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Food availability, perceived food environment and social norm perceptions of healthy and vegetarian food consumption at a public music festival in the Netherlands: a cross-sectional study

Tamika M Wopereis ,[1] Emely de Vet,[1,2] Frédérique C Rongen,[1] Maartje P Poelman[1]

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[1]Consumption and Healthy Lifestyles Chair Group, Wageningen University & Research, Wageningen, The Netherlands
[2]Tilburg School of Humanities and Digital Sciences, Tilburg University, Tilburg, The Netherlands

Correspondence to
Tamika M Wopereis;
tamika.wopereis@wur.nl

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ABSTRACT

Objective To gain insight into the food availability, the perceived food environment, and social norm perceptions in favour of healthy and vegetarian food consumption at a festival.

Design Two cross-sectional substudies were conducted to audit food and beverages at the festival, and to measure visitors' perceptions of the festival food environment (accessibility, affordability, availability, diversity, quality) and their social norms perceptions via a mobile survey.

Setting Public music festival, the Netherlands.

Sample 75 food stands and 153 adult festival visitors.

Results 75 food stands offered 627 food and beverage items, of which 92.4% were not supportive of a healthy diet. Of all food items, 46.6% were vegetarian (including 20% fries). Participants especially perceived the festival food environment as unsupportive of healthy choices. They also had weak descriptive and injunctive social norm perceptions in favour of healthy and vegetarian food consumption. However, they had stronger descriptive ($t(152)=-5.5$; $p<0.001$) and injunctive norm perceptions ($t(152)=-4.5$; $p<0.001$) of vegetarian food consumption (mean descriptive social norm perception=2.42; SD=0.82; mean injunctive social norm perception=3.14; SD=0.78), than healthy food consumption (mean descriptive social norm perception=2.10; SD=0.76; mean injunctive social norm perception=2.93; SD=0.78). Participants had stronger injunctive than descriptive social norm perceptions of healthy ($t(152)=-12.4$; $p<0.001$) and vegetarian ($t(152)=-11.3$; $p<0.001$) food consumption. Participants' perceived food environment and their perception of social norms were positively correlated.

Conclusion The festival's food environment appears unsupportive of healthy and vegetarian food consumption. The limited availability of healthy and vegetarian food coincided with weak social norm perceptions encouraging their consumption, particularly descriptive norms that arise from observing others. The food environment may stand in the way of developing descriptive norms for the consumption of healthy and vegetarian food, as people can only see others consume food that is available.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Local governments in the Netherlands are seeking strategies to encourage healthy and sustainable food consumption at festivals through public policies.

⇒ At present, there is very limited information about the food availability at festivals, visitors' perception of the food environment and their perception of social norms for healthy and vegetarian food consumption at festivals.

WHAT THIS STUDY ADDS

⇒ This study shows that there is room to improve the festival food environment as 92.4% of the food and beverages available were not supportive of a healthy diet. This was in line with the participants' perception that the food environment was unsupportive of healthy choices.

⇒ It was perceived as rather uncommon and inappropriate to consume healthy food at the festival, whereas the consumption of vegetarian food was considered more common and socially acceptable.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ These findings provide insights regarding the limited availability of healthy and vegetarian food at festivals, which coincided with visitors' general perception of a festival food environment unsupportive of healthy choices, and their perceptions about weak social norms for the consumption of healthy and vegetarian food.

⇒ This study shows the urge to integrate public festival food environments as part of wider local health promotion strategies. The findings can be used for the development and evaluation of public event policies for healthier, more sustainable festivals by formulating guidelines (eg, proportion of healthy food available) and serving as a baseline to monitor improvements.

Implementation of public event policies could support healthier, more sustainable festivals.

INTRODUCTION

Municipalities worldwide are seeking to create healthy and sustainable living environments to improve public and planetary health, as they have a responsibility to enhance and protect their community's well-being.[1] With festivals becoming more popular in the past decade,[2] municipalities in the Netherlands are exploring the potential of public policies to improve the food availability at planned events (eg, festivals). So far, public policies for planned events have mainly focused on economic development, place marketing and tourism.[3] While some local governments have sought ways to restrict alcohol and drug use at festivals through public policies,[4–6] improving the availability and accessibility of healthy and sustainable food remains largely unaddressed. Sustainable, environmentally friendly diets can be achieved by lowering the intake of animal-based proteins, through the consumption of vegetarian food for instance.[7] One of the challenges hindering the development of food policies for festivals is the lack of a comprehensive understanding by municipalities of the extent to which unhealthy and unsustainable foods are prevalent and how visitors perceive this. Besides, the pathways through which festival food environments (FEs) could shape food consumption on site remain unclear.

