



Variability of Food Choice Motives: Two Dutch studies showing variation across meal moment, location and social context

M.C.D. Verain^{a,*}, J. van den Puttelaar^a, E.H. Zandstra^{b,c}, R. Lion^b, J. de Vogel-van den Bosch^d, H.C.M. Hoonhout^e, M.C. Onwezen^a

^a Wageningen University & Research, Wageningen Economic Research, P.O. Box 35, 6700 AA Wageningen, The Netherlands

^b Unilever Foods Innovation Centre Wageningen, Plantage 14, 6708 WJ Wageningen, The Netherlands

^c Wageningen University and Research, Division of Human Nutrition & Health, P.O. Box 17, 6700 AA Wageningen, The Netherlands

^d Danone Nutricia Research, P.O. Box 80141, 3508 TC Utrecht, The Netherlands

^e Philips Research, High Tech Campus 34, 5656AE Eindhoven, The Netherlands

ARTICLE INFO

Keywords:

Food Choice Motives
Meal moment
Location
Social context
Sustainability
Health

ABSTRACT

Food Choice Motives (FCMs) such as price, sensory appeal and health are important in understanding food consumption. FCMs are traditionally investigated at a general level, for food choices on 'a typical day'. However, food choices have been shown to differ across temporal, situational and social contexts. This suggests that measuring FCMs at a context-specific level could increase our understanding of food consumption in different contexts. Therefore, the current paper aims to explore whether FCMs are indeed context-specific for different meal moments, locations and social contexts. Two studies were conducted among Dutch adults (Study 1: $N = 935$; Study 2: $N = 642$). Both studies measured FCMs in context, either by using 2-hour recalls (Study 1) or recalls of the last consumption moment (Study 2). Result showed that participants rated and ranked FCMs significantly different across most contexts showing the relevance of considering the context when studying FCMs. Egocentric motives of taste, affordability, and convenience were the most important motives across all contexts, as was health. In contrast, sustainability-related motives were consistently rated as least important. Most variability occurred in the middle part of the rankings and mainly in health-related motives such as weight control and safety. This shows the added value of measuring FCMs in different contexts, particularly for health-related motives. The contexts snacking versus main meals, eating out of home versus at home and eating alone versus with others showed the most pronounced contrasts in ranking of FCMs. The current study is the first to quantitatively explore the variability of FCMs across eating contexts, both in rating and ranking of FCMs. The chosen research method resulted in a representative, though unbalanced sample of consumption contexts in the Netherlands, which limits the generalizability of the results to an international context and restricts the insights in out-of-home contexts as food is mainly consumed at home in the Netherlands. The results enable public health authorities and food companies to target messages, interventions and products to consumers' Food Choice Motives in specific contexts.

1. Introduction

Consumers make food choices on a daily basis in different contexts. In the supermarket, they decide what to eat for dinner and in the canteen at work they decide what to eat for lunch. Food consumption takes place at certain locations, in a certain social context (i.e. alone or together with other people) and at different moments across the day. These various situational contexts in which consumers eat or drink are an important factor in food choice and the acceptability of food products

and meals (Bisogni et al., 2007; Meiselman, 2006; Tarancón, Fernández-Serrano, & Besada, 2021; Zandstra & Lion, 2019). Although it is known that consumers make different choices in different contexts, whether their Food Choice Motives also differ across contexts has rarely been studied. Related bodies of research already include contextual variations, for example in emotions (Köster & Mojet, 2015; Piqueras-Fiszman & Jaeger, 2014) and moods (Patel & Schlundt, 2001), though these studies focus on unconscious processes and singular effects. We aim to address this research gap by specifically focussing on Food Choice

* Corresponding author.

E-mail address: muriel.verain@wur.nl (M.C.D. Verain).

<https://doi.org/10.1016/j.foodqual.2021.104505>

Received 20 February 2021; Received in revised form 15 December 2021; Accepted 18 December 2021

Available online 22 December 2021

0950-3293/© 2021 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

Motives – consumers' motives or reasons for purchasing, choosing or eating certain food (Onwezen, Reinders, Verain, & Snoek, 2019; Steptoe, Pollard, & Wardle, 1995) – as we aim to increase understanding in variations in conscious priorities consumers make in their motives to choose for foods across contexts.

1.1. The need for more research on context in food choices

Food choice is influenced by many interrelated factors (Shepherd, 1989). Three main groups of factors that determine food choices have been identified (Furst, Connors, Bisogni, Sobal, & Falk, 1996): (1) characteristics of the food itself, such as sensory attributes, (2) characteristics of the person making the choice, such as physiology, attitudes, experiences and knowledge, and (3) characteristics of the context in which the choice is made, such as place, time and social context. Although context is an important factor in food choice and acceptability (King et al., 2004; Onwezen et al., 2012; Schutz, 1988; Machín, Giménez, Vidal, & Ares, 2014; Meiselman, Johnson, Reeve, & Crouch, 2000; Tarancón et al., 2021; Zandstra & Lion, 2019), previous research mainly focused on the characteristics of the foods or the person making the choice, with much less attention for contextual factors. There is a need for more research on contextual factors to fill this gap.

More specifically, context entails the situational and temporal conditions under which food choice and food consumption occurs (Machín et al., 2014). Bisogni et al. (2007) developed a conceptual framework that covers the contextual nature of eating and drinking. The framework includes eight dimensions: food and drink, time, location, activities, social setting, mental processes, physical condition and recurrence. In most studies the operationalisation of context either confounds contextual variables (e.g. Onwezen et al., 2012; Verain, Sijtsema, Taufik, Raaijmakers, & Reinders, 2020), which makes it difficult to explain differences in food choice to more distinct features of context, or is operationalised with only one contextual aspect, such as meal moment (e.g. Phan & Chambers, 2016; Rappoport, Downey, & Huff-Corzine, 2001). More research is needed to further disentangle the role of context in food choices and underlying motives. Clearer discrimination in how contextual dimensions impact Food Choice Motives will help to better understand why consumers choose and eat the food they do in a certain context. Therefore, the current paper adds to the literature by empirically unravelling different dimensions of context while studying the variability of Food Choice Motives.

1.2. Food Choice Motives are usually measured at a general level

Traditionally, socio-demographic variables (Aertsens, Verbeke, Mondelaers, & van Huylenbroeck, 2009) and psychological determinants such as attitudes, social norms, perceived behavioural control, food neophobia, familiarity, involvement, and emotions have been used to understand what determines eating behaviours, particularly in relation to (un)healthy eating (see reviews: Onwezen, Bouwman, Reinders, & Dagevos, 2021; Siegrist & Hartmann, 2020). Food Choice Motives add to this literature by providing an insight in how a range of motivations such as price, sensory appeal and convenience of food relate to each other. Thereby providing additional understanding of the 'why' of food choice and consumption (Dowd & Burke, 2013; Sun, 2008).

The Food Choice Questionnaire developed by Steptoe et al. (1995) is an internationally validated and frequently used method for measuring Food Choice Motives (FCMs). They identified nine FCMs: health, mood, sensory appeal, natural content, weight control, convenience, familiarity, price and ethical concern. Later studies added motives to cover a more broad spectrum of sustainability aspects (Lindeman & Väänänen, 2000; Onwezen et al., 2019; Verain et al., 2016; Verain, Sijtsema, & Antonides, 2016). The Food Choice Questionnaire asks respondents to score the importance of motives when selecting foods 'on a typical day', without considering possible contextual differences. Studies that use FCMs in different contexts usually measure FCMs in a similar manner,

thus exploring motives at a general level (e.g., Pieniak, Verbeke, Vanhonacker, Guerrero, & Hersleth, 2009; Prescott, Young, O'Neill, Yau, & Stevens, 2002; Sun, 2008). The current paper adds to the literature by measuring FCMs near-time for a specific context, in order to explore the variability of FCMs across contexts.

