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**Motivational differences in food orientation and the choice of
snacks made from lentils, locusts, seaweed or “hybrid” meat**

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Abstract

The recently developed Food Choice Motives (FCM) questionnaire was used in a survey among a sample from the general population in the Netherlands (n = 1083) to examine the relationship between motivational differences in food orientation and the choice of snacks made from environmentally-friendly proteins (i.e. lentils, locusts, seaweed or “hybrid” meat). The results show that there is room for a change to a diet with more environmentally friendly proteins, with the exception of insects. As hypothesized, there were important differences between consumers depending on the level and direction of involvement with food. The study identified potential “trendsetters” who appreciated authentic sources of proteins, such as lentils and seaweed, but who were less likely to choose a product that is not pure but hybrid. A hybrid meat product may be acceptable to lowly involved consumers but they will not actively search for more environmentally friendly proteins.

Highlights

Our study measured taste-oriented and reflection-oriented food choice motives.

It focused on choices of snacks made from environmentally-friendly proteins.

The study identified trendsetters who like authentic sources of proteins.

A hybrid meat product may be acceptable to lowly involved consumers.

1. Introduction

People's basic orientation toward food can be characterized by the level and direction of involvement with what they eat. The recently developed Food Choice Motives (FCM) questionnaire aims to reveal such differences between people in order to support the pursuit of healthy and environmentally-friendly eating (de Boer, Hoogland, & Boersema, 2007). Using the FCM questionnaire among a sample from the general population in the Netherlands, de Boer et al. (2007) show that consumers' level of involvement in food can be separated into distinct motivational goals, which agree with Higgins' (2000) distinction between prevention and promotion focus. The relevance of these motivational differences for healthy and environmentally-friendly eating has been demonstrated in the context of meat consumption. To be brief, if people in Western countries choose to eat smaller quantities of meat and more environmentally-friendly proteins, such as lentils, insects, or seaweed, there will be much less pressure on crucial resources (i.e. water, biodiversity, energy), food security and human health (Aiking, 2011). This change will require a complex nutritional transition, however, because the habits of most consumers are strongly adapted to the current meat system (Elzerman, Hoek, van Boekel, & Luning, 2011; Schösler, de Boer, & Boersema, 2012). One of the strategies to explore the potential for transition pathways is to consider options for snacks that are made from environmentally-friendly proteins. The aim of the present paper is to examine the relationship between motivational differences in food orientation and the choice of snacks made from lentils, locusts, seaweed or "hybrid" meat.

Higgins' (2000; 2012) motivation theory can explain how consumers may get the experience of "feeling right" about what they are doing if they opt for a carefully produced product or decide to consume less. A promotion orientation may include all the social and culinary motives that emphasize the importance of food as a positive force in life. In contrast, a prevention orientation may emphasize appropriate ways to fulfill obligations and avoid threats to the moral and health aspects of eating. Both orientations may demonstrate a high involvement with food, despite their directional differences. Additionally, the FCM questionnaire also reveals differences between consumers with a low level of involvement. Overall, then, there are two independent components (de Boer et al., 2007). The first component differentiates consumers who are focused on a varied and adventurous taste from those who prefer an ordinary meal. The second component differentiates consumers who are focused and reflective on the wider implications of food choices in terms of health, naturalness of the food, and ethical considerations from those who are easy about food. Both components offer interesting opportunities to explore preferences for different sources of proteins. In this field it is important to move beyond the literature on the adoption of new foods (Cox & Evans, 2008; Huotilainen, Pirttilä-Backman, & Tuorila, 2006), because a protein transition is not just a matter of innovation but also of reframing existing ingredients, such as plant based protein. Based on knowledge about food choice motives, the following hypotheses are addressed. As far as environmentally-friendly proteins, including insects, increase the variety of food choices, they may be attractive to consumers who are driven by an adventurous taste (hypothesis 1). A reflective orientation may be associated with a preference for either new or existing pure plant derived proteins (hypothesis 2). In contrast, the taste-oriented and the

reflection-oriented consumers will be less inclined to choose a product that is not pure but hybrid, such as a combination of meat and a meat substitute (hypothesis 3). Note that, given a choice between different snacks, the third hypothesis is not independent of the other two. The hypotheses were tested in a survey among a sample from the Dutch population, taking account of individual differences in meat and fish consumption habits.