While festival FEs have been understudied, other out-of-home settings are known to offer mainly unhealthy food[8] and have been associated with unhealthy and unsustainable food consumption.[9–15] A Swedish music festival successfully banned meat, which reduced the festival's ecological footprint by 40%.[16] Another study found that the majority of visitors to an Australian music festival declared having consumed unhealthy food, regardless of healthy eating intentions.[17] Yet, to the best of our knowledge, only one study has evaluated the food availability at a planned event. This study showed that the 2016 Rio Olympic games offered mostly unhealthy food and beverages, despite 'healthy choice' claims in the Rio 2016 policy.[18]

There is also a lack of studies regarding visitors' perceptions about the physical FE. Besides, physical FEs may shape the social FE (eg, social norms, SNs), which may shape food consumption.[19 20] These data are important for the design, implementation and evaluation of FE policies and are highly valued by policy and key decisions-makers.[21] They allow for the exploration of people's experiences and perceptions of physical and social FEs, which enriches our understanding of the way people interact with their FE. This can ultimately provide insights into ways to design effective policies for improved nutrition.[22]

The first aim of this study was to gain insight into the food availability at a yearly public music festival in Wageningen, the Netherlands. The second aim was to gain insight into visitors' perceptions of the FE, identify their SN perceptions of healthy and vegetarian food consumption at the festival, and test for the association between perceptions of the FE and of SNs.

METHODS

Design and setting

Two cross-sectional substudies were conducted using two data-collection methods. The studies took place on 5 May 2022, during and within the perimeters of the Liberation day public music festival, in Wageningen, the Netherlands (circa 40 000 inhabitants in 2022).[23] This festival takes place on a yearly basis since the 1980s and is organised by an appointed national committee (except during COVID-19 lockdown).[24] The festival annually hosts approximately 95 000 visitors, to celebrate the liberation after World War II.[25] The Social Sciences Ethics Committee of Wageningen University granted permission for this study on 17 May 2022.

Substudy 1: food availability

Study procedure

Researchers took photographs of all temporary food stands and their menu's within the festival's perimeters to measure the availability of healthy and vegetarian food and beverages at the festival. Food outlets permanently vested in the municipality were excluded from the study, although the temporary stands they set up specially for the festival were included.

Measures

First, it was assessed if the food provider was local (vested in Wageningen) (yes/no). Second, the food providers were categorised per type of food and beverages sold at the stand: alcoholic beverages; non-alcoholic beverages; fast-food; sweet snacks and composed dishes (meals). Fast-food included the food groups: fast-food sandwiches; pizzas; fries; fried savoury snacks; savoury snacks not fried. Stands that sold both food and beverages were categorised based on the food they predominantly sold. Third, all individual food or beverage items offered by each food stand were coded by food group.[26] Each item was also coded to determine whether it was a food (including meals and products) or a beverage, the item was healthy (yes/no), the food item was vegetarian (yes/no). An item was considered healthy if it was included in the 'Wheel of Five', a consumer guide for healthy and sustainable diets based on the Dutch dietary guidelines.[27] For meals, the Healthy Meal Index was used, which is a tool used to obtain an indication of the healthiness of meals, inspired by Kasper *et al*[28] and based on the 'Wheel of Five'.[8 28] Vegetarian food was defined as containing neither meat nor fish.

Data analysis

Descriptive analyses were used to summarise the proportion of food providers vested in Wageningen, types of

food providers, items per food group, food and beverage items, un(healthy) food and beverages, and (non-)vegetarian food. Missing values were only excluded from the analyses of substudy 1 for which the value was missing (eg, if an item could not be placed in a food group but could be categorised as vegetarian or not, it was excluded from the food group analysis but included in the vegetarian analysis). One item could not be placed in a food group (the word 'drinks'); 26 items could not be categorised for healthiness and nine could not be categorised as vegetarian or not. Data were analysed with IBM SPSS Statistics, V.28.0.1.1.[15]

Substudy 2: perceived FE and SNs

Participants

Eligible participants were festival visitors aged 18+ and fluent in Dutch. They had to have access to internet through their mobile phone. All participants gave written informed consent to participate in the study.

