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Gender information and perceived quality: An experiment with professional soccer performance

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ABSTRACT

Whether one looks at revenue, investment or coverage, men's sports do better than women's. Many assume that absolute differences in quality of athletic performance are the driving force. However, the existence of stereotypes should alert us to another possibility: gender information might influence perceived quality. We perform an experiment in which 613 participants viewed clips of elite female and male soccer players. In the control group, participants evaluated unmodified videos where the gender of the players is clear to see. In the treatment group, participants evaluated the same videos but with gender obscured by blurring. Using a regression analysis, we find that participants rate men's videos higher – but only when they know they are watching men. When blurring obscures the gender, ratings for female and male athletes do not differ. We discuss implications for research and the sports industry.

1. Introduction

In sports, the abilities of female athletes are closely scrutinized (Hyde, 2019; Scheadler & Wagstaff, 2018; Trolan, 2013). One especially prominent case was U.S. Soccer's employing a law firm in 2020 to defend the policy to pay Team USA male players a higher wage than female players (Dorrian, 2020). Their argument was that the women's team plays a different game with different levels of skill from the men "in the sense that men are bigger, stronger, faster" and that "there's no denying the science in that regard" (Dorrian, 2020).

When the lawyers' statement was made public, many – including sponsors – condemned it. The president of U.S. Soccer apologized and resigned shortly thereafter (Draper, 2020). Two years later, U.S. Soccer agreed to pay equal wages to the men's and women's national teams (Peterson, 2022). Despite this outcome, it is not clear to what extent the lawyers' argument is accepted. Many use beliefs about women's physical inferiority to argue that female soccer players are simply not as skilled as men (Allison, 2020). The revenue differences between women's and men's professional soccer are also

part of the ongoing debate about the relative athletic talents of men and women (Valenti et al., 2018).

Research shows that stereotypical beliefs about women as athletes influence the assessment of the quality of women's soccer (Allison, 2018; Allison & Pope, 2021). In sports – as in other male-dominated occupations – women face stereotypes regarding their abilities (Scheadler & Wagstaff, 2018). Female athletes must routinely deal with criticism of their talent and hardiness. Allison (2018) argues that a lack of investment, media coverage and exposure to sexist assertions reinforce these stereotypes in women's sports.

There is no denying that men's professional sports leagues consistently outperform their women's counterparts in economic terms, including demand figures, broadcasting revenue, franchise value, athlete pay and investment (Zimbalist, 2019).[1] However, there is also no denying that men's professional sports had a significant head start in the marketplace and that women's sports suffer from a lack of investment (Clarkson et al., 2022). The shortfalls in investment may be defended in terms of short-term profit maximization principles and negative projections of the potential long-term success of women's professional sports (Micelotta et al., 2018). Agha and Berri (2021), however, show that the same standards seen in the early years of men's professional sports leagues do not apply when judging the projections and the financial performance of women's professional sports leagues.[2]

Media coverage also differs greatly for women's and men's sports. Women's sport receives only around 4% of all sports media coverage (UNESCO, 2021), and live events are much harder to find among broadcasters (Cooky et al., 2013, 2015). Research also examines how the media covers women's sports. The focus is often more on the beauty of the participants than on the achievements of the athletes (Dietl et al., 2020; Fink et al., 2004, 2014; Kiefer & Scharfenkamp, 2018).

Sexist assertions that women's sports are boring, slow and unattractive are less common and acceptable than they were in the past, but they still exist (Allison, 2018); along with the lack of investment and enthusiasm in coverage, they still make women's performance appear dull compared to men's (Musto et al., 2017). From a managerial perspective, the question is whether gender information can influence fans and their perception of quality. The objective quality of a product is based on measurable attributes and is hard to influence; however, perceived quality is based on subjective judgments, and therefore more likely to be influenced by external factors (Mitra & Golder, 2006). It certainly is the case that women's and men's soccer differ in some physical parameters and that, for example, female soccer players run slower and cover less distance than male players (Bradley et al., 2014; Cheuvront et al., 2005).

In this paper, we examine whether gender information, which might imply stereotypical beliefs about women's athletic inferiority, influences the perception of quality of

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[1]For example, in December 2019, it was announced that David Tepper had paid $325 million for a new Major League Soccer (MLS) franchise in Charlotte, North Carolina (Negley, 2019). A few months later, it was thought the expansion fee for a new National Women's Soccer League (NWSL) team in Sacramento, California, was between $1 and $2 million (Kassouf, 2020).

[2]Today the National Football League generates more revenue than any other sports league in the world. But when it began it was far less successful. Across the first 16 years of the league, 50 NFL franchises started. Ultimately, only seven of these franchises failed to go out of business (Kelly et al., 2020). Despite a failure rate approaching 90%, the NFL kept attracting investors.

women's sports, specifically soccer. The aim is to empirically test if individuals rate the quality of women's and men's soccer performance differently if they cannot see the gender of the players. Based on hegemonic masculinity and gender imprinting theories, we hypothesize that gender information influence the perception of quality.

To test this hypothesis, we performed a novel experiment in this context.[3] Participants were shown videos of professional women's and men's soccer players scoring goals. In the treatment group, the gender of the players was blurred, making it impossible for a viewer to know if they were watching men or women. In the control group, videos were unmodified. Participants were then asked to evaluate the overall performance of the players. The results show that when participants can identify the gender of the players, men were rated higher. When the gender of the players cannot be ascertained, however, no significant differences between ratings of female and male athletes were detected.

Our results challenge the idea that the relatively low demand for women's professional soccer is due to the poor quality of female players' technical performance (Valenti et al., 2018). Additionally, the experiment shows that the willingness to pay to watch women's and men's matches only differ in the control group, where the gender of the players is clear to see. The findings have implications for coverage and investment in women's sports and how the performance of female athletes is perceived (Fink, 2015).