2. Method

2.1 Sample, participants and procedure

The very high degree of Internet penetration in the Netherlands enabled us to test the hypotheses in a survey among consumers with Internet access (about 93% of the population). The stratified sample was drawn from a large panel of persons who are willing to participate in web-based research for a small reward, which they can keep for themselves or donate to charity. In November 2010 the participants (n= 1083, response rate in two weeks 68%) answered questions about food. The data showed a representative distribution of the main demographic characteristics, i.e. gender (50% female), age (between 18 and 92, mean 49.5), level of education (24% primary and lower secondary, 51% upper secondary, 25% tertiary level) and place of residence. Building on earlier research on food choices (de Boer et al., 2007), the questionnaire included modules with the FCM items, questions on meat and fish consumption, choices between snacks made from different protein sources, and some demographics.

2.2 Measures and analyses

2.2.1 Food choice motives

The FCM items were developed by de Boer and colleagues (2007). Drawing on an approach adapted from Schwartz et al. (2001), the items were written in terms of short, positively worded portraits of persons who show different degrees of involvement in food, both in promotion-oriented and prevention-oriented ways (see Table 1). The female version of a highly involved promotion-oriented item is: “She feels proud of her taste. She believes that her food choices are very attractive.” The opposite is a preference for

ordinary meals. An example of a highly involved reflection-oriented item is: "She is very mindful of food. She wants to eat sensibly." In this case the opposite is being easy about food. Participants were asked to compare the portrait to themselves and to rate on a 7-point scale "how much like you" the person is. Following Schwartz et al. (2001), the answers were centered to correct for individual differences in average rating levels. Table 1 presents the results of the principal component analysis of the original and the current study. A newly added item is "She likes many different foods. She is also a great taster." Although the sign of the loadings is changed, this does not change the components. In agreement with the original study, the 12 items assessed two independent components of food choice motives, taste-oriented and reflection-oriented, respectively (Cronbach's alpha .74 and .62). It should be noted that two of the items had only a small gap ($< .20$) between primary loading and cross-loading, indicating that the difference between the components was less clear where they share a low level of involvement in food.

TABLE 1

2.2.2 Meat and fish consumption habits

A single-item measure asked for the number of meat eating days ("How many days per week do you eat your main meal with meat (including chicken)?"). The participants reported, on average, a number of 5.4 meat days per week (the median was 6). The number of vegetarians was low (1.2%). A similar measure asked for the number of fish days (the median was 1; 46% had no fish day). Just regarding meat, additional questions asked for the preferred portion size. The participants were shown three photos of a plate

with a piece of meat that was 50, 100 or 150 gram (specified in the caption). Each photo was accompanied by the question whether the portion size was too small, enough or too large (i.e. creating non-monotonic item response functions). After dichotomizing the responses to the 50 and the 150 gram items, the three items yielded a reliable score (Guttman's Lambda 5 = .63). The most preferred portion size was 100 gram.

2.2.3 Choices between snacks

Participants had to choose two times between four snacks. According to the text descriptions the snacks were made from (1) lentils or beans, (2) insects, such as locusts, (3) seaweed, such as nori, or (4) partly meat and partly a meat substitute (which was left unspecified). To assess preference, non-preference and aversion, participants were asked which one they would most like to taste and which one they would least like to taste.

2.2.4 Analyses

By performing a multinomial logistic regression, it was determined whether the snack choices were associated with the two independent components of food choice motives, the frequency of meat and fish consumption, and the preferred size of meat portions. To control for correlations with background variables, we included gender, age, level of education and community size in the analysis. Table 2 displays the correlations between the predictor variables. All analyses were conducted with SPSS 15 for Windows.

