Examining social norms among other motives for sustainable food choice: The promise of descriptive norms

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ABSTRACT

This study examines the relative importance of social norms among other motives in driving sustainable food choice. It distinguishes between injunctive and descriptive social norms, as well as between reported actual choice and intended future choice. The study uses binary logistic regression models and survey data (N = 348) from five workplace restaurants in Helsinki, Finland where a novel, local and environmentally friendly dish, roach fish patties, was being launched. Workplace restaurants account for a significant share of food consumption in Finland and are a relevant context for investigating the impact of social norms as the food choice is highly observable. The study reveals that perceived descriptive norms are significantly associated with both actual and intended food choice while perceived injunctive social norms are not related to either. It also finds that in the case of actual choice, the impact of perceived descriptive norms is weaker compared to that of other motives, such as habit, visual appeal, value for money, and ability to satiate hunger. In the case of intended choice, only taste has a stronger impact than the descriptive norm. Further, the analysis situates the motives for food choice in the larger theoretical discussion of System 1 and 2 decision processes and of the impact of visceral factors on food choice, and finds that visceral-factor-related motives have a stronger impact on actual choice than on intended choice. The study shows how the role of social norms in sustainable food choice is more nuanced than presented in previous literature. It concludes that there can be scope for steering food choice towards greater sustainability through a skilled mobilization of descriptive norms.

1. Introduction

There is increasing alarm about the unsustainability of current economic systems, most recently expressed in the Special Report by Intergovernmental Panel on Climate Change (IPCC, 2018) and the global assessment report on biodiversity and ecosystem services (IPBES, 2019). The message in these reports and other fora is that food systems need to move towards greater sustainability. Although this is only possible with the joint effort of producers, consumers and regulators, consumers can nevertheless have a significant impact. There are some encouraging signs in this direction: consumers are increasingly concerned about sustainability and some of them are willing to change their consumption patterns accordingly (e.g. Vermeir and Verbeke, 2006). Moreover, a better understanding of tools to affect consumption behaviour such as nudging has opened new avenues to regulators to complement traditional policy instruments (e.g. Lehner et al., 2016). However, at the moment of choice, several motives come into play for consumers, and it

is the total impact of these motives that produces the ultimate food choice, which often is not sustainable.

One such class of motives which may facilitate but also hinder sustainable behaviour is social norms (Jackson, 2005). Social norms have been defined as "rules and standards that are understood by members of a group, and that guide and/or constrain human behaviour without the force of laws" (Cialdini and Trost, 1998, p.152). Social norms, communicated through social interaction (Lapinski and Rimal, 2005) provide information about how others are behaving and what is the approved behaviour in a situation (Cialdini et al., 1990).

Social norms have gained attention from scholars across multiple disciplines and their influence has been firmly established for both food choice (for reviews see e.g. Higgs and Thomas, 2016; Robinson et al., 2014) and for sustainability-related behaviours (for a review see e.g. Farrow et al., 2017). However, studies are only beginning to emerge that combine these two strands of literature into a simultaneous enquiry of how social norms affect the sustainability of food choice (for a review,

see Cialdini and Jacobson, 2021). Most of these studies examine norms that have been intentionally activated, and some do not distinguish between types of social norms.

To obtain a fuller understanding of the role of social norms in sustainable food choice, further studies are thus needed, especially ones that address separately the impact of different types of social norms. Moreover, food choice is a multi-motive behaviour – more so than many other behaviours – and being able to steer food choices towards sustainability requires an understanding of these motives and their relative importance. Therefore, simply finding that social norms matter for the sustainability of food choices is not enough: social norms need to be placed in the wider context of other motives affecting food choice before firms can design effective marketing strategies and regulators effective policy interventions that exploit social norms to promote sustainable eating.

This study sheds light on the relative importance of descriptive and injunctive social norms on actual and intended sustainable food choice when these norms are not intentionally activated. *Descriptive* social norms refer to how most people typically behave in a given domain or situation, while *injunctive* social norms represent what is commonly approved or disapproved (Cialdini et al., 1990). The analysis uses binary logistic regression models and survey data from five workplace restaurants[1] where a novel, local and environmentally friendly dish, roach fish patties, was being launched. It emerges that the descriptive social norm has a significant association with actual and intended sustainable food choice while the perceived injunctive social norms do not. Other motives, namely habit to choose fish dishes, visual appeal, being satiating and value for money have a stronger impact on the odds of choosing the dish than the descriptive norm. In the case of intended choice, however, and once the respondents have tasted the novel dish, only taste has a stronger impact than the descriptive norm on the odds of consuming the dish.

2. Theoretical background

Social norms strongly influence consumers' food choices (for a review see e.g. Herman et al., 2003; Cruwys et al., 2015; Higgs and Thomas, 2016), such as intake (for a review see e.g. Cruwys et al., 2012), healthiness (e.g. Burger et al., 2010; Mollen et al., 2013), and the liking or disliking of specific foods (Robinson and Higgs, 2012).

Social norms also have an important impact on environment-related behaviours such as promoting energy conservation (Nolan et al., 2008), the reuse of towels in hotels (Goldstein et al., 2008), and recycling (Schultz, 1999), as well as on reducing harmful behaviours such as littering (Cialdini et al., 1990), stealing petrified forest wood (Cialdini et al., 2006), and using plastic bags (De Groot et al., 2013). The influence of social norms can be significant even when the consumers are unaware about this influence (e.g. Christie and Chen, 2018) or believe it to be small (Nolan et al., 2008). In their review of recent studies, Cialdini and Jacobson (2021) found robust supportive evidence of the significant impact of social norms on sustainable food choice.