The paper is structured as follows. Section 2 reviews the literature and presents the theoretical framework on hegemonic masculinity and gender imprinting. Section 3 describes the experimental design and method. Section 4 presents the results. Section 5 discusses the results and the implications. Section 6 discusses limitations and future research directions.

2. Theoretical framework and literature review

2.1. Hegemonic masculinity

Sport management scholars have argued that sport is a gendered space, where hetero-sexual masculinity is dominant (Anderson, 2009; Burton, 2015; Connell, 1995). Practices and beliefs that reinforce men's status and control over other groups, including women, sustain this hegemonic masculinity (Connell & Messerschmidt, 2005). Stereotypical attributes of men (e.g., strength, competitiveness and risk preferences) are overemphasized in sports (English, 2017), and explicitly more pronounced in disciplines characterized as masculine, such as contact sports (Plaza et al., 2017). The supposed lack of these attributes is often part of the critique of women's sports (Hyde, 2019).

Traditional gender roles and stereotypes, which place a higher value on men's sports, continue to marginalize women (Kane, 1995; LaVoi & Dutove, 2012; Norman, 2010). For sport-related positions, men tend to be perceived as more competent and are evaluated more highly than women with equal qualifications (Burton et al., 2012;

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[3]The experimental approach adopted in our paper has been used in other research settings. The concept of blinding identity features to analyze behavior has also been explored in labor (Goldin & Rouse, 2000), education (Hinnerich et al., 2015) and criminal justice (Sah et al., 2015). To the best of our knowledge, ours is the first study to empirically analyze the effect of blinded decision-making in the context of gender differences in sports. See Thomson et al. (2022) and Valenti et al. (2018) for a review.

Hindman & Walker, 2020). The gender roles and stereotypes that reward masculinity traits go beyond the organizational culture of specific institutions (LaVoi & Dutove, 2012).

The presence of women in sport is always under scrutiny (Kane, 1995). Detractors target women's physical attributes (Burch et al., 2018), sexuality (Cavalier & Newhall, 2018), athletic skills (Joncheray et al., 2016) and overall value (Micelotta et al., 2018). Even female fans are not immune to detrimental perceptions (Hoeber & Kerwin, 2013; Sveinson et al., 2019).

Valenti et al. (2018) review studies of stereotypes and prejudices in soccer (Caudwell, 2011; Hjelseth & Hovden, 2014). The credibility of women's soccer is affected at all levels: coaching (Fasting et al., 2019; Gomez-Gonzalez et al., 2019; Wicker et al., 2019), media (Peeters & Van Sterkenburg, 2017; Pfister, 2015), fandom (e.g., Allison & Pope, 2021; Richards & Parry, 2020) and leadership (Burton, 2015; Strittmatter & Skirstad, 2017). As a result of these stereotypes and prejudices, female athletes continue to deal with criticisms regarding their talent and strength, and people continue to believe that male athletes are a better fit for sports. Thus, hegemonic masculinity is preserved (Allison, 2020; Darvin et al., 2021; Wachs, 2005). Allegations of women's athletic inferiority, often publicly shared in mainstream media (Hyde, 2019; Scheadler & Wagstaff, 2018; Trolan, 2013), are used to justify lower investments and coverage, which in turn reinforce the idea of lower skills and second-tier performance. Micelotta et al. (2018) argue that in professional sports such gender stereotypes define cultural relations and beliefs, which influence the public's perception of women's performance.

2.2. Gender imprinting

Micelotta et al. (2018) introduced the concept of "gender imprinting" in the context of sports. Broadly, this concept refers to embedded sociocultural gender attributes that define values, norms and beliefs in specific industries. The gender imprinting of the sports industry is rooted in its origin. Hegemonic masculinity defined the culture, locking in place organizational norms and desired practices (Gisladottir & Reid, 2021; Micelotta et al., 2018).

Gender imprinting is closely related to the global level of hegemonic masculinity (Connell & Messerschmidt, 2005) and socialization (Allison & Pope, 2021). Despite the growth in attention and consumption of women's soccer (Pegoraro et al., 2018), widespread stereotypes and prejudices about women's athletic inferiority remain (Allison & Pope, 2021; Markovits, 2019). Women's professional soccer developed under the umbrella of men's; women's sections were essentially treated as second-tier teams (Markovits, 2019). As such, it has been difficult for women's soccer to create an independent fandom (Allison, 2018).

Micelotta et al. (2018) show that cultural barriers negatively affect the capacity of new ventures to acquire symbolic and material support in women's sports. The sociocultural level of women's sports is imprinted with prejudices about athletes' abilities, which determine the capacity to compete with the dominant men's sports culture (Scheadler & Wagstaff, 2018). Negative comments about women's attributes, athletic skills and overall values are imprinted within the sports industry (Micelotta et al., 2018). However, on the assumption that stereotypes influence perception when category information is available (Crandall & Eshleman, 2003), consumers may be predisposed to infer a lower quality when watching what they know to be women's soccer (Allison, 2018, 2020). Accordingly, we hypothesize that fans will perceive men's soccer to be of higher quality – but only when gender is clear to see.

3. Method

3.1. Experimental videos

An experiment tested this hypothesis. We selected 10 videos from women's and men's club and national team matches in 2019. The videos were between 5 and 14 seconds each. We used goal-scoring plays that either UEFA or FIFA chose as highlights for the season. All matches are either from World Cup or Champions League matches. The goal scorers include World Cup winners (Alex Morgan), World Cup finalists (Ivan Rakitić and Luka Modrić), Champions League winners (Sadio Mané) and Champions League finalists (Raheem Sterling and Erin Cuthbert). Thus, all videos feature highly skilled players and contain some of the most-watched goals on TV and social media.[4] Table 1 provides information about the match, scoring player and length of the videos.

