because the international scholarly community acknowledges them as being of high quality.¹² These databases also include research on both sports science and social science more broadly. I saw this as important given that football, technology, and gender intersect multiple disciplines. However, defining a search string to identify articles concerning VAR, refereeing, and gender proved challenging. The novelty of both VAR in football and gender perspectives in sports technology led to a combination of three different search strings to cover what are effectively two research fields, since the search string (football) OR (soccer) AND (referee) OR (umpire) AND (technology) AND (gender) OR (women) OR (female) provided zero results across all three databases. To identify articles dealing with the use of VAR in football refereeing I used the search string (football) OR (soccer) AND (referee) OR (umpire) AND (video assistant referee) OR (VAR). As modern football applies technologies (e.g. goal-line technology, GPS-tracking and other wearables) that are beyond the scope of this article, I chose "video assistant referee" instead of "technology" to specify the search.

Studies focusing on gender and the football refereeing role were identified using the search string (football) OR (soccer) AND (referee) OR (umpire) AND (gender) OR (women) OR (female). Many of the articles mentioned both "gender" and "referee" in their abstracts, without actually discussing gender in relation to the refereeing role. In many cases, gender simply referred to a gender-mixed sample of research participants included in the study. I conducted the initial literature search in January 2022. Every search, across the different search strings, was in titles, keywords and abstracts. In total I retrieved 110 articles for further consideration (see [Table 1](#)).

Review procedures

After removing any duplicates and excluding one article due to not being able to access the full text,¹³ I considered the abstracts of the remaining 75 articles using a set of inclusion and exclusion criteria. These are presented in [Table 2](#).

Table 1. Number of articles identified in each search string.

Search string	Number of hits
Football or soccer, technology, referee, gender	1*
Football or soccer, VAR, referee	44
Football or soccer, referee, gender	65
Total	110

*This was a Tae-Kwon Do study on vests that automatically counts points to see if the referees favoured athletes in either red or blue suits.

Table 2. Inclusion and exclusion criteria.

Inclusion criteria	Exclusion criteria
English, Norwegian, Swedish or Danish language	Other languages
The use of VAR in football	Technology behind VAR
Football referees and gender	Fans', coaches, players' perspectives on VAR
Peer reviewed journal articles	Grey literature

The exclusion criterion “technology behind VAR” refers to studies of the technicalities (e.g. frames per second, image resolution, etc.) of VAR. These studies do not fit the scope of this review. Additionally, studies exploring fans’ perceptions of VAR¹⁴ are excluded, as they do not indicate how VAR impacts the refereeing role or gender equity in refereeing. My own language abilities also limits the literature review to articles written in English, Norwegian, Swedish and Danish. Furthermore, studies of football and other kinds of technological aids or machine learning techniques¹⁵ are excluded from the review. The flow chart (Figure 1) shows an overview of the review process.

After I screened the abstracts, I excluded 49 articles using five main reasons (Figure 1). The first refers to studies with a focus on technology in general but not specifically on VAR. The second reason refers to studies with fans’, players’ or managers’ perspectives, while reason three represents football studies not focusing on gender and/or referees (e.g. female fans). Reason four relates to studies focusing on the health and nutrition of referees, and reason five refers to studies conducted on sports other than football.

I read the 26 remaining articles (SportDiscus $n = 8$, Scopus, $n = 14$, ISI Web of Knowledge, $n = 4$) in-depth and chose to exclude three additional articles: Nordstrom et al.¹⁶ for being about American football, rather than football (soccer), Samuel et al.¹⁷ for being a conceptual paper on decision making (DM), but not VAR or gender, and Sánchez et al.¹⁸ because theirs is a strictly methodological paper with no results considering referees or sexual harassment. Furthermore, I examined the reference lists of the included articles to identify additional works that could be included in the review. This process led to the inclusion of two additional articles.¹⁹ Lastly, the review process led to the inclusion two additional articles²⁰ that were published during the peer-review process of this scoping review.

Analysis

I used thematic analysis to analyse the identified literature.²¹ This analysis method gives an overview of patterns in the material,²² which connects to the first purpose mentioned in the introduction. The thematic analysis in this review can be linked to what Bratberg²³ describes as “content analysis”, where for instance, different parts of the texts was analysed with a focus on meanings and the use of certain terms or words (e.g. “he” when talking about referees).²⁴

A scoping should not only give an overview of research findings, but also compare and find patterns in the reviewed literature. In my thematic analysis the material contains information from many different texts creating a need for a systematic way of comparing.²⁵ To this end, I created a table of results (Table 3) providing an overview of the included articles and (short) descriptive

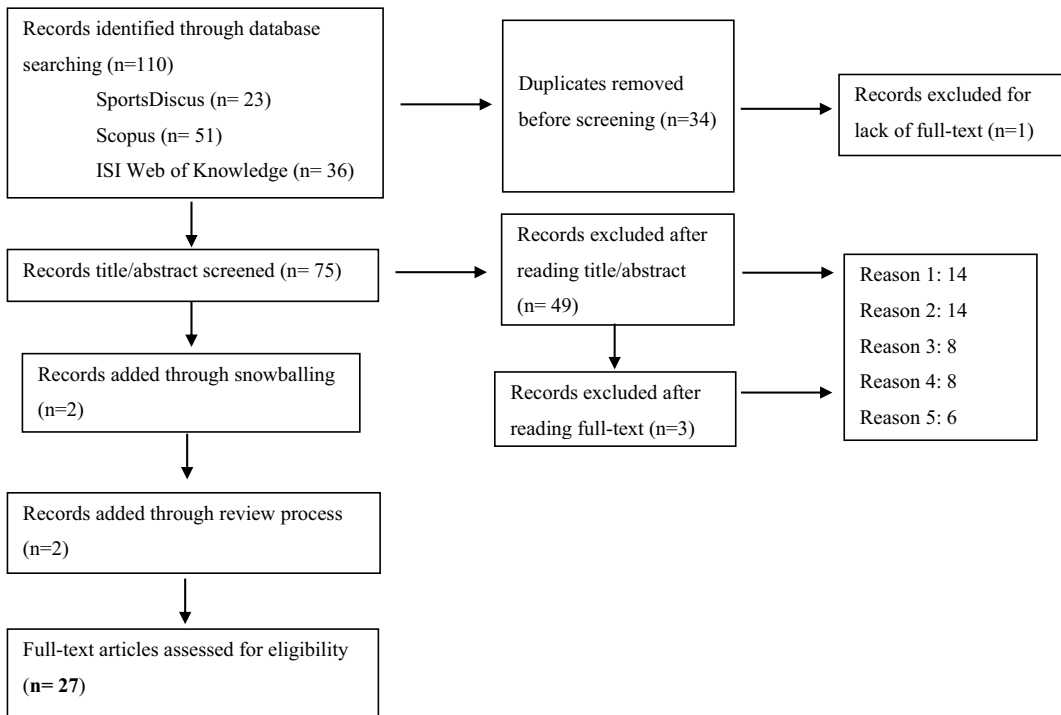


Figure 1. Flow chart of the review process.

information about the focus and findings of all the included studies, also called “descriptive matrices”.²⁶ Based on my analysis, I identified some main themes. The first is that research on gender issues and refereeing applies an individual perspective. This means that they utilize a bottom-up approach of personal experiences of (female) referees. Furthermore, these studies either emphasize female referees and their experiences of being in a male dominated profession, or the barriers and challenges of being and becoming referees (both male and female referees). The most prominent theme in VAR research is the overweight of quantitative mapping studies focusing on decision outcomes, rather than referees.

Limitations

This review, like any other methodological approach, has some limitations. The study only considers articles in English,²⁷ something that may impact the final sample. In future research, the criteria could be extended to include literature in several languages in order to broaden the findings. However, this would require resources to employ a multi-lingual team of researchers. Furthermore, the analysis was done by only one author, which may be a weakness considering that reviews are often undertaken collaboratively to ensure quality of interpretations and categorizations.²⁸ The quality of the review is therefore dependent on the sole author’s abilities to analyse the identified articles, which could have benefitted from asking additional researchers to analyse and discuss the material together.

Results

The total number of included articles in the review is 27 (Figure 1). No articles were identified that linked VAR, gender, and refereeing. Hence, the included studies represent two research fields: 1)

Table 3. Articles included in the review.