The analysis in the present paper relies on the distinction of social norms into descriptive and injunctive social norms from the Focus Theory of Normative Conduct (Cialdini et al., 1990). As these two types of norms have a different channel of influence (Cialdini et al., 1991), they can vary in their degree of influence in different situations. While descriptive norms (how people typically behave) are particularly important for the individual's interpersonal goal of behaving appropriately, injunctive norms (what is commonly approved or disapproved)

are associated with serving the individual's goals of obtaining affiliation and social approval (Cialdini et al., 1990) as well as avoiding social sanctions resulting from not adhering to the rules and beliefs of the group (e.g. Reno et al., 1993). As the standards on how to behave appropriately provided by descriptive norms are likely to change from situation to situation, injunctive norms are more likely to apply across settings (Reno et al., 1993). Descriptive norms are used as shortcuts in the decision-making process (Cialdini et al., 1990; Cialdini, 2009), and have a greater impact than injunctive norms when it is not clear what the appropriate behaviour should be (Cialdini, 2009). Injunctive norms demand more cognitive effort to be effective (Jacobson et al., 2011) and require an understanding of the morals of the group to which the individual wants to belong (Cialdini, 2003).

The literature also makes a distinction between collective and perceived norms (Lapinski and Rimal, 2005, see also Rimal and Lapinski, 2015). Collective norms are identified by the current behaviour at the level of social groups while perceived norms refer to individuals' subjective perception of such collective behaviour. This distinction is relevant for this study, since in the analysis the shorthand injunctive and descriptive norms stands for perceived injunctive and descriptive norms which may differ from the collective social norms. Thus, descriptive norms are defined as individual perceptions about the prevalence of a behaviour and injunctive norms as perceived pressures to conform to certain norms (Lapinski and Rimal, 2005).

The impact of social norms may be strengthened through intentional activation (Cialdini et al., 1990). However, as Jacobson et al. (2020) point out, even if social norms are not activated, they have some degree of "chronic salience" that individuals within a social group perceive. The focus of this study is on the chronic salience of social norms and if and how it affects the choice of a novel sustainable dish. Since social norms impact individuals' behaviour to the extent that information related to these norms is currently salient (Jacobson et al., 2011), in the state of chronic salience their impact is likely to be weaker than when activated.

There are certain core motives that tend to repeatedly come up as significant in studies modelling food choice. Typically, they relate to sensory appeal/taste, price, convenience, and health (e.g., Steptoe et al., 1995; Januszewska et al., 2011) as well as liking, habit, and need/-hunger (Renner et al., 2012). However, only a few studies have investigated the relative importance of social norms within the context of multiple motives driving food choice. One of those studies is by Renner et al. (2012), who identified in The Eating Motivation Survey (TEMS) fifteen main motives for food choice: liking, habits, need and hunger, health, convenience, pleasure, traditional eating, natural concerns, sociability, price, visual appeal, weight control, affect regulation, social norms, and social image. The social norms main motive included both descriptive-norm-like motives *"because other people (my colleagues, friends, family) eat it"* and injunctive-norm-like motives *"because I am supposed to eat it"*. Renner et al. (2012) found that social norms were among the least influential motives of food choice; a result which is in line with Jackson et al. (2003) and Phan and Chambers (2016).

Based on the above literature review, the following hypothesis is formulated:

H1. Perceived descriptive and injunctive social norms do have an impact on actual food choice but are nevertheless among the weakest food choice motives.

Renner et al. (2012) do not distinguish between descriptive and injunctive norms as separate motives. It is useful to turn to the literature on decision processes to gain some insight on the possible differences in the impact of these two types of norms. Ample research indicates that decision-making is guided by two types of decision processes called System 1 and System 2 (Stanovich and West, 2000). System 1 demands very little cognitive effort, makes large use of heuristics, is often guided by habits and is relatively fast, associative, automatic, and unconscious. System 2 requires analytical processing, is much slower, controlled, flexible and rule-based. (Stanovich and West, 2000, see also Kahneman,

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[1] This study shares part of the survey data with a larger study on social norm activation and sustainable food choice (Salmivaara and Lankoski, 2019). The present study covers only the subset of restaurants that acted as a control group in the other study, addresses a different research question, and uses different variables and methods.

2003). System 1 is also more affected by the specific context in which the decision takes place (Stanovich and West, 2000). Ohtomo and Hirose (2007) find that descriptive norms are determinants of System-1-type processes while injunctive norms are determinants of System-2-type processes. Their result is in line with the idea that descriptive norms act as a decisional shortcut for choosing how to behave in a specific situation (Cialdini et al., 1990) and with the evidence that any injunctive norm's ability to predict behaviour tends to be weak unless it is in the foreground of the individual's attention when the norm-relevant behaviour arises (Kallgren et al., 2000). Also studies on the impact of different types of messages on behaviour suggest the association of descriptive norms with System 1 automatic responses. For instance, Kredentser et al. (2012) find that the impact of descriptive norm messages is higher when people are under cognitive load, while that of injunctive norm messages is higher when people have both attention and time for analytically processing their choices. Based on these results, it is hypothesized that descriptive norms will have a greater impact on actual food choice than injunctive norms in the specific context of the workplace restaurant, which is a fast, repeated choice situation requiring little cognitive effort. Thus, the following hypothesis is formulated:

H2. In the case of a fast, repeated food choice situation requiring little cognitive effort, the role of perceived descriptive norms is stronger than that of perceived injunctive norms.

Social norms can affect not only actual choice but also intentions to choose. This is recognized also in the influential Theory of Planned Behaviour (TPB; Ajzen, 1991), where studies have found that subjective norms (together with attitude and perceived behavioural control) strongly predict behaviour through intention (for a review in the context of sustainable food see e.g. Han and Stoel, 2017; Scalco et al., 2017). However, this paper is grounded in the theoretical tradition of the Focus Theory of Normative Conduct (Cialdini et al., 1990) because it better suits the aim of investigating both choice and intention within this particular research design. Furthermore, the study makes a distinction between descriptive and injunctive norms as motives, whereas TPB does not (Ajzen, 2020) and the focus of TPB is more on injunctive norms (Scalco et al., 2017).