To conceal the gender of the players, we manipulated every video frame.[5] The same mask feather, opacity and expansion levels were used for each frame; then, the number of blocks (for blurriness) were selected. The lowest level of blurriness that still allowed us to effectively conceal the gender of the players was used. We blurred all human-related parts (players, coaches, referees and fans). Although this approach creates noise of its own for the evaluation of the play, pretests showed that blurring only critical areas such as players' heads was not enough to effectively conceal gender.[6] Figure 1 shows an example of the two versions of the videos, original and blurred.

Two groups were created. In the control group, 290 participants evaluated a sequence of 10 videos in which nothing was blurred (similar to Figure 1, left panel). In the treatment

Table 1. Videos in the experiment.

Video	Match	Cup	Scoring Player	Length (in sec)	Women
1	Tottenham vs. Barcelona	Champions League – Group stage	Ivan Rakitić	14	No
2	Argentina vs. Croatia	World Cup – Group stage	Luka Modrić	6	No
3	Liverpool vs. Bayern	Champions League – Round of 16	Sadio Mané	14	No
4	Manchester City vs. Donetsk	Champions League – Group stage	Raheem Sterling	9	No
5	Russia vs. Croatia	World Cup – Quarterfinal	Denis Cheryshev	9	No
6	Chelsea vs. Lyon	Champions League – Semi Final	Erin Cuthbert	6	Yes
7	Norway vs. England	World Cup – Quarterfinal	Lucy Bronze	5	Yes
8	Netherlands vs. Sweden	World Cup – Semi Final	Jackie Groenen	7	Yes
9	Nigeria vs. Korea Republic	World Cup – Group stage	Asisat Oshoala	13	Yes
10	United States vs. Thailand	World Cup – Group stage	Alex Morgan	5	Yes

[4]Sports highlights are an increasing touchpoint to connect with the younger generations, who prefer short-form content to consume and share on social media platforms (Silverman, 2020).
[5]All parameters of how we manipulated videos in Adobe Premiere Pro are available upon request.
[6]We wrote a machine learning algorithm as well. Unfortunately, the algorithm often failed with individual frames and players. It took too much time to correct for all errors. Accordingly, we dismissed this possibility.

Figure 1. Example of unblurred videos (a) and blurred videos (b). Notes: (a) The left image represents the characteristics of the unblurred condition (the gender of the players is clear to see). (b) The right image represents the characteristics of the blurred condition (the gender of the players is concealed). These images are not extracted from the videos in the sample due to copyright permits. Note that the videos in the sample omit plays involving corners, penalty kicks or tackles.

group, 323 participants evaluated the same sequence but with blurred videos (similar to Figure 1, right panel). Each sequence consisted of five women's and five men's videos, presented in random order. Table 2 gives an overview.

Table 2. Allocation of women's and men's videos in subsequent screens (S) across sequences (Seq.).

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
Seq. 1	♂	♂	♀	♂	♂	♀	♀	♂	♀	♀♂♀
Seq. 2	♀	♀	♀	♀	♂	♂	♂♂	♂	♂♂	♀♂♀
Seq. 3	♀	♀	♂	♀	♀♀	♂	♀♀	♂	♀♀♂	♂♀♀
Seq. 4	♀	♀	♂	♀	♂♂	♂♂	♀♀	♂	♀♀♂	♂♀♀
Seq. 5	♀	♀	♀	♀	♂	♂♂	♀♀	♀	♀♂♀	♂♀♂
Seq. 6	♀	♀	♀	♀	♀	♂♂	♂	♂	♂	♀♀♂
Seq. 7	♂	♀	♀	♀	♂♂	♀	♂	♂	♀	♂♂♀

Notes: ♀ women's video; ♂ men's video.

3.2. Participants and survey structure

The Amazon Mechanical Turk (MTurk) was used to recruit participants. MTurk is an online marketplace in which workers exchange their labor for a monetary reward. Employers decide payment and may specify additional worker qualifications. MTurk results in hetero-geneous samples (e.g., in nationality and age). Outcomes do not significantly differ from traditional methods (Arechar et al., 2018; Snowberg & Yariv, 2021) and are not affected by monetary incentives (Snowberg & Yariv, 2021).

In our experiment, the task was to complete a survey estimated to take 5 minutes. There were no qualification requirements; the pay was $1.00. Relative to most MTurk tasks at the time, the workload was low and the payment high. A sample of 613 participants was recruited (276 women, 337 men; mean age, 34 years). Each participant was given a task labeled "Answer a survey about soccer" with the description "Evaluate soccer performance (about 5 minutes)". We added the keywords "survey", "sport", "soccer" and "video". Participants answered questions on survey screens. Before evaluating the videos, they provided age, gender and country information. Participants were also asked to answer the following questions, with binary response possibilities: "Do you watch soccer?"; "Do you

watch soccer daily (highlights or matches)?"; and "Do you prefer men's or women's soccer?". Some 96% of the respondents watch soccer and 80% watch daily. Regarding preferences, 74% prefer men's soccer, 15% prefer women's and 11% prefer neither.

In subsequent screens, after each video, participants were asked (1) to rate the overall performance of the players on a 5-point scale (1 = *poor*; 5 = *excellent*) and (2) to indicate whether they would pay to watch the match (*yes/no*). The videos and questions were shown on subsequent survey screens, and participants had to submit the final task on the last screen. Participants could take up to 20 minutes to complete the survey and could go back and forth among the screens.[7]

3.3. Data and empirical strategy

Table 3 gives information about the participants' age, gender, watching frequency and preferences. The complete dataset is publicly available.[8]

Table 3. Descriptive statistics.

