

Ger J Exerc Sport Res 2024 · 54:76–85  
<https://doi.org/10.1007/s12662-023-00911-9>  
Received: 30 January 2023  
Accepted: 7 August 2023  
Published online: 8 September 2023  
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# Gender differences in pro-environmental nutrition behavior among football fans

## Introduction

Environmental concerns about consequences of one's own behavior and the willingness to contribute individually are the prerequisites for finding solutions for more sustainability in everyday life, but also for sport events (Thormann & Wicker, 2021a). Knowledge about environmental consequences of behavior (as a cognitive component), the willingness to act and protect the environment (as a conative component), and emotional reaction to environmental damages (affective component) are the dimensions of environmental consciousness (EC; Diekmann & Preisendörfer, 2003). Environmental consciousness is a prerequisite of performing pro-environmental behavior (PEB) in everyday life, which has several dimensions such as energy-saving, transportation, recycling-behavior, limited consumption, including conscious food choice (Breunig, 2013; Diekmann & Preisendörfer, 2003). Individuals who pursue PEB in everyday life might also behave pro-environmentally in other areas of life (Margetts & Kashima, 2017) such as in sport stadiums, e.g., everyday PEB moderates in a significantly positive way the link between travelers' intention for PEB and their actual PEBs at the destinations (Liu, Ma, Qu, & Ryan, 2020). Besides individual initiatives to contribute to sustainability, sport organizations can contribute in an economic, social, or environmental way (Bunds, McLeod, Barrett, Newman, & Koenigstorfer, 2019; Glibo, Misener, & Koenigstorfer, 2022; Purvis, Mao, & Robinson, 2019) by, e.g., calling attention to climate change (McCullough,

Kellison, & Melton, 2022) or offering pro-environmental food at sport events.

Nevertheless, and referring to the value–action gap, EC does not necessarily lead to PEB as the potential effect of PEB to, e.g., reduce global greenhouse emissions might be underestimated (Cologna, Berthold, & Siegrist, 2022). The environmental value–action gap describes the gap between environmental attitudes and related behavior (Blake, 1999) and can be explained by the low-cost hypothesis assuming that environmental attitudes are more likely to result in PEB under conditions of low cost and low inconvenience (Diekmann & Preisendörfer, 2003; Wicker, 2018, 2019). As eating no meat is a low-cost initiative that even saves approximately 20–30% in food expenditure (Springmann, Clark, Rayner, Scarborough, & Webb, 2021), the value–action gap for this PEN facet might be comparably low. Conversely, increasing food expenditures by buying organic food might hinder consumers from pursuing PEN so that a larger value–action gap emerges. Further, a value–action gap in the consumption of plant-based food might occur due to culinary traditions (Adamczyk, Jaworska, Affeltowicz, & Maison, 2022). Moreover, the most significant psychological barrier to reducing meat consumption is habit (Graves & Roelich, 2021). However, different PEN facets such as purchasing organic food or reducing meat consumption are perceived to be part of the translation of EC into PEB (Moser & Kleinhüchelkotten, 2018).

Pursuing PEB in everyday life is found to predict the adoption of PEN in the short term and for future intentions

(Krizanova, Rosenfeld, Tomiyama, & Guardiola, 2021). Pro-environmental nutrition is associated with limited meat consumption (Lacoeur et al., 2018), which also contributes to environmental sustainability by saving resources and energy (Breunig, 2013; Kaiser, 2020) as vegan protein sources have a lower carbon footprint than any meat (Ritchie, 2020). The aim to save energy through PEB is associated the highest with the purchase of organic food (Moser & Kleinhüchelkotten, 2018) due to the recognized lower energy investment of organic agriculture compared to conventional farming (Koen, Aertsens, & Van Huylenbroeck, 2009; Lee, Choe, & Park, 2015).

Women are more likely to pursue PEN as they are more likely to purchase organic food than men (Ureña, Bernabéu, & Olmeda, 2008) and are more positive toward the replacement of meat by pro-environmental protein options or vegetables compared with men (De Boer & Aiking, 2018). Underlying reasons for women to prefer meatless nutrition more than men do could be the association of meat consumption with masculine identity (Rothgerber, 2013). Further, women are more motivated to eat vegetarian food and to adhere to this nutrition more strictly than men (Modlinska, Adamczyk, Maison, & Pisula, 2020; Rosenfeld, 2020; Rozin, Hormes, Faith, & Wansink, 2012).

To manage sustainability initiatives efficiently, it is of interest to football clubs to learn whether PEN trends in the broad population also apply to football fans. Women fans in particular have become an important stakeholder of European foot-

ball clubs during the past few years as the number of regular women fans in men's football is growing. For example, in 2021, 47% of 144 million fans were women, with this number being expected to grow up to 328 million fans in 2033 (UEFA, 2022). International statistics comparing 2017 and 2020 show a steady although slow increase of the women share among football fans from 42% to 46% in Brazil, 33% to 37% in the United Kingdom, and 43% to 45% in the United States (GembaGroup, 2020).