As the impact of injunctive norms is greater the higher the degree of deliberation associated with the decision, it is expected that when asked to indicate one's intention to choose a food item in the future, injunctive norms will have a greater impact than in the case of actual choice. This is because there is greater opportunity for reflection and deliberation as opposed to a fast, non-deliberative actual choice situation. Moreover, intended choices may be formulated without regard to visceral influences. Visceral factors such as hunger, thirst, moods, emotions, and the like, "have a disproportionate effect on behaviour and tend to 'crowd out'" all other goals, but "people underweigh, or even ignore, visceral factors that they will experience in the future" (Loewenstein, 1996, p. 272). Hence, choice intentions can include goals contained in injunctive social norms, even though in actual choice situations these goals may later be overridden by visceral influences.

Thus it is hypothesized that

H3. The role of injunctive norms is stronger in the case of intended future choice compared to that of actual choice.

Studying the impact of social norms on food choice in specific naturalistic environments and based on one-time measurements poses challenges in terms of the external validity of the findings (Steckler and McLeroy, 2008). The above hypotheses are formulated with respect to contexts where food choice is highly observable and fast and where social norms are not intentionally activated.

3. Materials and methods

3.1. A novel sustainable dish as the food choice of interest

Restaurants and cafeterias have been the stage of several interventions aimed at promoting sustainable food choices, such as the introduction of a weekly vegetarian day in schools (Lombardini and Lankoski, 2013) or the development of a climate choice meal concept (Pulkkinen et al., 2016). Also this study is linked to a sustainability-related intervention, namely the introduction of a newly developed dish, roach fish patties.[2] This novel dish uses roach mass breaded with rye. Its consistency is similar to that of meatloaf, and of other fish patties that Finns are familiar with (for a photograph see Appendix F in Supplementary Material). The dish was developed in a cooperation project of John Nurminen Foundation (an NGO active in the protection of the Baltic Sea) and Palmia Catering services. The project aimed to promote the well-being of the Baltic Sea, and to increase the supply of ethical local food by advancing the utilization of the domestic, underused roach fish for human consumption (John Nurminen Foundation, 2016).

Fish remains one of the main components of hot meals in Finland (Mäkelä and Rautavirta, 2018; Mäkelä, 2005) with a consumption of 14.9 kg per capita/year (Natural Resources Institute Finland, 2020a) and 85% of Finns declaring that they eat fishery or aquaculture products "at least once a month" compared to EU average of 72% (European Commission, 2018). Moreover, in this country with abundant inland waters and a long coastline, approximately 27% of the population are leisure fishers (Natural Resources Institute Finland, 2020b).

Roach fish, although being a common fish for human consumption until the Second World War, has since lost popularity and its consumption is now negligible. Yet, roach is an environmentally friendly alternative to widely consumed domestic or imported fish (e.g. rainbow trout, salmon, and tuna) in terms of greenhouse gas emissions (Uusitalo et al., 2018, p. 697). The consumption of roach fish also helps reduce eutrophication as roach fishing removes significant masses of nutrients from aquatic ecosystems (Horppila and Kairesalo, 1990; Uusitalo et al., 2018). Moreover, it supports the livelihood of local fishermen. While there is no single definition for local food (Feldmann and Hamm, 2015), based on their fishing area these roach fish may be considered 'local' at least for the South of Finland where this study was conducted. Thus roach fish patties can be seen as sustainable food as they both contribute to "avoiding negative environmental impacts" and "contributing to resilient local economies", characteristics which Goggins and Rau (2016, p. 258) see as defining of sustainable foods.

In this study, to provide a contrast to roach fish patties in terms of sustainability, meat lasagne was offered as the other main course to choose from. Roach fish patties are a more sustainable source of protein compared to meat lasagne both in terms of greenhouse gases and nutrient emissions. (Uusitalo et al. (2018, p. 697) find in their life cycle analysis that the global warming potential of beef and cheese, the protein sources in meat lasagne, is several times higher than that of roach fish protein – up to 321 times higher in the case of beef and up to 34 times higher in the case of cheese. Moreover, high nutrient emissions contributing to eutrophication are associated with beef and milk production (de Vries and de Boer, 2010), while roach fishing actually reduces eutrophication.

3.2. Workplace restaurants as the setting for food choices

Workplace restaurants are a very fruitful setting for studying the influence of social norms on food choices for two reasons. Firstly, they account for a significant share of food consumption in Finland: 20% of

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[2] Note that in Finnish the word "roach fish" does not carry any association to cockroaches.

all Finnish men and 25% of Finnish women of working age eat lunch in a workplace restaurant (Raulio et al., 2018, p. 42). Since most Finns eat only one hot meal a day (Mäkelä, 2005), the lunch at the workplace restaurant is a crucial part of food consumption. Moreover, it is a situation where social influences can have a strong impact as food choices are made publicly and often in the presence of one's own reference group.

The study was carried out in five workplace restaurants in Helsinki, Finland. The restaurants, all run by the catering firm Palmia, were randomly selected (stratified randomization based on average number of lunch customers) from among 22 Palmia restaurants serving the novel dish of roach fish patties. The number of daily lunch customers of these five restaurants ranges between 50 and 700, and together the restaurants serve about 1200 lunches daily.

A fixed-price buffet with two main courses was served in all five restaurants. In addition, salads, bread, drinks and desserts were included in the buffet. The research took place on the very first day that roach fish patties were introduced as a main course.

