Consumers' Online Deliberation about Food-Related Risks and Benefits: The Case of Red Meat

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Abstract

Successfully engaging consumers in a dialogue may provide opportunities for better tailored and more effective communication about food-related risks and benefits. Using an online deliberation concept and software, VIZZATA™, we explored the validity of a behavioural measure of deliberation in an online environment in the context of consumers' perceptions and information seeking about the risks and benefits of red meat. Participants from Belgium, Portugal and the United Kingdom (n=150) participated in an asynchronous interaction with the research team about the information provided. Online deliberation was operationalized as an individual metric based on the number of questions asked in relation to the information, the number of comments left, the number of glossary terms accessed, and the time spent on deliberative activity. This operationalization provided a coherent measure of deliberation which was positively correlated with information recall about the risks and benefits of red meat. Participants who perceived the information about red meat risks and benefits as too complex engaged less with the information.

Keywords

Consumer; Information seeking; Online deliberation; Red meat; Risk-benefit communication

JEL codes

D12; D83; M31

1 Introduction

In the field of food risk and benefit communication, bridging the divide between scientific experts and the lay audience has traditionally been a difficult task (Gaskell, et al., 2004). Communicators have the challenging task to assist consumers in making informed decisions (EFSA, 2012) and provide clear information about the balance between risks and benefits, which should build trust and therefore attenuate unwarranted risk perceptions (van Dijk, et al., 2012). Over the last decade, communication about food-related risks and benefits has undergone a significant change as the interest has grown to involve the public in the communication and decision-making processes (Dijkstra & Gutteling, 2012).

The rapid growth of internet use and in particular the rise of web 2.0, has created new possibilities and new mechanisms for consumer engagement in food-related topics and deliberation, making the online environment a suitable context for the exploration of consumer views on risk and benefit issues. There are a few organisations using the internet or Twitter as a vehicle for consumer engagement in food safety or risk communication (e.g. the Food Standards Agency in the U.K. or the Food Safety Authority of Ireland). Much of this communication is still one-way, not personally tailored and fails to fully engage consumers in a deliberative process or in a proper dialogue, thus leaving a lot of potential that remains largely unexploited (Gaspar, et al., 2014; Thackeray, et al., 2012). Major challenges lie in measuring and monitoring such online deliberation processes, and assessing differences among individuals in their information seeking and deliberative activity (Anderson et al., 2012).

Furthermore, although risk communication has been extensively addressed over the last 30 years, much less attention has been paid to developing strategies for communicating balanced information and to understanding how consumers respond to more complex situations in which both risk and benefit information are available (Barnett, et al., 2011; Cope, et al., 2010; Fischer & Frewer, 2009;

Verbeke, et al., 2008). Red meat has increasingly been associated with risks (e.g. the presence of hormone or antibiotic residues, as well as associations with the prevalence of cardiovascular disease and colorectal cancer, but also the adverse environmental impact of livestock production) (McAfee, et al., 2010; Smolinska & Paluszkiewicz, 2010; Aston, et al., 2011) as well as benefits (e.g. as a source of high-value protein and essential minerals like iron, zinc and vitamin B12, providing sensory satisfaction and connecting to socio-cultural values) (McAfee, et al., 2010; Banovic, et al., 2009; Scholderer, et al., 2013;Van Wezemael, et al., 2014).)

Therefore, it is important to investigate how consumers weigh up the various positive and negative aspects of red meat, and how they engage in seeking clarification about these aspects as they try to make sense of the risk-benefit information received. Furthermore, given the ubiquitous use of the online environment for communicating risks and benefits to consumers, it is important to understand how consumers interact with information materials presented to them, and which aspects of such information most capture their attention. The objective of this study is to acquire a better understanding of the nature of consumer deliberation about the risks and benefits of food in an online environment, taking red meat as the specific case.