1.3. Variability of Food Choice Motives across contexts

Preliminary empirical evidence suggests that FCMs vary across contexts (Onwezen et al., 2012; Verain et al., 2020), though the amount of studies including contextual variations in FCM is limited. More specifically, literature had indicated variation in FCMs across at least three contextual dimensions mentioned in Bisogni's framework (Bisogni et al., 2007): meal moments, locations, and social contexts. *Meal moments* such as breakfast and dinner have a strong influence on food choice and food intake (de Castro, 1987; Van Rossum, Buurma-Rethans, Vennemann, Beukers, Brants, De Boer, & Ocké, 2016). These differences in food choices might be explained by differences in FCMs across meal moments as consumers select foods to fulfil different needs at different moments in time. For example, health and convenience were found to be more relevant for predicting food choices for breakfast than for lunch or dinner (Peters, Rappoport, Huff-Corzine, Nelsen, & Downey, 1995; Rappoport et al., 2001). In contrast, dinner was perceived as 'unusual' and 'happy' (Rappoport et al., 2001). Similar findings have been observed by Phan and Chambers (2016) who showed that breakfast was more motivated by feelings of hunger and convenience, whereas variety-seeking and socializing were more important motives at dinner. In addition, FCMs for snacks are different to FCMs for main meals, with health being more important for main meals and convenience being more important for snacks (Onwezen et al., 2012; Phan & Chambers, 2016; Phan & Chambers, 2018). Machín et al. (2014) found that FCMs for lunch and dinner were similar in that the motives convenience, variety and satiety were mostly mentioned, whereas for snacks the motives calories, price, convenience and preferences were most frequently mentioned. For *location*, several studies found evidence for the influence of different consumption locations, such as at home or outside the home, on food choices, acceptance and FCMs (Marshall & Bell, 2003; Meiselman, Johnson, Reeve, & Crouch, 2000). For example, Onwezen et al. (2012) found that convenience and satiety are more important on the go and at work/school as compared to at home. For *social context* there is clear evidence that product perceptions and the amounts consumed varies depending on the presence of other people (Krantz, 1979; Meiselman, 2006). Individuals are more likely to eat more when eating together with others than eating alone (de Castro, 1994). For FCMs, the social context is also important to consider (Machín et al., 2014; Phan & Chambers, 2016). Machín and colleagues for example found that others' preferences and number of people were more often mentioned as influencing factors for dinner than for other meal moments.

In conclusion, FCMs are traditionally investigated at a general level, but there is ample evidence to suggest that FCMs differ across meal moments, locations, and social contexts. Therefore, FCMs may better be measured on a context-specific level. Jaeger and Porcherot (2017) stress the importance of the consumption context and ecological validity in consumer research methods. Although previous studies provided indications of variations across contexts, an overview of the variability of a range of FCMs across multiple contexts is lacking. Previous studies that included motives and contexts typically focused on specific motives (e.g., health or taste) or specific contexts (e.g. meal moment). FCMs are traditionally measured with retrospective aggregated self-reports (e.g. the importance that the participant attaches to a particular motive on a typical day, or for a typical lunch situation) (Steptoe et al., 1995). Current technological developments, such as smartphone technology, make it easier to measure experiences, behaviours, moods or attitudes real-time or near-time in the real-life context (Burke et al., 2017), which has many advantages, such as a reduction of recall bias, and prevents the measurement to be an aggregation of past experiences (Keil, Koschate, &

Levine, 2020; Van den Puttelaar, Verain, & Onwezen, 2016). We add to the literature by applying near-time measurements that assess FCMs in the real-life context, to explore the variability of FCMs across a range of contexts. Wahl et al. (2020) researched the difference between eating motives as situation-stable dispositions (traits) versus eating motives in-the-moment (states) and underpin the importance of in-the-moment assessments of Food Choice Motives to capture intra-individual differences. We therefore use context-specific assessment of FCMs to investigate 1) whether the importance ratings and rankings of FCMs differ across contexts, and if so, 2) which FCMs and which contexts show most variation. Based on the above-mentioned literature we expect to find differences in Food Choice Motives across contexts. More specifically, we hypothesize that Food Choice Motives vary across the following contexts: snacks versus meals and for breakfast versus dinner, at home versus out of home and alone versus with others. We specifically expect contextual variations in health motives, convenience and price.

2. Study 1

2.1. Method

Study 1 explored whether FCMs differ across contexts in the Netherlands. FCMs were assessed with 2-hour recalls, to ensure that the reported FCMs were context-specific at that time slot. Ratings and rankings of FCMs were compared for a set of meal moments (breakfast, lunch, dinner, snack), locations (e.g., at home or at work) and social contexts (e.g., eating alone or with friends). FCMs were categorized into egocentric motives (taste, price, mood, convenience, appearance and familiarity), health-related motives (health and weight control) and sustainability-related motives (natural, Fair Trade, animal welfare, and environment), to identify patterns in variability.

2.1.1. Participants & procedure

Data were collected in The Netherlands in January 2018 by a market research company (MSI-ACI Europe BV). Informed consent was obtained by the market research agency and ethical approval was retrospectively obtained by the Social Science Ethics Committee of Wageningen University and Research. The authors only had access to the anonymised dataset. The survey was conducted in Dutch. The survey was pilot tested by food science experts, to check for technical feasibility to fill-out the survey on a smartphone screen and to check whether important motives or eating contexts were lacking. Several adaptations were made to the lay-out of the answering scales. In addition, an 'other'-option has been included for many questions in order to enable participants to add things when the predefined Food Choice Motives and contexts did not fit their situation.

Participants were recruited via e-mail and took the survey on a smartphone. Invitations to participants were spread out over time, in order to have variation in day of the week and time of the day that participants took the survey. Participants received a prompt through e-mail, after which they had an interval of 60 min to respond to the prompt. A representative sample of the Dutch adult population (18 years or older) for gender and age was invited to participate. The final sample consisted of 1006 participants, of which 61% was female. The mean age was 44 years, with a minimum of 18 and a maximum of 69 years. The smartphone questionnaire included a range of questions on food intake, Food Choice Motives and the context of consumption (see Section 2.1.2). On average, it took participants 2.7 min to fill out the questionnaire.

2.1.2. Measures

Food intake. First the participant was asked whether he/she had consumed any foods or drinks during the past two hours. When the participant selected 'No', the participant was asked how long ago he/she had consumed something. When the participant selected 'Yes', the participant was asked to report his/her *food intake* (results are not reported here), including questions on the *meal moment* (breakfast, lunch,

dinner, snack), the *location* (home, work, school, on the go, in a catering facility, at someone else's place) and the *social context* (alone, with my partner, with my family, with friends, with colleagues). For all questions, participants could indicate an "other" option; these results are not reported here, but were used as input for Study 2 (see under "measures" in Study 2 and under "Suggestions for future research").

Food Choice Motives. The participants that consumed something during the past two hours were asked to respond to the statement 'To me, the following things were important in my choice for what I just ate/drank', for twelve Food Choice Motives, on a 7-point scale ranging from 'not at all important' to 'very important'. Based on previous studies the following motives were included: Price, taste, convenience, health, familiar, natural, animal welfare, Fair Trade, environment, mood (makes me feel good), appearance (looks attractive) and weight control (good for my waistline) (Onwezen et al., 2019; Steptoe et al., 1995). In addition, other motives could be stated and rated in 3 empty boxes. Those who did not eat or drink during the past two hours were asked to respond to a similar, though general statement: 'On a typical day, the following things are important to me in my choice for food or drinks' (Steptoe et al., 1995); these results are not reported here.

2.1.3. Analysis

For location and for social context, the sample appeared to be unbalanced across the included categories, leading to small sample sizes for some of the categories (see Table 2 and 3). Power analyses were performed to check whether the amount of participants per context was sufficient to perform the analysis. For *location*, power analysis with an expected medium effect size indicated that a group size of 38 was required. As literature suggests that being at home versus out of home is an important contrast when it entails FCMs, participants who consumed on-the-go ($N = 17$), at a catering facility ($N = 13$) or at someone else's place ($N = 20$) were merged into an 'out of home' group to gain a large enough sample size ($N = 50$). Participants who were at school ($N = 7$) were excluded from further analyses. For *social context*, power analysis with an expected medium effect size, indicated that a group size of 43 was required. Participants that consumed with friends ($N = 23$) or colleagues ($N = 33$) were not further analysed as they could not be merged into a meaningful group to form a large enough sample.

Separate ANOVAs were conducted in SPSS 25.0 to check for differences in FCMs across meal moments, locations and social contexts. For each of the twelve motives, a one-way ANOVA was conducted with the respective motive included as the dependent variable, and meal moment, location or social context as the independent variable. When the ANOVAs showed significant results, post-hoc tests were conducted to compare differences in means for each pair of contexts. Kolmogorov-Smirnov tests showed that the assumption of normality did not hold for all of the FCMs. Therefore, a bootstrapping (with bias-correction) procedure was applied. Furthermore, due to the unbalanced sample sizes across the contexts and the fact that the assumption on homogeneity of variance did not hold for all contexts, the Brown-Forsythe and Welch F tests were conducted. Games-Howell post-hoc tests were performed because equal variances could not be assumed. This test is suitable when sample sizes are unequal, which is the case here (Field, 2004, p276).

2.2. Results

Nine-hundred and thirty-five of the 1006 participants (92.9%) indicated that they consumed something during the past 2 h. The remaining 71 participants were excluded from further analysis.

2.2.1. Meal moment

The mean *ratings* differed significantly ($p < .001$) across all four meal moments (breakfast, lunch, dinner, snack) for all FCMs, with one exception: importance of taste for snacks and breakfast did not differ significantly (see Table S1 in the supplementary material). The results thus revealed that the relevance of FCMs varies across meal moments.

Table 1

Ranking of means of egocentric motives (light green), health motives (blue) and sustainability motives (dark green) per meal moment (Study 1).