The clients of the fixed-price lunch buffet could take any combination of roach fish patties, lasagne, and the other items without limitations. The focus of the analysis is on how the choices played out between roach fish patties, the more sustainable alternative, and lasagne, the less sustainable one, and on how social norms among the other motives affected actual choice and intended future choice.

3.3. Questionnaire and data collection

The data were collected using a survey questionnaire on Tuesday, September 20th, 2016, during lunch opening hours. The survey was directed to those restaurant guests who had purchased the fixed-price lunch buffet. Questionnaires and pencils were placed on tables before the opening of the restaurant. The customers returned their filled questionnaires when returning their dishes. Respondents could participate anonymously in the drawing of book prizes and a set of five lunch vouchers. The restaurants were instructed to place roach fish patties as the first dish of the serving line so that their position and reachability would not affect food choice differently in different restaurants (Rozin et al., 2011). The social norms were not activated or made salient in any intentional way in order to capture their relative importance in a 'baseline' situation. Hence, the sustainable characteristics of the roach

fish patties were not advertised in any way. Before the data collection day, each restaurant was visited for observing the layout and distributing the materials (questionnaires and instructions) to the personnel. Afterwards, the completed surveys were collected and the personnel was shortly debriefed. As specified by the Finnish Advisory Board on Research Integrity, the research design was such that an ethical pre-review was not required. The questionnaire items used as variables are presented in Table 1. All the independent and dependent variables were measured on a 5-point Likert scale with 1 = "Strongly disagree" and 5 = "Strongly agree".

Dependent variables. Data on reported actual choice were collected by asking to which degree roach fish patties were the respondents' primary choice. Since the customers could take any combination of the different food items from the buffet, this formulation best reflects their choices. Customers were also asked to which degree they agreed that they would choose roach fish patties in the future if available. Hereafter in the text the terms actual and intended choice are used as a shorthand for reported actual choice and intended future choice as these were the ones collected with the questionnaire.

Descriptive norm. Following Cialdini (2003), to identify the strength of the perceived descriptive norm, customers were asked whether they agreed with the statement "I believe that today many of the lunch customers choose roach fish patties". This is similar to Culiberg and Elgaaied-Gambier (2016), who measured the strength of the descriptive norm regarding pro-environmental behaviour by relevant others using the formulation "most of my friends". Using the wording "I believe that …" it was aimed to emphasize the nature of perceived descriptive norms as beliefs of others' behaviour. A similar formulation has been used, for example, by Thøgersen (2006, 2008).

Injunctive norm. To gauge the impact of perceived injunctive norms relating to the two sustainability aspects embodied in the new dish, environmental friendliness and local food, it was asked whether the respondents perceived that it was generally thought that people should eat more environmentally friendly and that people should favour local food more. Some previous studies show that the closer the individual perceives themselves to be to the group which adheres to the norm, the more likely they are to behave according to the norm (e.g. Cruwys et al., 2012). As it was decided not to point to any particular social group, the formulation "the general opinion" was used.

Other food choice motives. To be able to situate the impact of social

Table 1
Descriptive statistics of questionnaire items and related model variables.

	Name of variable[a]	N Valid	Median	IQ range	Item, translated from Finnish[b]
Dependent variables	Reported actual choice	348	3	4	Roach fish patties were my primary choice today
	Intended future choice	348	4	4	I am likely to choose roach fish patties in the future if they are available
Independent variables	Habit	348	4	1	If there is a fish dish served at the workplace restaurant, I usually choose it
	Novelty seeking	346	4	1	I like to taste new dishes
	Visually appealing	344	3	1	Roach fish patties looked delicious in the buffet
	Tasty	246	4	4	Roach fish patties tasted good
	Healthy	345	4	1	Roach fish patties are healthy
	Satiating	341	4	2	Roach fish patties do not leave you hungry
	Trendy	340	3	1	Roach fish patties are trendy food
	Finnish traditional	345	4	1	Roach fish patties are part of Finnish food tradition
	Value for money	343	4	1	Roach fish patties are good value for money at lunch
	Perceived descriptive norm	347	3	1	I believe that today many of the lunch customers choose roach fish patties
	Perceived injunctive norm (eating environmentally friendly)[c]	343	4	1	The general opinion is that people should eat more environmentally friendly
		343	4	2	Roach fish patties are environmentally friendly
	Perceived injunctive norm (favouring local food)[c]	342	5	1	The general opinion is that people should favour local food more
		342	4	1	Roach is a local fish

[a] Coding into dummy variable from Likert so that 1–3 is coded into 0 and 4–5 is coded into 1.
[b] Likert 1 = Strongly disagree, 2 = Somewhat disagree, 3 = Neither agree nor disagree, 4 = Somewhat agree, 5 = Strongly agree.
[c] Formed from two items as explained in Section 3.4.

norms among other food choice motives, items relating to these other motives were included as the independent variables, partly according to The Eating Motivation Survey TEMS (Renner et al., 2012) which contains perhaps the most comprehensive listing of different food choice motives. The motives which were suitable to the choice examined were applied. Given that the dish had not been tasted before actual choice, taste was excluded for the case of actual choice but included for intended future choice. Convenience and sociability did not apply to the setting as both main course options were equally conveniently available and the option to eat alone or with colleagues did not depend on food choice. The price motive was not measured directly but is approximated through the concept 'value for money' as the price of the (buffet) lunch was the same regardless of the dish chosen and the amount consumed. Hence, the following motives were considered: habit, seeking novelty, visual appeal, taste, health, ability to satiate hunger, trendiness, traditional eating, value for money, descriptive norm, injunctive norm about environmentally friendly food, and injunctive norm about local food.

Background variables. Respondents were asked about their age, gender, and educational level. Finally, the questionnaire included items to filter out respondents whose choices between roach fish patties and lasagne were dictated by food allergies, special diets, or the restaurant temporarily running out of a main course (for details see Appendix A in Supplementary Material). All the analyses are based on data thus filtered.