To increase the number of women football fans, football clubs are interested in catering to women's needs at the stadium by, e.g., modernizing football stadiums to make women fans feel more comfortable (Jakubowska, Antonowicz, & Kossakowski, 2020). Another area is food supply, which should be attractive to all fans so that sport managers can maximize revenues from selling concessions. Therefore, possible gender differences in PEN are highly relevant for event organizers and the question arises as to which extent fans adopt PEN in their everyday lives and consequently also adopt it at football games. Football clubs need to know more about gender differences in PEN in order to plan efficiently in advance, before realizing costly environmental sustainability efforts to address these concerns.

The purpose of this study was to examine gender differences in PEN of football fans in their everyday life and to analyze whether PEN impacts the interest in vegan food offered at football games. Nuanced knowledge on possible gender differences in EC as a prerequisite for fans' behavior is needed to plan strategic sustainability initiatives of sport clubs (Casper, Pfahl, & McCullough, 2017). In our study, everyday PEN contained the three dimensions of buying food from controlled organic cultivation, eating vegetarian food, and/or eating vegan food. Hence, the purpose of this study was to identify possible gender differences in these three dimensions of everyday PEN and to see if it translates into gender differences in the interest in vegan food at the stadium. Three research questions were investigated in this study:

1. Does gender impact EC?

2. Do gender and EC impact PEN?
3. Do gender and EC, or gender and PEN, impact the interest in vegan food at the stadium?

These research questions were analyzed for fans of a German Football League club using online survey data. We contribute to the literature by providing initial and nuanced quantitative evidence of gender differences in EC and PEN of football fans and of their interest in vegan food at the stadium. Our findings offer practical recommendations for football clubs to calculate their food supply efficiently and avoid costly sustainability initiatives that might not be effective.

### Women's socialization, environmental consciousness, and resulting pro-environmental nutrition behavior

Gender differences in EC and consequent PEN might be explained by four interlinking theoretical concepts: socialization theory, ecofeminism, safety concerns (Briscoe, Givens, Hazboun, & Krannich, 2019; McCright, & Xiao, 2014), and prosocial behavior. According to socialization theory, gender roles and the expected behavior of men and women within cultural norms are determined by socialization in early childhood<sup>1</sup>. Conversely to men, who are socialized to enforce their competitiveness and (financial) independence (Chodorow, 1974; Gilligan, 1982; Eagly, 1987; Keller, 1985; Kim & Chatterjee, 2013; Saccardo, Pietrasz, & Gneezy, 2018), women are increasingly socialized to enforce their interdependence, compassion, cooperation, and caregiving (Beutel & Marini, 1995; Del Boca, Oggero, Profeta, & Rossi, 2020; Hunter, Hatch, & Johnson, 2004; López, Sanderman, Ranchor, & Schroevers, 2018; van Vugt, Cremer, & Janssen, 2007). As women are socialized to value the needs

of other individuals, they exhibit more helping behavior than men (Gilligan, 1982).

This gender-different socialization of women leads to a more altruistic and empathetic perspective of women compared to men (Dietz, Kalof, & Stern, 2002; Hunter et al., 2004). Following the concept of ecofeminism, this caring ethic of women spills over into caring for the natural environment (Leach, 2007; Sakellari & Skanavis, 2013), meaning that women are more environmentally conscious than men (Briscoe et al., 2019; Zelezny, Chua, & Aldrich, 2000). Given the strength of socialization, we assume that women football fans also show these traits:

**H1.** Women football fans are more environmentally conscious than men.

Gender differences in the translation of EC to environmental concerns and consequent PEN are suggested by the safety-concerns hypothesis (Davidson & Freudenburg, 1996). Following this hypothesis and as is empirically evident, women express more environmental concerns than men do (Hunter et al., 2004; Kollmuss & Agyeman, 2002; Zelezny et al., 2000). This hypothesis further argues that women care more about people around them (Beutel & Marini, 1995; Kennedy & Dzialo, 2015; Xiao, & McCright, 2012) and are more likely to evaluate environmental problems as a risk or threat to themselves and their loved ones than men do (Davidson & Freudenburg, 1996; Kennedy & Dzialo, 2015; Stern, Dietz, & Kalof, 1993; Xiao, & McCright, 2012, 2015). Therefore, gender differences in caregiving for loved ones might influence environmental concerns that translate differently into PEN. In line with the safety-concerns hypothesis, Dowsett and colleagues (2018) showed for the "meat paradox"<sup>2</sup> that women significantly decreased their meat consumption when exposed to the meat-animal condition.

Following socialization theory, the openness to avoid meat depends on gender roles. While greater conformity

<sup>1</sup> Experiences in childhood increased the preference for healthy versus unhealthy food consumption at sport events (Koenigstorfer, 2018) so that a similar effect might be expected for a gender-different socialization in early childhood.