Rank	Breakfast (N=214)		Lunch (N=221)		Dinner (N=239)		Snack (N=196)	
	Motive	Mean	Motive	Mean	Motive	Mean	Motive	Mean
1	Taste	6.05	Taste	6.17	Taste	6.20	Taste	6.05
2	Health	5.40	Health	5.33	Appearance	5.20	Convenience	5.20
3	Convenience	5.29	Convenience	5.16	Health	5.16	Mood	4.85
4	Mood	5.05	Mood	4.95	Convenience	5.09	Appearance	4.72
5	Natural	4.89	Appearance	4.95	Mood	5.03	Health	4.61
6	Appearance	4.84	Natural	4.84	Price	4.86	Natural	4.41
7	Price	4.54	Price	4.61	Natural	4.78	Familiar	4.17
8	Weight	4.53	Weight	4.48	Fair Trade	4.37	Price	4.16
9	Familiar	4.44	Environment	4.46	Animal	4.29	Fair trade	4.12
10	Fair Trade	4.42	Fair Trade	4.45	Familiar	4.28	Weight	4.06
11	Environment	4.40	Animal	4.33	Weight	4.27	Environment	4.03
12	Animal	4.35	Familiar	4.32	Environment	4.26	Animal	3.75

Note. 65 participants indicated 'other, namely' and were excluded from this analysis.

Note. Keywords have been used to refer to the include FCMs. The exact items are provided in the methods section.

Table 2

Ranking of means of egocentric motives (light green), health motives (blue) and sustainability motives (dark green) per location (Study 1).

Rank	Home (N=807)		Work (N=57)		Out of home (N=50)	
	Motive	Mean	Motive	Mean	Motive	Mean
1	Taste	6.13	Taste	6.09	Taste	6.00
2	Convenience	5.13	Convenience	5.54	Mood	5.46
3	Health	5.12	Health	5.39	Convenience	5.32
4	Mood	4.96	Appearance	5.04	Appearance	4.80
5	Appearance	4.90	Mood	4.91	Natural	4.58
6	Natural	4.73	Natural	4.91	Health	4.54
7	Price	4.54	Weight	4.67	Familiar	4.40
8	Fair Trade	4.36	Price	4.63	Price	4.22
9	Weight	4.35	Familiar	4.39	Environment	4.18
10	Familiar	4.29	Fair Trade	4.28	Fair Trade	4.02
11	Environment	4.29	Environment	4.19	Animal	3.86
12	Animal	4.22	Animal	4.18	Weight	3.40

Note. 14 participants indicated 'other, namely' and were excluded from this analysis.

Note. Keywords have been used to refer to the include FCMs. The exact items are provided in the methods section.

More specifically, the results showed that all FCMs, except taste and convenience, were rated as less important for snacking as compared to main meals. Most pronounced were the low rating of animal welfare for snacks compared to main meals. When comparing the main meals, appearance and animal welfare were rated higher for dinner compared to breakfast and lunch, while for weight control it was the other way around (means displayed in Table 1).

In order to gain insights in practically meaningful differences in FCMs across contexts, we looked at patterns in the rankings of the FCMs across contexts (Table 1). The patterns in rankings showed that participants find different FCMs important across different contexts, while some motives were similarly ranked across contexts. Clearly, the results showed that taste is paramount, ranking first in all contexts. The ranking of other FCMs showed more variability across contexts. Similar to the ratings, rankings of FCMs were most different for snacks, as compared to main meals. Health was rated less relevant and convenience and mood

were rated higher within the snacks context as compared to the main meals context.

2.2.2. Location

The mean ratings differed significantly ($p < .001$) across all three locations (home, work and out of home) for all FCMs, with two exceptions: familiarity and environment were not rated differently between work and out of home (see Table S2 in the supplementary material). More specifically, most of the FCMs rated lower for the out of home context compared to at home or at work (not for convenience, familiarity, environment and mood). Interestingly, for mood the opposite was true: mood was more important in an out of home setting compared to the other locations. Finally, most pronounced were the low rating of weight control when out of home compared to the other locations (means displayed in Table 2)

The rankings of the FCMs (Table 2) showed that the egocentric

Table 3

Ranking of means of egocentric motives (light green), health motives (blue) and sustainability motives (dark green) per social context (Study 1).

Rank	Alone (N=392)		Partner (N=263)		Family (N=165)	
	Motive	Mean	Motive	Mean	Motive	Mean
1	Taste	6.06	Taste	6.22	Taste	6.07
2	Convenience	5.18	Health	5.23	Convenience	5.07
3	Health	5.08	Appearance	5.22	Appearance	4.99
4	Mood	4.97	Convenience	5.16	Health	4.96
5	Appearance	4.69	Mood	5.02	Mood	4.89
6	Natural	4.61	Natural	4.95	Natural	4.66
7	Price	4.52	Fair Trade	4.66	Price	4.61
8	Weight	4.34	Price	4.54	Fair Trade	4.31
9	Familiar	4.26	Environment	4.52	Familiar	4.27
10	Environment	4.16	Animal	4.46	Environment	4.25
11	Fair Trade	4.12	Weight	4.40	Animal	4.21
12	Animal	4.06	Familiar	4.37	Weight	4.20

Note. Participants indicating 'other, namely...' (N = 28) or who had selected multiple social contexts (N = 37) were excluded from further analyses.

Note. Keywords have been used to refer to the include FCMs. The exact items are provided in the methods section.

motives taste and convenience were consistently ranked high across the contexts. Animal welfare, environmental aspects and Fair Trade, which we categorized as sustainability-related motives were consistently ranked in the bottom. The ranking of health and weight control showed much more variation between the different locations compared to egocentric and sustainability-related motives. In line with the ratings, especially for the out of home context health and weight control ranked lower compared to the other locations, and mood ranked higher. Fair Trade ranked higher at home compared to the other locations.

2.2.3. Social context

The mean ratings differed significantly ($p < .001$) across all three social contexts (alone, with partner and with family) for all FCMs, with one exception: the importance of familiarity did not differ between the situation of eating alone compared to the situation of eating with family (see Table S3 in the supplementary material). Interestingly, all sustainability-related motives were rated significantly higher when with family as compared to alone, and even higher when with the partner as compared to with family. Actually, for all FCMs, except for price, the rating was highest when with a partner (means displayed in Table 3).

The ranking of the FCMs showed that taste, convenience and health were ranked high irrespective of the social context (Table 3). In contrast, the sustainability-related motives consistently ranked at the bottom. Weight control ranked higher when eating alone compared to when eating with others, although the difference in mean score was small (but significant), whereas Fair Trade and appearance ranked lower when eating alone, compared to eating with a partner or family. Familiarity ranked lower when eating with a partner as compared to eating alone or with family, although in absolute terms familiarity ranked highest while consuming with a partner.

2.3. Conclusion

The results showed that the relative importance of FCMs differed significantly across contexts for all motives. This clearly indicates the relevance of measuring FCMs in different contexts. The overall pattern of responses indicates that egocentric motives and especially taste, were the most important motives in all contexts as they were consistently ranked at the top. This echoes other research showing that taste is the main determinant of food choices in many contexts (Verain et al., 2020). Interestingly, whereas price is often rated as one of the most important motives, in this study it trailed other egocentric motives (e.g. Onwezen

et al., 2019; Verain, Sijtsema, et al., 2016). This may be because in this study "price" did not refer to affordability and at the moment of consumption "price" was less relevant, either because the products had been bought earlier in the supermarket or because the choice of the out-of-home location had already determined the price-range of the options.

The two health-related motives that were included differed in their ranking. Health was often ranked in the top, although not for snacks and out of home consumption. In contrast, weight control fluctuated in the bottom half of the list. Perhaps weight motives influence how much people eat, rather than what people choose to eat. Sustainability-related motives were consistently rated as least important, echoing research showing that sustainability is not yet the main motive impacting food choice (Onwezen et al., 2019). Natural content consistently ranked in the middle part of the list, which could be explained by the association of naturalness with both sustainability and health aspects, which is found in the literature (Fotopoulos, Krystallis, Vassallo, & Pagiaslis, 2009; Lockie, Lyons, Lawrence, & Grice, 2004; Pieniak et al., 2009; Pula, Parks, & Ross, 2014; Sautron et al., 2015; Steptoe et al., 1995).

In short, the rankings showed some consistency across contexts, as well as diversity in ranking for specific motives. Study 2 was conducted 1) to replicate the findings of Study 1, and 2) to extend the list with more short-term egocentric and health-related motives. This was done as FCMs tend to focus on general motives for food consumption (e.g., sustainability), whereas the momentary assessment allows for more immediate needs to be measured, such as the desire to fulfil a craving or to get a quick energy boost. The hypothesis was that including these more immediate needs would allow for a better understanding of variations within and across contexts of these two categories of motives.

3. Study 2

3.1. Method

Study 2 aimed to replicate the results of Study 1. However, some adaptations in the methodology were made to advance the understanding of our findings, including a wider range of egocentric and health motives.