Author & year	Aim	Sample	Methods & measures	Findings
Reid and Dallaire (2019)	Examine how female referees understands gendered experiences as referees.	15 female football referees at the recreational to elite level from Canada	Qualitative case study with semi-structured interviews, and observation of one game.	Female referees have to establish their ability every game, and achieve male standards but prevail through a focus on skill and as officials, not on being women.
Perreau-Niel and Erard (2015)	Investigate conditions of access, and pursuit of career in football refereeing in France	148 (9 female) referees at national, inter-regional and regional levels in France.	Questionnaires on the referees' social background, experience in football, refereeing, education.	Female referees are less able to choose their social conditions compared to male colleagues, since they have lower social status combined with stereotypes and the unequal allocation of domestic chores.
Karabulut et al. (2014)	Investigate empathic tendency levels of active football referees	49 (8 female) football referees in Turkey.	Empathic Tendency Scale to measure empathic tendencies	No correlation between male and female referees' empathic levels, but empathy decreases with experience.
Ignatov, Ivanov, and Miryanov (2018)	Measure decision making styles and referees' preferences when making decisions	116 (8 female) elite football referees at elite youth to international level in Bulgaria.	Decision-Making Questionnaire used to measure decision making styles in February 2017.	Referees prefer more responsibility and freedom in decision making, and no gender differences in results.
Hacicaferoglu and Gündogdu (2014)	Explore the level of exposure to mobbing behaviours among football referees.	374 (29 female) referees (amateur and professional) in Turkey.	Mobbing Scale for Football Referees used to measure exposure to mobbing.	Women more exposed to mobbing than men
Kavasoğlu (2021)	Explore how stereotypes and gender roles affect how referees perceive female football players	8 female elite players and 7 (2 female) referees.	Phenomenological approach with interviews to understand perceptions of female players.	Male referees believed they treat players equally, while the two female referees thought referees were more tolerant of feminine, well-groomed players
Selvi and Karagün (2020)	Study factors affecting violence tendencies, resilience and decision-making styles among referees	1115 (107 female) referees from 7 regions in Turkish football.	Decision-Making Styles Questionnaire to measure violence tendencies, resilience and DM.	Level of resilience to violence higher among women and tendencies to violent behaviour lower.
Kim and Hong (2016)	Identify reasons why women quit refereeing.	6 former female football referees in South Korea.	Qualitative approach with semi-structured interviews.	Women stops refereeing due to negative attitudes towards them, lack of peer group, administrative support, work-family conflict.
Jones and Edwards (2013)	Examine the relevance of sex differences in elite refereeing in men's football.	None	Conceptual	Evidence lacks for sex-differences in non-playing roles, which is unjustified, and undermine the objections that still persist against female referees.
Mean (2001)	Explore how the gender discourse in football is reproduced, challenged and defended at an 'everyday' level.	8 male football referees in non-FA 5v5 matches.	40 minutes audio recordings of the referees during 28 5aside matches (at least one women's game)	Referees engage with male players through category entitlement, with female players through silence, negation or citing rules, protecting salient masculinity

(Continued)

Table 3. (Continued).

Author & year	Aim	Sample	Methods & measures	Findings
Reid and Dallaire (2020)	Explore how female referees give meaning to their gendered referee experiences	15 female football referees (recreational to elite) refereeing for 2+ years in Canada.	Semi-structured interviews about experiences and what constitutes them as subjects in footballing discourse.	Refereeing identities centred around ability often linked to masculine ideals, and 'ignoring' gender (power relations) by negotiating and downplaying their femininity.
Webb (2022)	Discuss developments the research area of sport match officials.	None	Conceptual	Research should aim to improve the working environment for referees by engaging governing bodies.
Forbes, Edwards, and Fleming (2015)	Explore female referees' experiences and techniques dealing with sexism	4 female football referees in the UK.	Observation and semi structured interviews	Female referees negotiate their female identities to adopt to gender stereotypes, thus maintaining male hegemony.
Gürler and Polat (2021)	Investigate VARs impact on key statistics to compare before and after implementation.	Statistics from 94 match weeks in Turkish Super League	Correlation analysis with significance levels 5% in independent T-test	Frequency of decisions not increased despite increase in cards after VAR.
Lago-Peñas, Gómez, and Pollard (2021)	Analyse VARs impact on key statistics to compare before and after implementation of VAR.	Statistics from 790 matches in Spanish LaLiga.	Quantitative generalized linear model to analyze.	VAR contributes to a reduction in offsides, increases playing time, on-field reviews should be reduced to reduce impact.
Han et al. (2020)	Study the impact of VAR on football matches and referees' performance.	Statistics from 480 games in Chinese Super League.	Quantitative generalized linear model to analyze VARs effect on outcomes.	VAR's impact is subtle, offsides and fouls decreased and playing time increased, makes the game fairer, since home advantage decreased.
Holder, Ehrmann, and König (2021)	Investigate if VAR has changed referees decision-making and tendencies for home team bias.	2744 games from the German Bundesliga and Italian Serie A.	Quantitative OLS-regression analysis to analyze home team bias and VARs impact on red cards and penalties	No change in bias in added extra time in Germany, but eliminated in Italy. Home teams still get more penalties and less red cards. Referee experience and sold-out stadium no impact.
Kubayi, Larkin, and Toriola (2021)	Explore VARs impact on international tournament (men's World Cup).	128 matches from men's World Cup in 2014 and 2018	Comparative analysis of WC before and after VAR.	Increase in penalties and playing time with VAR.
Spitz et al. (2021)	Analyse the initial and final decisions, before and after VARs implementation, to see if accuracy improves.	2195 games from 13 countries.	Quantitative logistic regression analysis for initial and final decisions	Predictive odds for correct decision increased from 92,1% to 98,3%
Mather (2020)	Examine challenges with offside-calls with VAR and suggest improvements.	34 situations from one season in the English Premier League.	Conceptual.	Suggests 'zone of uncertainty' related to marginal offences (e.g. offsides, penalty/no penalty) to compensate for limitations of video images.
Samuel et al. (2020)	Explore how referees' experienced and dealt with integration of VAR.	11 male elite referees in Israel	Mixed-method using interviews with referees and CEI-questionnaire to explore VAR as career change event	Referees change their officiating to adapt to VAR, with greatest effect, in order, on pre-match preparation, players' management, public perception and then DM.

(Continued)

Table 3. (Continued).

Author & year	Aim	Sample	Methods & measures	Findings
Lucić, Babić, and Vučković (2020)	Examine perceptions of VARs and AVARs using VAR system	24 male VAR and AVAR referees in Croatia.	Quantitative questionnaire to measure perceptions of using VAR	Easy to apply VAR with necessary resources, knowledge, skills, needing lifelong learning programs.
Zglinski (2022)	Discuss VARs contribution and where it has and has not been effective	VAR situations from England, Germany, Champions League, and men's World Cup 2018.	Conceptual.	Weaknesses of VAR not only linked to technological challenges, but applying rule evaluation (black/white decisions) to evaluative standards (degree of contact).
Lago-Peñas, Ezequiel, and Anton (2019)	Examine VARs impact on decisions in elite football.	1024 matches (512 with VAR and without) from men's Bundesliga and Serie A	Quantitative generalized linear model to analyse statistics before and after VAR	Slight decrease in offsides, fouls and yellow cards, and increase in playing time with VAR, but national differences may reflect cultural diversity in football.
Errekagorri et al. (2020)	Assess VARs impact on playing time and teams' performances.	375 matches from Spanish LaLiga,	Quantitative one-way ANOVA analysis to compare 3 VAR-categories	Slight increase in playing time and goals with more VAR interventions, but slight decrease in distance run by teams.
Zhang et al. (2022)	Explore the impact of VAR on women's football matches during Women's WC.	104 matches (52 with VAR and without) from women's WC	Quantitative generalized linear model to analyse	Increase in playing time (first and second half and total). No significant changes to other variables.
Martin-Sanchez et al. (2022)	Analyse physical demands of elite male and female referees	36 elite football referees (19 male, 17 female) in 409 matches in Spain	Quantitative generalized model (independent T-test)	Male referees experienced greater physical demands than female referees

studies dealing with gender issues and football refereeing ($n = 14$) and 2) VAR and football refereeing ($n = 13$). The results of the scoping review are summarized in [Table 3](#).