TABLE 2

3. Results

The most popular snack was the one made from partly meat and partly a meat substitute (chosen by 54%). Less popular were the snack from lentils or beans (30%), the snack from seaweed (12%), and the snack from insects (4%). As Table 3 demonstrates, these choices were related to a number of variables, including food choice motives and consumption habits. A unit increase in the measure of taste oriented food choice motives (e.g., one standard deviation) was associated with an increase of the odds of choosing a snack from lentils (38%), insects (92%) and seaweed (115%), in comparison with choosing the snack from hybrid meat. This finding agrees with hypothesis 1. A unit increase in the measure of reflection oriented food choice motives (e.g., one standard deviation) was associated with an increase of the odds of choosing a snack from lentils (42%) and seaweed (36%), in comparison with choosing the snack from hybrid meat. This finding supports hypothesis 2. As noted above, given a choice between four different snacks, the third hypothesis is not independent of the other two. Because the odds ratios were greater than one, the snack from hybrid meat, which was reference category, was less likely to be chosen by the taste-oriented and the reflection-oriented consumers.

TABLE 3

Table 3 shows that consumers who were high on meat were less likely to choose the snacks from lentils and seaweed. Both number of meat days and preferred portion size were significant predictors of their choices. In contrast, fish consumers were more likely

to choose the snack from seaweed. A higher level of education and living in a more urban environment were also associated with choices of the snacks from lentils and seaweed.

The overall model resulted in a Nagelkerke pseudo R^2 of .25 (Chi-square = 265.79, $df = 27$, $p < .001$). The difference in likelihoods between the final model and a reduced model was larger for the measure of taste oriented food choice motives (Chi square = 56.93, $df = 3$, $p < .001$) than for the measure of reflection oriented food choice motives (Chi square = 19.08, $df = 3$, $p < .001$).

In answering the question which snack they would least like to taste, most participants chose the snack made from insects (79%). Much less often mentioned were the snack from lentils or beans (8%), the snack from seaweed (8%), and the snack from hybrid meat (5%). These choices were weakly related to the predictor variables. The overall model resulted in a Nagelkerke pseudo R^2 of .09 (Chi-square = 74.70, $df = 27$, $p < .001$). Although there were some associations found in bivariate analyses, none of the predictors produced a highly significant ($p < .001$) difference in likelihood between the final model and a reduced model.

4. Discussion

This work has shown that motivational theory can help to integrate and contextualize empirical findings. From the perspective of food sustainability it is important to see that there is room for a change to a diet with more environmentally friendly proteins, as far as no insects are involved. The relative popularity of the hybrid snack suggests that it may be valuable to combine vegetarian and animal protein. Instead, responses to insects may be more complex, dependent on the form in which locusts are presented to consumers (Schösler et al., 2012). In addition, the results show that there were important differences between consumer groups. Highly involved, taste oriented and or reflection oriented consumers with a high level of education and an urban background may become “trendsetters” who appreciate authentic sources of proteins, such as lentils and seaweed. As hypothesized, however, these same consumers were less likely to choose a product that is not pure but hybrid, such as a combination of meat and a meat substitute. This does not mean that hybrid meat products will be less useful, although the sensory quality of meat substitutes needs to be improved (Elzerman et al., 2011). A hybrid meat product may in principle be acceptable to many consumers, especially those who are lowly involved, because it may seem more familiar to them (Schösler et al., 2012). However, lowly involved consumers will not actively search for more environmentally friendly proteins. Hence, it is crucial for policymakers in industry and government to take these differences into account.

One of the limitations of our study is that we did not present consumers with real products to taste rather than text descriptions and that we did not check the perceived

attributes of the snacks in terms of familiarity and authenticity. However, our aim was to explore the relationship between motivational orientations and choices of different protein sources. The theoretical background of the FCM questionnaire provides support for two important motivational orientations regarding food (de Boer et al., 2007; Higgins, 2000), which can be measured in a reproducible way. Consumers with an adventurous taste may have the experience of “feeling right” about what they are doing if they choose an exotic source of proteins; those with a reflective orientation may have the same experience if they choose a pure or natural source of proteins. As far as a snack is exotic and pure, these consumers may choose the same one for different reasons. Our approach may help to put empirical work on food neophobia and the adoption of new foods (Huotilainen et al., 2006) in a broader perspective. Lowly involved consumers may prefer an ordinary meal or an easy meal, but they do not seem to have a strong aversion to lentils or seaweed. More research is necessary to improve our understanding of their motives and to explore how the protein sources can be used for the substitution of meat in convenience products without compromising their taste or mouthfeel.