Variable	All videos (*n* = 613) Mean	Std. Dev.	Min	Max	Blurred videos – treatment group (*n* = 323) Mean	Std. Dev.	Unblurred videos – control group (*n* = 290) Mean	Std. Dev.	Difference and *p*-values (*p < 0.10, **p < 0.05, ***p < 0.01)
Age of participant	33.59	9.22	19	71	34.05	9.63	33.07	8.74	0.981
Gender of participant (Male = 1)	0.55	0.50	0	1	0.60	0.49	0.49	0.50	0.108***
Participant watches soccer (Yes = 1)	0.96	0.20	0	1	0.96	0.19	0.95	0.21	0.011
Participant watches daily (Yes = 1)	0.80	0.40	0	1	0.82	0.39	0.78	0.42	0.039
Willingness to pay for match (Yes = 1)	0.72	0.36	0	1	0.69	0.37	0.75	0.35	0.063***
Participant rating for women video (1 = *poor*; 5 = *excellent*)	3.69	0.74	1.2	5	3.58	0.79	3.83	0.65	0.283***
Participant rating for men video (1 = *poor*; 5 = *excellent*)	3.79	0.80	1	5	3.56	0.86	4.02	0.66	0.429***
Participant response time (in 100 seconds)	5.66	2.67	0.89	11.9	5.62	2.60	5.71	2.75	0.008
Participant watch preference									
No preference	0.11				0.12		0.10		0.02
Women's soccer	0.15				0.14		0.17		0.03
Men's soccer	0.74				0.75		0.73		0.02

Table 3 shows that we have more men in the treatment group than in the control group. To ensure that the results are not driven by male participants, we perform

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[7]In a small subsample, we found no differences when the demographic questions were asked after evaluating the videos rather than before.

[8]The data that support the findings of this study is publicly available in HarvardDataVerse, https://doi.org/10.7910/DVN/P12G8I (accessible upon publication).

a robustness check. We randomly select 68% of the male participants who watched the videos and examined the results with the same variables. The results are not significantly different. We use the "set seed" command from Stata to make the results reproducible. The different "seeds" randomly select the share of the population that is dropped. The results are available upon request. The difference between treatment and control for all other variables is not statistically significantly different from zero. The different composition of the samples might influence the outcome of the video evaluation. Therefore, we interact the gender of the participant with both men's and women's videos (see Table 5).

Considering first the individual videos, all videos received a lower rating when they were blurred (see Figure 2). Three unblurred men's videos received an average evaluation >4; none of the unblurred women's videos did so. As expected, blurred videos received lower evaluations than the unblurred ones (blurred videos $M = 3.57$, unblurred videos $M = 3.93$; average treatment effect (ATE) = 0.36, Mann–Whitney U, $z = 7.442$, $p = 0.00$, $N = 1,226$). We expected this result as blurred videos can create some noise in perceived quality. Whether blurred or unblurred, the video evaluations show similar trends. The key point for our research, however, is how participants evaluate men's and women's soccer videos within the two different experimental groups.

As shown in Figure 3, when the videos were not blurred and hence the gender visible, participants rated men's performance significantly higher than women's (men's videos, $M = 4.012$; women's videos, $M = 3.839$; ATE = 0.173; Mann–Whitney U, $z = 3.429$, $p = 0.00$, $N = 580$). However, when the videos were blurred and hence gender not visible, participants' ratings did not differ significantly between men's ($M = 3.583$) and women's ($M = 3.556$) videos (ATE = 0.027; Mann–Whitney U, $z = 0.846$, $p = 0.398$, $N = 646$).
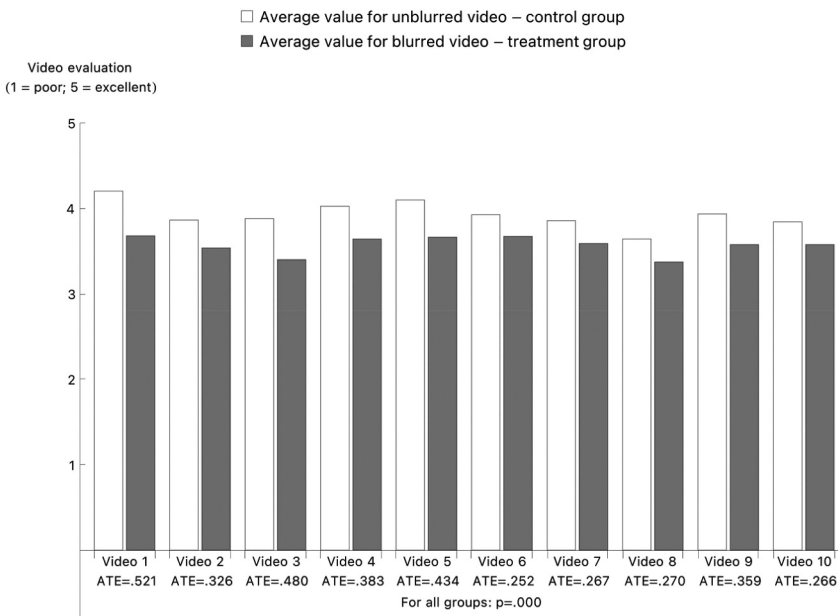