<sup>2</sup> The disconnection between killing animals for food while simultaneously not wanting them to suffer.

with traditional gender roles predicts consuming beef or chicken for men respondents, the same traditional gender role conformity and gender identity centrality is linked with a greater openness by women to become vegetarian for health reasons (Rosenfeld & Tomiyama, 2021). As the consumption of meat is strongly associated with masculinity (Rozin et al., 2012; Rosenfeld, 2020), PEN in terms of eating vegetarian/vegan is associated with low masculinity, thus being less attractive for men (Rothgerber, 2013). Furthermore, there are more prejudices by omnivore-living individuals toward vegetarian men than vegetarian women, thus making PEN less attractive to men due to an increased social pressure (Modlinska et al., 2020).

According to the concept of ecofeminism, the male dominance in society causes both “the domination of women and the despoliation of nature” (Plant, 1991: p. 100). Due to the male dominance in the labor market, women have lower income and therefore lower access to financial resources (Dillon, 2020), which explains why women, for instance, would rather use public transport than men do (Briscoe et al., 2019). Women have a higher likelihood of PEN since they show significantly more public and private PEB than men (Briscoe et al., 2019). Further, women are more likely to engage in household-level PEB than men (Kennedy & Kmec, 2018) as they have limited access to necessary resources for public PEB (Tindall, Davies, & Mauboules, 2003). As women further show environmentally friendly shopping behavior (Lynn & Longhi, 2011), this might potentially include buying food from organic cultivation. We hypothesize that this behavior also applies to football fans:

**H2.** Women football fans are more likely than men to show PEN behavior in everyday life.

The next question is whether individuals also adopt PEN at sport events and whether there are gender differences. Therefore, we extend previous theoretical approaches and empirical studies on gender differences in PEB at sport events (Casper et al., 2017) by asking whether

everyday PEN spills over to sport events. Sport organizations and especially European football clubs have a notable influence on their fan communities and can positively affect their fans’ behavior, including PEB (Barnhill, Smith, & Oja, 2021). Pursuing PEN at the stadium might provide an extra utility to individuals as PEB adds to well-being (Schmitt, Akin, Axsen, & Shwom, 2018; Wicker & Thormann, 2022).

These well-being contributions are rooted in prosocial behavior, which is characterized by primary benefits for others such as cooperation, helping, or sharing but which is costly for acting individuals (Bénabou & Tirole, 2006). Similar to EC, it is explained by norms and roles and situational, cognitive, and affective factors (Batson, 2012). These are shaped in early childhood (Benish-Weisman, Sneddon, & Lee, 2019), together with the gender-different socialization of prosocial behavior (Eagly, 2009). As many individuals have the propensity for prosocial behavior, the translation from intention into action depends on the observability of one’s own actions by others. According to socialization theory, women might have a higher interest in caring more about others, but also what people think about them (Eagly, 2009). Since women are more likely to behave environmentally friendly at sport events than men (Casper et al., 2017) and due to the high observability of food consumption in a football stadium and consequent social pressure, women might have a higher interest in the offer of vegan food.

**H3.** Women football fans have a higher interest in vegan food at the stadium than men do.

Relating EC and everyday PEN with the interest in vegan food at the stadium, we assume that vegetarian-/vegan-eating women have a higher interest than vegetarian/vegan men do. As eating meat is associated with masculinity (Rozin et al., 2012; Rosenfeld, 2020), men are under more social pressure than women. Therefore, they are more likely to eat meat in public to conform with masculine stereotypes (MacInnis & Hodson, 2017), although they have a high EC or adopt

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### Abstract

Concerns about consequences of everyday nutrition have led to a gender gap in pro-environmental nutrition (PEN), implying that women decide more often to limit their meat consumption than men. For sport and football managers who increasingly deal with environmental sustainability while aiming to increase female audiences, the question arises of whether the gender gap in PEN also applies to football fans. Based on socialization theory, the safety-concerns hypothesis, ecofeminism, and a conceptual model on prosocial behavior, this study analyzed gender differences in environmental consciousness (EC) and everyday PEN and examined how gender moderates the impact of these two factors on the interest in vegan food in football stadiums. An online survey ( $n = 1605$ ) of fans of a German Football League club was conducted to assess fans’ interest in the offer of a vegan sausage or burger. Empirical findings confirm the gender gap in EC. Women are significantly more likely to adopt PEN everyday if they have a high EC. Furthermore, women are significantly more likely to eat often/always a vegetarian diet everyday than men. Finally, women have a significantly higher interest in the offer of vegan food in the football stadium than men, irrespective of the EC level. Although we confirm the gender gap in EC and everyday PEN, sport managers learn from our findings that the growing female audience at football games is generally more interested in the availability of vegan food at the stadium than men are, irrespective of their EC or PEN in everyday life.

