Consumer segmentation based on environmental consciousness of meat production

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***Abstract* – High meat consumption in the West causes severe environmental problems, resulting in calls for more sustainable practices in the agricultural sector, and particularly the lowering of meat consumption. Consumer behaviour is a key element that enables these changes to take place, and the environmental consciousness (EC) of consumers is a prerequisite if they are to adopt sustainable food choices. Only recently have studies examined the EC of consumers with regard to meat production. In this paper we focus on that issue by studying the differences between consumer segments. The data are based on a postal survey sent to a random sample of 4,000 Finns in spring 2010 (response rate=47.3%; n=1,890). The results reveal Finns are mostly unaware of the topic, but also indicate that a third of consumers are conscious of the issue. As EC appears to be a fairly coherent concept, strengthening one dimension of it may result in higher overall levels of EC, a finding that is promising for future policy measures.**

INTRODUCTION

The modern food system is far from sustainable. This is especially evident in the case of meat, which is nowadays consumed in large amounts in the West, and is, on average, much more resource and energy intensive to produce compared to plant-based foods (Steinfeld et al., 2006). *Technological development* in the production system offers one solution to the problem (ibid.). In addition, switching to alternative methods of production, such as *organically* or *locally produced foods*, has been discussed (Duchin, 2005; McMichael et al., 2007). These measures are important for creating a sustainable food system, but have been considered insufficient. Hence, there is also a need to *decrease meat consumption* in Western nations, a measure that would also be beneficial for public health (ibid.).

There are many determinants for the practices of the food system, of which, consumer action is a key area. Though *environmental consciousness* (EC) does not define consumer choices fully, it can be considered a prerequisite for sustainable consumer practices (Takács-Sánta, 2007). Although many forms of EC have been described in the literature, the concept typically consists of *cognitive*, *affective* and *conative* dimensions (Dunlap and Jones, 2002). In this study we focus on the following topics:

1. What is the EC of consumers regarding meat production?
2. What kind of consumer segments can be discerned regarding the EC of meat production?

Extensive research into EC with regard to consumer segments and meat production issue is, to the authors' knowledge, rare. However, it seems that consumers tend to be quite unaware of environmental problems resulting from meat production (e.g. Tobler et al., 2011; Vanhonacker et al., 2013).

DATA AND METHODS

The data are based on a survey questionnaire sent to a random sample of 4,000 Finns in spring 2010. The survey concerned consumer attitudes towards farm animals and meat products. The response rate (47.3%; n=1,890) can be considered good and the data effectively represents the population of Finland.

We included eight statements about the key areas of EC in a cluster analysis [one statement for affective (*concern*), two for cognitive (*knowledge*) and five for conative (one for *perceived personal effectiveness* and four for *solutions*) dimensions]. They were measured using a one-to-five level Likert scale.

We used hierarchical clustering with Ward's Method. There are no hard rules to define the number of clusters. We chose a ten cluster solution, based on the hierarchical dendrogram, similarities with K-means analysis, meaningful segment sizes and the theoretical relevance of the results.

RESULTS

The results show that on average one third of the respondents are concerned and knowledgeable

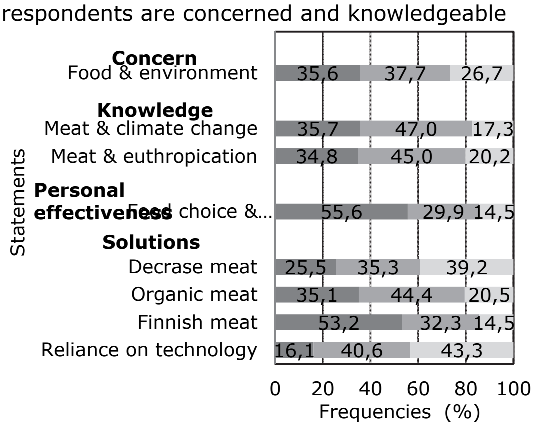

Figure 1. The EC of consumers regarding meat production. Dark gray: % agree (answer options 1 and 2 in the survey). Medium gray: % neutral (answer option 3). Light gray: % disagree (answer options 4 and 5).

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Table 1. Ten consumer segments related to the environmental consciousness of meat production (n=1787).