Figure 2. Evaluation for all videos under the two experimental conditions (average values), average treatment effect.
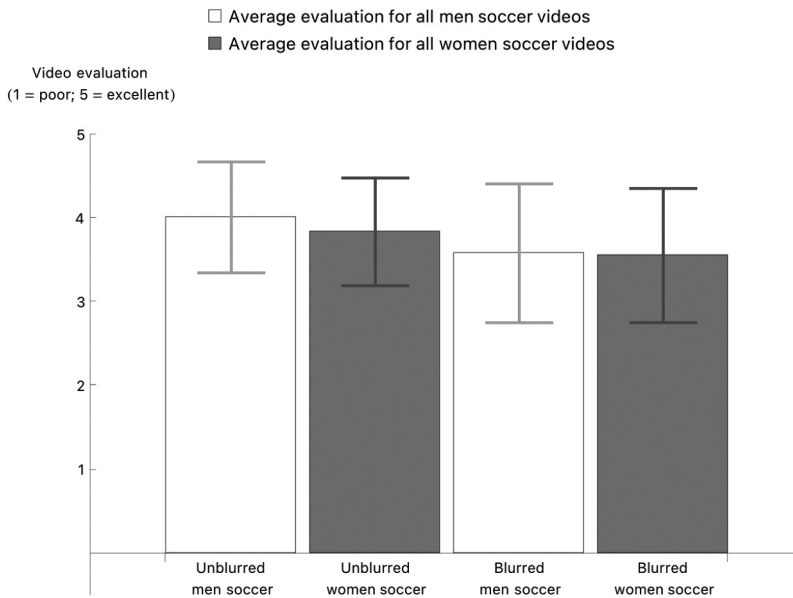
Figure 3. Women's and men's soccer videos under the two experimental conditions (average values and standard deviation).

To verify that the results are robust, we controlled for various covariates. We used a regression analysis where the dependent variable is the *VideoEvaluation*$_i$ that participant *i* gave to women's or men's videos. That means we have two observations per participant – one when watching women's and one when watching men's videos.[9]

$$VideoEvaluation_i = \alpha_0 + \beta_1 WomenVideo_i + X_i \cdot \delta + \varepsilon_i$$

β_1 estimates how much the video evaluation changes when a participant watches a video of women's or men's soccer. In some regression models, we also include all other variables that are reported in the descriptive statistics, captured with the vector *X* (Table 3).[10] This vector includes demographic variables such as age, gender and nationality, whether the participant watches soccer and whether the participant watches daily. Additionally, we control for the different sequences.

Our sample includes participants with different nationalities. Unfortunately, in MTurk we cannot randomly assign participants to treatment and control. Therefore, these nationalities are not represented equally in both groups. Table 4 gives an overview of the countries in our sample. As a robustness check, we include a specific control in the regression analyses. Moreover, we run a model with a (randomized) balanced subsample with respect to nationalities. We generate this subsample by dropping observations until both groups are identical with respect to nationalities. As we randomly drop the observations, we report the results from three different randomizations in Stata (i.e., seed 1, 2 and 3).

We expect participants who watch soccer daily to be more critical with their evaluations. We also control for participants' preference for women's soccer, men's soccer and

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[9]Using 10 observations per participant, i.e., one for each video, yields almost the same results.
[10]Inserting all other variables stepwise does not markedly change the magnitude of the variable *WomenVideo*.

Table 4. Sample composition.

Variable	All videos	Blurred videos – treatment group (n = 323)	Unblurred videos – control group (n = 290)
Respondent is from continent:			
Africa	0.0066	.0095	.0035
Asia	0.0166	.0016	.0175
Europe	0.3738	.4290	.3213
North America	0.5349	.5110	.5614
Oceania	0.0033	.0032	.0035
South America	0.0648	.0315	.1018
Respondent is from country:			
Australia	0.0033	.0031	.0034
Bangladesh	0.0016	.0031	-
Brazil	0.0604	.0248	.1
Bulgaria	0.0033	.0062	-
Canada	0.0114	.0124	.0103
Ecuador	0.0016	.0031	-
England	0.0114	.0124	.0103
Estonia	0.0033	.0062	-
Finland	0.0016	-	.0034
France	0.0049	.0031	.0069
Germany	0.0163	.0155	.0172
Greece	0.0016	.0031	-
Hongkong	0.0016	-	.0034
India	0.1811	.2229	.1345
Ireland	0.0049	.0093	-
Italy	0.044	.0619	.0241
Japan	0.0016	.0031	-
Macedonia	0.0016	-	.0034
Mexico	0.0016	.0031	-
Morocco	0.0016	.0031	-
Nigeria	0.0049	.0062	.0034
North Macedonia	0.0016	.0031	-
Philippines	0.0049	.0031	.0069
Poland	0.0016	.0031	-
Portugal	0.0016	.0031	-
Romania	0.0033	.0031	.0034
Scotland	0.0033	.0031	.0034
Singapore	0.0016	-	.0034
Spain	0.0163	.0062	.0276
Sweden	0.0016	-	.0034
Switzerland	0.0016	.0031	-
The Netherlands	0.0033	-	.0069
Turkey	0.0016	.0031	-
UK	0.0555	.0526	.0586
Ukraine	0.0016	-	.0034
USA	0.5122	.4861	.5414
Venezuela	0.0016	.0031	-
Vietnam	0.0016	.0031	-
Not available	0.0212	.0217	.0207

no preference, as research suggests that personal beliefs and values may moderately influence behavior (Crandall & Eshleman, 2003). Finally, we distinguish between participants that watched blurred and unblurred videos.

Additionally, we replicate the model with willingness to pay to watch a match as a dependent variable. We want to check whether the results are consistent when using a variable with explicit economic interest. We suppose that the direction of some control

variables might be altered, but the main difference for blurred and unblurred videos should remain unchanged.

4. Results

Table 5 presents the results when the videos are unblurred (left side) and blurred (right side).[11] The table shows the regression results with the ratings for unblurred videos as the dependent variable. Model 1 presents only the evaluation of women's and men's videos. Model 2 includes all control variables for different sequences and participant country. For the blurred videos, it drops 84 observations due to a coding error for the question about participants' preference for men's or women's soccer and 12 observations from participants who did not report their place of residence.

Table 5. OLS results for responses to videos.