3.1.1. Participants & procedure

Data were collected in September and October 2018 by a professional market research company (MSI-ACI Europe BV) in the Netherlands. Informed consent was obtained by the market research

company. The authors only had access to the anonymised dataset. Participants were approached via e-mail and took the survey online, in Dutch. Quota-sampling was applied in order to recruit a representative sample of the Dutch adult population for gender and age. The minimum age to be eligible to participate was 18 years. The sample consisted of 642 participants, of which 52.2% was female. The mean age was 46 years, with a minimum of 18 and a maximum of 74 years.

3.1.2. Measures

Data collection was part of a larger project (Agrifoodmonitor (Onwezen, Bouwman, Reinders & Taufik, 2018)). The questions which were included in this paper formed the first part of the questionnaire. We used the same measurements as Study 1, with some small differences. First, the participant was asked to think back to when he/she last consumed something and was asked to indicate how long ago that was. So, in contrast to Study 1, in which a 2-hour recall period was used, the recall in Study 2 could have been longer ago. Second, food intake was measured with a list with food groups (fruit, vegetables, dairy, bread etc.) instead of an open question. Third, the category “with my child/children” was added for social context, as it was often mentioned under “other, namely” in Study 1. Finally, the list of FCMs included eight additional motives. This list resulted from a literature review, expert consultation, the additional motives mentioned in Study 1 in the open boxes, and a pre-test. To measure a broader range of health-related motives, six additional motives were added: “provides my body with energy”, “digestion”, “safety”, “satiety (makes me feel full)”, “variation (a varied diet)”, and “craving” (Cepeda-Benito et al., 2000; den Uijl, Jager, de Graaf, Waddell, & Kremer, 2014; Fotopoulos et al., 2009; Geeroms, Verbeke, & Van Kenhove, 2008; Machín et al., 2014; Phan & Chambers, 2016). “Cosiness” and “trying something new” were included

to broaden the egocentric motives (Renner, Sproesser, Strohbach, & Schupp, 2012; Sautron et al., 2015).

Adapted items. In addition, the description of some of the FCMs was changed. Price was changed into affordable to align with the single item Food Choice Questionnaire (Onwezen et al., 2019). Appearance was changed into sensory appeal to better match with the original Food Choice Questionnaire (Stepoe et al., 1995). Sensory appeal covers a broader range of aspects, such as texture and smell, that have been mentioned by participants in Study 1 under the “other” option. Moreover, Fair Trade was broadened into social justice (fair working conditions and reward for food production). Note that these adaptations might affect the results (see conclusion section).

3.1.3. Analysis

Data analyses were similar to Study 1. For meal moment, 7 participants were removed from the analysis because they answered ‘other, namely’. For location, the category ‘out of home’ combined 15 participants that consumed on the go, 8 participants that consumed at a catering facility and 10 participants that consumed at someone else’s home, resulting in a relatively small group for ‘out of home’ (N = 33). For social context, the newly added category ‘with children’ (N = 22) was merged with ‘with family’ to have a large enough group size (N = 79). Those who consumed with friends (N = 17) or with colleagues (N = 35) were excluded from further analyses due to a too small sample size.

3.2. Results

Results for 642 participants were analysed. Of them, 367 participants indicated that their last consumption moment was within the past two hours.

Table 4

Ranking of means of egocentric motives (light green), health motives (blue) and sustainability motives (dark green) per meal moment (Study 2).

Rank	Breakfast (N=148)		Lunch (N=163)		Dinner (N=243)		Snack (N=81)	
	Motive	Mean	Motive	Mean	Motive	Mean	Motive	Mean
1	Taste	5.73	Taste	5.82	Taste	5.81	Taste	5.81
2	Affordable	5.50	Affordable	5.56	Affordable	5.62	Craving	5.26
3	Energy	5.48	Health	5.55	Variation	5.29	Affordable	5.23
4	Health	5.35	Energy	5.43	Health	5.28	Safety	5.05
5	Digestion	5.32	Safety	5.34	Energy	5.28	Convenience	5.02
6	Safety	5.30	Convenience	5.25	Convenience	5.19	Sensory	4.93
7	Convenience	5.28	Digestion	5.20	Sensory	5.18	Familiar	4.90
8	Satiety	5.09	Satiety	5.16	Safety	5.12	Mood	4.77
9	Natural	5.05	Variation	5.12	Digestion	5.11	Satiety	4.77
10	Sensory	4.97	Natural	5.12	Natural	5.10	Natural	4.72
11	Weight	4.96	Sensory	5.10	Satiety	5.08	Energy	4.72
12	Familiar	4.91	Familiar	5.09	Familiar	5.02	Variation	4.58
13	Mood	4.86	Mood	4.89	Animal	4.91	Animal	4.48
14	Variation	4.83	Weight	4.85	Weight	4.90	Cosiness	4.44
15	Animal	4.75	Craving	4.80	Mood	4.87	Health	4.43
16	Environment	4.71	Animal	4.77	Environment	4.79	Digestion	4.41
17	Fair Trade	4.69	Fair Trade	4.71	Craving	4.79	Fair Trade	4.40
18	Craving	4.49	Environment	4.67	Cosiness	4.77	Environment	4.31
19	Cosiness	4.13	Cosiness	4.55	Fair Trade	4.66	Weight	4.17
20	Novelty	4.03	Novelty	4.30	Novelty	4.26	Novelty	3.79

Note. 7 participants indicated ‘other, namely’ and were excluded from this analysis.

Note. Keywords have been used to refer to the include FCMs. The exact items are provided in the methods section.

Note. F-values were all significant at the $p < .001$ level. Games-Howell post-hoc tests showed that for all motives, the mean scores differed significantly ($p < .05$) across all four meal moments except for mood, satiety, taste, familiarity and craving. Mood and satiety did not differ between breakfast and dinner; Taste for snacks did not differ from lunch and dinner; Familiarity did not differ between breakfast and snacks; Craving did not differ between lunch and dinner.

3.2.1. Meal moments

The mean ratings differed significantly ($p < .001$) across all four meal moments for most of the FCMs (means displayed in Table 4). Mood and satiety did not differ between breakfast and dinner, taste did not differ between snacks and lunch and snacks and dinner, familiarity did not differ between breakfast and snacks and craving did not differ between lunch and dinner. Similar to Study 1, most FCMs were rated lower for snacking as compared to main meals. The newly added motive ‘craving’ was rated higher for snacks as compared to all main meals (means displayed in Table 4).

The highest ranked motives and the lowest ranked motive were the same across all meal moments. Taste was again consistently rated as most important in all meal moments. Novelty (trying something new) was consistently ranked lowest. The other motives showed fluctuations in their ranking, although some more than others. Affordability was ranked in the top 3 in all contexts, which was higher than the ranking of price in Study 1.

Similar to Study 1, sustainability-related motives were consistently ranked in the bottom part, except for natural, which ranked in the middle. Health-related motives and egocentric motives showed much more variation in ranking within contexts, showing to have motives in the top, middle and bottom.

Snacking compared to the other meal moments showed a striking signature in ranking of FCMs compared to the three main meals: craving, safety, familiar and cosiness were relatively more important whereas health, weight control, energy and digestions were less important. Especially the high ranking of craving and the low ranking of health distinguished snacks from the three main meals. When comparing the three main meals, the ranking of FCMs for breakfast and lunch were most similar. Especially the much higher ranking of variation

distinguished dinner from breakfast and lunch.

3.2.2. Locations

For eighteen out of the twenty Food Choice Motives, mean ratings differed significantly ($p < .001$) across all locations (means displayed in Table 5). The importance of animal welfare and safety in food choices did not differ between when at home or at work. Taste was rated relatively high for the out of home context compared to the other contexts (means displayed in Table 5).

Again, taste consistently ranked highest for all locations. Energy also ranked in the top 3 for all locations. In addition, similar to Study 1, the sustainability-related motives ranked in the bottom for the three location, although animal friendliness ranked relatively high at work. Natural again scored in the middle part of the ranking, except for the out of home context where it ranked much lower (as opposed to what has been found in Study 1).

The ranking of FCMs for the various locations also showed some important contrasts. Particularly the much lower ranking of health and the much higher ranking of craving for out of home compared to the other two locations is noteworthy. In addition, the home context was characterised by a higher ranking of affordable and weight control compared to the other locations. In contrast, the work context was characterised by a relatively high ranking of satiety.

3.2.3. Social context

The mean ratings differed significantly ($p < .001$) across all three social contexts for all FCMs, with one exception: the importance of taste did not differ between eating alone or with family (means displayed in Table 6). Similar to Study 1 all sustainability-related motives scored highest when with a partner. This is the case for all included FCMs,

Table 5
Ranking of means of egocentric motives (light green), health motives (blue) and sustainability motives (dark green) per location (Study 2).