### Keywords

Pro-environmental behavior · Sustainability · Nutrition · Gender · Interest · Stadium

PEN every day. Conversely, women were found to be less concerned about making their food choices congruent to gender stereotypes (Gal & Wilkie, 2010), thus they are more likely to adhere to PEN and more strictly to vegetarianism/veganism (at the stadium) than men (Modlinska et al., 2020; Rosenfeld, 2020; Rozin et al.,

Table 1 Overview of variables and descriptive statistics (n = 1605)			
Variable	Description	Mean	SD
EC	Environmental consciousness index (1 = not environmentally conscious at all; 5 = highly environmentally conscious)	3.815	0.746
PEN	Pro-environmental nutrition in everyday life (e.g., organic, vegetarian, and vegan food; 1 = never; 5 = always)	2.552	0.873
Organic food	Respondent often or always buys food from controlled organic cultivation (1 = yes; 0 = no)	0.472	–
Vegetarian	Respondent often or always eats vegetarian meals (1 = yes; 0 = no)	0.245	–
Vegan	Respondent often or always eats vegan meals (1 = yes; 0 = no)	0.092	–
Sausage	Respondents who were randomly assigned to the vegan sausage questions (1 = yes; 0 = vegan burger)	0.502	–
Interest	Interest in a vegan sausage/burger (1 = not interested at all; 5 = highly interested)	3.229	1.167
Taste	Belief how a vegan sausage/burger would taste (1 = not good; 5 = very good)	2.824	1.505
Female	Respondent is female (1 = yes; 0 = no)	0.252	–
Age	Age of respondent (in years)	32.405	11.914
Low education	Educational level is below A-levels (1 = yes; 0 = no)	0.206	–
A-levels	Educational level is university entry degree (i.e., A-levels) (1 = yes; 0 = no)	0.418	–
University degree	Educational level is university or university of applied sciences degree (1 = yes; 0 = no)	0.376	–
Full-time job	Respondent has a full-time job (1 = yes; 0 = no)	0.624	–
Part-time job	Respondent has a part-time job (1 = yes; 0 = no)	0.119	–
Self-employed	Respondent is self-employed (1 = yes; 0 = no)	0.048	–
Short-time work	Respondent is in short-time work (1 = yes; 0 = no)	0.007	–
Pupil	Respondent is a pupil (1 = yes; 0 = no)	0.054	–
Student	Respondent is a student (1 = yes; 0 = no)	0.216	–
Pensioner	Respondent is a pensioner (1 = yes; 0 = no)	0.011	–
Unemployed	Respondent is unemployed (1 = yes; 0 = no)	0.021	–
Income	Personal monthly net income divided (in € 1000)	1.961	1.148
Migrant	Respondent is a migrant (1 = yes; 0 = no)	0.074	–
	Respondent has a disability (1 = yes; 0 = no)	0.072	–
Interest in football club	Respondent's interest in the football club (1 = not at all; 5 = very strong)	4.930	0.311
Disability	Number of match days of the 1st and/or 2nd League that respondent watch at the stadium each season	10.426	5.535

2012). Consequently, we derive the following hypotheses:

**H4.** Women football fans with high EC have a higher interest in vegan food at the stadium than men do.

**H5.** Women football fans who adopt PEN in their everyday life have a higher interest in vegan food at the stadium than men do.

## Methods

### Data collection

In cooperation with a club in the first division of the Football League, an online survey was designed that was targeted at individuals interested in the club. The survey was online from 29 August to 31 October 2021 and programmed using [www.soscsurvey.de](http://www.soscsurvey.de). The survey link was distributed via social media channels of the club and through e-mailing lists of the neighboring university. Following previous Willingness-to-Pay (WTP)

studies, the sampling approach reflects an established convenience sampling procedure (Thormann & Wicker, 2021b). Altogether, 1652 respondents completed the online survey. Since our research questions target the offer of vegan food at the stadium of the analyzed team, we neglected the responses of 47 respondents who do not visit home games of the analyzed football club. The final sample consisted of  $n = 1605$  respondents.

### Questionnaire and variables

Table 1 presents an overview of the dependent, explanatory, and control variables that were used in the empirical analysis.

**Environmental consciousness and pro-environmental nutrition.** Respondents' EC was measured using the established scale of Diekmann and Preisendörfer (2003). The scale contains nine items, with three items capturing the affective, conative, and cognitive dimension (Table 5 in the Appendix). This EC scale is established in previous sport ecology research (Thormann & Wicker, 2021b; Wicker, 2019; Thormann, Wicker, & Braksiek, 2022), and was validated in previous research (Diekmann & Preisendörfer, 2003). The reliability of this scale was tested by calculating Cronbach's  $\alpha$ , which is 0.894, thus indicating a very good reliability (Hair, Black, Babin, & Anderson, 2013). The EC is calculated as the mean of these nine items.