	Dependent variable: Video evaluation (measuring the overall performance of the players; 1 = *poor*; 5 = *excellent*).			
	Unblurred videos – control group		Blurred videos – treatment group	
	Model 1	Model 2	Model 1	Model 2
Women's video	−0.17***	−0.17***	−0.027	−0.023
	(0.054)	(0.052)	(0.064)	(0.057)
Gender of participant (female)		0.106		0.24***
		(0.063)		(0.067)
Age of participant		0.001		0.012
		(0.003)		(0.003)
Participant watches soccer		0.20		−0.25
		(0.14)		(0.17)
Participant watches daily		−0.28***		0.030
		(0.077)		(0.095)
Participant has no preference		omitted		omitted
Participant prefers women's soccer		0.15		−0.120
		(0.096)		(0.107)
Participant prefers men's soccer		0.062		−0.39***
		(0.12)		(0.14)
Sequence control		Yes		Yes
Country control		Yes		Yes
Constant	4.01***	3.87***	3.58***	3.13***
	(0.038)	(0.50)	(0.045)	(0.52)
Observations	580	580	646	562
Adj. R^2	0.016	0.090	0.000	0.214

Notes: Standard errors in parentheses *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

Participants who watch unblurred videos rate women's videos significantly lower. However, once the videos are blurred, participants no longer rate men's and women's videos differently. This result is robust and consistent across models and specifications. The control variables throughout the models do not influence the participants' higher evaluation of men's videos that are not blurred.

Most control variables had no statistically significant effect. However, participants who watch soccer daily give lower ratings overall when the videos are not blurred. Women

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[11]Running OLS, OLS with clustered standard errors, Poisson with dummies for each participant and clustered standard errors, ANOVA or Tobit models does not significantly change the results. For readability, we show only the OLS results. All other results are available upon request.

Table 6. OLS results for responses to videos.

	Dependent variable: Video evaluation (measuring the overall performance of the players; 1 = *poor*; 5 = *excellent*).			
	Panel A. Unblurred videos – control group			
	Complete sample	Seed 1	Seed 2	Seed 3
Women's video	−0.17***	−0.12**	−0.15**	−0.14**
	(0.054)	(0.059)	(0.060)	(0.059)
Constant	4.01***	3.96***	3.98***	3.13***
	(0.038)	(0.50)	(0.042)	(0.52)
Observations	580	492	493	490
Adj. R^2	0.016	0.008	0.016	0.009
	Panel B. Blurred videos – treatment group			
Women's video	−0.027	−0.024	0.010	−0.027
	(0.064)	(0.073)	(0.072)	(0.071)
Constant	3.58***	3.57***	3.58***	3.60***
	(0.045)	(0.051)	(0.051)	(0.050)
Observations	646	492	485	501
Adj. R^2	0.000	−0.002	−0.002	−0.002

Notes: Standard errors in parentheses *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

participants give higher ratings when the videos are blurred, and participants who prefer men's soccer evaluate the blurred videos significantly lower.

Table 6 presents the results from the robustness check where we randomly balance the number of participants from each country in both groups. The number of observations is different for seeds 2 and 3 as the exact similarity (including number of observations) is calculated for seed 1. Thus, a few countries are over-represented by 1 or 2 observations for one group in seeds 2 and 3. Running the analysis with balanced groups with respect to nationalities has a small influence on the magnitude when the videos are not blurred. The results are very similar when the videos are blurred. Panel A in Table 6 reports these results for unblurred videos, and Panel B for blurred videos.

In Table 7, we further examine the influence that the gender of the participants has on the evaluations. Specifically, we test the interaction between player gender and participant gender to examine if women and men participants evaluate unblurred and blurred videos differently. The results show that men evaluate blurred videos in general significantly lower. When the videos are not blurred, this difference disappears.

Table 8 shows the results for a probit analysis with the willingness to pay as the dependent variable (with marginal effects for readability). Consistent with the results reported in Table 5, although smaller in magnitude, when the players' gender is visible, participants report being significantly less likely to pay to watch a women's match; when gender is not visible, the effect disappears. As expected, participants who regularly watch soccer are more willing to pay to watch matches. Participants who prefer women's soccer and are younger are also more willing to pay for matches.

Table 7. OLS results for responses to videos with interaction term.

	Dependent variable: Video evaluation (measuring the overall performance of the players; 1 = poor; 5 = excellent).			
	Unblurred videos – control group		Blurred videos – treatment group	
	Model 1	Model 2	Model 1	Model 2
Men's video	0.13*	0.14*	0.073	0.056
	(0.077)	(0.075)	(0.082)	(0.077)
Gender of participant (male)	−0.006	−0.048	−0.266***	−0.244***
	(0.077)	(0.082)	(0.091)	(0.089)
Men's video x Gender of participant (male)	−0.084	−0.074	0.117	0.088
	(0.108)	(0.106)	(0.130)	(0.119)
Age of participant		0.002		0.013***
		(0.003)		(0.003)
Participant watches soccer		0.21		−0.24
		(0.14)		(0.17)
Participant watches daily		−0.26***		0.025
		(0.073)		(0.084)
Participant has no preference		omitted		omitted
Participant prefers women's soccer		0.14		−0.08
		(0.091)		(0.103)
Participant prefers men's soccer		0.012		−0.356**
		(0.112)		(0.139)
Sequence control		Yes		Yes
Country control		Yes		Yes
Constant	3.88***	3.799***	3.62***	3.49***
	(0.054)	(0.497)	(0.058)	(0.38)
Observations	580	570	646	550
Adj. R^2	0.015	0.104	0.013	0.187

Notes: Standard errors in parentheses *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

Table 8. Probit results (with marginal effects) for responses to videos with willingness to pay as dependent variable.