Gender and refereeing research mainly consists of studies from the USA, Canada and the UK. However, this also appear to be a rapidly developing field, considering five studies were published between 2019–2022,²⁹ while only one study was dated before 2014.³⁰ Studies mostly focus on individual perspectives,³¹ barriers for career development, and experiences of being a female football referee.³² The experiences concerns female referees constantly having to prove they are good enough, while men are naturally perceived as good referees. This is often due to “good referee” being defined by stereotypes depicting female referees as incompetent, weak, unfit and unskilled.³³ Barriers for career development relates to studies showing (see [Table 4](#)) female referees being more exposed to violence and discrimination,³⁴ and experiencing a broader set of gendered barriers than their male counterparts.³⁵ These studies often have similar findings researching gendered experiences and how they work to exclude female referees. However, similarity is also due to women being treated as an homogenous group when researching referees, meaning that nuancing in how women experience refereeing differently is overlooked. Regarding footballing environments, Hacicaferoglu and Gündogdu³⁶ argues that organizations consciously working to prevent mobbing behaviour see less of this type of practice.

VAR-studies in football is also a novel field. All of the 13 included studies were published in 2019³⁷ or later.³⁸ The VAR studies consist of data from 19 different countries, mostly central Europe (England, Germany, Italy), Israel, Turkey, and the USA. VAR studies mentions referees' decision making as one of the most complex aspects of the refereeing role.³⁹ Therefore, Samuel et al.⁴⁰ emphasizes the importance of providing support for referees undergoing technical change, through setting clear goals, being tolerant of mistakes, and protecting referees from media scrutiny.

Table 4. Barriers and challenges for female referees.

Barriers and challenges for female referees
Lack of organizational support (Kim and Hong, 2016)
Being depicted as a <i>female</i> referee (Reid and Dallaire, 2019)
Negotiating towards ‘masculine identity’ as referee (Reid and Dallaire, 2020; Forbes, Edwards, and Fleming, 2015)
More exposed to mobbing than male referees, and mobbing with gendered aspect (Hacicaferoglu and Gundogdu, 2014)
Lack of peer-group support (Kim and Hong, 2016)
More responsible for domestic chores (Perreau-Niel and Erard, 2015) and increased work-family conflict (Kim and Hong, 2016)

However, I argue that these studies examines the *outcome* of decision-making processes rather than referees’ experiences using VAR. The outcome of decisions,⁴¹ are studied through quantitative mapping studies of how VAR impacts the total number of decisions.⁴² Table 5 shows an overview of which situations the included studies focus on:

Table 5. Quantitative statistical variables in VAR studies.

Variable	References
Penalty	Lago-Peñas, Gómez, and Pollard (2021), Han et al. (2020), Holder, Ehrmann, and König (2021), (Kubayi, Larkin, and Toriola, 2021), Spitz et al. (2021), Lago-Peñas, Ezequiel, and Anton (2019), Zhang et al. (2022)
Offside	Lago-Peñas, Gómez, and Pollard (2021), Han et al. (2020), Kubayi, Larkin, and Toriola (2021), Mather (2020), Lago-Peñas, Ezequiel, and Anton (2019), Zhang et al. (2022)
Playing time (total, first and second half)	Gürler and Polat (2021), Lago-Peñas, Gómez, and Pollard (2021), Han et al. (2020), Holder, Ehrmann, and König (2021), Kubayi, Larkin, and Toriola (2021), Lago-Peñas, Ezequiel, and Anton (2019), Errekagorri et al. (2020), Zhang et al. (2022)
Passes, dribbles and crosses	Errekagorri et al. (2020)
Corner kicks	Kubayi, Larkin, and Toriola (2021), Errekagorri et al. (2020), Zhang et al. (2022)
Shots and total distance ran	Errekagorri et al. (2020)
Yellow cards	Gürler and Polat (2021), Lago-Peñas, Gómez, and Pollard (2021), Han et al. (2020), Kubayi, Larkin, and Toriola (2021), Lago-Peñas, Ezequiel, and Anton (2019), Zhang et al. (2022)
Red cards	Gürler and Polat (2021), Lago-Peñas, Gómez, and Pollard (2021), Han et al. (2020), Holder, Ehrmann, and König (2021), Kubayi, Larkin, and Toriola (2021), Spitz et al. (2021), Lago-Peñas, Ezequiel, and Anton (2019), Zhang et al. (2022)
Fouls	Lago-Peñas, Gómez, and Pollard (2021), Han et al. (2020), Lago-Peñas, Ezequiel, and Anton (2019), Errekagorri et al. (2020), Zhang et al. (2022)
Frequency of decisions	Gürler and Polat (2021)
Goals per game	Gürler and Polat (2021), Lago-Peñas, Gómez, and Pollard (2021), Han et al. (2020), Kubayi, Larkin, and Toriola (2021), Spitz et al. (2021), Lago-Peñas, Ezequiel, and Anton (2019), Errekagorri et al. (2020), Zhang et al. (2022)

The focus of these studies is how (potential) changes in outcome of decisions represents evidence of how VAR impacts the game of football. For instance, Errekagorri et al.⁴³ studies how VAR increases total playing time and physical performance. They argue that changes are relatively small,⁴⁴ which e.g. Lago-Peñas et al.⁴⁵ supports, and concludes that VAR does not modify the game of football.⁴⁶

However, when evaluating VAR’s impact on the game of football, it is important which decisions are evaluated (see Table 4). For instance, Spitz et al.⁴⁷ leaves all “grey zone” situations out of their analysis, which contributes to an image of the efficiency of VAR. Excluding all “grey zone” situations makes VAR appear more accurate than it really is, creating a falsified image of VAR’s efficiency. Consequently, experiences of referees working with a tool which appears to be perceived as infallible, while they tend to be blamed for mistakes, is overlooked in current research.

Discussion: setting a research agenda

As the results indicate, there are two topics which will be important in future research agenda: 1) VAR research ignoring the referee, and 2) VAR in football being a gender blind research field. The results shows that research has yet to examine how the implementation of VAR may impact the gendering of football refereeing. This is already present when considering experiences by female

referees. These often relate to how they are perceived by players and coaches⁴⁸ and gender based assumptions about abilities as referees.⁴⁹ VAR research seems to ignore the referees, and therefore ignores technology and gender issues, in refereeing. In this section, I discuss the findings from the 27 identified articles jointly from a meta-perspective. Based on this discussion a research agenda is proposed.

VAR research: ignoring the referee?

Lago-Peñas et al.⁵⁰ state that the purpose of technology in refereeing is threefold: to support referees' decisions, to replace decisions, and to help in the enforcement of the rules. VAR is placed in the first category as a supporting technology for referees.⁵¹ The 13 identified VAR-studies indicates that VAR research mostly focuses on the outcome of decisions the referee makes, rather than the refereeing role.⁵² Referees are treated as passive agents, rather than stakeholders making decisions that affects the outcome of situations, with or without VAR.

The outcome of decisions refers to differences in a number of variables (see Table 4), but not VAR's role in changing referees' decision-making processes. For instance, VAR is credited for making the outcome of decisions fairer, but when mistakes are made the referee tends to get the blame. A common narrative for the legitimization of VAR in current research is how it improves accuracy and issues of bias in refereeing.⁵³ There appear to be expectations of eliminating bias and having flawless refereeing decisions when VAR is implemented. This may cause a shift in who has authority when making such decisions, e.g. when on-field referees do not adhere to the VAR recommendations.⁵⁴ Samuel et al.⁵⁵ argue that: "there is zero room for errors in the VAR, while on-field errors get more tolerated". The intended impartialness of referees, influenced mostly by external factors (e.g. crowd noise), causes a well-documented home team advantage (bias), often in the form of penalties given, stoppage time decisions, and disciplinary sanctions.⁵⁶

Holder et al.⁵⁷ suggests home team bias persists with VAR due to the advantages of playing in one's local surroundings. VAR does not eliminate bias yet, although Han et al.⁵⁸ suggest that when VAR technology improves, decisions made with VAR will become faster and more accurate. Hence, when there was home team bias before VAR it was the referee's fault, but when the same bias persists after VAR's implementation it is due to the advantages of playing at home (known surroundings, friendly atmosphere, etc.). Therefore, VAR research implicitly (or in the case of Han et al.⁵⁹, explicitly) argues that referees have to adapt their refereeing style to fit VAR, not vice versa. This could mean referees supporting the technology rather than the technology supporting referees, which Lago-Peñas et al. argues is the purpose.⁶⁰