Study procedure

Festival visitors were approached by one of the researchers (at the festival). If they wanted to participate and met the inclusion criteria, they scanned a QR code and filled in a survey using their mobile phone. The survey was developed to assess participants' demographic characteristics, determine their perceived supportiveness of the FE for healthy and vegetarian food consumption (accessibility, affordability, availability, diversity and quality),[29] and measure descriptive and injunctive SN perceptions in favour of healthy and vegetarian food consumption at the festival. At the start of the survey, participants could read about the characteristics of a healthy dietary pattern ('a healthy diet includes fruit, vegetables, whole grain products, and few sweets and snacks') and of a vegetarian diet ('a vegetarian (including vegan) diet does not contain meat or fish'), conform prior research.[29] These definitions were given to standardise participants' understanding of the terms healthy and vegetarian, given that they may otherwise interpret these terms differently.

Measures

Participants' characteristics were assessed through close and open-ended questions. The questions pertained to gender (female/male/non-binary), age (open-ended question, responses categorised by researchers into 18–25/26–50/51+), education level (close-ended question, responses were based on the education levels from the Dutch Central Bureau for Statistics (CBS). Responses categorised by researchers into low/middle/high, based on the CBS[30]). Finally, it was ascertained if participants were vegetarian (yes/no).[27]

Visitors' perceived supportiveness of the FE regarding healthy and vegetarian food consumption was measured using the items: accessibility, affordability, availability, diversity, and quality of healthy and vegetarian food, separately, and with the following statements[29]: 'I think [healthy/ vegetarian] food is [easily accessible/ affordable/ sufficiently available] at this May 5 festival'; 'I think there is enough diversity of [healthy OR vegetarian] food available at this May 5 festival'; 'I think the quality of [healthy OR vegetarian] food available at this May 5 festival is satisfactory'. A 5-point Likert scale ranging from 'strongly disagree' to 'strongly agree' was used for all statements of the mobile survey, except the questions about demographics. Both percentages and mean scores were calculated for each item of the perceived FE score. The scores of the five individual items of the perceived FE were averaged into the total mean score for the perceived FE. This was done separately for the perceived FE for the consumption of healthy food (Cronbach's alpha: 0.72) and of vegetarian food (Cronbach's alpha: 0.73).

Descriptive SN perceptions in favour of healthy and vegetarian food consumption were assessed separately, each with two items[19]: 'At this May 5 festival, [people mainly eat/ I see other visitors mainly eat] [healthy/ vegetarian]'. Mean scores for the two items were calculated separately for healthy food (Cronbach's alpha: 0.63) and for vegetarian food (Cronbach's alpha: 0.67). Injunctive SN perceptions in favour of healthy and vegetarian food consumption were assessed separately, each with three items: 'At this 5 May festival, [it is appropriate to eat/ people think it's fine to eat/ it is normal to eat] [healthy/ vegetarian]'. Mean scores for the three items were calculated separately for healthy food (Cronbach's alpha: 0.69) and for vegetarian food (Cronbach's alpha: 0.73). Because SNs influence behaviour when the participants identify themselves with the referent group, the extent to which participants identified themselves with other festival visitors was measured using the statements: 'I have a lot in common with the other visitors of this May 5 festival' (identification 1); and 'I feel at home at this May 5 festival' (identification 2). The data for the two identification scores are presented separately as a mean score could not be calculated for these items due to the low Cronbach's alpha (Cronbach's alpha: 0.55).