	Dependent variable: Willingness to pay			
	Unblurred videos – control group		Blurred videos – treatment group	
	Model 1	Model 2	Model 1	Model 2
Women's video	−0.04**	−0.05**	−0.009	0.001
	(0.025)	(0.024)	(0.029)	(0.030)
Gender of participant (female)		0.010		−0.029
		(0.030)		(0.033)
Age of participant		−0.002		−0.001
		(0.002)		(0.002)
Participant watches soccer		0.11***		0.26***
		(0.05)		(0.068)
Participant watches daily		0.12***		0.019
		(0.030)		(0.048)
Participant has no preference		Omitted		Omitted
Participant prefers women's soccer		−0.011		0.14**
		(0.040)		(0.068)
Participant prefers men's soccer		−0.000		0.116
		(0.052)		(0.082)
Sequence control		Yes		Yes
Country control		Yes		Yes
Constant	1.386***	−1.166	1.029***	−0.486
	(0.106)	(1.103)	(0.085)	(0.590)
Observations	579	531	646	492
Pseudo R^2	0.007	0.196	0.000	0.163

Notes: Standard errors in parentheses. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

5. Discussion

We performed an experiment showing participants' video clips of elite female and male soccer players. In the control group, participants evaluated unmodified videos. In the treatment group, participants evaluated the same videos but with gender of the players obscured by blurring. When participants did not know who they were watching, ratings for women's and men's videos did not differ significantly. When they did know who they were watching, men's videos were rated higher.

One common assumption is that low level of demand observed in women's soccer is due to the poorer quality of players' technical performance (Valenti et al., 2018). The results from our study, however, show that gender information influences fans when evaluating women's and men's athletic performance, which is in line with traditional gender roles and stereotypes (Kane, 1995; LaVoi & Dutove, 2012; Norman, 2010). This finding is critical since assumed differences in quality are the starting point to a circular logic that justifies comparatively low allocation of resources and investments for women's soccer, thereby perpetuating inequality (Allison, 2020).

From a sociological perspective, previous research discussed how gender stereotypes and prejudices about women's soccer negatively influence its credibility and market potential (Caudwell, 2011; Hjelseth & Hovden, 2014). More specifically, Allison (2018, 2020) and Allison and Pope (2021) discussed how stereotypical beliefs about women as athletes can negatively influence fan perception about women's soccer. From a novel experimental approach in sports research, we find evidence for this narrative.

The results of the experiment show that participants rated men's soccer videos higher when they knew they were watching men. These findings support our hypothesis that the perception of quality in women's soccer is influenced by gender beliefs imprinted in the industry (Micelotta et al., 2018). Several factors have been noted that have long served to reinforce stereotypes and perpetuate the revenue gap between women's and men's soccer, including a history of discrimination, fandom, development, investment, and coverage (Allison, 2018; Valenti et al., 2018). While this study cannot shed light on each mechanism, it provides evidence that the gap is not due to a lack of quality in women's soccer. Additionally, we find that the gender of the respondents has an influence on the evaluation. Men give a lower evaluation to women's videos when they know they're watching women.

Additionally, the findings support the argument that there may be more similarities than differences in women's and men's athletic performance (Allison, 2020; Wachs, 2005). Knowledgeable observers also emphasize these similarities.[12] Nevertheless, emphasizing the differences and overlooking the similarities preserves hegemonic masculinity (Allison, 2020; Wachs, 2005).

Our results remain the same after we consider the influence of factors such as the participants' demographics, preferences, and habits. For example, participants who watch soccer daily rated both blurred and original videos lower than other participants.

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[12]For example, Diego Pablo Simeone, a successful coach in Spanish soccer, was asked in an interview for the Argentinian newspaper *La Nación* to evaluate the performance of female soccer players. He answered that the only real difference at the professional level in men's soccer is physical power; women have the technique, quality and talent (Grosso, 2019). Similarly, Jurgen Klopp, Liverpool FC's coach, also highlighted the quality of women's soccer after the 2022 Women's Euro tournament: "The quality of the tournament is insane" (Sky Sports, 2022).

Apparently, the more you watch soccer, the more it takes to impress you. On the other hand, we did not find the expected influence of personal beliefs and values on behavior (Crandall & Eshleman, 2003). The results are also robust when including an alternative dependent variable. We use participants' willingness to pay, as this variable has more explicit economic implications for the industry, but the main difference between blurred and unblurred conditions for women's videos persists.

6. Managerial implications

Conventional wisdom says that men's sports are simply better than women's sports. If this were true, the marketplace for women's sports would always be limited. Fans, broadcasters, sponsors, and investors would always favor the superior men's product. Our results, though, show that women's sports are not perceived to be inferior when the gender of the players is blurred. This finding challenges the conventional wisdom that because men run faster, jump higher and kick harder, men's sports are inherently more attractive than women's (Bradley et al., 2014; Cheuvront et al., 2005). Such a finding shows that women's soccer, and women's team sports in general, has not yet reached its full economic potential. This has significant managerial implications for sports associations, federations, leagues and clubs, as well as for the management of individual players.

Managers of federations, associations and leagues should unleash the "hidden potential" of women's sports by investing more and further developing women's competitions at the international, national and regional levels. In soccer, for example, women's competitions are still underdeveloped compared to men's competitions, although the high growth rates in terms of fans' interest, viewership and revenues document the large potential of women's competitions (FIFA, 2022; Fitzgerald, 2022).

At the club level, some managers have already seized the opportunity and strongly invested in the development, management and marketing of women's teams. Investments in infrastructure, such as stadiums and training facilities, may pay off as well as investments in the playing strength of women's teams. When it comes to marketing, perhaps the most productive approach would be to focus on relative instead of absolute performance.

