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Analysis of Differences in Meat Consumption Patterns

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Abstract

Even though nowadays meat is affordable for nearly everyone in western societies, demand has been decreasing in Germany. Thus, not only income, which is the dominant determinant in emerging economies, but also other factors seem to affect meat consumption.

With an a-priori segmentation and a multiple group comparison of "low", "average" and "heavy" meat consumers, this paper analyzes in which attitudes towards meat "Low Meat Consumers" differ from typical consumer behavior. The results show that "Low Meat Consumers" generally are more concerned about individual and ethical issues of meat consumption.

Keywords: attitudes, consumer, meat, multiple group comparison

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Introduction

In emerging economies, the per capita meat consumption increases with the per capita Gross Domestic Product (GDP), whereas the curve stagnates or even declines for countries with a GDP of more than about 25,000 US$ PPP (Purchasing Power Parity) (FAO 2009). In Germany for instance, a fall in demand has been observed since the 1990s. Whereas at the beginning of the 1990s the average per capita consumption of meat was about 65 kg per year, today this has been reduced to about 60 kg (Gurath 2008). If this trend continues, the per capita meat consumption will decrease to about 53 kg per year in 2030 (Spiller et al. 2010), which would have a serious impact on the German meat market.

Nevertheless, meat consumption will, in line with the economic development and the growing world population, grow worldwide. The increase is highest in poultry consumption, lower in pork and beef. Overall, the demand for grain and other traditional food will decrease in favor of animal foods (DBV 2012).

Interestingly, in this context, it can be stated, that the reduction of meat consumption in Germany does likewise not include all meat types. Whereas the consumption of pork and beef declines, the per capita consumption of poultry is rising (DBV 2010, Spiller et al. 2010).

Thus, not only income, but also other factors seem to affect meat consumption. A multitude of attributes and beliefs, such as animal welfare, health or environmental effects concerning the consumption of meat are discussed in this context (e.g. Richardson et al. 1993; Lea & Worsley 2001; Guenther et al. 2005; De Boer et al. 2007).

In order to gain detailed insights into the multiple attitudes and the social environment that might have impact on the amount of meat consumed, a consumer survey was undertaken in this study. Most studies use regression models to explain meat consumption, whereas in the present analysis participants are a-priori segmented in “low”, “average” and “heavy” consumption patterns. This simplifies the understanding for managers. The study thereby focuses on attitudes that are distinguished as most influential according to the literature and expert discussions. In addition, socio-demographic factors, such as age or income, are considered.

The results of the analysis are not solely interesting from a scientific point of view, but also important for decision makers of the meat chain, who are confronted with new challenges caused by societal and demographic changes.

Theoretical Background

As mentioned above, a multitude of studies deal with consumer attitudes towards meat and meat consumption in developed countries (e.g. Woodward 1988; Richardson et al. 1994; Verbeke and Viaene 1999; Grunert 2006; Verbeke et al. 2010). These studies regard various attitudes as

relevant for building an image of meat in general or of special meat types or product variations. Likewise, the impact of attitudes on meat consumption has been analyzed, particularly since a reduction of meat consumption in western populations is occurring (FAO 2009).

To some extent, changes and differences in meat consumption can be explained by socio-demographic dimensions. Particularly gender has a strong influence on attitudes towards meat and meat consumption. Following the literature it can be stated that men generally consume more meat than women and that women are more concerned about a healthy diet and about food choices in general (Beardsworth & Bryman 1999, 2004; Lea &Worsley 2001; Gossard & York 2003; Praettaelae et al. 2006). A negative determinant of meat consumption can be seen in the age of consumers (Gossard & York 2003; De Boer et al. 2007). Gossard and York (2003) also found that social class has substantial impacts on beef and total meat consumption. In their study, those in laborer occupations and people with a low level of education ate more beef and meat in general than people in service or professional occupations and people with a higher level of education. Furthermore, beef consumption increased with higher income, whereas the total meat consumed was not affected by income. Consumers with medium and high income are also a target group for premium beef (Kim & Boyd 2004). In Germany, the comprehensive National Nutrition Survey II revealed that men belonging to the lower class ate 20% more meat and meat products than men belonging to the upper class. For women, there is a minimal difference of 7 grams per diem between upper and lower class (MRI 2008). By contrast, Beardsworth and Bryman (1999, 2004) found no association between the respondents' social class and their food choices. Since they conducted an eleven year longitudinal study with undergraduate students in the UK, a certain class position bias may be pre-sent in their findings. Further socio-demographic impacts on meat consumption can be seen in race, ethnicity, location of residence and religion (Beardsworth & Bryman 1999; Gossard & York 2003).