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Table 1

FCM items, female version: mean rating, SD, loadings after Varimax rotation

Items	M	SD	Component loading			
			1	2	3	4
She likes to vary her meal. She is curious about new tastes.	4.90	1.54	.71	(.71)	-.08	(.11)
She eats because she has to. Meals are not important to her.	2.90	1.66	-.69	(-.72)	.31	(-.12)
She enjoys eating well. In her view every meal should be festive.	4.20	1.51	.65	(.74)	.25	(-.10)
Food does not bother her. She has no special demands on it.	3.53	1.76	-.64	(-.67)	.47	(-.46)
She feels proud of her taste. She believes that her food choices are very attractive.	4.39	1.46	.63	(.67)	-.10	(.07)
She likes many different foods. She is also a great taster.	5.19	1.43	.59		-.03	
She prefers an ordinary meal. She is happy with meat and two vegetables.	4.46	1.84	-.52	(-.67)	.20	(.00)
She is easy about cooking. She uses a lot of ready-made products in her meals.	3.28	1.65	-.41	(-.24)	.59	(-.60)
She is grateful for her meal. In her view everything that is edible deserves respect.	4.32	1.58	-.02	(-.06)	-.65	(.63)
She is very mindful of food. She wants to eat sensibly.	4.10	1.58	.24	(.30)	-.63	(.66)
She is a big eater. She loves to have plenty of palatable foods.	3.69	1.78	.12	(.30)	.62	(-.61)
She prefers natural products. She would really like her food fresh from the garden.	4.53	1.63	.18	(.11)	-.58	(.74)
Eigenvalues			3.11	(3.17)	2.34	(2.34)
Alpha			.74	(.75)	.62	(.63)

Notes: All items have been centered (rating scale: 1= not like me at all, 7= very much like me). The loadings found in the original study (n = 1530, de Boer et al., 2007) are given between the parentheses.

Table 2

Correlations between the predictor variables.

	1	2	3	4	5	6	7	8
1. Taste oriented motives	1							
2. Reflection oriented motives	.00	1						
3. Meat days per week	.01	-.17***	1					
4. Prefers large meat portions	.02	-.30***	.20***	1				
5. Fish days per week	.17***	.17***	-.23***	-.12***	1			
6. Gender (woman)	.07*	.16***	-.04	-.19***	-.01	1		
7. Age	-.05	.32***	-.00	-.11***	.13***	-.16***	1	
8. Level of education	.15***	.01	-.14***	-.15***	.08**	.00	-.14***	1
9 Community size	.08**	.01	-.10**	.00	.07*	-.04	.00	-.05

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3

Results of multinomial logistic regression models predicting choices of snacks.

	Odds Ratio		
	Snack from lentils (30%)	Snack from locusts (4%)	Snack from seaweed (12%)
Taste oriented food choice motives	1.38 ^{***}	1.92 ^{***}	2.15 ^{***}
Reflection oriented food choice motives	1.42 ^{***}	1.34	1.36 [*]
Meat days per week	.79 ^{***}	1.07	.75 ^{***}
Prefers large meat portions	.74 ^{***}	1.26	.82
Fish days per week	1.04	.97	1.65 ^{***}
Gender (woman)	1.04	.62	1.16
Age	.94	.90	1.08
Level of education	1.35 ^{***}	1.02	1.67 ^{***}
Community size	1.22 ^{**}	.91	1.33 ^{**}

Notes: The reference category is “snack from partly meat and partly a meat substitute”

(54%); all predictors except meat days fish days and gender have been standardized;

Nagelkerke R square =.25.

* $p < .05$. ** $p < .01$. *** $p < .001$.