Online deliberation is operationalized as a behavioural measure in terms of questions asked by consumers about the online stimulus material, comments left by consumers, glossary terms accessed, together with the total time spent on deliberative activity. The option to comment gave participants the opportunity to express personal views and reflect on the given information. The glossary terms in the text provided the participants the opportunity to access additional information and clarifications they desired. The total time spent on the exercise indicates a level of interest in and close attention to the presented information material. Based on the theories of information avoidance and risk information seeking and processing (Griffin, et al., 1999), we examined the following constructs as antecedents of deliberation: perceived information complexity, risk and benefit information sufficiency, and personal relevance.

2 Materials and methods

2.1 Participants

A total of 244 participants were invited by a market research agency to take part in a study about the risks and benefits of red meat (80 from the UK; 80 from Belgium and 84 from Portugal).All participants agreed to participate in a deliberative study about red meat, consisting of two stages. All participants were frequent red meat eaters (i.e. non-vegetarians and consuming red meat at least once a week) and the sample was diverse in terms of a wide range of socio-demographic characteristics (e.g. education levels, participants with and without children). Of the total invited sample, 150 participants (62%) completed both phases of the study in the summer of 2012. Of the 150 participants, 55 came from Belgium, 50 from Portugal and 45 from the UK. There was an equal division of men and women in the sample. 22.7% of the sample was younger than 30 years, 42% were aged between 30 and 40 years and 35.3% were older than 40 years. The majority of the sample had completed a higher education (53.3%) and 45.3 % of the sample reported they had children.

2.2 Procedure

This study used the online deliberation software VIZZATA™ (http://www.vizzata.com) (Barnett, et al., 2008). This tool allows researchers to present the target audience with information (text, images,

videos, website screenshots, etc.) and to elicit the audience's questions and comments in relation to these pieces of content. One of the core features of VIZZATA™ resides in eliciting questions and comments from the participants and observing their engagement with the study material, for example by measuring the time spent on each of the content testers (online pages with pieces of information) or the number of glossary terms that the participants access.

The recruited participants were invited by email to the website and presented with a series of seven content testers where they could ask questions or make comments. Firstly, the participants completed a short series of closed response questions, which included measures of the antecedents of deliberation and other control measures. They were then presented with the seven content testers. Five of these pages contained highlighted glossary terms. At the bottom of each page, participants had the opportunity to leave questions or comments on the material presented. The first phase of the study finished with the participants completing a further series of measures pertaining to information seeking and processing. After the research team conducted the necessary work to provide responses to the questions and comments participants had submitted, the responses were emailed back to the participants. Approximately two weeks after completion of the first phase, they were invited to the second phase of the study and asked to complete a final set of questions. Between both study phases, no significant incidents regarding the study topic (red meat) were reported in the media in the participating countries.

2.3 Content of the study

All the content tester pages were about red meat and potential risks and benefits linked to it. The first content tester page gave a general introduction to red meat. The next two pages dealt with nutritional and environmental risks of red meat, respectively. Pages four and five provided information about the nutritional benefits and socio-cultural aspects of red meat, respectively. On page six, a recent article from the BBC News Online was presented (BBC, 2012) (in Belgium and Portugal, translations of the article were used which appeared in national newspapers). The article discussed the increased risk of early death in relation to excessive consumption of red meat based on a recent US study (Pan, et al., 2012). The seventh content tester contained a YouTube video about synthetic (in-vitro) meat (YouTube, 2011) developed by the Royal Institution of Australia.

2.4 Measures

We aimed to measure how consumers engaged in deliberative activity, which we operationalized as a latent construct based on the standardized scores of four components: (i) the number of questions participants asked, (ii) the number of comments they left, (iii) the number of glossary terms they accessed and (iv) the time they spent on deliberative activity. It is important to note that standardized scores were calculated, which means that the deliberation measure for each participant is a relative measure that takes into consideration the comparison to the other study participants.