A main finding from this analysis is that current VAR studies tend to overlook the infallibility of football refereeing. Zglinski⁶¹ argues that one of the problems with VAR is that it is presented as a neutral tool that "always" makes the right call. This is problematic considering that there is not always a clear right or wrong answer. Many decisions are "grey zone" decisions, that can go either way. This may result in situations where referees are overturned by VAR, or "hold back", because they know VAR will (can/should) intervene. Holder et al.⁶² argues that the number of penalties awarded by referees directly after VAR's implementation has decreased, which could be an example of referees withdrawing from making penalty decisions for fear of "losing face".⁶³ Not withdrawing from decision-making may be extra challenging for inexperienced referees, who tend to be more insecure when making decisions.⁶⁴

Holder et al.⁶⁵ conclude that as VAR does not often intervene, the fear of "losing face" is minimal amongst football referees in Germany and Italy. However, the number of penalties given with VAR match the number of penalties before VAR, because VAR detects many of these situations and corrects the referees' decisions. This is interpreted as evidence of the effectiveness of VAR, which overlooks that by having VAR, the fear of "losing face" exists, and the tendency to withdraw from making decisions is amplified.⁶⁶ Reviewed literature demonstrates that research currently ignores how referees' experiences VAR, and how VAR may force referees into a more passive refereeing

role, since the fear of being corrected may increase. If referees are more inclined to withdraw from decision-making⁶⁷ VAR may move into the second purpose of technology in sports refereeing: replacing decisions.⁶⁸ Withdrawing from decision-making has serious impact on both the refereeing role, and the game itself, and should be given greater attention in VAR research. For example using qualitative approaches to explore how referees experience VAR as a tool intervening the decision-making processes. Samuel et al.⁶⁹ argues studies have yet to investigate how referees modify their officiating style with VAR, underlining a main finding from the reviewed literature: VAR research seems to overlook the referee.

Studies should investigate how the power balance between VAR and the head referee affects the refereeing role and the use of VAR, especially with mix-gender refereeing teams. For one, quantitative studies could examine the gender representation across refereeing teams, and VAR-teams. VAR is not “just” a technological tool, but is worked by humans who make decisions about what to review and where to recommend changes to the on-field referee. Therefore, qualitative studies could explore how this is experienced by men and women working with VAR. Of the reviewed VAR studies, only Lucić et al.⁷⁰ and Samuel et al.⁷¹ refer to referees’ experiences of the implementation of VAR. Lucić et al.⁷² does this through a quantitative approach (see Table 3), focusing on expectations and factors for the implementation of VAR to be successful. However, the authors do not explore why some of these factors are important. For instance, arguing that VAR “works better than expected”,⁷³ without discussing what referees expected from VAR in the first place. Samuel et al.⁷⁴ examines how referees experience VAR as a new tool in their careers as elite referees, and is the only identified study of how referees experience VAR.

Additionally, the effect of longer games, which studies show to be a consequence after implementing VAR,⁷⁵ largely due to VAR checks taking additional time, is something future studies should investigate. Prolonged games, involving more start-stops (the game is stopped during VAR checks) might increase the risk of injuries for players and referees. A hypothesis to examine in future studies could be that the physical requirements of elite refereeing will increase following the implementation of VAR. Further hypothesis to investigate could be how the increased physical requirements impacts training load and motivation among referees.

Regarding training, Spitz et al.⁷⁶ argues referees should have more decision-making training to secure consistency in decisions. Lucić et al.⁷⁷ argues VAR-training should happen throughout referees’ careers while Samuel et al.⁷⁸ argues referees’ needing enough time to learn and work with VAR before implementation to make it successful. In other words, quantitative studies examining the contents and structure of VAR-training would be valuable, as is qualitative studies exploring how referees experience this training, and any needs for additional training. A hypothesis is that the increased need for training and the importance of training all aspects of VAR will lead to an increase in full time referees. Current VAR studies fail to discuss these issues, and as Han et al.⁷⁹ suggests, more research needs to examine how VAR impacts the refereeing role through analyses of referees’ perspectives of VAR.

There is also lack of studies with an organizational perspective on implementation of VAR. This is needed to understand how football organizations adopt and work with novel technologies, as well as issues of sexism, discrimination and the lack of gender equity in refereeing. Especially since an inherent gender bias, a strong valuation of masculinity, and heterosexuality⁸⁰ causes football organizations to overlook issues of sexism in refereeing. Specifically, there is lack of studies of how organizations can use technologies to improve gender equity in elite refereeing. A hypothesis is that there could be new possibilities to act as VAR-referee in the men’s game, which is independent of physique often highlighted as difference between male and female referees.⁸¹ Also, professionalizing the women’s game, and making the step towards female referees being full-time referees. Studies needs to explore how technologies might impact the retention of female elite football referees and the recruitment and promotion of women in elite football refereeing. This could be done through both quantitative and qualitative approaches. Qualitatively exploring how the above-mentioned possibilities are perceived by the governing bodies in football, as well as the (female)

referees themselves is needed. Quantitative approaches could investigate the hypothesis that female referees given VAR-education and practice will continue as referees longer than those excluded from VAR. Another option is survey studies examining the possibilities and challenges organizations experience regarding the impact of novel technologies on gender equity. As men are assumed to be “closer” to the notion of a “football referee” identity⁸² football organizations need to invest in well-being and security of referees to avoid losing organizational knowledge and suffer reputational damage if referees quit.⁸³ As of now, becoming a “good referee” seems to be each individual woman’s task, rather than part of a collective, organizational concern.⁸⁴

VAR in football: a gender-blind research field

None of the identified studies examined how the implementation of VAR impacts the gendering of football refereeing. At present, VAR research consists of studies of men’s football, as all but one⁸⁵ of the VAR studies included ($n = 13$) in this review have been conducted on men’s football. This can be seen as a consequence of VAR almost exclusively being implemented in men’s football leagues globally. The fact that sports technologies are expensive⁸⁶ combined with women’s football being commercially limited compared to men’s football (e.g. fewer cameras in TV production, and unfavourable broadcasting times) limits the growth of women’s football.⁸⁷ Men’s football is financially strong and enjoys more attention from TV companies which makes VAR a digital sports technology affecting gender relations. Therefore, VAR (unintentionally) contributes to the prolonged discrimination of women in football⁸⁸ by being a type of technological development increasing the commercialization differences between men’s and women’s elite football.

This is shown in research as well, where Han et al.⁸⁹ states the tournaments internationally using VAR without mentioning the women’s World Cup. Likewise, Kubayi et al.⁹⁰ explore the impact of VAR in the men’s World Cup of 2014 and 2018 (before and after VAR), but fail to mention why they not examine the women’s World Cup of 2015 and 2019 (before and after VAR). Thus, current research seems to overlook examples of the implementation of VAR in women’s football, underlining the intertwining of technology and gender. Gender relations might come in to play when a woman uses VAR to “correct” a male referee, or vice versa, given that the refereeing role is traditionally associated with men and masculinity.⁹¹ This contributes to technologies affecting gender relations.⁹²

The lack of gender perspectives in VAR research could be due to VAR mostly being implemented in men’s football. The fact that few women are employed as coaches and referees in men’s elite football,⁹³ might increase gendering of football referees currently overlooked by current research. Still, gender perspectives should also be applied with data from only men’s football to problematize Fox et al.’s⁹⁴ claim that technology is developed by, and for, men. The use of masculinity perspectives could be utilized as men too are gendered in regards to expectations towards them in refereeing.