Data analysis

Only the data from completed surveys were included in substudy 2. Descriptive analyses were used to summarise the demographic characteristics of the participants, the mean score for the perceived FE, and mean scores for descriptive and injunctive SN perceptions. A point-biserial correlation was computed (due to non-normal distribution of data) to assess the relationship between being vegetarian and the perceived FE for vegetarian food consumption. Paired sample t-tests were conducted to analyse if there were differences in the means of the scores for the descriptive and the injunctive SN measures; and between the SNs for healthy versus vegetarian food consumption. Spearman's rank correlation was computed to assess the association between the perceived FE and the descriptive as well as the injunctive SNs for healthy and vegetarian food consumption, at the festival. Data were analysed with IBM SPSS Statistics, V.28.0.1.1.[15]

RESULTS

Substudy 1: food availability

There were 75 food stands within the festival's perimeters (350 000 m^2), of which 51.8% were owned by food providers not permanently vested in Wageningen. 69.4% of the food stands were specialised in fast-food (N=36; 48%) or alcoholic beverages (N=20; 26.7%).

In total, the food stands offered 627 food and beverage items, which included 274 (43.7%) food and 353 (56.3%) beverage items. Most available beverages were alcoholic beverages (N=147 (23.4%)) and sugar-sweetened beverages (N=84 (13.4%)). The most available foods were (1) fried savoury snacks (N=90 (14.4%)); (2) fast-food sandwiches (N=57 (9.1%)) and (3) non-fried sweet pastries (N=27 (4.3%)). Of the entire assortment at the festival, 556 (92.4%) food and beverage items were classified as unhealthy and 46 (7.6%) as healthy. When considering only food items, 0.8% were classified as healthy. Almost half (n=122, 46.6%) of the food assortment was vegetarian, but this amounted to 37.4% when fries (offered 24 times) were excluded. The main vegetarian options available were fries, sweet pastries and fried savoury snacks. The majority of vegetarian food items were classified as unhealthy (N=113 (98.3%)). Of the entire food assortment at the festival, one food item (0.4%) contained fish or seafood. This item was entitled 'fish and chips with sauce ravigote' and was classified under the food group 'composed dishes' (table 1).

Substudy 2: perceived FE and SNs

Participant characteristics

205 festival visitors started the survey and 153 (74.6%) completed it entirely. 22.5% of participants lived in

Table 1 Proportion of food and beverages in each food group, and proportion of healthy and vegetarian food and beverages per food group, at the May 5 festival of Wageningen, the Netherlands

Food groups	Items in food group, N (%)	Healthy items (Wheel of Five: yes), N (%)	Unhealthy items (Wheel of Five: no), N (%)	Vegetarian food items, N (%)	Non-vegetarian food items, N (%)
Sugar-sweetened beverages (non-alcoholic)	84 (13.4)	0 (0)	84 (100)	n/a	n/a
Beverages without sugar (non-alcoholic)	71 (11.3)	44 (62.0)	27 (38.0)	n/a	n/a
Alcoholic beverages (eg, wine, beer)	147 (23.4)	0 (0)	147 (100)	n/a	n/a
Strong alcoholic beverages (eg, strong, cocktails)	37 (5.9)	0 (0)	37 (100)	n/a	n/a
Alcohol-free beverages (eg, mocktails, 0% beer or 0% wine)	14 (2.2)	0 (0)	14 (100)	n/a	n/a
Total for beverages	353 (56.3)	44 (12.5)	309 (87.5)	n/a	n/a
Fast-food sandwiches (eg, hamburgers, kebabs, doners, hotdogs, shawarmas, burritos, wraps, sandwiches, savoury pastries)	81 (12.9)	0 (0)	76 (100)	11 (14.1)	67 (85.9)
Pizzas	5 (0.8)	0 (0)	5 (100)	2 (50)	2 (50)
Fries	24 (3.8)	0 (0)	24 (100)	24 (100)	0 (0)
Fried savoury snacks	90 (14.4)	0 (0)	90 (100)	37 (41.1)	50 (55.6)
Savoury snacks not fried	1 (0.2)	0 (0)	1 (100)	0 (0)	1 (100)
Salads and vegetables ready to eat	1 (0.2)	1 (100)	0 (0)	1 (100)	0 (0)
Composed dishes	34 (5.5)	0 (0)	16 (100)	9 (31)	20 (69)
Fruits	3 (0.5)	1 (100)	0 (0)	3 (100)	0 (0)
Fried sweet pastries	4 (0.6)	0 (0)	4 (100)	4 (100)	0 (0)
Non-fried sweet pastries	27 (4.3)	0 (0)	27 (100)	27 (100)	0 (0)
Ice cream, candies, chocolate, cookies	4 (0.7)	0 (0)	4 (100)	4 (100)	0 (0)
Dairy products	0 (0)	n/a	n/a	n/a	n/a
Nuts and seeds	0 (0)	n/a	n/a	n/a	n/a
Total for food	274 (43.7)	2 (0.8)	247 (99.2)	122 (46.6)	140 (53.4)
Total for food and beverages	627 (100)	46 (7.6)	556 (92.4)	n/a	n/a

n/a, not available.