Respondents' PEN was measured with three different variables reflecting the consumption of organic food, eating vegetarian, and eating vegan following Kaiser (2020; Table 2). Respondents were asked on a 5-point scale if they buy food from controlled organic cultivation, eat vegetarian food, or vegan food, with replies ranging from *never* (1) to *always* (5). The good reliability is indicated by a Cronbach's  $\alpha$  of 0.728. The overall PEN index was calculated as the mean of these three items to capture that individuals might pursue multiple PEN dimensions simultaneously, e.g., consuming organic food by often eating vegetarian and sometimes eating vegan.



**Table 2** Pro-environmental nutrition (PEN) scale and index ( $n = 1605$ )

Items (1 = <i>never</i> ; 5 = <i>always</i> )	Mean	SD
I buy food from controlled organic cultivation	3.33	0.83
I eat vegetarian food	2.55	1.28
I eat vegan food	1.77	1.09
PEN	2.66	0.93
Cronbach's $\alpha$	0.728	–

To learn more about the determinants of buying organic food, or eating vegetarian/vegan, we built dummy variables, which were coded 1 if respondents answered *yes* to doing one of these three facets often or always, and 0 otherwise.

**Interest.** Before assessing respondents' interest in vegan food, they were informed about the importance of ecological sustainability and the possible adopted initiatives of the club. Respondents were randomly assigned to the item battery for a vegan sausage or burger (*Sausage*) and were informed that the club plans to offer such a product at the stadium during the 2021/2022 season. The products were described so that respondents could gain a better understanding. The vegan sausage was planned to have the same weight as the non-vegan counterpart and to also be served in a bun. The vegan burger would be an XXL burger consisting of a vegetable patty (125g), lettuce, fresh tomatoes, fresh onions, fried onions, pickles, and sauces. Thereafter, respondents were asked to which extent they would be interested in the vegan sausage/burger on a 5-point-scale (*Interest*; **Table 1**). Furthermore, respondents were asked to rate how they believe that the vegan sausage/burger would taste on a 5-point scale (*Taste*).

**Gender and control variables.** The explanatory variable was the respondent's gender. Respondents were asked to indicate their gender as woman, man, or non-binary gender. Since no respondent indicated a non-binary gender, we coded a binary variable for female respondents (*Female*) with male respondents as the reference category.

As further individual characteristics, we consider the respondents' age (*Age*), educational level (*Low education*,

*A-levels*, *University degree*), and employment situation (*Full-time job*, *Part-time Job*, *Self-employed*, *Short-time work*, *Pupil*, *Student*, *Pensioner*, *Unemployed*). Further control variables were the respondents' income (*Income*), a possible migration background (*Migration*), and a mental and/or physical disability (*Disability*). Finally, we also controlled for respondents' interest in the analyzed football club (*Interest in football club*), and the number of match days they typically attend at the stadium (*Match days in stadium*).

### Empirical analysis

The empirical analysis comprised five steps. After a descriptive analysis of our dataset, we estimated linear regressions to analyze gender differences in EC. In a third step, we ran a linear regression to identify significant gender differences in PEN. Since the original dependent variable was right skewed, we used the natural logarithm of the PEN index in the regressions. We deepened our analysis by further logit regressions, estimating the probability of respondents to often/always buy food from organic cultivation, eat vegetarian food, or eat vegan food. Fourthly, we ran log-linear regressions to determine whether women have a significantly different interest in vegan food at the stadium than men. Lastly, we estimated the impact of the female gender dummy interaction with EC, and separately the impact of female gender interaction with the three PEN dimensions on logged interest (*log interest*) and logged taste (*log taste*). We used the logged variables as the distribution of the interest measurement was quite w-shaped and the distribution of taste was right-skewed.

To detect multicollinearity, we further calculated the mean variation inflation factor for each linear regression

and checked the independent variables for multicollinearity for the logistic regressions. As no bivariate correlation was higher than the critical threshold of 0.8, our regressions should not be distorted due to multicollinearity (Hair et al., 2013). However, we decided to estimate separate models including either the EC or PEN measures as explanatory variables due to a correlation of 0.498. This was done because results change in coefficients and significance when including both variables in one model. Heteroscedasticity consistent standard errors were used for all models.

## Results

### Descriptive statistics

**Table 1** presents the descriptive statistics. Average environmental consciousness was 3.82, indicating that respondents tended to agree with the proposed statements. Average PEN was 2.55, suggesting that respondents sometimes pursue PEN behaviors. While 47.2% of respondents often or always buy food from controlled organic cultivation, 24.5% often or always eat vegetarian food, and 9.2% often or always eat vegan food. Average interest in the supply of vegan sausages/burgers was 2.82, suggesting that respondents are rather indifferent, as the value is closest to the response "do not know." However, respondents were more positive that the supply of vegan sausages and burgers "would be more to my liking," with a mean of 3.22.