Gendered stereotypes of the refereeing role⁹⁵ might increase with VAR, especially with the extensive implementation in men’s football. Most VAR studies shows how gender is taken for granted through the language used, for example using “he” when talking about referees, as Errekaigorri et al.⁹⁶ do. Also, Gürlür and Polat⁹⁷ refer to the referee as “he” or “his”, as do Holder et al.⁹⁸ This makes VAR gendered by association, which Wajcman et al.⁹⁹ argues happens when technology is developed and used in gender-blind ways. Studies using poststructuralist perspectives analysing power and language could give insights regarding gendered consequences of skewed power balance represented through the way “referee” is understood. This also occurs in studies on gender issues in refereeing where it is implicit who is a referee, e.g. when discussing education levels: “to move up from Regional to Federation level *he* has to pass an examination”.¹⁰⁰ The same thing occurs in Karabulut et al.¹⁰¹, Ignatov et al.¹⁰², and Hacıcaferoglu and Gündođdu¹⁰³ when discussing referees’ education levels. Implicitly, a referee is a man, and a woman referee is something unusual. Therefore, expectations of masculinity in refereeing with VAR could be examined. Since studies of

gender issues in refereeing shows that when examining gender in refereeing it is women in refereeing, studies should be examining the homosocial experiences with a gendered lens. Additionally, qualitative studies with male referees examining how expectations around masculinity are furthered in VAR would be valuable.

A main finding in this review is that both identified research fields are shaped by an apparent sex-data gap, creating the paradox of women being the focus of gender in refereeing, while at the same time being overlooked in studies. The field of gender issues in refereeing, where all 13 included studies to some degree focus on gender and the refereeing role, had a total sample of 1901 referees (elite or amateur) as informants. Only 228 of them were female referees (1673 male), across both qualitative and quantitative studies. That means that only 12% of the informants in the identified articles in the field of gender and refereeing are female referees. The academic literature on football remains dominated by work on the men's game.¹⁰⁴ One of the studies¹⁰⁵ considers women to have more barriers becoming football referees, based on a survey of 148 football referees of whom only 9 are women. Hence, women are seldom present in referee studies, also where gender is an explicit purpose of study. The exception is qualitative studies exclusively focusing on experiences and barriers (see Table 5) of being a *female* referee.¹⁰⁶ Kavasoğlu¹⁰⁷ includes 7 referees, of whom 2 are women, the reason being that few women referee football in Turkey. Those who were included only contributed through informal conversations in fear of being recognized.¹⁰⁸ There is also a need to nuance the category of women used in these studies and include intersectional perspectives. The experiences of e.g. being a women of colour from outside of Europe being a referee in the age of VAR might be different from white women in Europe.

Against this backdrop, studies would do well to explore which referees are given (access to) VAR-training. There is a need to deepen the understanding of how technologies like VAR, when developed and used for mainly men's football, contribute to the discrimination of women.¹⁰⁹ Especially since technology increases differences in commercialization between men's and women's football.¹¹⁰ A hypothesis in such studies might be that male referees will have greater access to VAR. Another hypothesis is that since VAR requires more referees per game, young (male) referees might be promoted earlier. On the other hand, experienced referees might stay in refereeing longer after VAR, especially since the impact of ageing has shown to be overstated in refereeing.¹¹¹ A hypothesis could be that the limited physical requirements of being a VAR-referee prolongs referees career in elite football, reducing the chance of promoting (female) referees, since new positions does not become available.

Access to VAR-training is also related to geographical location. Most of the analysed VAR studies are situated in Europe.¹¹² Only three of the identified empirical VAR studies are from other parts of the world: China,¹¹³ Israel¹¹⁴ and Brazil/Russia.¹¹⁵ This is a somewhat skewed representation, given that VAR is used globally. For instance, the USA has used VAR in the men's league (MLS) since 2017, and it has also been implemented in the Argentinian league, the Uruguayan league, and the CONCACAF World Cup qualifiers in South and North America. Furthermore, VAR is also used in South Korea and Japan in Asia, and Morocco and Tunisia in Africa. However, studies in other languages may have investigated some of these contexts, which would naturally add to the current knowledge of VAR globally. Still, quantitative studies examining the differences, globally and between men and women's football, in VAR-use is valuable. One hypothesis might be that the extensive implementation of VAR in European men's football gives male referees in this region an advantage.

VAR-studies representing other contexts than Europe is needed especially considering the reviewed literature shows issues of gender discrimination experienced by female referees seem to be global, with similar findings in different countries and continents, spanning from Canada,¹¹⁶ the UK,¹¹⁷ Bulgaria,¹¹⁸ Turkey,¹¹⁹ South-Korea¹²⁰ and France.¹²¹ It is also evident that most of the studies are from North America or Europe. Elsewhere in the world there is a lack of studies in the fields of gender and refereeing, and refereeing and VAR, which is noteworthy considering the global span of football as a sport.

Since the implementation in 2018/19,¹²² VAR has gotten a lot of media attention. This makes for interesting data for researchers to investigate. I suggest two ways of doing such research: 1) using media texts to formulate research questions and hypothesis' based on current discourses in football. One concrete example would be to investigate consequences for referees making mistakes with VAR, especially when being past the age limit of on-field referees.¹²³ 2) utilizing media texts as data for quantitative or qualitative content analysis to study how VAR is gendered in various ways. The discussions regarding VAR in women's football is relevant to expand the field of VAR, gender and refereeing.¹²⁴ This could also be done comparatively across different countries. Furthermore, intersectionality perspectives (with VAR) is also something for further studies to investigate, through e.g. experiences of being a referee of colour¹²⁵ or minorities such as Sikh.¹²⁶

What's at stake? Concluding thoughts on the need for gender perspectives in VAR research

This review shows that VAR is a gender blind research field. This gender blindness is both methodological and through categorizations of referee as "he". There is a need for research examining gendered consequences of VAR, given that technology impacts gender relations and have been shown to contribute to the discrimination of women, in other social contexts.¹²⁷ Additionally, with exceptions of a few studies,¹²⁸ there is a need to explore both VAR and gendered aspects of refereeing in Asia and Africa. VAR is implemented in many countries and leagues globally, including Thailand, Japan, South Korea, Morocco and Tunisia. Therefore, this type of research is just as important in Asia and Africa as it is in the global north, since VAR contributes to shaping women's conditions and career possibilities as referees. However, VAR-studies mostly focus on the outcome of decision-making processes, rather than VAR's impact on the refereeing role.

None of the analysed studies examines: 1) the understanding of how VAR impacts the refereeing role, authority, and decision making from the referees' perspective, 2) how the implementation of VAR may intentionally or unintentionally hinder or promote women in elite refereeing, or 3) structural analyses of how VAR can be used as a tool for the promotion of gender equity in elite football refereeing by football organizations. Future studies could employ masculinity, intersectionality, poststructuralist and mediatization perspectives to these concerns, given the current lack of gender equity amongst referees and the organizations working with referees as instructors, mentors, and administrators.

The gendered inequalities of VAR highlighted in this review is pivotal given the skewed gender representation in elite refereeing. Recruitment and retention of referees is already a major challenge,¹²⁹ but becomes even harder if women is excluded from recruitment. VAR reinforces gendered inequalities, while at the same time requiring more referees per game.¹³⁰ This might cause female referees to be even more marginalized, instead of VAR providing new possibilities for a career in refereeing. Therefore, the future of elite refereeing might be in jeopardy

Notes

1. Chen and Davidson, "English Premier League manager perceptions"; Fisne et al., "Analysis of Perceptions of Turkish Fans"; Samuel et al. "Implementation of the Video Assistant Referee"; and Scanlon et al., "It's not football anymore".
2. FIFA, "Video Assistant Referee Technology".
3. Han et al., "Influence of Video Assistant Referee"; Lago-Peñas et al., "How Does VAR Modify Elite Soccer"; and Spitz et al., "VAR: Impact of Technology".
4. Jones and Edwards, "Woman in Black"; Reid and Dallaire, "Marginalization of female soccer referees"; Reid and Dallaire, "I'd like to think I'm a good referee".
5. Fasting et al., "Norwegian Elite Level Coaches"; and Reid and Dallaire, "Marginalization of female soccer referees".