These social structural dimensions can be seen as the context in which psychological factors operate. So even if their impact on meat consumption in developed countries is smaller than the influence of psychographic determinants, they play an important role in shaping individual attitudes (Gossard & York 2003).

As described above, the focus of this study lies on these psychographic factors.

The main reasons given by consumers for reducing their meat consumption or avoiding meat completely seem to be health and diet related. The nutritional awareness of meat, the perceived unhealthiness, concerns about additives or the perceived fat content can be mentioned in this context (Woodward 1988; Beardsworth & Keil 1991; Richardson et al. 1993, 1994; Verbeke & Viaene 2000; Lea & Worsley 2001). The aspect of health plays an important role concerning the consumption of meat. Especially red meat is associated with a higher risk of health complaints like coronary heart disease (Huijbregts et al. 1995; Mahley et al. 1995), Type 2 Diabetes (Song et

al. 2004; van Dam et al. 2002) and different types of cancer (Chao et al. 2005; Tavani et al. 2000).

Besides health, Woodward (1988) evaluated individual price considerations as main reason for eating less meat.

Ethical factors or outcomes as external effects of meat production and consumption have also been discussed as main forces determining attitudes towards meat and meat consumption. Primarily animal welfare concerns are considered to result in a reduction of meat consumption (Woodward 1988; Beardsworth & Keil 1991; Richardson et al. 1993, 1994; Verbeke & Viaene 1999; Lea & Worsley 2001; Guenther et al. 2005; De Boer et al. 2007). The good treatment of animals is one of the future lifestyle trends concerning meat consumption (Grunert 2006). Sustainable consumers prefer animal-friendly produced meat (Harper & Henson 2001).

The role of environmental awareness in this respect is controversial. While De Boer et al. (2007) found a negative influence (of universal values) on reported meat consumption, Richardson et al. (1993) found by contrast no influence of environmental awareness, whereas Lea and Worsley (2001) only found impacts of universal values on women's meat consumption. According to McCarty et al. (2003, 2004) environmental concerns had no significant influence on the attitude towards meat.

Further aspects affecting meat consumption are seen in the influence of reference groups (Richardson et al. 1994; Lea & Worsley 2001) and in a lack of trust in the product or information sources (Richardson 1994; Verbeke & Viaene 2000; Lea & Worsley 2001). Also, the negative image of meat (Andersen et al. 2005) and the bad reputation of the agri-food industry (Albersmeier & Spiller 2010) are considered responsible for decreasing meat consumption. Especially meat scandals contribute to consumer uncertainty (Saghaian & Reed 2007; Verbeke et al. 1999), associated with mistrust against food safety in meat industry (Goldsmith et al. 2003; Latvala & Kola 2003).

In contrast to the traditional view of meat as being tasty (Richardson et al. 1994), a dislike of the taste of meat and the disgust of preparing a dead animal are seen as factors leading to a reduction or avoidance of meat (Woodward 1988; Beardsworth & Keil 1991; Richardson et al. 1993, 1994).

However, according to Richardson et al. (1994) meat choice or avoidance motives are often multi-layered and therefore no single issue should be considered separately: "Views might be classed as ethical, philosophical, aesthetic, psychological, political, economic, cultural, ecological, nutritional, medical, and countless ways besides. Which influences are of primary relevance, and how they are categorized, depends largely on context and orientation of the research."