In total, 434 filled questionnaires were obtained, corresponding to an overall response rate of 33.9% calculated from the number of lunch buffets sold on that day. The response rate varied from 14.2% to 53.2% between the five restaurants. After filtering, 348 responses (27.2% of the daily lunch customers) were left for use in the analyses.

3.4. Methods

The binary logistic regression method was chosen as this study wanted to explore, with non-normally distributed data, the relative impact of different food choice motives on the likelihood of the respondents declaring that (1) roach fish patties were their primary choice on the day of data collection (actual choice); and that (2) they will choose roach fish patties in the future if available (intended choice). Binary rather than ordinal logistic regression was preferred as the interpretation of the odds ratios is much clearer in the former.

For the estimations, all ordinal variables were transformed from a 5-point Likert scale into binary variables. To be conservative, the answers 1, 2, and 3 ("Strongly disagree", "Somewhat disagree", and "Neither agree nor disagree") were coded into 0 and the answers 4 and 5 ("Somewhat agree" and "Strongly agree") into 1. The first category of each binary variable was set as the reference category.

In the questionnaire, the injunctive norms were presented without any reference to roach fish patties. However, in this form the injunctive norms may not have an impact on food choice for two reasons: individuals may not care about food localness or environmental friendliness, or they may fail to identify roach fish patties as an alternative that is local and environmentally friendly. To be able to distinguish between these situations, the injunctive norms were contextualised to the specific food item at hand. It was postulated that an individual who chose "Strongly agree" or "Somewhat agree" to both the items "The general opinion is that people should eat more environmentally friendly" and "Roach fish patties are environmentally friendly", would hold an injunctive norm for environmental friendliness that is contextualised to the choice situation and goes as follows: "The general opinion is that people should eat roach fish patties as they are environmentally friendly". These individuals were assigned the value 1 for the contextualised variable for the injunctive norm of eating environmentally friendly, and all other individuals were assigned the value 0. Likewise, an individual who chose "Strongly agree" or "Somewhat agree" to both the items "The general opinion is that people should favour local food more" and "Roach is a local fish", would hold an injunctive norm for

choosing local food that is contextualised to the choice of roach fish patties, namely: "The general opinion is that people should favour roach fish patties as they are made of local fish". These individuals were assigned the value 1 for the contextualised variable for the injunctive norm of favouring local food, and all other individuals the value 0.[3]

The significance level was set at $p < 0.05$. The models were estimated for both dependent variables separately. All analyses were conducted using the SPSS Statistics for Windows, version 24 (IBM).

4. Results

4.1. Descriptive statistics

The respondents consist of 24.7% males and 73.9% females (with 1.4% missing values) aged between 21 and 78 years,[4] with a median age of 51 years (SD = 11.30). The educational level of the respondents was high as 62.8% of all respondents had at least a bachelor's degree. Thus, compared to the Finnish adult population of 21 years and older, in the sample women are overrepresented (51.3% in the Finnish adult population), and the level of education is higher (general population 22.6% with bachelor's degree or higher) (Official Statistics of Finland, 2019a;2019b.). Moreover, the youngest cohort of the adult population, people under 21, is missing entirely (see details in Appendix B in Supplementary Material).

The distribution of the dependent variables shows that there was some polarisation within the primary choice: 32.2% of the respondents completely agreed that they chose roach fish patties as their primary choice whereas the percentage of those who completely disagreed was roughly as large: 31.9%. Respondents' intentions to choose roach fish patties were stronger than their reported actual choice: 57.4% declared that they somewhat agreed/completely agreed that they would choose the novel dish in the future compared to 42% who somewhat agreed/completely agreed in the case of actual choice. Table 1 contains the descriptive statistics for the variables.

Strong correlations were detected between some of the independent variables in their Likert form using both Kendall's Tau and Spearman correlation measures. However, there was no problem of multicollinearity with the independent variables transformed into dummies, as described in section 3.4, and used in the regression analysis. In fact, all Variance Inflation Factor (VIF) values were smaller than the threshold of 3 (VIF$_{range}$: 1.028–2.339), which indicates that multicollinearity is not a concern for the regressions (Hair et al., 2010). (For details see Appendices C and D in the Supplementary Material).

4.2. Regression results

In order to investigate the impact of perceived social norms among food choice motives, binary logistic regression models were estimated for both dependent variables, reported actual and intended future choice of roach fish patties. The Hosmer and Lemeshow test suggests that both models are a good fit to the data (see Tables 2 and 3). The explained variation as measured by Nagelkerke R^2 is 43.0% for reported actual

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[3] Alternatively, it is possible to perceive the characteristics of being local and environmentally friendly as subcategories of a more general idea of sustainable food. Measuring these two injunctive norms separately may thus underestimate the impact on food choice of the general injunctive norm that one should eat sustainable food. Therefore, the models were re-estimated using a single variable for the injunctive social norm instead of two separate variables. The single variable took the value 1 if individuals had been assigned the value 1 for one or both of the injunctive norms of eating environmentally friendly and favouring local food, and 0 otherwise. The qualitative results were unaffected.

[4] Although these were workplace restaurants, it is not known whether all the respondents were currently in working life since some of the restaurants had free access.

Table 2
Results of the binary logistic regression for reported actual choice and intended future choice.

