ORIGINAL ARTICLE

Home advantage in women's football: Comparison of Europe and America

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ABSTRACT

This study aims to investigate the home advantage in women's football leagues. Additionally, the difference between Europe and America was examined. The sample of the study is first-tier women's football leagues of England, Germany, Spain, France, and the United States. Variables of the study are stadium attendance (crowd support), goals scored and conceded (secondary performance outcomes), and number of wins, draws, and losses (tertiary performance outcomes). Related data were obtained from Two Circles, Soccer Stadium Digest, and Sports Reference. The analyses used in the study are Spearman's correlation analysis, the GLM mediation model, the Mann-Whitney U test, and the GLM moderated mediation test. The findings showed a significant relationship of stadium attendance with goals conceded, the number of wins, and the number of losses. Moreover, the number of goals conceded has a full mediation role in the effect of stadium attendance on the number of losses. In terms of regional differences; stadium attendance and the number of goals conceded are differentiated significantly. Lastly, the moderated mediation model was supported which means there was a strong mediation for Europe and no mediation for America. Consequently, this study supports the game location framework and a framework for home advantage in women's sports.

Keywords: Performance analysis, Home advantage, Women's football, Crowd support, Stadium attendance.

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INTRODUCTION

Home advantage is one of the most intriguing topics in football. However, it has been commonly studied in men's football (e.g. Bhagwandeen et al., 2024; Chacón-Fernández et al., 2025; Leite et al., 2023; Lyhagen, 2025). The market size and popularity of men's football can rationalize this attention. On the other hand, the market size of women's football has also been increasing. According to Deloitte (2024), one of the most prestigious global audit firms, the total revenue of Women's Super League clubs is expected to reach £68 million in 2025 which means 360% growth compared to 2020.

In addition to the increase in market size, stadium attendance one of the most influential factors of home advantage (Schwartz and Barsky, 1977), has also been rising in women's football (Statista, 2024). In spite of that, the number of studies in the literature that investigated the effect of home advantage in women's football is scarce. In this context, studies focused on comparing women's football leagues with men's (e.g. Leite and Diniz da Silva 2023; Pollard and Gomez, 2014), investigating the effect of COVID-19 on home advantage (e.g. Krumer and Smith, 2022), and testing the difference of league level (e.g. Leite and Pollard, 2020). Results showed that home advantage is less for women's football leagues than men's but still significant; 2nd tier of women's league had higher home advantage (55.5%) than 1st tier; ghost matches emerged due to the COVID-19 did not lead to a disadvantage for home teams in Scandinavian women's football league.

There is a novel framework of home advantage in women's sports in the literature developed by Leite (2023) that provides a theoretical basis for empirical studies. Within this scope, there are several factors that impact the home advantage in women's sports as psychological factors, travel effects, referee bias, socio-cultural factors, familiarity, physiological factors, tactical factors, and others. One of them is also crowd support that provides motivation for home players and pressure on away teams and referees.

Based on the statistics, literature review, and theoretical background above-mentioned; crowd support, the reflection of boosting and social support that the home team gets from its fandom (Courneya and Carron, 1992), can be labelled as a crucial element of home advantage. However, the literature includes limited studies regarding crowd support in women's football leagues. Therefore, the research question of this study is "*What is the effect of crowd support in women's football?*"

MATERIAL AND METHODS

Participants

The sample of the study includes the Women's Super League (England), Frauen-Bundesliga (Germany), Liga F (Spain), Arkema Prémiere Ligue (France), and National Women's Soccer League (United States). The most valuable women's football leagues were recruited in this study. In accordance with the purpose of the study, five leagues were categorized as European (England, Germany, Spain, France) and American (US). Therefore, only one season was considered for each European league and four seasons were considered for the American league to balance the number of observations. Additionally, reliable data for the stadium attendance in European leagues for the previous seasons could not provide. Hence, the total sample is 100 (Europe = 52, America = 48). The sample of the study is presented in Table 1 below.