Sample Description and Research Design

In the present study, 990 consumers were interviewed online with a standardized (identical) questionnaire in the spring of 2011. The respondents were recruited with the help of a private market research provider. In order to draw conclusions about the German population from the sample, the participants were selected by socio-demographic quota specifications. The gender ratio in the sample is 48.8% men and 51.2% women. The respondents (30.7%) are 18 to 39 years old; 36.9% are between 40 and 60 years old and 32.4% are older than 60 years. Sixteen percent of the respondents live in Northern Germany, 27.5% in Southern Germany, 20.5% in Eastern Germany and 36.1% in the Western part of Germany. The largest group—41.7% of the participants—live in villages with fewer than 20,000 inhabitants. Of these, 27.6% live in a city with 20,000 to 100,000 inhabitants and 30.7% in a large city with more than 100,000 inhabitants. Thereby, the sample approximates a small-scale representation of the German population (Statistisches Bundesamt 2009).

Regarding further characteristics not included in the selection, such as marital status, household size and available income, good conformances with the German average were found, whereas higher educational levels are overrepresented.

Thirty four individuals identified themselves as vegetarian and were therefore excluded from the analysis, since the motives of vegetarianism were not subject of this study. Hence, 956 respondents were taken into consideration for the present analysis.

In order to prevent the risk of common method bias (cf. Soehnchen 2009), the statements and attributes of the questionnaire were retrieved from various scales (Likert scale, ranking, percentages, slider). However, predominantly five-point Likert scales from -2 to +2 were used (cf. Weijters et al. 2010).

The statements were constructed based on a literature study and expert discussions and pre-tested with 66 respondents. The questionnaire developed subsequently contains several questions concerning attitudes towards meat and meat products, eating, buying and cooking habits as well as socio-demographic variables. Missing values were replaced by an expectation-maximization algorithm (cf. Dempster et al. 1977).

Data analysis was conducted with the statistical program SPSS (IBM SPSS Statistics 19) by means of uni-, bi- and multivariate methods (cf. Backhaus et al. 2008).

The respondents were grouped according to the proportion of meat in their total diet. Trying to divide the sample into almost equal subsamples, the group of “Low Meat Consumers” (32.6% of the respondents) is characterized by a proportion of meat less than 12% of the total diet; the “Average Meat Consumer” (34.5%) eats between 13% and 23% meat and the “Heavy Meat Consumer” (32.8%) more than 24%.

In order to explore group differences, an analysis of variance (ANOVA) was undertaken, comparing attitudes concerning meat (factors) that can be regarded as relevant according to the literature study (e.g. Richardson et al. 1993, Lea & Worsley 2001, Guenther at al. 2005, De Boer et al. 2007) and expert discussions. These factors were established by a confirmatory principal component analysis respecting the common quality values (Backhaus et al. 2008, Field 2009) (see Table 1, see Appendix). The reliabilities (Cronbach´s Alpha) of the scales (factors) ranged from 0.553 to 0.805. Although the reliability of the factor "Figure awareness" did not reach the value of 0.6, it was integrated in further analysis. On early stages of research, Alpha-values between 0.5 and 0.6 are acceptable (Nunnally 1978).

Likewise the proportion of the different meat types (beef, pork, poultry, and other meat) in the total meat consumption was analyzed. Furthermore, socio-demographic variables were included in the comparison of means. The Levene-Test shows that homogeneity of variances cannot be assumed; hence the T2 test (Tamhane) was chosen for a post-hoc multiple group comparison. This test offers the same results as the conservative Bonferroni-Test if the variances are homogeneous and enables pair-wise comparisons on the grounds of a t-test (cf. Backhaus et al. 2008, SPSS 2003).

Results of the Analysis

The results (see Table 2) show that "Low Meat Consumers" (LMC) have an average proportion of 7.12% of meat of their total diet, the "Average Meat Consumers"(AMC) 19.00% and the "Heavy Meat Consumer" (HMC) 38.31% on average.