6. Fox et al., *Women, Gender and Technology*; and Harris, "Technology and Violence Against Women"
7. Fox et al., *Women, Gender and Technology*
8. Fox et al., *Women, Gender and Technology*
9. Wajcman et al., "Digital Revolution: Implications for Gender Equality".
10. Cardinale and Varley, "Wearable Training-Monitoring Technology".
11. Jesson et al., *Doing your literature review*
12. Gusenbauer and Haddaway, "Which academic search systems are suitable".
13. Samuel et al., "Soccer Refereeing in the VAR Era".
14. Fisne et al., "Analysis of Perceptions of Turkish Fans"; Hamsund and Scelles, "Fans" Perceptions Towards VAR"; and Winand et al., "Sports Fans and Innovation".
15. Íspa et al., "Clustering English Premier League Referees".
16. Nordstrom et al., "Behind the Stripes".
17. Samuel et al., "Integrated Conceptual Framework of Decision-Making".
18. Sanchez et al., "Confirmatory Factor Analysis and Validity".
19. Forbes et al., "Women can't referee"; and Jones and Edwards, "Woman in Black".
20. Zhang et al., "The effect of the Video Assistant Referee"; Martin-Sanchez et al., "Physical demands in elite football referees".
21. Thagaard, *Systematikk og Innlevelse*
22. Thagaard, *Systematikk og Innlevelse*
23. Bratberg, *Tekstanalyse for Samfunnsvitere*
24. Bratberg, *Tekstanalyse for Samfunnsvitere*
25. Thagaard, *Systematikk og Innlevelse*
26. Ibid., 173.
27. No articles published in Scandinavian languages were identified.
28. Peters et al., "Updated methodological guidance".
29. Kavasoglu, "Construction of Compulsory Heterosexuality"; Reid and Dallaire, "Marginalization of female soccer referees"; Reid and Dallaire, "I'd like to think I'm a good referee"; Webb, "Sports Match Official Research"; Martin-Sanchez et al., "Physical demands in elite football referees".
30. Meân, "Identity and Discursive Practice".
31. Reid and Dallaire, "Marginalization of female soccer referees"; Reid and Dallaire, "I'd like to think I'm a good referee".
32. Perreau-Niel and Erard, "French football referees".
33. Reid and Dallaire, "I'd Like To Think I'm A Good Referee".
34. Selvi & Karagün, "Violence Tendency, Resilience and Decision-Making"
35. Reid and Dallaire, "I'd Like To Think I'm A Good Referee".
36. Hacıcaferoglu and Gündogdu, "Surveying the Exposure Level".
37. Lago-Peñas et al., "How Does VAR Modify Elite Soccer".
38. Gürler and Polat, "Video Assistant Referees` Effect"; Holder et al., "Monitoring Experts"; Lago-Peñas et al., "Effect of Video Assistant Referee on Decisions"; and Spitz et al., "VAR: Impact of Technology".
39. Errekagorri et al., "Effects of Video Assistant Referee"; Lago-Peñas et al., "How Does VAR Modify Elite Soccer"; and Spitz et al., "VAR: Impact of Technology".
40. Samuel et al., "Implementation of Video Assistant Referee". 14.
41. Errekagorri et al., "Effects of Video Assistant Referee"; Lago-Peñas et al., "How Does VAR Modify Elite Soccer"; and Lago-Peñas et al., "Effect of Video Assistant Referee on Decisions".
42. Errekagorri et al., "Effects of Video Assistant Referee"; Gürler and Polat, "Video Assistant Referees" Effect'; Kubayi et al., "Impact of Video Assistant Referee"; and Lago-Peñas et al., "Effect of Video Assistant Referee on Decisions".
43. Errekagorri et al., "Effects of Video Assistant Referee".
44. Errekagorri et al., "Effects of Video Assistant Referee".
45. Lago-Peñas et al., "How does VAR Modify Elite Soccer"; and Lago-Peñas et al., "Effect of Video Assistant Referee on Decisions".
46. Lago-Peñas et al., "How does VAR Modify Elite Soccer", 652.
47. Spitz et al., "VAR: Impact of Technology", 148–149.
48. Kim and Hong, "A red card for women"; Reid and Dallaire, "Marginalization of female soccer referees"; Jones and Edwards, "Woman in black".
49. Reid and Dallaire "I'd Like To Think I'm A Good Referee".
50. Lago-Peñas et al., "Effect of Video Assistant Referee on Decisions".
51. Lago-Peñas et al., "Effect of Video Assistant Referee on Decisions".
52. Errekagorri et al., "Effects of Video Assistant Referee"; Han et al., "Influence of Video Assistant Referee"; and Lago-Peñas et al., "How Does VAR Modify Elite Soccer".

53. Han et al., “Influence of Video Assistant Referee”; and Lago-Peñas et al., “Effect of Video Assistant Referee on Decisions”.
54. Samuel et al., “Implementation of Video Assistant Referee”.
55. Samuel et al., “Implementation of Video Assistant Referee”, 8.
56. Holder et al., “Monitoring Experts”.
57. Holder et al., “Monitoring Experts”.
58. Han et al., “Influence of Video Assistant Referee”.
59. Han et al., “Influence of Video Assistant Referee”.
60. Lago-Peñas et al., “Effect of Video Assistant Referee on Decisions”.
61. Zglinski, “Rules, Standards and VAR”.
62. Holder et al., “Monitoring Experts”.
63. Holder et al., “Monitoring Experts”.
64. Samuel et al., “Integrated Conceptual Framework of Decision-Making”.
65. Holder et al., “Monitoring Experts”.
66. Holder et al., “Monitoring Experts”.
67. Holder et al., “Monitoring Experts”.
68. Lago-Peñas et al., “Effect of Video Assistant Referee on Decisions”.
69. Samuel et al., “Implementation of Video Assistant Referee”.
70. Lucić et al., “Perceptions of Using VAR”.
71. Samuel et al., “Implementation of Video Assistant Referee”.
72. Lucić et al., “Perceptions of Using VAR”.
73. Lucić et al., “Perceptions of Using VAR”, 910.
74. Samuel et al., “Implementation of Video Assistant Referee”.
75. Errekaigorri et al., “Effects of Video Assistant Referee”; Lago-Peñas et al., “How does VAR Modify Elite Soccer”; and Lago-Peñas et al., “Effect of Video Assistant Referee on Decisions”.
76. Spitz et al., “VAR: Impact of Technology”, 150–151.
77. Lucić et al., “Perceptions of Using VAR”.
78. Samuel et al., “Implementation of Video Assistant Referee”.
79. Han et al., “Influence of Video Assistant Referee”, 666.
80. Meân, “Identity and Discursive Practice”, 790.
81. Martin-Sanchez et al., “Physical demands in elite football referees”.
82. Meân, “Identity and Discursive Practice”.
83. Kim and Hong, “A Red Card for Women”.
84. Reid and Dallaire, “Marginalization of Female Soccer Referees”.
85. Zhang et al., “The effect of the Video Assistant Referee”.
86. Cardinale and Varley, “Wearable Training-Monitoring Technology”.
87. Persson et al., “Fotball Som Kjønnen Mulighetsrom”.
88. Fox et al., *Women, Gender and Technology*
89. Han et al., “Influence of Video Assistant Referee”.
90. Kubayi et al., “Impact of Video Assistant Referee”.
91. Perreau-Niel and Erard, “French football referees”; Reid and Dallaire, “Marginalization of Female Soccer Referees”.
92. Fox et al., *Women, Gender and Technology*
93. Fasting et al., “Norwegian Elite Level Coaches”; and Reid and Dallaire, “Marginalization of female soccer referees”.
94. Fox et al., *Women, Gender and Technology*
95. Reid and Dallaire, “Marginalization of Female Soccer Referees”; Kim and Hong, “A Red Card for Women”; Forbes et al., “Women can’t referee”.
96. Errekaigorri et al., “Effects of Video Assistant Referee”, 809.
97. Gürlér and Polat, “Video Assistant Referees’ Effect”, 120.
98. Holder et al., “Monitoring Experts”.
99. Wajcman et al., “Digital Revolution: Implications for Gender Equality”.
100. Perreau-Niel and Erard, “French Football Referees”, 6 (my italics).
101. Karabulut et al., “Evaluation of Empathic Tendency Levels”, 239.
102. Ignatov et al., “Decision Making Styles”, 21.
103. Hacicaferoglu and Gündogdu, “Surveying the Exposure Level”, 123.
104. Forbes et al., “Women can’t referee”.
105. Perreau-Niel and Erard, “French Football Referees”.
106. Reid and Dallaire, “Marginalization of female soccer referees”; Reid and Dallaire, “I’d like to think I’m a good referee”; Kim and Hong “A Red Card for Women”.
107. Kavasoglu, “Construction of Compulsory Heterosexuality”.