Segment	Fairly consc	Highly consc	Green gr consc	Highly uncert	Active uncert	Passive uncert	Green gr uncert	Green gr resistant	Highly resistant	Cynical resistant
Segment size(%/n)	10/179	10/176	10/171	18/328	14/246	12/222	9/166	7/123	5/103	4/73
Segmentation var.[a]										
Concern over food and environment	**69.3** (25.1)	**86.4** (12.5)	**76.6** (21.6)	28.6 **(63.7)**	19.1 **(57.3)**	12.6 (45.0)	13.3 (38.6)	0.8 (13.0)	4.9 (9.7)	45.2 (43.8)
Knowledge of meat and climate change	**83.2** (16.2)	**93.2** (5.7)	**83.6** (14.6)	14.6 **(77.7)**	13.4 **(69.5)**	6.3 **(80.6)**	21.7 **(63.9)**	0.8 (19.5)	5.8 (15.5)	**61.6** (34.2)
Knowledge of meat and eutrophication	**74.9** (24.6)	**75.0** (20.5)	**63.2** (28.1)	18.9 **(69.5)**	20.7 **(61.4)**	14.0 **(69.4)**	34.3 **(51.8)**	0.8 (19.5)	4.9 (7.8)	**52.1** (39.7)
Perceived personal effectiveness	**73.3** (21.2)	**89.2** (9.7)	**91.8** (7.0)	**54.3** (38.7)	**73.2** (23.2)	13.1 **(58.6)**	**51.8** (39.8)	29.3 (34.1)	23.3 (26.2)	28.8 (27.4)
Need to decrease meat consumption	**88.3** (11.7)	**75.0** (23.9)	46.8 (31.0)	14.3 **(80.2)**	9.8 (45.9)	0.5 (21.2)	6.0 (36.7)	0.0 (4.1)	1.0 (8.7)	2.7 (28.8)
Need to favour organic meat	45.8 (46.9)	9.7 (45.5)	**56.1** (33.9)	23.5 **(69.5)**	40.2 (39.4)	16.7 **(64.4)**	**78.3** (17.5)	**56.9** (36.6)	9.7 (27.2)	0.0 (16.4)
Need to favour Finnish meat	**82.1** (17.3)	14.2 (46.0)	**88.9** (9.9)	33.2 **(58.5)**	**59.8** (37.4)	35.1 (48.2)	**92.8** (4.8)	**89.4** (10.6)	19.4 (29.1)	1.4 (20.5)
Reliance on technology	2.2 (24.0)	3.4 (16.5)	37.4 (45.6)	13.7 **(76.8)**	2.8 (17.9)	12.6 **(54.5)**	45.8 (48.8)	25.2 (40.7)	18.4 (20.4)	4.1 (16.4)

[a] % agree: answer options 1 and 2 in the survey (% neutral answer: answer option 3). Frequencies of ≥50.0% are in boldface. P-values for the differences between the segments are <0.001 (χ^2 test)

about the environmental effects of meat production (Fig. 1). In addition, consumers feel quite confident about being able to influence the environmental impacts of food production. There is large variation between the different solutions, the extremes being favouring Finnish meat and reliance on technology. Overall, neutral answers were most common.

Ten consumer segments were formed in the cluster analysis. Three segments (*Fairly conscious*, *Highly conscious* and *Green growth conscious,* 30% in total) can be considered to have high levels of knowledge and concern (Table 1). However, only the *Highly conscious* acknowledge the most environmentally sound combination of solutions. The other major grouping consists of the unaware segments (*Highly uncertain*, *Active uncertain*, *Passive uncertain* and *Green growth uncertain*, 53% in total), who particularly differ from each other regarding the conative profiles. In addition, two antagonistic segments were identified (*Green growth resistant* and *Highly Resistant*, 12% in total). The former are highly favourable towards alternative production methods, whereas the latter display more persistent attitudes of opposition. Lastly, the *Cynical resistant* are fairly concerned and knowledgeable but have no faith in any of the solutions.

Discussion

The transformation of the agro-food sector towards sustainability is strongly needed. However, there is a notable share of consumers who are unaware of the topic of this study, which poses the question: how will consumers respond? Organic and local production may be promising future trends as consumers seem to have widespread interest in them. However, if these measures are considered sufficient, this may avert the environmentally more relevant discussion of the need to decrease meat consumption.

It was encouraging to find fairly coherent segments regarding EC, as taking policy measures to increase one dimension of EC may affect others. Furthermore, the considerable amount of consumers unaware of the topic of this study can be seen as a promising *tabula rasa* condition for increasing EC.

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