Regarding the meat types separately, it can be stated that with a proportion of 39.59%, the "Low Meat Consumers" eat relatively more poultry than the other two patterns (AMC: 32.52%, HMC: 32.28%), which distinguish themselves by a significantly higher consumption of pork (LMC: 33.76%, AMC: 40.96%, HMC: 42.01%). In contrast, the proportions of beef (LMC: 19.32%, AMC: 19.31%, HMC: 18.63%) and other meat (e.g. lamb, game) (LMC: 5.17%, AMC: 5.47%, HMC: 6.29%) do not differ significantly among the three groups.

Concerning the attitudes, it can be observed that the group of "Low Meat Consumers" is generally characterized by the highest concerns related to the effects of meat consumption. They show significantly higher health (LMC: 0.28, AMC: -0.09, HMC: -0.20), figure (LMC: 0.18, AMC: -0.02, HMC: -0.15) and particularly higher environmental (LMC: 0.31, AMC: -0.05, HMC: -0.24) and animal welfare awareness (LMC: 0.34, AMC: -0.10, HMC: -0.23) than those of the other two patterns.

Likewise, with a value of 0.20, they have more problems with the concept of eating animals than the "Average Meat Consumers" (-0.08) and the "Heavy Meat Consumers" (-0.11). Furthermore they are more influenced by their environment (LMC: 0.16, AMC: -0.03, HMC: -0.13). Strikingly, the "Low Meat Consumer" group has significantly less trust (-0.26) in the agri-food industry compared to the "average" (0.06) and the "heavy" (0.21) meat consumer. As expected, the general preference for meat increases from the "Low Meat Consumer" (-0.58) to the "Heavy Meat Consumer" (0.40, AMC: 0.16).

By contrast, the chosen socio-demographic variables age (LMC: 46.88 years on average, AMC: 47.75, HMC: 48.53), occupation (index from 1= pupil, unemployed to 6= executive manager, LMC: 3.39, AMC: 3.45, HMC: 3.54) and personal income (index from 1= under 1,000€ to 5= more than 4,000€, LMC: 1.87, AMC: 2.04, HMC: 2.05) do not display significant differences between the three groups. Only the level of education differs significantly between the respondents (index from 1= no degree to 4= A level, LMC: 3.44, AMC: 3.31, HMC: 3.19).

Table 2. Results of the ANOVA

	Low Meat Consumer (a)	**Average Meat Consumer (b)**	**Heavy Meat Consumer (c)**	**Total**
N	312 (32.6%)	330 (34.5%)	314 (32.8%)	956 (100%)
[1]**Proportion of meat in the total diet *****	**7.12**^{bc}	**19.00**^{ac}	**38.31**^{ab}	**21.49**
Consumption of Meat Types				
[1]Proportion of pork in the total meat consumption***	33.76^{bc}	40.96^{a}	42.01^{a}	38.96
[1]Proportion of poultry in the total meat consumption ***	39.59^{bc}	32.52^{a}	32.28^{a}	34.75
[1]Proportion of beef in the total meat consumption$^{n.s.}$	19.32	19.31	18.63	19.09
[1]Proportion of other meat (e.g. lamb, game) in the total meat consumption$^{n.s.}$	5.17	5.47	6.29	5.64
Attitudes towards meat				
[2]General preference for meat***	-0.58^{bc}	0.16^{ac}	0.40^{ab}	0.00
[2]Trust in the agri-food sector***	-0.26^{bc}	0.06^{a}	0.21^{a}	0.00
[2]Environmental awareness***	0.31^{bc}	-0.05^{ac}	-0.24^{ab}	0.00
[2]Health awareness***	0.28^{bc}	-0.09^{a}	-0.20^{a}	0.00
[2]Figure awareness***	0.18^{bc}	-0.02^{a}	-0.15^{a}	0.00
[2]Eating of animals***	0.20^{bc}	-0.08^{a}	-0.11^{a}	0.00
[2]Normative influence**	0.16^{bc}	-0.03^{a}	-0.13^{a}	0.00
[2]Animal welfare awareness***	0.34^{bc}	-0.10^{a}	-0.23^{a}	0.00
Socio-demographic variables				
Age$^{n.s.}$	46.88	47.75	48.53	47.72
[3]Education (index)***	3.44^{bc}	3.31^{a}	3.19^{a}	3.31
[4]Occupation (index)$^{n.s.}$	3.39	3.45	3.54	3.46
[5]Personal income (index)*	1.87	2.04	2.05	1.99