108. Ibid., 952.
109. Fox et al., *Women, Gender and Technology*
110. Persson et al., “Fotball Som Kjønnen Mulighetsrom”.
111. Weston et al., “Ageing and Physical Match Performance”.
112. Errekaigorri et al., “Effects of Video Assistant Referee”; Holder et al., “Monitoring Experts”; Lago-Peñas et al., “How does VAR Modify Elite Soccer”; Lago-Peñas et al., “Effect of Video Assistant Referee on Decisions”; and Lucić et al., “Perceptions of Using VAR”.
113. Han et al., “Influence of Video Assistant Referee”.
114. Samuel et al., “Implementation of Video Assistant Referee”.
115. Kubayi et al., “Impact of Video Assistant Referee”.
116. Reid and Dallaire, “Marginalization of Female Soccer Referees”; and Reid and Dallaire, “I’d Like To Think I’m A Good Referee”.
117. Forbes et al., “Women Can’t Referee”.
118. Ignatov et al., “Decision Making Styles”.
119. Hacicaferoglu and Gündoğdu, “Surveying the Exposure Level”; and Kavasoglu, “Construction of Compulsory Heterosexuality”.
120. Kim and Hong, “A Red Card for Women”.
121. Perreau-Niel and Erard, “French Football Referees”.
122. FIFA, “Video Assistant Referee Technology”.
123. Newbould, “Lee Mason Leaves PGMOL”.
124. Chenard et al., “NSWL to Implement Video Review”.
125. Anka, “You Stand Out More”.
126. Reuters, “First Sikh Assistant Referee”.
127. Fox et al., *Women, Gender and Technology*
128. Han et al., “Influence of Video Assistant Referee”; and Kim and Hong, “A Red Card for Women”.
129. Webb et al., “Striving for Excellence”.
130. FIFA, “Video Assistant Referee Technology”.

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Bibliography

- Anka, C. “‘You Stand Out More’ – What It’s Like to Be a Referee of Colour”. *The Athletic*. (2022). October 23rd <https://theathletic.com/3731769/2022/10/31/black-referees-football-ethnicity/>.
- Bratberg, Ø. *Vol 1. Tekstanalyse for samfunnsvitere*. Oslo: Cappelen Damm Akademisk, 2014.
- Cardinale, M., and M.C. Varley. “Wearable Training-Monitoring Technology: Applications, Challenges, and Opportunities.” *International Journal of Sports Physiology & Performance* 12, no. s2 (2017): S2-55-S2-62. doi:10.1123/ijspp.2016-0423.
- Chenard, C.A., D. Fischer, F. Mariscal, K. Nesbitt, and K. Koroleva. “NSWL to Implement Video Review Next Season.” *Professional Referee Organization* (November 26th 2022). Proreferees (blog). <https://proreferees.com/2022/11/26/nwsl-to-implement-video-review-next-season/>.
- Chen, R., and N.P. Davidson. “English Premier League Manager Perceptions of Video Assistant Referee (VAR) Decisions During the 2019-2020 Season.” *Soccer and Society* 23, no. 1 (2022): 44–55. doi:10.1080/14660970.2021.1918680.
- Errekaigorri, I., J. Castellano, I. Echeazarra, and C. Lago-Peñas. “The Effects of the Video Assistant Referee System (VAR) on the Playing Time, Technical-Tactical and Physical Performance in Elite Soccer.” *International Journal of Performance Analysis in Sport* 20, no. 5 (2020): 808–817. doi:10.1080/24748668.2020.1788350.
- Fasting, K., M.K. Sisjord, and T.S. Sand. “Norwegian Elite-Level Coaches: Who are They?” *Scandinavian Sports Studies Forum* 8, (2017): 29–47.
- FIFA. *Video Assistant Referee (VAR) Technology*, 2022. <https://www.fifa.com/technical/football-technology/standards/video-assistant-referee>.
- Fişne, M., S. Bardakçı, and A. Hasaan. “Analysis of Perceptions of Turkish Fans of Video-Assistant-Referees in Elite Soccer.” *South African Journal for Research in Sport, Physical Education and Recreation* 43, no. 2 (2021): 29–46. doi:10.10520/ejc-sport_v43_n2_a3.
- Forbes, A., L. Edwards, and S. Fleming. “‘Women Can’t referee’: Exploring the Experiences of Female Football Officials within UK Football Culture.” *Soccer and Society* 16, no. 4 (2015): 521–539. doi:10.1080/14660970.2014.882829.

- Fox, M.F., D.G. Johnson, and S.V. Rosser. *Women, Gender, and Technology*. Urbana and Chicago: University of Illinois Press, 2006.
- Gürler, C., and V. Polat. "Video Assistant Referee's Effect on Football: Turkish Super League Case." *RBF-Revista Brasileira de Futsal e Futebol* 13, no. 52 (2021): 118–124.
- Gusenbauer, M., and N.R. Haddaway. "Which Academic Search Systems are Suitable for Systematic Reviews or Meta-Analysis? Evaluating Retrieval Qualities of Google Scholar, PubMed, and 26 Other Resources." *Research Synthesis Methods* 11, no. 2 (2020): 181–217. doi:10.1002/jrsm.1378.
- Hacıcaferoğlu, S., and C. Gündoğdu "Surveying the Exposure Level of Intimidation (Mobbing) Behaviours of the Football Referees." *Journal of Physical Education and Sport* 14, no. 1 (2014): 120–126.
- Hamsund, T., and N. Scelles. "Fans' Perceptions Towards Video Assistant Referee (VAR) in the English Premier League." *Journal of Risk and Financial Management* 14, no. 12 (2021): 573. doi:10.3390/jrfm14120573.
- Han, B., Q. Chen, C. Lago-Peñas, C. Wang, and T. Liu. "The Influence of the Video Assistant Referee on the Chinese Super League." *International Journal of Sports Science & Coaching* 15, no. 5–6 (2020): 662–668. doi:10.1177/1747954120938984.
- Harris, B.A. 'Technology and Violence Against women'. *The Emerald Handbook of Feminism, Criminology and Social Change*. Emerald Publishing Limited, 2020.
- Holder, U., T. Ehrmann, and A. König. "Monitoring Experts: Insights from the Introduction of Video Assistant Referee (VAR) in Elite Football." *Journal of Business Economics* 92, no. 2 (2021): 285–308. doi:10.1007/s11573-021-01058-5.
- Ignatov, G., I. Ivanov, and R. Miryanov. Decision Making Styles of Elite Football Referees in Bulgaria. *Activities in Physical Education & Sport* 8 (2018): 21–23.
- İspa, M., U. Yarışan, and T. Kaya. "Clustering English Premier League Referees Using Unsupervised Machine Learning Techniques." International Conference on Intelligent and Fuzzy Systems. Springer, Cham, 2021.
- Jesson, J., L. Matheson, and F.M. Lacey. *Doing Your Literature Review: Traditional and Systematic Techniques*. London: SAGE Publications, 2011.
- Jones, C., and L.L. Edwards. "The Woman in Black: Exposing Sexist Beliefs About Female Officials in Elite Men's Football." *Sport, Ethics & Philosophy* 7, no. 2 (2013): 202–216. doi:10.1080/17511321.2013.777771.
- Karabulut, E.O., A. Pultur, Z. Bahadır, and B.M. Turan. "Evaluation of Empathic Tendency Levels of Active Football Referees of Ankara Region". *Science, Movement and Health* 14, no. 2 (2014): 238–242.
- Kavasoglu, İ. "The Construction of Compulsory Heterosexuality by Referees in Women's Football in Turkey." *Journal of Gender Studies* 30, no. 8 (2021): 949–963. doi:10.1080/09589236.2020.1869535.
- Kim, M.-C., and E. Hong. "A Red Card for Women: Female Officials Ostracized in South Korean Football." *Asian Journal of Women's Studies* 22, no. 2 (2016): 114–130. doi:10.1080/12259276.2016.1168156.
- Kubayi, A., P. Larkin, and A. Toriola. "The Impact of Video Assistant Referee (VAR) on Match Performance Variables at Men's FIFA World Cup Tournaments". Proceedings of the Institution of Mechanical Engineers, Part P: Journal of Sports Engineering and Technology (2021). doi:10.1177/1754337121997581.
- Lago-Peñas, C., R. Ezequiel, and K. Anton. "How Does Video Assistant Referee (VAR) Modify the Game in Elite Soccer?" *International Journal of Performance Analysis in Sport* 19, no. 4 (2019): 646–653. doi:10.1080/24748668.2019.1646521.
- Lago-Peñas, C., M. Gómez, and R. Pollard. "The Effect of the Video Assistant Referee on Referee's Decisions in the Spanish LaLiga." *International Journal of Sports Science & Coaching* 16, no. 3 (2021): 824–829. doi:10.1177/1747954120980111.
- Lucić, I., S. Babić, and D. Vučkov "Perception of Using VAR Technology in Football After Completion of Training and Education and Experiences of Croatian Video Assistant Referees (VARs) and Assistant VARs (AVARs)". Paper presented at the 43rd International Convention on Information, Communication and Electronic Technology (MIPRO), Opatija, Croatia, September 28–October 2, 2020.
- Martin-Sanchez, M.L., J.M. Oliva-Lozano, J. Garcia-Unanue, J. Luis Felipe, V. Moreno-Pérez, L. Gallardo, and J. Sánchez-Sánchez. "Physical Demands in Spanish Male and Female Elite Football Referees During the Competition: A Prospective Observational Study." *Science and Medicine in Football* 6, no. 5 (2022): 566–571. doi:10.1080/24733938.2022.2145015.
- Mather, G. "A Step to VAR: The Vision Science of Offside Calls by Video Assistant Referees." *Perception* 49, no. 12 (2020): 1371–1374. doi:10.1177/0301006620972006.
- Mean, L. "Identity and Discursive Practices: Doing Gender on the Football Pitch." *Discourse & Society* 12, no. 6 (2001): 789–915.
- Newbould, K. "Lee Mason Leaves PGMOL After Arsenal Mistake Allows City to Go Top of the League". *Manchester Evening News*. (2023). February 18th, sec. Football News. <https://www.manchestereveningnews.co.uk/sport/football/football-news/man-city-arsenal-mason-quits-26271326>.
- Nordstrom, H., S. Warner, and J.C. Barnes. "Behind the Stripes: Female Football officials' Experiences." *International Journal of Sport Management and Marketing* 16, no. 3–6 (2016): 259–279. doi:10.1504/IJSM.2016.077934.