To understand this difference, consider how men's sports are generally perceived in the marketplace. Men's sports often ignore absolute differences and focus much of their attention on relative differences. For example, in boxing, pound-for-pound rankings suggest that smaller boxers are better fighters than heavyweights (Berri, 2018). The argument is not that the smaller boxer would win a fight against a bigger fighter. The argument is that relative to their competition, the smaller boxer is superior. This is not true just for boxing aficionados but also for regular fans who often flock to fights between middleweights (and smaller) fighters. The absolute quality of the boxer is not relevant in marketing fights. What matters is relative differences.

This pattern is not just seen in boxing. In marketing NCAA sports, no one argues that a collection of college athletes would be competitive in a match against professionals. The entertainment value of a football game between the University of Alabama and the University of Michigan does not depend on the ability of either team to be competitive against an NFL team. What matters is the skill of these teams relative to each other. A similar story could be told about high school sports and the Little League World Series.

Just like promotors of middleweight boxing and college basketball, promotors of women's competitions should focus on the relative attractiveness of women's sports. This perspective should also be the focus of agents of female athletes. If the focus remains on absolute athletic performance, female athletes will never earn the same amounts of commercial income from their sponsors as male athletes. As soon as the focus shifts to relative attributes, however, female athletes may become even more attractive for sponsors than male athletes.

Therefore, this study also has implications for investors, broadcasters, media managers and sponsors. According to our results, women's soccer (and probably other women's team sports) does not receive the attention by fans that it potentially could. Consequently, investors, as well as broadcasters, other media and sponsors, underinvest in women's competitions. Women's sport receives only around 4% of all sports media coverage; most private and public investment is in men's sports (Agha & Berri, 2021; Berri, 2022). More exposure to women's sports could positively influence the perception of quality among sports fans and challenge the conventional wisdom. Concrete strategies that managers, sponsors and broadcasters can implement to increase exposure include coverage, promotion and engagement activities (Scheadler & Wagstaff, 2018).

Another concrete step that an organization could take to signal that men's and women's sports are equally valuable is pay equality (Akst, 2020). We've already seen this in the Grand Slam tournaments in tennis. However, even in tennis, it is not the case that men and women get paid the same in every tournament. Outside of tennis, pay equality is far from the norm. The persistent practice of paying men more for the same work in sports serves to promote the idea that men's sports must be better.

Investors, broadcasters, media managers and sponsors should seize this opportunity and increase their investments in women's team sports to realize first-mover advantages over their competitors. Their investments will not only allow them to realize first mover advantages but will also increase the speed at which the full attention and revenue potential of women's sports will be realized.

7. Concluding remarks

This study demonstrates that in the absence of gender information, the perceived quality of women's and men's soccer does not differ. The results are similar when exploring the willingness to pay for the matches. The findings from the experiment are robust and suggest that the financial differences in men's and women's soccer do not affect perceived differences in the quality of play.

Although we emphasize the significance of our findings, we are aware of the study's limitations. First, we selected videos that show only elite performance, which could lead to a ceiling effect, an effect that is only applicable for the very best athletes. Sports media broadcasters chose the videos, and people who are not part of our study pushed them to the top of the list. Therefore, the focus on popular highlights limits the extent of the implications. Other videos involving less skilled players could potentially prompt different evaluations.

Second, we used goal plays exclusively. Modern sports consumption trends show a growing preference for formats showing brief highlights of matches. A soccer match consists, however, of various scenes that are interesting for viewers (e.g., tackles, corners,

free kicks, penalty kicks), and many enjoy watching whole matches. Third, the experimental design includes only 10 videos because of the time needed to modify the videos to conceal gender. A larger number of videos would ensure higher variability and allow us to draw more conclusions.

Third, we asked respondents generic questions when evaluating the highlights. However, a more elaborate analysis can include how respondents evaluate the performance of, for example, the attacking team, the defending team, the goal scorer or the keeper. Additionally, we recruit participants from MTurk. We chose this platform to gain access to a diverse pool of participants regarding age and country of residence, as opposed to the alternative, more homogenous student samples. In this platform, however, we cannot randomly assign participants to treatment and control groups. This is a downside as the treatment and control groups are not balanced with respect to the gender and nationality of the respondents. We control for this imbalance in our regressions and perform robustness checks to show that it does not have a significant impact.

MTurk and other crowdsourcing platforms are widely used in behavioral and social science research, and we did not detect any signs of dubious data quality, such as unrealistic completion times, incomplete tasks or incoherent responses. Unfortunately, the platform does not measure how much time participants take to evaluate individual videos but only measures the overall task time. Our 5-minute survey mainly comprises closed-ended questions, and participants were rewarded accordingly. Still, such crowdsourced samples always need to be used cautiously to ensure data quality (Webb & Tangney, 2022).

Fourth, we cannot rule out the possibility that other variables influence the results. For example, we did not control for the atmosphere in the stadium. Participants watched the videos without any sound, as commentators frequently reveal the gender of the players. People often go to the stadium or watch a match not only because of the quality of the players but because of match uncertainty or the atmosphere (Funk et al., 2003; García & Rodríguez, 2002; Valenti et al., 2020). Future research can explore other sports and exploit new experimental designs. Artificial intelligence and machine learning algorithms have the potential to contribute to this line of research.

Finally, the practical implications of our findings are limited. Fans will not suddenly change the way they perceive women's soccer, and gender stereotypes will not disappear overnight. Still, as societies advance in women's rights and equality, the exposure of future generations to gender stereotypes will decrease, making investments in women's sports more attractive. Our work clearly suggests any perception that women's sports do not match men's sports in the quality of play should not blunt the enthusiasm for such investments.

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Data availability statement

The data that support the findings of this study are publicly available in HarvardDataVerse, https://doi.org/10.7910/DVN/P12G8I. We deleted individual identifiable information.

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