Measures

The variables of the study are crowd support, secondary performance outcome, and tertiary performance outcome. In this context, measures are average stadium attendance (crowd support), goals scored and goals

conceded (secondary performance outcomes), and number of wins, draws, and losses (tertiary performance outcomes).

Table 1. Sample of the study.

	League	Country	Number of Clubs	Season
Europe	Women's Super League	England	12	2023-2024
	Frauen-Bundesliga	Germany	12	2023-2024
	Liga F	Spain	16	2023-2024
	Arkema Prémiere Ligue	France	12	2023-2024
America	National Women's Soccer League	United States	14	2024
	National Women's Soccer League	United States	12	2023
	National Women's Soccer League	United States	12	2022
	National Women's Soccer League	United States	10	2021

Procedures

The data were entered on the Jamovi Version 2.2 (2021). For this purpose; region, season, league, team, stadium attendance, number of wins, draws, losses, goals scored, and conceded were obtained from Two Circles, Soccer Stadium Digest, and Sports Reference (twocircles.com; soccerstadiumdigest.com; fbref.com). The hypotheses generated according to the game location framework (Courneya and Carron, 1992) and framework for home advantage in women's sports (Leite, 2023) are given below:

H_1: Crowd support has significant relationships with secondary performance outcomes.

- H_{1a}: Stadium attendance has a significant relationship with the number of goals scored.
- H_{1b}: Stadium attendance has a significant relationship with the number of goals conceded.

H_2: Crowd support has significant relationships with tertiary performance outcomes.

- H_{2a}: Stadium attendance has a significant relationship with the number of wins.
- H_{2b}: Stadium attendance has a significant relationship with the number of draws.
- H_{2c}: Stadium attendance has a significant relationship with the number of losses.

H_3: Secondary performance outcomes mediate the effect of crowd support on tertiary performance outcomes.

- H_{3a}: The number of goals scored mediates the effect of stadium attendance on the number of wins.
- H_{3b}: The number of goals conceded mediates the effect of stadium attendance on the number of losses.

H_4: Home advantage differentiates significantly between the regions (Europe/America).

- H_{4a}: Stadium attendance differentiates significantly between the regions.
- H_{4b}: The number of goals conceded differentiates significantly between the regions.
- H_{4c}: The number of goals scored differentiates significantly between the regions.
- H_{4d}: The number of wins differentiates significantly between the regions.
- H_{4e}: The number of draws differentiates significantly between the regions.
- H_{4f}: The number of losses differentiates significantly between the regions.

H_5: The mediation role of the secondary performance outcomes is moderated by the regions.

- H_{5a}: The mediation role of the number of goals scored is moderated by the regions.
- H_{5b}: The mediation role of the number of goals conceded is moderated by the regions.

Analysis

The analysis of the study was performed on Jamovi. First, the Shapiro-Wilk test was performed to test the normality of the variables. Second, Spearman's correlation analysis was performed to test the relationship among variables. Third, the GLM mediation model (Gallucci, 2020) was performed to test the mediation role. Fourth, the Mann-Whitney U test was performed to test the differentiation of the variables according to the categorical factor. Lastly, the GLM moderated mediation test was performed to test categorical differences.

RESULTS

Normality of the variables

The findings of the Shapiro-Wilk Test are presented in Table 2 below. The number of observations is 100. Mean values are 6003 (stadium attendance), 19.3 (goals scored), 16.3 (goals conceded), 5.24 (number of wins), 2.55 (number of draws), and 4.27 (number of losses). Shapiro Wilk p values are significant for all variables which means that the data is distributed non-normally.

Table 2. Normality of the variables.

Variable	*n*	*M*	*SD*	*Shapiro-Wilk W*	*Shapiro-Wilk p*
Stadium attendance	100	6003	5720	0.823	< .001
Goals scored	100	19.3	10.3	0.790	< .001
Goals conceded	100	16.3	6.99	0.973	.036
Wins	100	5.24	2.92	0.962	.006
Draws	100	2.55	1.50	0.944	< .001
Losses	100	4.27	2.55	0.956	.002

Correlation analysis

Spearman's correlation analysis was performed among non-parametric tests due to the non-normal distribution of the data. The Spearman's rho values are significant for the relationship of stadium attendance between goals conceded, number of wins, and number of losses. The relationship of stadium attendance with goals conceded is negative and strong; with number of wins is positive and moderate, and with number of losses is negative and strong. Hence, H_{1b}, H_{2a}, and H_{2c} are supported. The correlation table for the variables is presented in Table 3 below.