Independent variables	Reported actual choice		Intended future choice	
	OR (95% C. I.)	p-value	OR (95% C. I.)	p-value
Habit	5.58 (2.53–12.31)	0.000	4.60 (1.61–13.16)	0.004
Visually appealing	3.46 (1.87–6.40)	0.000	3.70 (1.45–9.44)	0.006
Value for money	3.21 (1.61–6.40)	0.001	1.78 (0.66–4.81)	0.255
Satiating	3.07 (1.30–7.29)	0.011	1.85 (0.55–6.25)	0.325
Descriptive norm	2.74 (1.54–4.90)	0.001	5.04 (1.93–13.13)	0.001
Gender	1.83 (0.92–3.63)	0.085	0.79 (0.25–2.45)	0.678
Finnish traditional	1.56 (0.82–2.96)	0.178	0.88 (0.32–2.44)	0.808
Education	1.17 (0.65–2.11)	0.606	1.11 (0.43–2.88)	0.829
Age in years	1.01 (0.99–1.04)	0.364	0.98 (0.94–1.03)	0.433
Novelty seeking	0.81 (0.35–1.90)	0.631	0.94 (0.27–3.28)	0.916
Injunctive norm (favouring local food)	0.72 (0.32–1.62)	0.422	2.02 (0.6–6.8)	0.257
Trendy	0.64 (0.32–1.29)	0.210	0.47 (0.16–1.42)	0.180
Injunctive norm (eating environmentally friendly)	0.63 (0.27–1.45)	0.275	1.24 (0.37–4.16)	0.729
Healthy	0.49 (0.20–1.19)	0.114	3.47 (1.01–11.98)	0.049
Tasty			9.24 (3.15–27.10)	0.000
Constant	0.02	0.000	0.02	0.011
Hosmer & Lemeshow test	8.368 (8; 0.398)		4.760 (8; 0.783)	
Nagelkerke R square	0.430		0.597	
Cox & Snell R square	0.322		0.403	

Table 3
Relative importance of statistically significant food choice motives as measured by the odds ratio.

Reported actual choice (OR)	Intended future choice (OR)
Habit to choose fish dishes (5.58)	Tasty (9.24)
Visually appealing (3.46)	Descriptive norm (5.04)
Value for money (3.21)	Habit to choose fish dishes (4.60)
Satiating (3.07)	Visually appealing (3.70)
Descriptive norm (2.74)	Healthy (3.47)

choice and 59.7% for intended future choice; measured by Cox & Snell R^2 the figures are 32.2% and 40.3% (see details in Appendix E in the Supplementary Material).

Before running the regression analyses, the linearity of the only continuous independent variable, age, was assessed with respect to the logit of the dependent variable using the Box and Tidwell (1962) procedure. The interaction term, age times the natural log of age, is not significant in either model. It was concluded that the age variable satisfies the continuity assumption for the binary logistic regression on both actual choice and intention to choose.

4.2.1. Likelihood of declaring roach fish patties as primary lunch choice

Table 2 contains the results for declaring roach fish patties as primary lunch choice (actual choice).

The following motives were positively related to roach fish patties as the primary choice: having a habit of choosing fish if offered on the menu (OR = 5.58, CI95% = 2.53–12.31, p < 0.001), considering roach fish patties visually appealing (OR = 3.46, CI95% = 1.87–6.40 p < 0.001), satiating (OR = 3.07; CI95% = 1.30–7.29, p < 0.05), and good value for money (OR = 3.21; CI95% = 1.61–6.40, p < 0.01). The perception of the descriptive norm was also associated with actual choice of roach fish patties: respondents who strongly or somewhat agreed with the statement "I believe that today many of the lunch customers choose roach fish patties", the proxy for the perceived descriptive norm, were almost three times more likely to declare roach fish patties as their primary choice (OR = 2.74, CI95% = 1.54–4.90, p < 0.01). The injunctive norms had no significant impact on the likelihood of choosing roach fish patties. Thus, only partial support for hypothesis 1 was found limited to the descriptive norms (H1: *Perceived descriptive and injunctive social norms do have an impact on actual food choice but are nevertheless among the weakest food choice motives*). Hypothesis 2 was supported (H2: *In the case of a fast, repeated food choice situation requiring little cognitive effort, the role of perceived descriptive norms is stronger than that of perceived injunctive norms*).

4.2.2. Likelihood of intention to consume roach fish patties in the future

Table 2 also reports the results for the model having as dependent variable the statement "I am likely to choose roach fish patties in the future if they are available" (intended choice). The model is identical to the one for actual choice with the exception of the variable 'Tasty', which was added as individuals now had had the opportunity of tasting the roach fish patties.

There was a significant association between the following food choice motives and the intention to choose roach fish patties: perceiving roach fish patties as tasty (OR = 9.24, CI95% = 3.15–27.10, p < 0.001), having a habit of choosing fish if offered on the menu (OR = 4.60, CI95% = 1.61–13.16, p < 0.01), considering roach fish patties visually appealing (OR = 3.70, CI95% = 1.45–9.44, p < 0.05) and healthy (OR = 3.47; CI95% = 1.01–11.98, p < 0.05). Respondents who believed that "Today many of the lunch customers choose roach fish patties" were about five times more likely to declare that they would choose roach fish patties in the future. (OR = 5.04, CI95% = 1.93–13.13, p < 0.01).

As in the case for actual choice, none of the variables for the injunctive norms were significant. Based on these results hypothesis H3: *The role of injunctive norms is stronger in the case of intended future choice compared to that of actual choice* was not supported.

5. Discussion

It has been repeatedly shown that taste and visual appeal are key drivers of food choice (e.g., Steptoe et al., 1995; Januszewska et al., 2011), and this is confirmed once again by this study. Beyond this, however, the study offers additional, important findings that shed light on the motives at play in sustainable food choice – actual and intended – and their relative importance (see Table 3).

One key finding is that the perceived descriptive norm is significantly associated with both reported actual choice of roach fish patties (OR = 2.74) and intended future choice (OR = 5.04), which is consistent with the notion that people's choices are affected by the perceived prevalent behaviour (see e.g. Cialdini, 2003). Part of the difference in the strength of the association of the perceived descriptive norm with actual choice and intended choice may be due to visceral factors crowding out other factors in actual choice but having a weaker impact when considering future choice (Loewenstein, 1996). Indeed, the visceral-factor-related motive of ability to satiate hunger was significantly associated with actual choice but not with intended choice. On the other hand, healthiness, which tends to be overridden by visceral factors, was significantly

associated with intended choice but not with actual choice.