The respondents' average age was 32 years and 25.2% of respondents were women. Regarding education, 41.8% of respondents had A-levels, followed by a university degree (37.6%), and lower education (21%). Most respondents had a full-time job (62.4%), followed by students (21.6%), part-time jobs (11.9%), self-employment and attending school (both 5%), unemployment (2.1%), short-term work and pensioners (both 1%). The average monthly net income was €1960. Only 7.4% of respondents had a migration background, or had a physical, mental, or both forms of disability. With a mean of 4.93, average interest in the football club was very high, with

**Table 3** Linear regressions for environmental consciousness (EC) and pro-environmental nutrition (PEN) (models 1–3) and logit regressions for the probability to eat organic food, eat vegetarian food, or eat vegan food (models 4–9),  $n = 1605$

	(1) EC	(2) Log (PEN)	(3) Log (PEN)	(4) Organic food	(5) Organic food	(6) Vegetarian	(7) Vegetarian	(8) Vegan	(9) Vegan
Female	0.102** (0.039)	0.021 (0.017)	-0.205*** (0.179)	-0.016 (0.027)	-0.211 (0.178)	0.061** (0.021)	-0.61 (0.021)	0.022 (0.014)	-0.440** (0.155)
EC	-	0.208*** (0.011)	0.198*** (0.018)	0.208*** (0.016)	0.194*** (0.019)	0.212*** (0.016)	0.212*** (0.015)	0.136*** (0.016)	0.108*** (0.017)
Female × EC	-	-	0.048*** (0.044)	-	0.066 (0.042)	-	0.446 (0.288)	-	0.105** (0.035)
Individual controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Constant	3.861*** (0.233)	0.171 (0.119)	0.236* (0.118)	-4.272*** (0.878)	-4.091*** (0.899)	-3.868*** (1.123)	-3.382** (1.161)	-7.865*** (1.495)	-6.576*** (1.509)
$R^2$	0.095	0.297	0.303	-	-	-	-	-	-
Mean VIF	1.40	1.39	5.12	-	-	-	-	-	-
Log-likelihood	-	-	-	-992.059	-991.473	-725.525	-724.190	-408.597	-403.750
Adj. McFadden's $R^2$	-	-	-	0.090	0.090	0.168	0.168	0.136	0.144

In models 4–9,  $\beta$  coefficients are average marginal effects; robust standard errors in parentheses. *VIF* variance inflation factor  
 \*\*\* $p < 0.001$ , \*\* $p < 0.01$ , \* $p < 0.05$

fans spending on average 10 days at the stadium per season (Table 1).

### Gender differences in EC and PEN

Table 3 displays the models for gender differences in EC (model 1) and PEN (models 2–3), and for the probability of frequently consuming organic food (models 4–5), eating vegetarian (models 6–7), or eating vegan (models 8–9). The results show that women have a significantly higher EC level than men (model 1), supporting H1. Moreover, women do not have a significantly unconditionally higher level of PEN than men (model 2), but environmentally conscious women have a significantly higher level of PEN by 8.8 percentage points (model 3). The probability to often/always buy organic food is not affected by gender (models 4 and 5). By contrast, women have a significantly higher probability to often/always eat vegetarian food by 6.1 percentage points compared to men (model 6). Further, there is no significant difference for women with high EC (model 7). Interestingly, we found no unconditional gender difference in the probability to often/always eat vegan food (model 8), but the probability for environmentally conscious women is significantly higher by 10.5 percentage points (model 9). Thus, H2 is only supported for vegetarian women.

### Gender differences in interest

Table 4 displays the results for the moderating effect of gender in the relationship of EC and PEN with fans' interest in vegan food at the stadium. Women have a significantly higher interest in the supply of vegan sausages or burgers than men do (model 10), supporting H3. Conversely, gender does not moderate the link between EC and the interest in vegan food at the stadium (model 11). These findings are robust for the expected taste of vegan food (models 14–15), rejecting H4. Respondents who often/always buy organic food, eat vegetarian food, or eat vegan food all have a significantly higher interest in vegan food at the stadium than those less pursuing PEN in their everyday life (model 12). Interestingly, we found that women who often/always eat vegetarian food have a significantly lower interest in the supply of vegan food at the stadium (model 13). The same results are evident for the expected taste of vegan food at the stadium (models 14–17), thus rejecting H5.

### Discussion

The purpose of this study was to examine gender differences in EC and PEN of football fans in their everyday life and to investigate whether EC and PEN impact the interest in vegan food offered at the

stadium. The study is based on a unique sample of football fans of a German Football League club. Like other studies analyzing PEB (Thormann & Wicker, 2021b), men football fans were overrepresented in our sample compared to the German average as football is still a male-dominated sport.