Information recall was measured in the second phase of the study where the participants returned to fill in a final short survey. One of the questions was related to recall of the presented information. The participants were asked to name up to three risks and three benefits of eating red meat they could remember from reading the material presented in the first phase. The measure of recall was calculated as the sum of risk and benefit information correctly recalled and thus ranged from zero to six.

Information sufficiency about the risks and benefits of red meat, information complexity and personal relevance were measured as self-reported variables. *Information sufficiency* was defined as the extent to which the individual feels his/her need for information on a given topic was sufficient (Eagly & Chaiken, 1993). Information sufficiency regarding both the risks and benefits of red meat was measured on a 7-point Likert scale ranging from 'completely disagree' to 'completely agree'. *Perceived complexity* of information was measured on a 7-point Likert scale based on the study of Shepherd and Kay (2012). *Personal relevance* was also measured on a 7-point Likert scale using four items as presented in Table 1.

2.5 Data analysis

Data were analysed using the statistical software SPSS version 20.0 and LISREL 8.72. First, descriptive statistical analyses were performed using independent sample tests for comparison of mean scores between groups of participants. Second, a maximum likelihood confirmatory factor analysis was conducted using the robust maximum likelihood procedure in LISREL 8.72. Third, structural equations model parameters were estimated and the general fit of the model was assessed.

3 Results

3.1 Descriptive statistics

Of the 150 participants who completed the study, 72% engaged in deliberative activity by asking questions, giving comments or clicking on glossary terms. In total, the participants asked 138 questions, left 279 comments and accessed the 20 glossary terms 435 times. Participants with a higher education level provided significantly more comments and spent on average a longer time on the stimulus material. Participants with children gave on average more comments. No significant differences were found for the four hypothesised antecedents of deliberative activity between countries, gender and age categories.

Information sufficiency about the risks of red meat was perceived higher in Portugal than in Belgium and the United Kingdom. Information sufficiency about the benefits of red meat was perceived higher for participants aged above 35 years compared to younger age. Participants with a higher education level perceived the information to be significantly less complex compared to lower educated participants.

3.2 Confirmatory factor analysis

Confirmatory factor analysis was performed to determine whether measures of a construct actually converged towards the intended latent variable of deliberation or shared a high proportion of variance in common, and whether the constructs were distinct from each other. Latent variables, items, loadings and reliability estimates are presented in Table 1.

Due to low factor loadings (<0.40) six items were deleted. Loadings of the remaining items on the constructs were all significant with values ranging from 0.49 to 0.96. All cross loadings were below 0.40. One factor loading was relatively low (0.49 for the item *It is valuable to me to include red meat in my diet*). However, due to acceptable values of Cronbach's alpha coefficients for the personal relevance construct (alpha=0.80) and the consistent meaning of the item within the construct we decided to retain it in further analyses. All Cronbach's alpha internal reliability coefficients were above the threshold value of 0.70 for satisfactory scales (Hair et al., 2006).

Table 1. Latent variables, items, factor loadings and reliability estimates

Constructs and items	
Online deliberation	*(0.73)*
Number of questions asked	0.63
Number of comments given	0.71
Number of glossary terms clicked	0.55
Total time spent (s)	0.79
Personal relevance	*(0.80)*
It is important to me to include red meat in what I eat in a typical week	0.79
It is valuable to me to include red meat in my diet	0.96
It is not important to me to eat red meat on a regular basis (R)	0.49
Eating red meat is important to my well-being	0.75
Information sufficiency about risks	*(0.74)*
I know many of the negative aspects of eating red meat	0.84
I am confident I know enough about the risks of eating red meat	0.88
I am not satisfied with my knowledge about risks of red meat for human health (R)	0.70
Information sufficiency about benefits	*(0.83)*
I know many of the positive aspects of eating red meat	0.64
I am confident I know enough about the benefits of eating red meat	0.85
I am not satisfied with my knowledge about benefits of red meat for human health (R)	0.64
Perceived complexity of the information	*(0.78)*
The various benefits and risks of eating red meat were difficult to grasp	0.86
I found myself struggling to understand the information on red meat	0.93
The risks and benefits of red meat consumption seemed incredibly technical and complex	0.63
The sheer number of things to take into consideration when deciding how much red meat I should eat was overwhelming	0.50