Table 2 Descriptive statistics of the 153 participants in the study

Variable	N (%)
Gender	
Female	84 (54.9)
Male	64 (41.8)
Non-binary	5 (3.3)
Age	
18–25 years	62 (40.5)
26–50 years	56 (36.6)
51+ years	35 (22.9)
Education level	
High	80 (53)
Middle	63 (41.7)
Low	8 (5.3)
Dietary preferences	
Vegetarian	17 (11.1)

Wageningen, 54.9% identified as woman, 40.5% were aged 18–25 years and 80% were highly educated (table 2).

Perceived FE

Many participants perceived the FE as rather unsupportive of healthy food consumption (total score perception healthy FE: mean=2.88; SD=0.68). The individual means of the five items included in the total score perception healthy FE, had a score slightly lower than three, except for the item 'quality' (mean: 3.18). The percentages of responses for the individual items, indicate that 50.3% of participants were unsatisfied with the accessibility of healthy food and 47.7% were unsatisfied with the affordability of healthy food at the festival. The minority of the participants were satisfied with the quality (36.4%) of the healthy food at the festival (table 3).

Participants' perception of the FE in terms of supporting vegetarian food consumption seemed more neutral (total score perception vegetarian FE: mean=2.99; SD=0.64). The means of the five individual items included in the total score perception vegetarian FE had scores around three. The percentages of responses for the five items indicate that there was not a strong tendency. Several participants chose the neutral answer to score the affordability (38.7%), availability (39.1%), diversity (40.4%) and quality (50.3%) of vegetarian food at the festival. On the other hand, 41.7% of participants were unsatisfied with the affordability of vegetarian food (table 3).

No association was found between being a vegetarian and the perceived supportiveness of the FE for vegetarian food ($r_{pb}(151)=-0.020$; p=0.803).

Perceived SNs for healthy and vegetarian food consumption

Participants identified themselves with other May 5 festival visitors (Identification 1: mean=3.41; SD=0.94; identification 2: mean=4.01; SD=0.8). Overall, participants perceived weak descriptive and injunctive SNs in favour of healthy and vegetarian food consumption

Table 3 Perceived food environment and social norms of May 5 festival visitors

	(Totally) disagree (% participants)	Neither disagree, nor agree (% participants)	(Totally) agree (% participants)	Mean (SD)
Perceived food environment (scale 1–5)				
Total score perception healthy food environment				2.88 (0.68)
Easy access to healthy food	50.3	23.2	26.5	2.71 (1.03)
Satisfying affordability of healthy food	47.7	33.1	19.2	2.64 (0.97)
Sufficient availability of healthy food	37.8	29.1	33.1	2.98 (1.04)
Enough diversity of healthy food available	41.7	25.2	33.1	2.90 (1.10)
Satisfying quality of healthy food	19.9	43.7	36.4	3.16 (0.84)
Total score perception vegetarian food environment				2.99 (0.64)
Easy access to vegetarian food	35.1	30.5	34.4	3.00 (1.04)
Satisfying affordability of vegetarian food	41.7	39.7	18.5	2.69 (0.91)
Sufficient availability of vegetarian food	23.8	39.1	37.9	3.14 (0.96)
Enough diversity of vegetarian food available	32.5	40.4	27.2	2.93 (0.90)
Satisfying quality of vegetarian food	15.2	50.3	34.4	3.18 (0.80)
Social norm perceptions (scale 1–5)				
Descriptive social norm; in favour of healthy food				2.10 (0.76)
Injunctive social norm; in favour of healthy food				2.93 (0.78)
Descriptive social norm; in favour of vegetarian food				2.42 (0.82)
Injunctive social norm; in favour of vegetarian food				3.14 (0.78)

at the festival (table 3). Still, participants perceived stronger descriptive norms to consume vegetarian food (mean=2.42; SD=0.82) than healthy food (mean=2.10; SD=0.76; t(152)=−5.5; p<0.001). They also perceived stronger injunctive norms to consume vegetarian food (mean=3.14; SD=0.78) than healthy food (mean=2.93; SD=0.78; t(152)=−4.5; p<0.001).