Table 3. Correlation analysis result.

Variable	*n*	*1*	*2*	*3*	*4*	*5*	*6*
Stadium attendance	100	-	0.031	-0.456**	0.204*	-0.121	-0.274**
Goals scored	100	0.031	-	-0.399**	0.819**	-0.304**	-0.614**
Goals conceded	100	-0.456**	-0.399**	-	-0.667**	0.050	0.834**
Wins	100	0.204*	0.819**	-0.667**	-	-0.412**	-0.751**
Draws	100	-0.121	-0.304**	0.050	-0.412**	-	-0.046
Losses	100	-0.274**	-0.614**	0.834**	-0.751**	-0.046	-

*Note. *: p < .05, **: p < .01.*

Mediation analysis

The findings of the GLM mediation model are presented in Table 4 below. The indirect effect (mediation path) is significant (p < .001, β = -0.293) and the confidence interval does not cover zero. Component paths are both significant and show that higher stadium attendance decreases the number of goals conceded (p < .001, β = -0.342) and more goals conceded increase the number of losses (p < .001, β = 0.856). The direct effect

is not significant showing that stadium attendance does not have an influence on the number of losses directly. The total effect is significant ($p < .05$, $\beta = -0.206$) showing that higher stadium attendance is related to fewer losses. Consequently, the number of goals conceded has a full mediation role in the effect of stadium attendance on the number of losses. Hence, H_{3b} is supported.

Table 4. GLM mediation model.

Type	Effect	Estimate	%95 CI		β	p
			LL	*UL*		
Indirect	Attendance⇒Goals conceded⇒Losses	-1.31e-4	-2.04e-4	-5.83e-5	-0.293	<.001
Component	Attendance⇒Goals conceded	-4.19e-4	-6.44e-4	-1.93e-4	-0.342	<.001
	Goals conceded⇒Losses	0.313	0.270	0.355	0.856	<.001
Direct	Attendance⇒Losses	3.88e-5	-1.31e-5	9.07e-5	0.087	.14
Total	Attendance⇒Losses	-9.21e-5	-1.78e-4	-6.06e-6	-0.206	.03

Note. CI = confidence interval, LL = lower limit, UL = upper limit. Confidence intervals computed with method: Standard (Delta method). Betas are completely standardized effect sizes.

Comparison of the regions

Mann-Whitney U test was performed for independent groups among non-parametric tests due to the non-normal distribution of the data. The findings of the Mann-Whitney U test are presented in Table 5 below. Within this scope, stadium attendance and the number of goals conceded are differentiated significantly. Hence, H_{4a} and H_{4c} are supported.

Table 5. Independent samples t-test.

Variable	Test	Statistic	p
Stadium attendance	Mann-Whitney U	245	< .05
Goals scored	Mann-Whitney U	983	.07
Goals conceded	Mann-Whitney U	741	< .05
Wins	Mann-Whitney U	1215	.82
Draws	Mann-Whitney U	1009	.09
Losses	Mann-Whitney U	1042	.15

Table 6. Group descriptives.

Variable	Group	n	M	SD
Stadium attendance	Europe	52	3095	4483
	America	48	91152	5256
Goals scored	Europe	52	21.58	12.67
	America	48	16.88	6.19
Goals conceded	Europe	52	18.77	8.09
	America	48	13.69	4.27
Wins	Europe	52	5.31	3.50
	America	48	5.17	2.17
Draws	Europe	52	2.33	1.50
	America	48	2.79	1.47
Losses	Europe	52	4.67	2.83
	America	48	3.83	2.16

Group descriptives were checked to interpret the differences among the regions. In this context, clubs from America had much more stadium attendance (*M* = 91152) than European clubs (*M* = 3095). In addition to the stadium attendance, American clubs conceded fewer goals (*M* = 13.69) than European clubs (*M* = 18.77).