N= number of respondents, significance level: * =p≤ 0.05, **=p≤ 0.01, ***=p≤ 0.001, n.s.= not significant, letters indicate significant difference to the specified class (post-hoc test T2 after Tamhane on the significance level 0.05)), bold= cluster-forming variable, [1]percentage , [2]factor, [3]index from 1= no degree to 4= A level, [4]index from 1= pupil, unemployed to 6= executive manager, [5]index from 1= under 1,000€ to 5= more than 4,000€

Furthermore, based on cross-classified tables with standardized residuals (sr) (interpretation like z-values with ± 1.96 = p≤ 0.05; ± 2.58 = p≤ 0.01; ± 3.29 = p≤ 0.001) (Field 2009), it can be said that more women belong to the "Low Meat Consumers" (women sr: 5.3; men sr: -5.4) whereas men are overrepresented in the group of "Average Meat Consumers" (women sr: -2.7; men sr: 2.8) and in the group of "Heavy Meat Consumers" (women sr: -2.5; men sr: 2.5).

In summary, the "Average Meat Consumers" who generally display indifferent views, show more similarities to the "Heavy Meat Consumers" than to the "Low Meat Consumers". The

differences between the "Average Meat Consumers" and the "Heavy Meat Consumers" are in most cases not significant, however the difference between the "Low Meat Consumers" and both of these groups concerning attitude towards meat differs significantly in all dimensions examined.

Discussion and Limitations

Considered as a whole, the present study indicates that the per capita meat consumption in western countries, such as Germany, does not reflect class position, in contrast to emerging economies (FAO 2009). Instead, various attitudes, and in particular those concerning external effects of meat production and consumption, lead to a stagnation or even decrease in meat consumption.

In the study it becomes obvious that consumers with a low consumption of meat are concerned about personal factors, such as their health and their figure, but more than that about the treatment of animals and about environmental consequences of meat production. Interestingly they show a lack of trust in the agri-food sector, but the preferred meat seems to be poultry, even though the poultry production chain has the highest degree of vertical integration and industrialized structures in Germany. In this context, the disgust of eating animals might have an impact since the preparation of poultry is less bloody than the preparation of other types of meat.

What limits the results of this study is the fact that even though the sample is, with 990 participants, of a satisfactory size and most socio-demographic variables comply with the German population, it is still a convenience sample. Particularly the fact that higher educated people are overrepresented in this study may have an impact on the results. As Gossard and York (2003) found out that people in laborer occupations and people with a low level of education ate more beef and meat in general, especially the results of the "Heavy Meat Consumers" could vary from the true results.

Furthermore, the estimation of consumed meat is a self-estimation in this study and therefore might deviate from the true values.

Further research especially focusing on the group of "Low Meat Consumers" might be interesting, in order to identify possible shifts towards vegetarianism. In this context a more differentiated classification with more groups might allow deeper insights.
Since, as seen in this study, psychographic determinants seem to explain differences in meat consumption better than socio-demographic dimensions, life style approaches, such as the food-related life style (e.g. Grunert et al. 1993, Grunert 2006), might be appropriate to explain meat consumption in western societies.

Management Implications

For the meat industry the results offer the possibility to gain more information about their customers and to develop or adapt marketing and communication strategies accordingly. With a focus on the poultry chain, it can be stated that this supply chain has a high segment of critical

"Low Meat Consumers" and therefore has to intensify its efforts with regard to health and sustainability issues. A communication strategy combining sustainable management and emotional marketing, which distances the end products from the raw products seems to be appropriate to attract this critical consumer segment.