Rank	Home (N=530)		Work (N=58)		Out of home (N=33)	
	Motive	Mean	Motive	Mean	Motive	M(sd)
1	Taste	5.81	Taste	5.48	Taste	6.12
2	Affordable	5.55	Energy	5.33	Energy	5.64
3	Energy	5.25	Health	5.31	Convenience	5.58
4	Health	5.24	Satiety	5.24	Sensory	5.58
5	Safety	5.19	Affordable	5.21	Craving	5.55
6	Convenience	5.18	Safety	5.19	Affordable	5.52
7	Digestion	5.06	Convenience	5.10	Safety	5.24
8	Sensory	5.06	Digestion	5.10	Variation	5.18
9	Natural	5.05	Natural	4.91	Satiety	5.15
10	Variation	5.04	Variation	4.91	Mood	5.12
11	Familiar	5.01	Animal	4.78	Digestion	5.12
12	Satiety	5.01	Sensory	4.78	Health	5.06
13	Mood	4.86	Mood	4.71	Familiar	5.06
14	Weight	4.81	Craving	4.69	Cosiness	4.88
15	Animal	4.78	Familiar	4.67	Natural	4.85
16	Craving	4.75	Fair Trade	4.66	Environment	4.67
17	Environment	4.64	Weight	4.60	Novelty	4.61
18	Fair Trade	4.63	Environment	4.59	Animal	4.58
19	Cosiness	4.53	Cosiness	4.36	Weight	4.48
20	Novelty	4.07	Novelty	4.29	Fair Trade	4.27

Note. The 5 participants that answered ‘other, namely’ were removed from further analyses.

Note. Keywords have been used to refer to the include FCMs. The exact items are provided in the methods section.

Note. F-values were all significant at the $p < .001$ level. Games-Howell post-hoc tests showed that for all motives, the mean scores differed significantly ($p < .05$) across all locations, except for animal welfare and safety, for which no difference were found between at home and at work.

Table 6

Ranking of means of egocentric motives (light green), health motives (blue) and sustainability motives (dark green) per social context (Study 2).

Rank	Alone (N=295)		Partner (N=179)		Family (N=79)	
	Motive	Mean	Motive	Mean	Motive	Mean
1	Taste	5.74	Taste	5.93	Taste	5.75
2	Affordable	5.46	Affordable	5.63	Affordable	5.52
3	Energy	5.24	Health	5.36	Energy	5.27
4	Health	5.22	Sensory	5.33	Variation	5.20
5	Safety	5.16	Energy	5.32	Health	5.15
6	Convenience	5.16	Safety	5.31	Convenience	5.11
7	Natural	5.04	Variation	5.30	Safety	5.09
8	Digestion	5.01	Digestion	5.27	Sensory	5.06
9	Satiety	4.91	Convenience	5.26	Craving	5.03
10	Familiar	4.90	Satiety	5.16	Satiety	5.01
11	Sensory	4.90	Familiar	5.15	Mood	4.89
12	Mood	4.82	Natural	5.13	Familiar	4.89
13	Variation	4.82	Environment	4.95	Weight	4.89
14	Animal	4.75	Weight	4.95	Natural	4.86
15	Weight	4.68	Animal	4.94	Cosiness	4.82
16	Craving	4.65	Craving	4.90	Digestion	4.82
17	Environment	4.53	Mood	4.90	Animal	4.68
18	Fair Trade	4.53	Cosiness	4.88	Fair Trade	4.59
19	Cosiness	4.15	Fair Trade	4.82	Environment	4.47
20	Novelty	3.90	Novelty	4.37	Novelty	4.24

Note. Participants indicating 'other, namely...' (N = 36) or who had selected multiple social contexts (N = 36) were excluded from further analyses.

Note. Keywords have been used to refer to the include FCMs. The exact items are provided in the methods section.

Note. F-values were all significant at the $p < .001$ level. Games-Howell post-hoc tests showed that for all motives, the mean scores differed significantly ($p < .05$) across social contexts, except for taste for which no difference were found between eating alone or with family.

except for craving, which scored highest when with family (means displayed in Table 6).

Taste was, again, consistently ranked as the most important motive in all social contexts. And similar as for meal moments, novelty (trying something new) consistently ranked last. In contrast to Study 1, affordability consistently ranked as the second most important motive. Energy and health also ranked high in all social contexts. The sustainability-related motives scored in the bottom part of the ranking for all social contexts, with the exception of naturalness when eating alone.

Next to naturalness, other motives that show a lot of differences in ranking across social contexts were digestion, variation and craving. These are all health-related motives. Digesting ranked much lower and craving and variation ranked much higher when eating with family as compared to alone or with a partner. In addition, variation ranked higher when with a partner as compared to alone. Furthermore, eating with a partner was characterised by a higher ranking of sensory appeal and a lower ranking of mood as opposed to eating alone or with family. Finally, the higher ranking of environment when with a partner as opposed to consuming alone or with family was remarkable.

3.3. Conclusion

The results of Study 2 provide further support for the findings in Study 1. There were consistencies in the rankings of the FCMs and they also showed significant differences across meal moment, locations and social contexts. This again underlines the relevance of measuring FCMs in a context-specific way.

With respect to the overall pattern of responses, the findings are in line with Study 1. A consistent finding across all contexts was that taste

ranked first. Also, other ego-centric motives like affordable and convenience ranked high. Interestingly, rephrasing "price" into "affordability" changed the relative importance of that motive. In Dutch, price is a more neutral reference to the price of products, whereas affordability refers to the relative value of a product. In a similar vein, appearance might be rated more important (Study 1) compared to sensory appeal (Study 2) because appearance is more concrete. In the original Food Choice Questionnaire (Stephens et al., 1995) appearance is one of the items to measure the concept of sensory appeal. Health-related motives such as health, energy and safety came in second place. Natural and health-related motives like craving and weight control ranked in the middle. Sustainability-related motives, cosiness and novelty ranked in the bottom.

However, more pertinent to our main research question, the relative importance and the ranking also showed variation across contexts. Health motives again showed the highest variability across contexts. For example, when snacking, craving and safety were relatively more important, and health, weight control, energy and digestion were relatively less important as compared to the main meals. Satiety was relatively more important at work. Craving was more important out of home and health and weight control were less important out of home. The addition of the more short-term egocentric and health-related motives in Study 2 showed that these differed considerably across contexts, indicating that it is important to include these short-term motives. They provide additional understanding of the motives that drive specific food choices across different contexts. Arguably, novelty seems less relevant to include as it consistently ranked low.

4. General discussion

4.1. Food Choice Motives are context-specific

Although context is often mentioned as a relevant dimension to increase insight in consumer understanding of food choice, the context-specificity of Food Choice Motives (FCMs) has not been explored systematically yet. The current study adds to the literature by showing that FCMs are indeed context-specific, as the rating and ranking of FCMs varies across meal moments, locations and social contexts. Moreover, the amount of variation differs between contexts and between the different categories of FCMs. Therefore our study provides insight into how FCMs vary across contexts and it indicates the relevance of measuring FCMs on a context-specific level.

FCMs are usually measured at a general level asking respondents to score the importance of items when selecting foods 'on a typical day', without considering possible contextual differences (Step toe et al., 1995). The current results showed variability of ratings and rankings of FCMs across contexts, indicating the relevance of measuring FCMs on a context-specific level. This finding is in accordance with research indicating the relevance of being as specific as possible when measuring personal characteristics such as domain specific innovativeness (Goldsmith & Hofacker, 1991) or context-specific engagement (Calder, Isaac, & Malthouse, 2016).

In addition, the current study gives insights in which motives are relatively stable and which motives vary across contexts. In accordance with previous studies (e.g., Lindeman & Väänänen, 2000; Steptoe et al., 1995; Onwezen et al., 2019), the egocentric motives taste, affordability, and convenience were in the top most important motives across all contexts, as was health. In contrast, sustainability-related motives were consistently rated as least important. Most variability occurred in the middle part of the rankings and mainly in health-related motives such as weight control and safety. This shows the added value of measuring FCMs in different contexts particularly for health-related motives.

Because of the large amount of significant differences across contexts in ratings of FCMs, rankings of FCMs within the different contexts were compared in this study to gain more insights in patterns of relative importance of FCMs. For meal moments, the most pronounced contrasts in rankings of FCMs were found between main meals and snacks, where egocentric motives seem to have a more important role and health-related motives being less important regarding snacking compared to the other meals. Regarding the location where a meal is being consumed, it seems most relevant to take into account differences in importance of FCMs between eating at home and eating out of home, where egocentric motives have a more important role and health-related and sustainability-related motives a less important role when eating out of home compared to eating at home. Regarding the social context, it seems relevant to take into account that the rating and ranking of FCMs differs when consuming alone, with a partner or with family.

4.2. Implications

Our results imply that FCMs can best be assessed in a context-specific manner, since importance ratings of the FCMs differed across meal moments, locations and social context. Moreover, we find that studying patterns in rankings seems practically more relevant than studying mean scores, as mean scores, even though significant, show small differences across all contexts. This suggestion is in line with a finding by Konttinen, Sarlio-Lähteenkorva, Silventoinen, Männistö, and Haukkala (2013), who found that it is the individual priorities in FCMs, rather than the absolute importance of FCMs, that lead to dietary differences across socio-economic groups.