Note: internal construct composite reliabilities are reported in parentheses. All factor loadings are significant at $p< 0.001$. Fit-statistics: $\chi^2(120) = 157.53$, $p= 0.012$; RMSEA = 0.044; NNFI = 0.97; CFI = 0.98. Items not included owing to factor loadings <0.40: There is no need for me to find out more information about the benefits of red meat; Understanding the aspects of red meat production and consumption is quite a challenge; I was able to follow the arguments about the benefits and risks associated with red meat; It was easy to see why eating red meat has risks and benefits both for human health and the environment.

3.3 Deliberation and information recall

Information recall was assessed as a check of the validity of our behavioural measure of online deliberation. Based on the deliberation scores, the participants were divided in three tertiles, i.e. low, medium and high deliberators. High deliberators (M=4.32; SD=1.72) recalled significantly more risks and benefits compared to low (M=2.74; SD=1.85; $t(98) = -4.42$, $p < .001$) and medium deliberators (M=3.22; SD=1.84; $t(98) = -3.09$, $p < .01$).

3.4 Model validation

The hypothesised online deliberation model performed well. The χ^2 for the model was 202.18 with 125 degrees of freedom ($p<0.001$), and a ratio of 1.6 thus in accordance with the recommended threshold level. The RMSEA value was 0.064; the NNFI was 0.95 and the CFI was 0.94, indicating that the goodness-of-fit indices were satisfactory. *Perceived complexity* of the information was negatively moderately (-0.41) and directly associated with our measure of online deliberation (Figure 1). Thus, the lower the perceived complexity of the information in the stimulus material, the greater the online

deliberation. Direct relationships between personal relevance, information sufficiency about risks of red meat, information sufficiency about benefits of red meat and online deliberation had been included in the model but failed to reach statistical significance. The findings thus support only one of the four theorized antecedents of online deliberation.

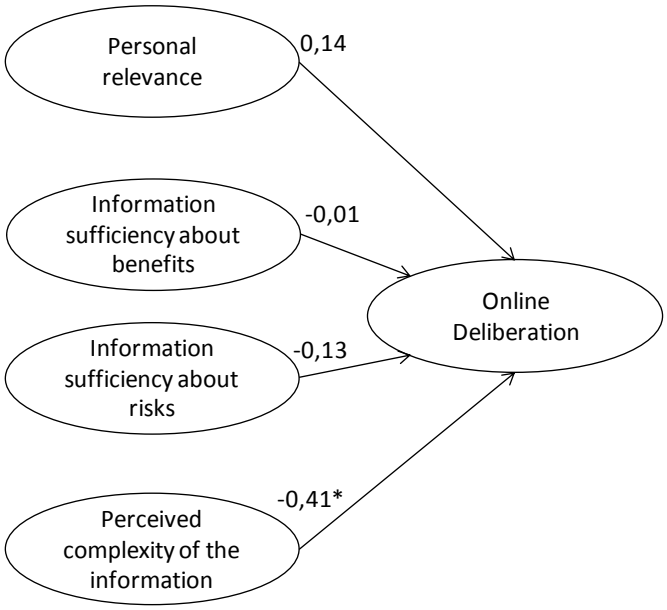

Figure 1. Path modelling results of antecedents of online deliberation (note: *p<0.01)

4 Discussion and conclusion

The present study offers insight in how consumers engage in online deliberation when provided with information about the risks and benefits of red meat. We conceptualized and operationalized deliberation as an activity resulting from asking questions, leaving comments, accessing glossary terms, and spending time on the study stimulus material. Using the VIZZATA^{TM} online deliberation concept and software, we identified a number of actions undertaken by individuals that allowed us to construct an individual measure of deliberation. The results indicate that deliberative activity can be assessed as an individual and behavioural measure that – at least, for the case of red meat – varies among individuals and associates with the level of education and having a responsibility as a parent.