A second key finding is that a habit to eat fish dishes has a stronger impact of actual choice than on intended choice. This is in line with System 1 and System 2 theory (Stanovich and West, 2000; Kahneman, 2003) according to which the role of habits is accentuated when choice is novel, uncertain and fast. In the case of actual choice, having a habit of choosing fish dishes was the strongest motive in terms of odds ratio (OR = 5.58). Thus, in the presence of a novel fish dish and having to make a fast choice, the habit to eat fish was strongly associated with actual choice. Once the uncertainty related to the taste of the novel dish was resolved and taste could be meaningfully included as an independent variable in the model, the relative strength of habit was reduced. Nevertheless habit (OR = 4.6) was the third strongest motive for intended choice after taste and the descriptive norm.

Yet another key finding is that there was no significant association between the injunctive norms and reported actual food choice nor intention to choose in the future. This result holds even though the respondents agreed that injunctive norms for choosing environmentally friendly and local food existed, and that choosing roach fish patties was compatible with these norms.

Thus, hypothesis 2 is fully supported (H2: *In the case of a fast, repeated food choice situation requiring little cognitive effort, the role of perceived descriptive norms is stronger than that of perceived injunctive norms).* However, there is only partial support for hypothesis 1, limited to perceived descriptive norms (H1*: Perceived descriptive and injunctive social norms do have an impact on actual food choice but are nevertheless among the weakest food choice motives).* As for hypothesis 3 (H3*: The role of injunctive norms is stronger in the case of intended future choice compared to that of actual choice),* it was not supported since the injunctive norms were not statistically significant motives in either actual or intended choice models.

This study hence suggest that the results obtained by Renner et al. (2012) on the existing but weaker importance of social norms compared to other food choice motives hold but in a more nuanced way: the results seem to hold for descriptive norms only. Note that the data and methods differ from those of Renner et al. (2012). Since individuals may not be self-aware of the motives influencing their choices, respondents were not asked directly for food choice motives but the strength of these motives was inferred indirectly from respondents' perceived characteristics of the roach fish patties and their actual and intended choice. Moreover, the data were collected in conjunction with choice taking place in a public setting and with limited time, in an attempt to provide a lifelike account of food choice motives.

The findings in this study on the differential impacts of injunctive and descriptive norms are in line with the recent literature. Bavorova et al. (2018) found that injunctive norms were not linked to buying from farm shops while descriptive norms were. Hawkins et al. (2020) found that the impact of different types of social norms varied according to the type of food: perceived descriptive norms predicted fruit and vegetable consumption, whereas perceived injunctive norms predicted the use of snacks and sugar-sweetened beverages. It can be argued that the case of roach fish patties as an example of sustainable food choice resembles more closely their case of healthy food choice where descriptive norms were important. Jun and Arendt (2020) found that although both descriptive and injunctive norms had a significant effect on the intention to choose the low-calorie menu item, injunctive norms were more influential than descriptive norms. Jun and Arendt (2020) note that this may be because – contrary to this study – their participants were not put in a specific situation and the food choice did not take place in the presence of others. In sum, the argument of this study that both injunctive and descriptive norms ought to be examined as different constructs to better understand the overall construct of social norms (a point also made by (Nystrand and Olsen, 2020)) receives support from recent literature.

In this study, the descriptive norm was aligned with the choice of roach fish patties. Researchers have also examined situations where the descriptive norm is not aligned with the desired behaviour. In such cases, the descriptive norm can still play an important role in the dynamic form, that is, through providing information about a growing minority adopting a more sustainable behaviour. This has been studied by Sparkman and Walton (2017; 2019), Sparkman et al. (2020), and Richter et al. (2018).

The finding that habits have a significant impact on food choice is also consistent with the recent literature. According to a review of studies by Kaljonen et al. (2020), factors such as habits, rush or taste play a key role in food choice, including in restaurant settings, such that they can, for example, override the impact of environmental labels. In their own study, carried out in a workplace restaurant, Kaljonen et al. (2020) found that lunch customers favouring plant- or fish-based diets used their habitual food consumption patterns as a heuristic to make the lunch choice easier. Thus, fast decision situations emphasize the role of factors such as habits and descriptive norms which offer simple heuristics for food choice. However, Veltkamp et al. (2020) found that habits were a key driver for the choice of some food categories but not for others, and thus the results of this study on the impact of habit on sustainable fish consumption may not carry over to other food categories.

There are certain limitations that should be kept in mind when considering the results of this study. The measurement of food choice is self-reported. The comparability of the items related to actual and intended choice could have been strengthened by rewording since actual choice was formulated in terms of "roach fish patties were my primary choice" whereas intended choice was formulated in terms of "I am likely to choose roach fish patties". It cannot be excluded that having roach fish patties consistently as the first alternative on the serving line in all workplace restaurants might have acted as a cue to choose them and thus might have affected the dependent variable of actual choice. Also, choosing roach fish patties may have led respondents to overestimate the extent to which others choose this dish; the design of the study does not allow us to reach conclusions about the direction of the relationship between choice and the descriptive norm. Note, however, that this study measures the *perceived* descriptive norm: if it is over- or underestimated based on the respondent's own behaviour, it is still the perceived norm, and in the absence of actual information about others' behaviour, the only reference point available to the customers. Yet another limitation of the study is the fact that it contains a narrow empirical setting (one day, one dish). This presents a challenge for external validity and gives raise to the question to what extent the findings can be generalized to other food choice situations with different characteristics. Further replications in different settings and over the longer term would be called for to establish the robustness vs. contingent nature of the present findings. For example, in this study the potential impact of descriptive norms was heightened by the fast and public nature of the choice made in front of one's peers, and thus the results may not carry over to situations where the food choice is less observable by peers (e.g., a supermarket) or slower. Finally, the results may not be generalizable to the whole Finnish population as urban, highly educated women are overrepresented in the data and people under the age of 21 are missing entirely. Also the extent to which the results hold in other countries with different (food) cultures would call for separate study.