Regarding the first research question, the regressions confirmed that women fans have a significantly higher level of EC than men do, just as socialization theory (Eagly, 1987; Gilligan, 1982) predicted. This finding ties in with studies showing that women football fans are socialized to be interdependent, cooperative, and compassionate (Del Boca et al., 2020; López et al., 2018; van Vugt et al., 2007), and thus more concerned about the consequences of their actions than men fans are (Zelezny et al., 2000). Building on these studies, our results confirm the gender gap in EC in favor of women (Zelezny et al., 2000).

The second research question refers to the translation of EC into action (PEN), thus the decision to buy organic food, and/or eat vegetarian/vegan food, thus to avoid eating meat. Our empirical findings show that women fans are significantly more likely to eat vegetarian food than men fans are, thus supporting the safety-concerns hypothesis (Davidson & Freudenburg, 1996) and ecofeminism (Briscoe et al., 2019). Admittedly,

**Table 4** Linear regressions for interest and taste ( $n = 1605$ )

	(10) Interest	(11) Interest	(12) Interest	(13) Interest	(14) Taste	(15) Taste	(16) Taste	(17) Taste
Female	0.172*** (0.030)	0.187 (0.159)	0.165*** (0.030)	0.250*** (0.044)	0.100*** (0.022)	0.124 (0.147)	0.101*** (0.022)	0.143*** (0.034)
EC	0.344*** (0.018)	0.345*** (0.020)	– –	– –	0.233*** (0.016)	0.235*** (0.018)	– –	– –
Female × EC	– –	–0.004 (0.039)	– –	– –	– –	–0.006 (0.036)	– –	– –
Organic food	– –	– –	0.205*** (0.029)	0.226*** (0.034)	– –	– –	0.148*** (0.022)	0.156*** (0.026)
Vegetarian	– –	– –	0.495*** (0.034)	0.557*** (0.040)	– –	– –	0.256*** (0.024)	0.289*** (0.029)
Vegan	– –	– –	0.160*** (0.044)	0.129* (0.056)	– –	– –	0.129*** (0.033)	0.121** (0.041)
Female × Organic food	– –	– –	– –	–0.077 (0.062)	– –	– –	– –	–0.027 (0.045)
Female × Vegetarian	– –	– –	– –	–0.209** (0.067)	– –	– –	– –	–0.114* (0.047)
Female × Vegan	– –	– –	– –	0.103 (0.084)	– –	– –	– –	0.030 (0.067)
Individual controls	YES	YES	YES	YES	YES	YES	YES	YES
Sausage	YES	YES	YES	YES	YES	YES	YES	YES
Constant	–0.279 (0.196)	–0.282 (0.197)	0.515** (0.175)	0.512** (0.179)	0.275 (0.156)	0.270 (0.155)	0.870*** (0.147)	0.872*** (0.151)
$R^2$	0.269	0.269	0.302	0.307	0.252	0.252	0.242	0.245
Mean VIF	1.37	4.91	1.38	1.63	1.37	4.91	1.38	1.63

Robust standard errors in parentheses. *VIF* variance inflation factor

\*\*\* $p < 0.001$ , \*\* $p < 0.01$ , \* $p < 0.05$

this is the only unconditional gender difference in PEN in our results. Interestingly, only women with a high level of EC have a significantly higher level of PEN and a higher probability to eat vegan food. Thus, only women vegetarians translate their perceived EC into unconditional avoidance of meat consumption, which might be caused by the association of meat consumption with masculinity (Modlinska et al., 2020; Rosenfeld, 2020; Rozin et al., 2012). The (only) conditional higher probability of women with high EC to adopt a vegan diet might be explained by vegans limiting their nutrition more strictly to only vegan food compared to vegetarians, thus having fewer food alternatives and therefore higher barriers to decide for this form of PEN.

Regarding the third research question, whether gender moderates the effects of EC and PEN on the interest in vegan food alternatives, women football fans showed a significantly higher interest in vegan food at the stadium than men did.

This finding is in line with Gilligan (1982), showing that women react more sensitively to social cues regarding desirable behavior than men do. As sustainability is a worldwide desired societal aim, women might be more open to eat vegan food in order to contribute to sustainability. As women are more generous in economic decisions without risk than men (Eckel & Grossman, 2008) like the consumption of vegan food at the stadium, women might thus be more interested in vegan food at the stadium than men are (irrespective of EC and everyday PEN). This finding is in line with the concept of ecofeminism (Briscoe et al., 2019; Sakellari & Skanavis, 2013) and the finding that women are more likely to behave pro-environmentally at sport events than men (Casper et al., 2017). As football is a male-dominated sport, the association of meat consumption and masculinity (Modlinska et al., 2020; Rosenfeld, 2020; Rozin et al., 2012) might be the reason why men have a significantly lower interest in vegan

food. Since sport events attract a huge audience, which increases the observability of fans' nutrition behavior among each other, men might perceive social pressure to conform with masculine roles, neglecting vegan food alternatives at football matches. While high levels of PEN in all three dimensions positively affected the interest in vegan food at the stadium, gender did not moderate these effects. Surprisingly, the results show that vegetarian women have a lower interest in vegan food at the stadium, challenging previous research outlining that women adhere more strictly to PEN than men do (Modlinska et al., 2020; Rosenfeld, 2020; Rozin et al., 2012).