Having constructed a coherent measure of online deliberative activity we corroborated it further using a measure of information recall which enabled us to observe a systematic relationship between behavioural indicators of attentiveness to and engagement with the stimulus material and the details that were subsequently reproduced. That is not to say that recall is a primary or necessary outcome of deliberation but as part of this first attempt to develop online methods that facilitate deliberation, information recall can serve as a useful construct against which to locate the deliberation measure.

The development of a measure of online deliberation allowed us to investigate possible antecedents of online deliberation such as personal relevance, perceived information sufficiency and complexity for the specific case of red meat. By using structural equation modelling, we were able to estimate the strength of direct relationships between the different constructs on one hand and deliberation on the other hand. Our first assumption was that personal relevance would have a positive influence on deliberation as in the case with information seeking (Chaiken, 1980), i.e. the more personally relevant

red meat was, the more the participants were expected to engage in commenting, questioning, and accessing glossary terms. The concept of personal relevance has also been linked previously with involvement in the context of fresh meat consumption (Verbeke & Vackier, 2004). Despite a positive correlation between personal relevance (or perceived importance of red meat in the diet) and deliberation, this construct had no significant impact in the SEM, suggesting that people may engage in deliberative activity irrespective of their level of personal involvement with the issue at hand.

Information sufficiency about the risks and benefits of red meat was also expected to have an influence on deliberation. While the RISP model of Griffin et al. (1999) suggests that the perceived gap between the actual and the desired level of knowledge influences information seeking, information sufficiency was not found to relate to online deliberation for the case of red meat. A possible explanation is that risks and benefits about red meat have been regularly and quite prominent in the news during recent years, which may have led to a 'good match' between the actual and desirable level of knowledge. Our findings suggest that if people feel knowledgeable about the risks and benefits of red meat, they may either refrain from further deliberation or they may still enjoy engaging with additional stimulus material by asking questions, leaving comments or clicking glossary terms, e.g. out of curiosity or to confirm their own knowledge.

Perceived information complexity was the only significant antecedent with a negative effect on deliberation. While one might have assumed that difficulties in understanding the information may have resulted in people leaving more questions and comments or accessing more the glossary terms, the opposite was found as the greatest deliberation was observed among people with low perceived information complexity. This might tie in with previous research on the effect of task complexity on motivation which has found that when people are able to complete a more complex task this can in turn lead to satisfaction of a feeling of competence (Sun, et al., 2012). By contrast, if perceived task complexity is negatively related to the probability of completing a task and thus resulting in unsuccessful fulfilment, this can lead to a sense of incompetence. It could be argued that the participants who perceived the information about red meat as too complex might have therefore preferred to avoid this information instead of feeling incompetent to deal with the information.

Measuring deliberation in the context of public consultation provides food policy makers and marketers with valuable insights, and enables them to produce communications and interventions that focus on prevalent knowledge gaps, thus better adopting food-related communication and marketing efforts to people's information needs. While the present study investigated deliberative activity and its antecedents for the specific case of red meat, it remains to be tested whether the insights obtained apply equally to other food product categories. The case of red meat may be specific because of the large amount of predominantly negative press that has emerged during the last decade. This may have shaped both consumers' interest in engaging with additional information about red meat, as well as the perceived personal relevance of red meat in their diet and information sufficiency about risks and benefits of red meat. Our study is a first step towards a better understanding of the potential and possible effects of consumer deliberation beyond simple information seeking in a food context. Whereas this cross-national study demonstrates that deliberative activity can be meaningfully assessed, e.g. using the VIZZATA^{TM} tool, further studies are recommended to investigate the impact of information presentation formats, the role of people's prior information base when exposed to information that is (in)consistent with prior knowledge, as well the wider implications of consumer deliberation, notably in terms of its impact on food-related attitude, preference and behaviour change.

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