The overall picture leads to several practical implications. First, taste and convenience consistently ranked as most important motives together with affordability in Study 2. This confirms previous findings that these motives are prerequisites in product development, no matter

what context is targeted. Second, sustainability-related motives consistently ranked as the least important motives. Sustainability arguments might be positioned as an additional benefit to consume certain food, although linking them to primary benefits such as taste is likely a more effective strategy. It might also be that sustainability needs to be emphasised more at the point of purchase, a context that was not included in our study. When comparing the contexts, sustainability seemed relatively more important at dinner and when consuming with a partner, suggesting that innovations focusing on sustainability have more chance to succeed in these contexts. Finally, although health seemed an important motive in all contexts, specific health-related motives such as weight control, safety and variation varied in importance across contexts. This implies that it is important to consider the context in dietary health promotion. When aiming to stimulate more healthy food consumption, it seems wise to target products, messages or interventions at the health-related motive that is ranked highest in a particular context. For example, in the social context where individuals are having a meal with family members, energy and variation might be interesting motives to focus on, whereas safety or resisting cravings are interesting motives to focus on in the context of unhealthy snacking.

The absolute ratings of the FCMs also have implications. Although ratings of FCMs differed significantly for all FCMs for almost all contexts, the differences in mean scores were small. As FCMs are measured on a 7-point Likert scale that is not inherently meaningful, the size of the differences between means are difficult to interpret in terms of practical relevance. While the difference between the FCM with the highest rating and the FCM with the lowest rating is around two scale points in the different contexts, it is important to note that with only a few exceptions, all FCMs are on average rated above 4 (which is the neutral score). This indicates that all FCMs are important drivers of food consumption, thus when new food products are being developed or when interventions or marketing campaigns are being designed it is important to consider all the FCMs. A scientific implication of this finding is that FCMs should be measured by making explicit trade-offs between motives or to rank motives (we ranked based on mean scores, and did not force participants to make trade-offs between motives) to see whether such trade-offs more clearly reveal relative importance of FCMs. Studying patterns in rankings shows that not only the absolute rating, but also the relative importance of motives differs across contexts. However, future research is needed to establish how these differences in rankings can effectively be used in product development or in designing interventions.

Finally, the results imply that for some motives and some contextual aspects it is more important to consider the context than for others. For example, the results show that taste and convenience are always important, and that sustainability-related motives are relatively unimportant in all contexts. However, it is important that future research investigates which health-related aspects are more or less important in a particular context. This would open up opportunities to shorten context-specific questionnaires on FCMs. For example, the number of items in a survey can be reduced when significant differences do not lead to practically relevant differences or when rankings of FCMs do not change across contexts.

4.3. Limitations and suggestions for future research

This study adds to the literature by applying a context-specific way of measuring FCMs, with use of near-time recalls. Future research should apply the same methodology to assess the predictive validity of context-specific FCMs on food choices or food intake, and investigate whether context-specific FCMs lead to a better understanding of food choices compared to general FCMs. In that way, the viability of a methodology that links context-specific FCMs to actual food intake or purchases can be established. Moreover, the insights of this study can be useful for related areas in the context of food. Our main finding regarding the relevance of considering the context can be applied to a whole range of other determinants that can influence context-specific food choices,

both rational determinants (e.g. attitudes) as well as more affective determinants (e.g. experienced emotions; [Desmet & Schifferstein, 2008](#); [Gutjar et al., 2015](#); [Onwezen, 2015](#)). Thus, future studies should explore other ways of improving the understanding of food choice by applying a similar methodology to other determinants of food choice as well as other types of measurements such as ranking tasks and implicit associations.

Furthermore, this study includes only a selection of contextual factors and motives. Generalizability of our findings to other contextual factors, such as weekdays vs weekends or time of day, remains to be explored. The answers given as “other, namely” can be used in future research to select other categories. For example, for meal moments, a number of respondents indicated to just have had something to drink. Also, due to the unbalanced sample in terms of locations and social contexts, we had to combine some categories to a higher aggregation level (e.g. out of home was a combination of participants that consumed at a catering facility, on the go and at someone else’s home). It is possible that including other contexts results in different findings. For example, sustainability-related motives might become more relevant in contexts that activate moral engagement, such as certain social activities or having enough mental capability. The same can be reasoned for adding other motives. Locality and seasonality could be interesting additional motives to better understand consumers sustainability considerations in food choice ([Verain, Snoek, Onwezen, Reinders, & Bouwman, 2021](#)). An endless list of motives could be added, and it is therefore important for future research to include those motives that can be relevant to the research question. It is likely that on a general level the conclusions would not change, as the addition of eight motives in Study 2 did largely result in the same conclusions as were drawn in Study 1.

Note the division of respondents across locations was not balanced, due to our research method. Although the small number of respondents that indicated to have eaten outside the home is representative for the Dutch context, as only about 5% of Dutch meals is consumed in restaurants or on the go ([National Institute for Public Health and the Environment, 2018](#)), the out-of-home consumption is much higher in many other European countries ([Eurostat, 2020](#)). Future studies are needed to explore in more detail whether the findings can be replicated in more balanced samples, for example by including international samples representing countries that consume more out of home, or by using different study designs to recruit respondents at home versus at a restaurant.

The use of international samples is also needed to validate the representativeness of the findings in an international context. The FCMS that were applied in this study are developed and tested in western cultures and the reported studies are conducted in the Netherlands. Culture is an important determinant of food choice ([Chen & Antonelli, 2020](#)), and literature suggests that FCMS differ across cultures ([Cunha, Cabral, Moura, & de Almeida, 2018](#); [Wang, De Steur, Gellynck, & Verbeke, 2015](#)). Therefore, the findings that we report cannot be generalised to other cultures without further research.

Unfortunately, due to the unbalanced and sometimes small group sizes across the different context, it was not possible to investigate interactions between contextual factors. Future research could look at these interactions, as they might give interesting additional insights. A study by [Verain et al. \(2020\)](#) for example shows that FCMS at main meals at home deviate most from all other included contexts. In this study, we aimed to disentangle contextual aspects to see which aspects matter, but a next step could be to study which combinations of contextual factors show the most specific patterns in FCMS.

The above-mentioned suggestions could lead to an integrated methodology that measures food choice, FCMS, contextual factors and other determinants of food choice. Such a methodology could be used for the development and validations of a comprehensive framework to understand food choices throughout the consumer journey. In this regard, within-person variability regarding the importance of FCMS would be interesting to further investigate, even as the identification of

different consumer groups. Within-person variability can occur in different contexts, but also at different points in the consumer journey. Some types of motives might be more relevant at the moment of purchase (e.g. Fair Trade), whereas others might be more relevant at the moment of consumption (e.g. craving). Identification of consumer segments can be relevant as literature shows that consumers differ in importance ratings of FCMS in general, and across contexts ([Jaeger, Roigard, Hunter, & Worch, 2021](#); [Onwezen et al., 2012](#); [Sijtsema, Raaijmakers, Onwezen, & Doets, 2019](#); [Verain et al., 2020](#)). The development of an integrated framework would allow to explore relations across FCMS, contexts and food choices for different consumer groups and could reveal possible moderating or mediating effects of context on the relationship between FCMS and food choices.

Finally, this study shows important implications for developing research infrastructures in the food domain. Future research can benefit from developing harmonised methods that measure food intake and FCMS, enabling researchers to study variation over time, across countries and, as highlighted in this study, across contexts. Variations over time in the importance of health and sustainability motives are interesting to study in the light of the current increase in plant-based product marketing and offerings by industry as well as public health and environmental organisations who are stimulating a shift towards more plant-based consumption. By developing a harmonised method future research can draw comparisons across studies over time, in different countries and in different contexts, and gain a more comprehensive understanding of food choices and motives.

5. Conclusion

Overall, the current study shows that the importance of FCMS differ across context, for meal moments, locations and social contexts. Some FCMS show more variability across contexts than others. In general taste was valued most in all contexts. The ranking of health-related motives like energy, digestion and safety showed more variation across contexts. Particularly a distinction between snacking versus main meals, eating at home versus out of home, and eating alone versus together seems relevant when studying the importance of FCMS. This variability in importance of FCMS across contexts underpins the relevance of measuring FCMS on a context-specific level. Future research should confirm the generalizability of these findings in international samples, since the Dutch context is characterised by a high percentage of food consumption at home in comparison to other developed countries. Researchers and professionals can use the insights to deepen our understanding of consumers’ food choices, depending on the context at hand, as we show that not only food choices but also FCMS are context-dependent.

CRedit authorship contribution statement

M.C.D. Verain: Conceptualization, Methodology, Formal analysis, Writing – original draft, Writing – review & editing, Project administration, Funding acquisition. **J. van den Puttelaar:** Conceptualization, Methodology, Writing – review & editing, Funding acquisition. **E.H. Zandstra:** Conceptualization, Writing – review & editing. **R. Lion:** Conceptualization, Writing – review & editing. **J. de Vogel-van den Bosch:** Conceptualization, Writing – review & editing. **H.C.M. Hoonhout:** Conceptualization, Writing – review & editing. **M.C. Onwezen:** Conceptualization, Methodology, Formal analysis, Writing – original draft, Writing – review & editing, Supervision.