## Conclusion

Assuming that everyday pro-environmental behavior (PEB) spills over to many areas of life, football fans might behave similarly at the stadium. To avoid costly sustainable food initiatives at the

stadium that might not be consumed by fans, this study provides empirical evidence that suggests practical directions in terms of how men and women football fans might differ in their level of environmental consciousness (EC) and PEB.

The findings support the relevance of a nuanced analysis, so that football clubs may learn that women have a significantly higher EC and 48.6% of women respondents have a generally high level of environmental consciousness. Consequently, women fans are significantly more likely to value food offerings without meat. However, football managers may also learn that a high EC is a prerequisite for PEN in everyday life but this effect is not determined by gender, indicating that marketing initiatives for food supply at the stadium should refer to the sustainability aspect rather than speaking to different genders. As only women with a high EC are more likely to often/always eat vegan food in their everyday life, football managers might consider offering both a vegetarian and vegan food alternative at the stadium. This implication is supported by vegetarian women's lower interest in the supply of vegan food. Thus, offering vegetarian food might yield a higher demand, at least for women fans, than the offer of vegan food. For both genders, communicating the usage of organic ingredients might further push the demand for these food alternatives as this dimension of PEN is significantly driven by a high EC and also positively impacts the interest in vegan food alternatives at the stadium.

This study contributes to previous literature in manifold ways. Firstly, we provide initial and nuanced quantitative evidence on gender differences in EC and everyday PEN, and their effect on possible gender differences in the interest in sustainable food at sport events. Second, this study also analyzes the facets of PEN, thus elaborating that the offer of vegan food at the stadium might be of interest to women fans. By referring to socialization theory, the safety-concerns hypothesis, ecofeminism, and prosocial behavior, this study further provides a theoretical underpinning for the assumed gender differences in EC, PEN, and interest in

vegan food at the stadium. Lastly, this study is based on a unique sample of football fans with detailed information about personal nutrition preferences in everyday life.

This study is not without limitations. While it focuses on EC, PEN, and interest in vegan food at the stadium, future research might analyze a more differentiated offer of vegan food and other sport events that attract a different audience. As existing data on gender differences in football fans' behavior are quite outdated, more research on nutrition and consumption behavior is needed. Other reasons for PEN aside from socialization and environmental concerns, such as ethics, religious beliefs, or household diets, were neglected, which future research might examine. Moreover, our study neglected alternative food strategies of PEN-pursuing individuals such as eating outside of the stadium. Thus, future research might analyze further initiatives enabling attendants to pursue PEB at sport events. The impact of PEN on (women) fans' attendance compared to other determinants might be analyzed in future research. The present data were collected during the COVID-19 pandemic, so that post-pandemic studies might investigate the robustness of our findings. Since the analyzed dataset is only cross-sectional, our findings reveal correlations rather than causal results.

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**Funding.** Open Access funding enabled and organized by Projekt DEAL.

### Declarations

**Conflict of interest.** K. Scharfenkamp and P. Wicker declare that they have no competing interests.

For this article no studies with human participants or animals were performed by any of the authors. All

studies mentioned were in accordance with the ethical standards indicated in each case.

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**Table 5** Environmental consciousness (EC) scale (Diekmann & Preisendörfer, 2003;  $n = 1605$ )

Dimension	Items (1 = <i>strongly disagree</i> ; 5 = <i>strongly agree</i> )	Mean	SD
Conative	It is still true that politicians do not do enough to protect the environment	4.32	0.92
Conative	In favor of the environment, we should all be willing to reduce our current standard of living	3.86	1.04
Conative	Environmental protection measures should also be enforced when jobs are lost as a result	3.27	1.17
Affective	It worries me when I think about the environmental circumstances under which our children and grandchildren have to live	4.11	0.93
Affective	When watching TV or reading newspaper articles about environmental problems, I am often embarrassed and angry	3.76	0.95
Affective	If we continue our current style of living, we are approaching an environmental disaster	4.31	0.90
Cognitive	There are limits of economic growth that our industrialized world has already passed or will reach soon	3.76	1.05
Cognitive	In my opinion, environmental problems are greatly exaggerated by proponents of the environmental movement (reverse-coded) <sup>a</sup>	2.25	1.08
Cognitive	Science and technology will solve many environmental problems, without us having to change our way of life (reverse-coded) <sup>a</sup>	2.71	1.06
	EC	3.82	0.75
	Cronbach's $\alpha$	0.894	–

<sup>a</sup>Item re-coded into 1 = *strongly agree* to 5 = *strongly disagree*. SD standard deviation

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## Appendix

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