GLM moderated mediation test was used to check the effect of the region. The findings are presented in Table 7 below. The indirect effect is significant for Europe ($p < .001$, β = -0.477) while it is insignificant for America ($p < .68$, β = 0.054). Additionally, the component effects mean that the effect of stadium attendance on the number of goals conceded ($p < .001$, β = -0.541). and the effect of the number of goals conceded on the number of losses ($p < .001$, β = 0.881) are both significant. Lastly, the direct effect of stadium attendance on number of losses is not significant ($p < .065$, β = 0.047). This confirms the full mediation role of the number of goals conceded in the model. On the other hand, the mediation model is not significant for America. Hence, the moderated mediation model was supported which means there was a strong mediation for Europe and no mediation for America. Eventually, higher stadium attendance provides fewer goals conceded which leads to fewer losses in Europe. This process is not valid for America because stadium attendance does not have a significant effect on goals conceded or losses. Thus, H_{5b} is supported.

Table 7. Moderated mediation analysis.

Type	Effect	Estimate	%95 CI		β	p
			LL	*UL*		
Europe						
Indirect	Attendance⇒Goals conceded⇒Losses	-2.07e−4	-3.28e−4	-8.64e−5	-0.477	<.001
Component	Attendance⇒Goals conceded	-6.62e−4	-0.001	-2.87e−4	-0.541	<.001
	Goals conceded⇒Losses	0.313	0.270	0.357	0.881	<.001
Direct	Attendance⇒Losses	2.03e-5	-6.84e−5	1.09e-4	0.047	.65
Total	Attendance⇒Losses	-1.87e−4	-3.37e−4	-3.73e−5	-0.419	.01
America						
Indirect	Attendance⇒Goals conceded⇒Losses	2.64e-5	-9.93e−5	1.52e-4	0.054	.68
Component	Attendance⇒Goals conceded	6.99e-5	-2.63e−4	4.03e-4	0.057	.68
	Goals conceded⇒Losses	0.378	0.334	0.422	0.937	<.001
Direct	Attendance⇒Losses	-1.08e−5	-8.53e−5	6.36e-5	-0.022	.78
Total	Attendance⇒Losses	1.56e-5	-1.17e−4	1.49e-4	0.035	.82

Note. Confidence intervals computed with method: Standard (Delta method). Betas are completely standardized effect sizes.

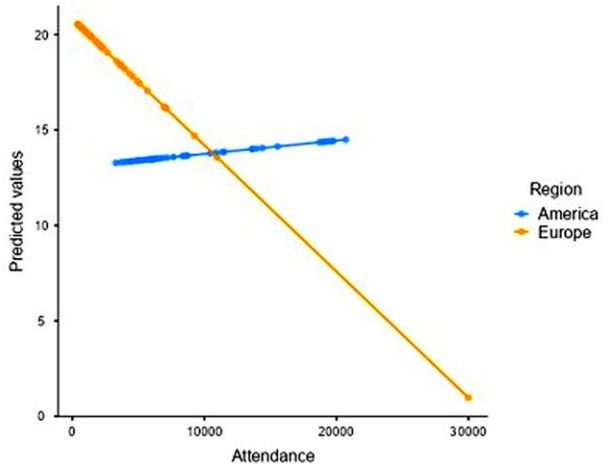

Figure 1. The scatterplot of the moderated mediation effect.

The scatterplot was used to visualize these findings (Soetaert, 2019). For this purpose, predicted values were generated to represent a moderated mediation model. In this context, predicted values were calculated via linear regression which includes the interaction term as well (attendance*region). Then the scatterplot was generated in Figure 1.

DISCUSSION

This study supports the game location framework of Courneya and Carron (1992) and a framework for home advantage in the women's sport of Leite (2023). In this respect, the crowd is a key factor for home games in women's football leagues. Additionally, the working principle of this factor in women's football was elucidated in this study. In other words, home advantage in terms of crowd provides conceding fewer goals and in turn probability of loss decreases. Therefore, it is recommended for home teams to focus on defensive strategies intensively and try to have clean sheets in home games.