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.

Acknowledgements

Funding: This work was executed under the Smart Food Intake-project funded by the Dutch Top Sector Agri & Food (TKI-AF-16096, 2017), Unilever Foods Innovation Centre Wageningen, Netherlands, Danone Nutricia Research, Netherlands, FrieslandCampina, Amersfoort, Netherlands and Philips Research, Netherlands.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.foodqual.2021.104505>.

References

- Aertsens, J., Verbeke, W., Mondelaers, K., & van Huylenbroeck, G. (2009). Personal determinants of organic food consumption: A review. *British Food Journal*, 111(10), 1140–1167. <https://doi.org/10.1108/00070700910992961>
- Bisogni, C. A., Falk, L. W., Madore, E., Blake, C. E., Jastran, M., Sobal, J., & Devine, C. M. (2007). Dimensions of everyday eating and drinking episodes. *Appetite*, 48(2), 218–231. <https://doi.org/10.1016/j.appet.2006.09.004>
- Burke, L. E., Shiffman, S., Music, E., Styn, M. A., Kriska, A., Smailagic, A., ... Rathbun, S. L. (2017). Ecological momentary assessment in behavioral research: Addressing technological and human participant challenges. *Journal of Medical Internet Research*, 19(3). <https://doi.org/10.2196/jmir.7138>
- Calder, B. J., Isaac, M. S., & Malthouse, E. C. (2016). How to capture consumer experiences: A context-specific approach to measuring engagement: Predicting consumer behavior across qualitatively different experiences. *Journal of Advertising Research*, 56(1), 39–52. <https://doi.org/10.2501/JAR-2015-028>
- Cepeda-Benito, A., Gleave, D. H., Fernández, M. C., Vila, J., Williams, T. L., & Reynoso, J. (2000). The development and validation of Spanish versions of the State and Trait Food Cravings Questionnaires. *Behaviour Research and Therapy*, 38(11), 1125–1138. [https://doi.org/10.1016/S0005-7967\(99\)00141-2](https://doi.org/10.1016/S0005-7967(99)00141-2)
- Chen, P. J., & Antonelli, M. (2020). Conceptual models of food choice: Influential factors related to foods, individual differences, and society. *Foods*, 9(12), 1898. <https://doi.org/10.3390/foods9121898>
- Cunha, L. M., Cabral, D., Moura, A. P., & de Almeida, M. D. V. (2018). Application of the food choice questionnaire across cultures: Systematic review of cross-cultural and single country studies. *Food Quality and Preference*, 64, 21–36. <https://doi.org/10.1016/j.foodqual.2017.10.007>
- de Castro, J. M. (1987). Circadian rhythms of the spontaneous meal pattern, macronutrient intake, and mood of humans. *Physiology and Behavior*, 40(4), 437–446. [https://doi.org/10.1016/0031-9384\(87\)90028-X](https://doi.org/10.1016/0031-9384(87)90028-X)
- de Castro, J. M. (1994). Family and friends produce greater social facilitation of food intake than other companions. *Physiology and Behavior*, 56(3), 445–455. [https://doi.org/10.1016/0031-9384\(94\)90286-0](https://doi.org/10.1016/0031-9384(94)90286-0)
- den Uijl, L. C., Jager, G., de Graaf, C., Waddell, J., & Kremer, S. (2014). It is not just a meal, it is an emotional experience – A segmentation of older persons based on the emotions that they associate with mealtimes. *Appetite*, 83, 287–296. <https://doi.org/10.1016/j.appet.2014.09.002>
- Desmet, P. M. A., & Schifferstein, H. N. J. (2008). Sources of positive and negative emotions in food experience. *Appetite*, 50(2–3), 290–301. <https://doi.org/10.1016/j.appet.2007.08.003>
- Dowd, K., & Burke, K. J. (2013). The influence of ethical values and food choice motivations on intentions to purchase sustainably sourced foods. *Appetite*, 69, 137–144. <https://doi.org/10.1016/j.appet.2013.05.024>
- Eurostat (2020). *How much are households spending on eating-out?* <<https://ec.europa.eu/eurostat/web/products-eurostat-news/-/EDN-20200101-2>> (last accessed 08-10-2021).
- Field, A. (2004). *Discovering statistics using SPSS*. London: Sage Publications Ltd.
- Fotopoulos, C., Krystallis, A., Vassallo, M., & Pagiaslis, A. (2009). Food Choice Questionnaire (FCQ) revisited. Suggestions for the development of an enhanced general food motivation model. *Appetite*, 52(1), 199–208. <https://doi.org/10.1016/j.appet.2008.09.014>
- Furst, T., Connors, M., Bisogni, C. A., Sobal, J., & Falk, L. W. (1996). Food choice: A conceptual model of the process. *Appetite*, 26(3), 247–266. <https://doi.org/10.1006/appe.1996.0019>
- Geeroms, N., Verbeke, W., & Van Kenhove, P. (2008). Consumers' health-related motive orientations and ready meal consumption behaviour. *Appetite*, 51(3), 704–712. <https://doi.org/10.1016/j.appet.2008.06.011>
- Goldsmith, R. E., & Hofacker, C. F. (1991). Measuring consumer innovativeness. *Journal of the Academy of Marketing Science*, 19(3), 209–221. <https://doi.org/10.1007/BF02726497>
- Gutjar, S., Dalenberg, J. R., de Graaf, C., de Wijk, R. A., Palascha, A., Renken, R. J., & Jager, G. (2015). What reported food-evoked emotions may add: A model to predict consumer food choice. *Food Quality and Preference*, 45, 140–148. <https://doi.org/10.1016/j.foodqual.2015.06.008>
- Jaeger, S. R., & Porcherot, C. (2017). Consumption context in consumer research: Methodological perspectives. *Current Opinion in Food Science*, 15, 30–37. <https://doi.org/10.1016/j.cofs.2017.05.001>
- Jaeger, S. R., Roigard, C. M., Hunter, D. C., & Worch, T. (2021). Importance of food choice motives vary with degree of food neophobia. *Appetite*, 159, 105056. <https://doi.org/10.1016/j.appet.2020.105056>
- Keil, T. F., Koschate, M., & Levine, M. (2020). Contact Logger: Measuring everyday intergroup contact experiences in near-time. *Behavior Research Methods*, 52(4), 1568–1586. <https://doi.org/10.3758/s13428-019-01335-w>
- King, S. C., Weber, A. J., Meiselman, H. L., & Lv, N. (2004). The effect of meal situation, social interaction, physical environment and choice on food acceptability. *Food Quality and Preference*, 15(7), 645–653. <https://doi.org/10.1016/j.foodqual.2004.04.010>
- Konttinen, H., Sarlio-Lähteenkorva, S., Silventoinen, K., Männistö, S., & Haukka, A. (2013). Socio-economic disparities in the consumption of vegetables, fruit and energy-dense foods: The role of motive priorities. *Public Health Nutrition*, 16(5), 873–882. <https://doi.org/10.1017/s1368980012003540>
- Köster, E. P., & Mojet, J. (2015). From mood to food and from food to mood: A psychological perspective on the measurement of food-related emotions in consumer research. *Food Research International*, 76, 180–191.
- Krantz, D. S. (1979). A naturalistic study of social influences on meal size among moderately obese and nonobese subjects. *Psychosomatic Medicine*, 41(1), 19–27. <https://doi.org/10.1097/00006842-197902000-00003>
- Lindeman, M., & Väänänen, M. (2000). Measurement of ethical food choice motives. *Appetite*, 34(1), 55–59. <https://doi.org/10.1006/appe.1999.0293>
- Lockie, S., Lyons, K., Lawrence, G., & Grice, J. (2004). Choosing organics: A path analysis of factors underlying the selection of organic food among Australian consumers. *Appetite*, 43(2), 135–146. <https://doi.org/10.1016/j.appet.2004.02.004>
- Machin, L., Giménez, A., Vidal, L., & Ares, G. (2014). Influence of context on motives underlying food choice. *Journal of Sensory Studies*, 29(5), 313–324. <https://doi.org/10.1111/joss.12107>
- Marshall, D., & Bell, R. (2003). Meal construction: Exploring the relationship between eating occasion and location. *Food Quality and Preference*, 14(1), 53–64. [https://doi.org/10.1016/S0950-3293\(02\)00015-0](https://doi.org/10.1016/S0950-3293(02)00015-0)
- Meiselman, H. L. (2006). The role of context in food choice, food acceptance and food consumption. In *The Psychology of Food Choice* (pp. 179–199).
- Meiselman, H. L., Johnson, J. L., Reeve, W., & Crouch, J. E. (2000). Demonstrations of the influence of the eating environment on food acceptance. *Appetite*, 35(3), 231–237. <https://doi.org/10.1006/appe.2000.0360>
- National institute for public health and the environment (2018). *Factsheet: Food Consumption 2012-2016: What, Where and When*. Retrieved from: <<https://www.waateetnederland.nl/publicaties-en-datasets/publicaties>> (last accessed on 08-10-2021).
- Onwezen, M. C., Reinders, M. J., van der Lans, I. A., Sijtsma, S. J., Jasiulewicz, A., Dolors Guardia, M., & Guerrero, L. (2012). A cross-national consumer segmentation based on food benefits: The link with consumption situations and food perceptions. *Food Quality and Preference*, 24(2), 276–286. <https://doi.org/10.1016/j.foodqual.2011.11.002>
- Onwezen, M. C. (2015). I did good, and we did bad: The impact of collective versus private emotions on pro-environmental food consumption. *Food Research International*, 76(P2), 261–268. <https://doi.org/10.1016/j.foodres.2015.03.032>
- Onwezen, M., Bouwman, E., Reinders, M., & Taufik, D. (2018). *De Agrifoodmonitor 2018: Waardering van de Agri & Foodsector in beeld*. Wageningen Economic Research.
- Onwezen, M. C., Bouwman, E. P., Reinders, M. J., & Dagevos, H. (2021). A systematic review on consumer acceptance of alternative proteins: Pulses, algae, insects, plant-based meat alternatives, and cultured meat. *Appetite*, 159, 105058. <https://doi.org/10.1016/j.appet.2020.105058>
- Onwezen, M. C., Reinders, M. J., Verain, M. C. D., & Snoek, H. M. (2019). The development of a single-item Food Choice Questionnaire. *Food Quality and Preference*, 71, 34–45. <https://doi.org/10.1016/j.foodqual.2018.05.005>
- Patel, K. A., & Schlundt, D. G. (2001). Impact of moods and social context on eating behavior. *Appetite*, 36(2), 111–118.
- Peters, G. R., Rappoport, L. H., Huff-Corzine, L., Nelsen, C., & Downey, R. G. (1995). Food preferences in daily life: Cognitive, affective and social predictors. *Ecology of Food and Nutrition*, 33(3), 215–228. <https://doi.org/10.1080/03670244.1995.9991429>
- Phan, U. T. X., & Chambers, E. (2016). Motivations for choosing various food groups based on individual foods. *Appetite*, 105, 204–211. <https://doi.org/10.1016/j.appet.2016.05.031>
- Phan, U. T. X., & Chambers, E. (2018). Motivations for meal and snack times: Three approaches reveal similar constructs. *Food Quality and Preference*, 68, 267–275. <https://doi.org/10.1016/j.foodqual.2018.03.018>
- Pieniak, Z., Verbeke, W., Vanhonacker, F., Guerrero, L., & Hersleth, M. (2009). Association between traditional food consumption and motives for food choice in six European countries. *Appetite*, 53(1), 101–108. <https://doi.org/10.1016/j.appet.2009.05.019>
- Piqueras-Fiszman, B., & Jaeger, S. R. (2014). The impact of the means of context evocation on consumers' emotion associations towards eating occasions. *Food Quality and Preference*, 37, 61–70.
- Prescott, J., Young, O., O'Neill, L., Yau, N. J. N., & Stevens, R. (2002). Motives for food choice: A comparison of consumers from Japan, Taiwan, Malaysia and New Zealand. *Food Quality and Preference*, 13(7–8), 489–495. [https://doi.org/10.1016/S0950-3293\(02\)00010-1](https://doi.org/10.1016/S0950-3293(02)00010-1)
- Pula, K., Parks, C. D., & Ross, C. F. (2014). Regulatory focus and food choice motives. Prevention orientation associated with mood, convenience, and familiarity. *Appetite*, 78, 15–22. <https://doi.org/10.1016/j.appet.2014.02.015>
- Rappoport, L., Downey, R. G., & Huff-Corzine, L. (2001). Conceptual differences between meals. *Food Quality and Preference*, 12(1), 9–17. [https://doi.org/10.1016/S0950-3293\(00\)00023-9](https://doi.org/10.1016/S0950-3293(00)00023-9)