- Perreau-Niel, A., and C. Erard. "French Football Referees: An Exploratory Study of the Conditions of Access and Employment for Referees in Terms of Level and Gender." *Soccer and Society* 16, no. 1 (2015): 1–16. doi:10.1080/14660970.2012.627168.
- Persson, M., K. Stefansen, and Å. Strandbu. "Fotball som kjønnet mulighetsrom. Hvilken betydning har metafortellingen om kvinnefotball for unge jenters idrettsprosjekt?" *Tidsskrift for Kjønnforskning* 44, no. 3 (2020): 231–245. doi:10.18261/issn.1891-1781-2020-03-05.
- Peters, M.D.J., C. Marnie, A.C. Tricco, D. Pollock, Z. Munn, A. Lyndsay Patricia McInerney, C.M. Godfrey, and H. Khalil. "Updated Methodological Guidance for the Conduct of Scoping Reviews." *JBI Evidence Synthesis* 18, no. 10 (2020): 2119–2126. doi:10.11124/JBIES-20-00167.
- Reid, K., and C. Dallaire. "'Because There are so Few of us': The Marginalization of Female Soccer Referees in Ontario, Canada." *Women in Sport & Physical Activity Journal* 27, no. 1 (2019): 12–20. doi:10.1123/wspaj.2017-0031.
- Reid, K., and C. Dallaire. "'I'd Like to Think I'm a Good referee': Discourses of Ability and the Subjectivity of the Female Soccer Referee in Ontario (Canada)." *Soccer and Society* 21, no. 7 (2020): 762–777. doi:10.1080/14660970.2020.1742705.
- Reuters. 'Singh Gill is Premier League's First Sikh Assistant referee'. *Reuters*, (2023). January 4th <https://www.reuters.com/lifestyle/sports/singh-gill-is-premier-leagues-first-sikh-assistant-referee-2023-01-04/>.
- Samuel, R.D., Y. Galily, E. Filho, and G. Tenenbaum. "Implementation of the Video Assistant Referee (VAR) as a Career Change-Event: The Israeli Premier League Case Study." *Frontiers in Psychology* 11 (2020). doi: 10.3389/fpsyg.2020.564855.
- Samuel, R.D., G. Tenenbaum, and Y. Galily. "An Integrated Conceptual Framework of Decision-Making in Soccer Refereeing." *International Journal of Sport and Exercise Psychology* 19, no. 5 (2021): 738–760. doi:10.1080/1612197X.2020.1766539.
- Samuel, R.D., G. Tenenbaum, and Y. Yair Galily. "Soccer Refereeing in the VAR Era: Conceptual Considerations and Training Implications." *International Journal of Sport and Exercise Psychology* 19, no. 5 (2021): 738–760. doi:10.1080/1612197X.2020.1766539.
- Sánchez, J., S. Serrat, E. Castillo, and A. Nuviala. "Confirmatory Factor Analysis and Validity of the Sexual Harassment Scale in Football Refereeing." *International Journal of Environmental Research and Public Health* 18, no. 4 (2021): 1374. doi:10.3390/ijerph18041374.
- Scanlon, C., G. Griggs, and C. McGillick. "'It's Not Football anymore': Perceptions of the Video Assistant Referee by English Premier League Football Fans." *Soccer and Society* 23, no. 8 (2022): 1–13. doi:10.1080/14660970.2022.2033731.
- Selvi, S., and E. Karagün "Violence Tendency, Resilience and Decision-Making in Foot-Ball Referees of Various Classes: An Examining for Turkey." *Progress in Nutrition* 22, no. 4 (2020): 1–8.
- Spitz, J., J. Wagemans, A.M.W. Daniel Memmert, and F.H. Werner. "Video Assistant Referees (VAR): The Impact of Technology on Decision Making in Association Football Referees." *Journal of Sports Sciences* 39, no. 2 (2021): 147–153. doi:10.1080/02640414.2020.1809163.
- Thagaard, T., vol 3. *Systematikk og innlevelse: en innføring i kvalitativ metode*. (Bergen: Fagbokforlaget, 2009).
- Wajcman, J., E. Young, and A. Fitzmaurice. "The Digital Revolution: Implications for Gender Equality and Women's Rights 25 Years After Beijing." *UN Women*, no. 36 (2020): 1–38.
- Webb, T. "Sports Match Official Research: An Evolving Narrative, Positioning Future Research." *Managing Sport and Leisure* 27, no. 3 (2022): 199–206. doi:10.1080/23750472.2020.1762304.
- Webb, T., J. O'Gorman, and L. Markham. "Striving for Excellence: Talent Identification and Development in English Football Refereeing." *European Sport Management Quarterly* 23, no. 2 (2021): 351–369. doi:10.1080/16184742.2020.1864748.
- Weston, M., C. Castagna, F.M. Impellizzeri, E. Rampinini, and S. Breivik. "Ageing and Physical Match Performance in English Premier League Soccer Referees." *Journal of Science and Medicine in Sport* 13, no. 1 (2010): 96–100. doi:10.1016/j.jsams.2008.07.009.
- Winand, M., C. Schneiders, S. Merten, and M. Marlier. "Sports Fans and Innovation: An Analysis of Football fans' Satisfaction with Video Assistant Refereeing Through Social Identity and Argumentative Theories." *Journal of Business Research* 136 (2021): 99–109. doi: 10.1016/j.jbusres.2021.07.029.
- Zglinski, J. "Rules, Standards, and the Video Assistant Referee in Football." *Sport, Ethics & Philosophy* 16, no. 1 (2022): 3–19. doi:10.1080/17511321.2020.1857823.
- Zhang, Y., D. Li, M.-Á. Gómez-Ruano, D. Memmert, C. Li, and M. Fu. "'The Effect of the Video Assistant Referee (VAR) on Referees' Decisions at FIFA Women's World Cups.'" *Frontiers in Psychology* 13: (2022). doi: 10.3389/fpsyg.2022.984367.