In addition to the frameworks, this study also promotes some theories based on personality and gender differences. In this context, the Big Five Personality Traits developed by McGrae and Costa (1987) were examined in terms of gender differences. It was revealed that women have higher agreeableness and neuroticism, on the other hand, men have higher assertiveness (Costa et al., 2001). In this respect, the current study shows home advantage in women's football is related to goals conceded rather than goals scored. However, home advantage in men's football is more related to goal scoring (e.g. Güngör, 2025). This supports the personality differences between the genders which means the current study is parallel with the Theory of Big Five Personality Traits.

Together with the Theory of Big Five Personality Traits, Evolutionary Personality Psychology developed by Buss (1991) also claims personality differences between men and women such as women being less aggressive than men. Moreover, hormonal differences can be considered as an influential factor. Within this scope, testosterone released less in women is related to aggression, dominance, and risk-taking (e.g. Giammanco et al., 2005; Mazur and Booth, 1998; Stanton et al., 2011). This is also congruent with the current study.

From the point of regional difference, the national culture theory of Hofstede (1984, 1991) can be revealed. When Europe (England, Germany, Spain, and France) is compared with America (United States). There are noteworthy differences in the dimensions of uncertainty avoidance (Europe: 68, US: 46) and indulgence (Europe: 50, US: 68) (The Culture Factor). In this context, the US has lower uncertainty avoidance means higher openness to new experiences, freedom of expression, and lower emotional manifestation. On the other hand, the US has higher indulgence means weaker control of desires and impulses. Consequently, these traits can be a clue for the lower level of impaction for away teams in terms of crowd support.

This study has a coherence with some studies (e.g. Errico et al., 2024; Leite and Diniz da Silva 2023) in the literature as well. Accordingly, Errico and colleagues (2024) demonstrated the effect of home advantage in major women's football leagues. As distinct from the current study, they approached the crowd support as density rather than size. However, both studies confirmed the existence of home advantage via crowd. This supports the framework of Courneya and Carron (1992) that crowds can be investigated in terms of density or size. Leite and Diniz da Silva (2023) put forward the effect of socio-cultural factors on the home advantage gender gap (HAGG). Within this scope; cultural globalization, gender equality, and regional division as socio-cultural factors were explanatory roles of HAGG. This is also supportive of the current study.

Despite the theoretical contributions, this study has various limitations. From the point of regions, only five countries were included in the sample. In terms of time, the study is limited to the 2023-2024 seasons for the European Leagues. Additionally, America was just represented by the U.S. and five different seasons had to be used to balance the number of observations. The reason for these limitations is the scarce reliable statistics for stadium attendance in women's football leagues. Otherwise, the data would be enlarged. Another limitation of the study is the selection of football as the sports field.

Several suggestions can be made for future studies. For instance, apart from major women's football leagues, other leagues such as Italian, Dutch, or Portuguese can be involved. Other continents can also be incorporated in future studies such as Australia or Africa. Different kinds of sports can be compared in terms of home advantage. Other factors of home advantage as travel effect, familiarity, and referee bias, can be also investigated in women's football. Lastly, similar kinds of studies can be conducted for international teams.

CONCLUSIONS

This study investigated the home advantage in women's football leagues. For this purpose, crowd support was considered as one of the main home advantage factors. First, the relationship between crowd support and the performance outcomes of clubs was examined. The analysis demonstrated that stadium attendance significantly correlated with the number of goals conceded, wins, and losses. Then, the mediator role of goals conceded was confirmed for the effect of stadium attendance on the number of losses.

Regional differences (Europe/America) were also examined in the study. In this context, stadium attendance was higher for American women's football leagues and the number of goals conceded was less compared to the European women's football leagues. Additionally, the mediator role of the number of goals conceded was also compared according to the regions which meant the moderated-mediation role. Within this scope, this role was valid for European women's football leagues and invalid for Americans.

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DISCLOSURE STATEMENT

No potential conflict of interest was reported by the author.

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