- Renner, B., Sproesser, G., Strohbach, S., & Schupp, H. T. (2012). Why we eat what we eat. The Eating Motivation Survey (TEMS). *Appetite*, 59(1), 117–128. <https://doi.org/10.1016/j.appet.2012.04.004>
- Sautron, V., Péneau, S., Camilleri, G. M., Muller, L., Ruffieux, B., Hercberg, S., & Méjean, C. (2015). Validity of a questionnaire measuring motives for choosing foods including sustainable concerns. *Appetite*, 87, 90–97. <https://doi.org/10.1016/j.appet.2014.12.205>
- Schutz, H. G. (1988). Beyond preference: Appropriateness as a measure of contextual acceptance of foods. In D. M. H. Thomson (Ed.), *Food Acceptability* (pp. 115–134). London: Elsevier Applied Science.
- Shepherd, R. (1989). Factors influencing food preferences and choice. In *Handbook of the psychophysiology of human eating* (pp. 3–24).
- Siegrist, M., & Hartmann, C. (2020). Consumer acceptance of novel food technologies. *Nature Food*, 1(6), 343–350.
- Sijtsema, S. J., Raaijmakers, I., Onwezen, M. C., & Doets, E. (2019). Exploring health-related motive orientations among Dutch seniors. *British Food Journal*, 122(11), 3499–3512. <https://doi.org/10.1108/BFJ-03-2019-0192>
- Stepoe, A., Pollard, T. M., & Wardle, J. (1995). Development of a measure of the motives underlying the selection of food: The Food Choice Questionnaire. *Appetite*, 25(3), 267–284. <https://doi.org/10.1006/appe.1995.0061>
- Sun, Y. H. C. (2008). Health concern, food choice motives, and attitudes toward healthy eating: The mediating role of food choice motives. *Appetite*, 51(1), 42–49. <https://doi.org/10.1016/j.appet.2007.11.004>
- Tarancón, P., Fernández-Serrano, P., & Besada, C. (2021). Consumer perception of situational appropriateness for fresh, dehydrated and fresh-cut fruits. *Food Research International*, 140, 110000. <https://doi.org/10.1016/j.foodres.2020.110000>
- Van den Puttelaar, J., Verain, M. C. D., & Onwezen, M. C. (2016). *The Potential of Enriching Food Consumption Data by use of Consumer Generated Data: a case from RICHFIELDS*. Dublin: A. Spink.
- Van Rossum, C. T. M., Buurma-Rethans, E. J. M., Vennemann, F. B. C., Beukers, M., Brants, H. A., De Boer, E. J., & Ocké, M. C. (2016). *The diet of the Dutch: Results of the first two years of the Dutch National Food Consumption Survey 2012-2016*. RIVM letter report 2016-0082.
- Verain, M. C. D., Sijtsema, S. J., & Antonides, G. (2016). Consumer segmentation based on food-category attribute importance: The relation with healthiness and sustainability perceptions. *Food Quality and Preference*, 48(Part A), 99–106. <https://doi.org/10.1016/j.foodqual.2015.08.012>
- Verain, M. C. D., Onwezen, M. C., Sijtsema, S. J., & Dagevos, H. (2016). The added value of sustainability motivations in understanding sustainable food choices. *APSTRACT: Applied Studies in Agribusiness and Commerce*, 10(2-3), 67–76. <https://doi.org/10.19041/APSTRACT/2016/2-3/8>
- Verain, M. C. D., Sijtsema, S. J., Taufik, D., Raaijmakers, I., & Reinders, M. J. (2020). Motive-based consumer segments and their fruit and vegetable consumption in several contexts. *Food Research International*, 127, 108731. <https://doi.org/10.1016/j.foodres.2019.108731>
- Verain, M. C. D., Snoek, H. M., Onwezen, M. C., Reinders, M. J., & Bouwman, E. P. (2021). Sustainable food choice motives: The development and cross-country validation of the Sustainable Food Choice Questionnaire (SUS-FCQ). *Food Quality and Preference*, 93, 104267. <https://doi.org/10.1016/j.foodqual.2021.104267>
- Wahl, D. R., Villinger, K., Blumenschein, M., König, L. M., Ziesemer, K., Sproesser, G., ... Renner, B. (2020). Why we eat what we eat: Assessing dispositional and in-the-moment eating motives by using ecological momentary assessment. *JMIR mHealth and uHealth*, 8(1), e13191. <https://doi.org/10.2196/13191>
- Wang, O., De Steur, H., Gellynck, X., & Verbeke, W. (2015). Motives for consumer choice of traditional food and European food in mainland China. *Appetite*, 87, 143–151. <https://doi.org/10.1016/j.appet.2014.12.211>
- Zandstra, E. H., & Lion, R. (2019). In-home testing. In *Context: The Effects of Environment on Product Design and Evaluation* (pp. 67–85). Woodhead Publishing. <https://doi.org/10.1016/B978-0-12-814495-4.00004-0>