Likewise the pork and the beef chain could benefit from product quality differentiation. Next to standard quality products, which might be sufficient for individuals with a generally high preference for meat, specific product qualities might lead to more demand. Especially the proportion of consumed pork is significantly low in the segment of "Low Meat Consumers". Intensified efforts of the industry to produce and to market differentiated meat due to special process qualities should help developing new marketing segments.

Overall, the retrieval of consumers' trust seems to be a major component in order to increase meat consumption. Therefore, marketing or communication strategies should truthfully advertise the products and their processes. Private or public certification systems might be helpful in this context (Albersmeier et al. 2009). Also an implementation or intensification of a reputation management might lead to more consumers' trust. In this context a structural discussion with critical stakeholders such as NGOs (Non-Governmental Organizations) should be taken into consideration.

In general, the paper reveals that health and sustainability issues are the most important drivers of the changing meat consumption behavior in some developed countries. Considering the growing world population and limited resources, this development has positive implications for world food security and climate change.

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Appendix

Table 1. Results of the principal component analysis

General preference for meat (CA: 0.791, MSA: 0.783, TVE: 55.05%)	
Variables	Loadings
Meat is a source of vitality.	0.772
Meat always tastes good.	0.754
I can never have enough meat in a meal.	0.754
A juicy steak is better than anything else.	0.751
Meat is essential for a balanced diet.	0.675
Trust in the agri-food sector (CA: 0.779, MSA: 0.660, TVE: 69.38%)	
Variables	Loadings
I have a great deal of trust in the meat sector.	0.886
The information provided by meat producers is reliable.	0.839
I am certain that the majority of farmers look after their animals well.	0.770
Environmental awareness (CA: 0.805, MSA: 0.714, TVE: 63.13%)	
Variables	Loadings
Eating a lot of meat and sausage is very bad for the climate.	0.890
I restrict my meat consumption to protect the climate.	0.831
Animal husbandry pollutes the environment.	0.812
Living sustainably is important to me.	0.619

Table 1. *Continued*

Health awareness (CA: 0.668, MSA: 0.622, TVE: 50.19%)	
Variables	Loadings
People who do not eat meat are healthier.	0.761
People who eat a lot of meat are damaging their body.	0.756
A balanced diet is more important to me than taste.	0.655
I am very health-conscious in what I eat.	0.654
Figure awareness (CA: 0.553, MSA: 0.570, TVE: 52.84%)	
Variables	Loadings
I look for low calorie food products.	0.816
I am very conscious of my figure.	0.729
I find meat too fatty.	0.623
Eating of animals (CA: 0.723, MSA: 0.739, TVE: 54.70%)	
Variables	Loadings
I can't bear the sight of dead animals.	0.779
If I'm going to eat meat products, I'd at least rather not be able to see that it was once an animal.	0.758
I find raw meat disgusting.	0.723
I avoid eating meat as much as possible because it means that an animal must be killed.	0.696
Normative influence (CA: 0.679, MSA: 0.691, TVE: 51.82%)	
Variables	Loadings
I adjust what I eat at a restaurant according to what the others at my table are eating.	0.671
Eating meat is out of fashion.	0.795
Whether I eat meat depends on what my family thinks about it.	0.761
When the media reports about scandals such as the dioxin contamination, this influences my eating behavior.	0.641
Animal welfare awareness (CA: 0.706, MSA: 0.741, TVE: 54.00%)	
Variables	Loadings
Recoded: I find meat and sausage from factory farming ok.	0.788
Recoded: To be honest, I don't think much about animal welfare.	0.773
I have often thought about eating less meat because I feel so sorry for the animals.	0.709
Animals should be kept in accordance with their natural needs.	0.663

Note. CA= Cronbach´s alpha, MSA= Measure of sampling adequacy, TV = Total variance explained