6. Conclusions

There is a need to change production and consumption patterns towards greater sustainability, and food is an important part of that change. The purpose of the present study was to estimate the relative importance of perceived descriptive and injunctive social norms compared to other food choice motives. The reported actual and intended future choice of a novel, local and environmentally friendly dish, roach fish patties, was examined using binary logistic regression and survey data collected in five workplace restaurants.

This study contributes importantly towards achieving an improved

understanding of social norms and sustainable food choice. First, it places social norms among other motives for food choice to show their relative importance. Second, it distinguishes between injunctive and descriptive social norms and finds differences in how they relate to food choice. Third, it examines both actual choice and intended future choice and finds that different motives are prominent in these choice situations. Through all these results it shows how the role of social norms in sustainable food choice is more nuanced than presented in previous literature. Fourth, the analysis situates the motives for food choice in the larger theoretical discussion of System 1 and 2 decision processes and of the impact of visceral factors on food choice. The study hence shows how these theories help us understand and interpret food choice, especially with regard to the role of habit and the descriptive norm. Overall, the study helps identify ways to realize the full potential of social norms in steering sustainable food choice, especially by bringing up the promise of descriptive norms in public settings.

The findings have direct implications for management and policy-making. Considering the crucial role of taste and visual appeal in food choice, product development to improve the organoleptic and visual characteristics of sustainable foods remains of foremost importance for actors throughout the food system. In addition, however, the results suggest that there can be scope for steering food choice towards greater sustainability through a skilled mobilization of descriptive norms. In contrast, the promise shown by injunctive norms to steer food consumption is weak, at least when the norms are not activated.

To mobilize a descriptive norm it is essential to make the norm observable to individuals. Managers can achieve this through marketing activities, telling how widely consumers make sustainable food choices. Online marketing already exploits cues such as ranking products in the order of popularity, and other modes of flagging previous users' purchase behaviour to communicate a descriptive norm. Regulators can increase the observability of a norm through information campaigns. In addition to making the descriptive norm observable through explicit communications to that effect, observability of the norm can also be obtained more indirectly, such as through nudging whereby physical cues are arranged to give the impression that a particular behaviour is prevalent. For example, in a restaurant setting the amount and placement of various food items often also suggest something about their popularity.

The mobilization of descriptive norms needs to be implemented skilfully to achieve the desired effects. For one, it is crucial only to signal cases where the prevalent behaviour is indeed aligned with sustainability. Underlining the contrary, for example with an information campaign which stresses how the diet of most individuals contains too much meat in order to be sustainable, may in fact backfire by unintendedly highlighting the unsustainable descriptive norm. If it is not possible to communicate a descriptive norm because it is not consistent with sustainable behaviour, it may still be possible to communicate an increasing trend in that norm (e.g., "the share of customers choosing the vegetarian option in this restaurant has been constantly increasing"), or people's intended behaviour (e.g., "most of the patrons of this restaurant intend to reduce their meat consumption this year"), if those are consistent with sustainability.

Further, to fully tap on the potential of descriptive norms, managers and regulators can aim towards reaching a tipping point where the unsustainable food choice, rather than the sustainable choice, becomes the deviating case. The more normalised the sustainable choice becomes, the more powerfully the descriptive norm works to further promote that choice. For example, while in some consumer segments being vegetarian is considered a special diet, there are consumer segments where being vegetarian is the default assumption and eating meat deviates from this default.

It also needs to be recognized that descriptive norms are but one of several motives affecting food choice. Measures that focus on creating synergies among descriptive norms and other motives may therefore be the most effective. Within social norms, managers and regulators can

identify and promote situations where descriptive norms are aligned with injunctive norms. Moreover, potential synergies can also be found beyond social norms among the situational characteristics affecting food choices, such as time available to deliberate, cognitive load, and visceral factors. Thus, to promote sustainable food choices, there is not only the question of offering product alternatives with sustainable features but also that of designing choice situations that support sustainable choices. Descriptive norms may also serve as additional elements to enhance other measures. For example, although it is well known that relative prices affect consumption choices, the bandwagon effect that an increase in consumption due to a change in relative prices can have via descriptive social norms is not generally considered when designing tax policies.

There are also clear implications for future research. This study shows that simultaneously collecting reported actual and intended future food choice data, as well as distinguishing between injunctive and descriptive norms, allows for a more nuanced analysis of social norms and their impact on food choice. Further research is called for to elaborate on the promise of descriptive norms found in this study. Moreover, experiments could be conducted to establish best ways to effectively mobilize descriptive norms. As the present study was based on a one-off survey, further research is also called for to establish the generalizability of the findings. If the impact of social norms is found to vary across different settings, an important research opportunity to enrich the theory is to identify the moderating variables that affect the relationships between social norms and sustainable food choice. All these research avenues could help to fine-tune the deployment of descriptive norms in supporting a shift towards more sustainable food choices.

CRediT authorship contribution statement

Laura Salmivaara: Conceptualization, Methodology, Formal analysis, Investigation, Data curation, Writing – original draft, Writing – review & editing. **Chiara Lombardini:** Conceptualization, Methodology, Formal analysis, Writing – original draft, Writing – review & editing. **Leena Lankoski:** Conceptualization, Methodology, Investigation, Writing – original draft, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jclepro.2021.127508.

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