Participants perceived stronger injunctive norms than descriptive norms at the festival. This was the case for SNs for healthy (injunctive: mean=2.93; SD=0.78; descriptive: mean=2.10; SD=0.76; (t(152)=−12.4; p<0.001)) and for vegetarian food consumption (injunctive: mean=2.93; SD=0.78; descriptive: mean=2.42; SD=0.82; t(152)=−11.3; p<0.001).

Correlation between perceived FE and perceived SNs for healthy and vegetarian food consumption

There was a positive moderate correlation between the perceived FE for healthy and vegetarian food consumption and the perceived descriptive SNs for healthy (r(151)=0.44; p<0.001) and vegetarian (r(151)=0.35; p<0.001) food consumption, and the perceived injunctive SNs for healthy (r(151)=0.31; p<0.001) and vegetarian (r(151)=0.47; p<0.001)) food consumption.[31] This indicates that participants who perceived the FE at the festival as supportive of healthy and vegetarian food consumption, also perceived stronger SNs for healthy and vegetarian food consumption and vice versa.

DISCUSSION

The majority of the food and beverages available at the festival were unhealthy. Vegetarian food was available but consisted mostly of fries. Overall, participants perceived the FE as unsupportive of healthy food consumption while their perception of the FE for vegetarian food consumption was more neutral. Participants had weak descriptive and injunctive SN perceptions of healthy and vegetarian food consumption. Still, they perceived stronger injunctive than descriptive SNs for healthy and vegetarian food consumption. They perceived stronger descriptive and injunctive norms for vegetarian compared with healthy food consumption. Last, participants who found the perceived FE more supportive of healthy and vegetarian food consumption also found it more common (descriptive SN) and appropriate (injunctive SN) to consume these foods.

The availability of healthy food and beverages at the festival was very low (7.6%). These findings match the literature on food availability and consumption in out-of-home settings.[9–15 18] There was a better availability of vegetarian food (46.4%) compared with healthy food at the festival, but it could be improved by increasing the diversity and healthiness of vegetarian options, which were mostly unhealthy (fries, sweet pastries, fried savoury snacks).[27] This could contribute to the protein transition as FEs with large varieties of vegetarian dishes contribute to reducing meat consumption.[32] While this study evaluated the healthiness and sustainability of the food available at a public music festival, it should be noted that food consumed at festivals constitutes an occasional event, as opposed to food consumed on a daily basis. Hence, the impact of the food offered and consumed during festivals on the overall diet of people may be limited. Also, these results should ideally be compared with other studies on food at planned events or in out-of-home settings.

While the vast majority of food and beverages at the festival were unhealthy (92.4%), participants' perceptions were mixed. Some perceived healthy food as sufficiently available (33.1%) while others did not (37.8%). This discrepancy could be attributed to several factors. First, participants may have had a different understanding of healthy food. Second, participants were not asked what their expectations were regarding the FE at the festival (eg, with low expectations, the actual situation may seem satisfying). Third, participants were not asked about their reference point when evaluating their perceptions of the FE. Fourth, not all participants may have been aware of the food available at the festival or may have obtained food elsewhere. Finally, researchers approached visitors at different locations. The direct surroundings of a participant when filling in the survey may have impacted their perceptions of the FE.[33]

Participants perceived weak descriptive SNs for healthy and vegetarian food, with the perceived descriptive SNs for healthy food being weaker than those for vegetarian food consumption. This suggests that they did not see other visitors consuming vegetarian food and even less healthy food. This is probably a reflection of the direct FE, which most likely hampered visitors to display healthy or vegetarian food consumption. These findings are in line with prior findings indicating that SNs on food consumption may be steered by the FE.[19 20 33 34] Empirical evidence has shown that SNs are physically embedded in FEs and might influence food consumption.[20] In another study, participants living in neighbourhoods with more fast-food outlets reported stronger descriptive and injunctive SNs about fast-food consumption, which were associated with higher fast-food intake.[19]

Participants perceived stronger injunctive than descriptive SNs endorsing healthy and vegetarian food consumption. Nonetheless, their perception of injunctive SNs for healthy food consumption remained weak (mean=2.93; SD=0.78), suggesting that they still thought it was rather inappropriate to eat healthy food at the festival. They might be used to eating unhealthy food in out-of-home settings[9–15 18] or might associate festivals with the consumption of unhealthy food. Enjoying a special occasion (eg, a party) was identified as the most important reason for people to enjoy unhealthy snacks.[35]

Their perception of the injunctive SNs for vegetarian food consumption was stronger (mean: 3.14) than for healthy food, indicating that vegetarian food consumption was seen as more appropriate. This may be due to age, gender and education level. Prior studies reported more vegetarians and flexitarians among younger adults[36]

and highly educated women.[37] While 11% of participants identified as vegetarian, a larger proportion may have been flexitarian. Besides, 55% of participants were female, 40.5% were young adults and 53% were highly educated.

Participants who perceived the FE as more supportive of healthy and vegetarian food consumption also perceived stronger descriptive and injunctive SNs for healthy and vegetarian food consumption. This could indicate that their perception of the FE influenced their SN perceptions or vice versa. Both measures may influence food consumption. Previous studies have found associations between perceptions of an unhealthy FE and fast-food consumption,[38] and associations between vegetarian food consumption and perceived SNs.[39]

Recommendations for policy and research

The findings from this study can serve as input to develop public policies for improved food availability at festivals (eg, guidelines for proportion of healthy/unhealthy food and types of food providers). Inspiration can be taken by what has been done to restrict alcohol and drugs at festivals.[4–6 40] Besides, the majority of festival visitors perceived a low availability and accessibility of affordable healthy food, which may encourage policy makers to take initiatives.[41]

Additional research on the availability of healthy and vegetarian food at festivals is needed to validate current findings. More research is also needed to determine how the availability of healthy and vegetarian food at festivals influences consumption on site and daily food consumption in the future.[40] Besides, future research could examine the association between the perceived FE and perceived SNs for healthy and vegetarian food consumption, and their eventual influence on actual food consumption at festivals. Similar studies have been conducted to examine the association between FEs, SNs and food consumption.[19 20] More research is needed to evaluate the impacts of public policies for festivals targeting food.[18] This study can serve as a baseline to evaluate the implementation and effectiveness of such policies.

Strengths and limitations

This study had notable strengths. It is, to the best of our knowledge, the first study measuring the festival FE objectively and subjectively, including social aspects. Food availability was audited by researchers, rather than relying on self-reported outcomes of participants or food providers. Last, the food availability and surveys were completed on-site, reducing chances of recall bias.

This study also had limitations. There were internet connection problems given the large number of visitors, which explains the uncompleted surveys. This could be resolved by using tablets to fill in the surveys offline. Next, the researchers covered the whole site to invite participants to participate so the particular context in which participants completed the survey may have differed. Moreover, we did not account for the duration that participants spent at the festival before filling in the survey, which may have caused participants to perceive the FE and SNs differently.[33] Also, participants were not asked whether they had already visited food stands or bought food, which may have caused differences in their perception of the FE. The food stands' menus were used to evaluate the food available, which did not always provide enough information to evaluate healthiness. Last, participants were given succinct definitions of what constitutes healthy and vegetarian diets, similar to previous research,[29] and with the aim of increasing the validity of their responses. These definitions may have influenced participants' responses, by making participants more critical about their perceived FE for instance.

CONCLUSION

The festival's FE appeared to be unsupportive of healthy and sustainable food consumption. It was seen as rather uncommon and inappropriate to consume healthy food at the festival, whereas the consumption of vegetarian food was considered more common and socially acceptable. These findings can be used to develop public policies for healthier and more sustainable food consumption at festivals and as a baseline to evaluate them.

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Competing interests None declared.

Patient consent for publication Not applicable.

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ORCID iD
Tamika M Wopereis http://orcid.org/0009-0009-1623-3857

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