Consumers' avoidance of information on red meat risks: information exposure effects on attitudes and perceived knowledge

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Acknowledgements

The authors would like to acknowledge all partners of the FoodRisC project - *Food Risk Communication - Perceptions and communication of food risks/benefits across Europe: development of effective communication strategies*, Sara Gorjão for aiding in the data collection process and João Carvalho and the Health for All (H4A, CIS-IUL) group members, for their helpful comments during the development of the study and the preparation of the manuscript.

Funding

This work was funded by the European Commission under the 7th Framework Programme - Grant Agreement n. 245124.

Disclosure statement

The online platform used for this study – Vizzata™ – was developed by White October, Ld., U.K. and may be used in the future for financial purposes. The participants' recruitment was done by a recruitment company following the European Commission – FP7 guidelines for sub-contracting. Apart from these, no other declarable relationships exist.

Consumers' avoidance of information on red meat risks: information exposure effects on attitudes and perceived knowledge

In accordance with cognitive dissonance theory, individuals generally avoid information that is not consistent with their cognitions, to avoid psychological discomfort associated with tensions arising from contradictory beliefs. Information avoidance may thus make risk communication less successful. To address this, we presented information on red meat risks to red meat consumers. To explore information exposure effects, attitudes toward red meat and perceived knowledge of red meat risks were measured before, immediately after, and two weeks after exposure. We expected information avoidance of red meat risks to be: positively related to (1) study discontentment; and (2) positive attitudes toward red meat; and negatively related to (3) information seeking on red meat risks; and (4) systematic and heuristic processing of information. In addition, following exposure to the risk information, we expected that (5) individuals who scored high in avoidance of red meat risks information to change their attitudes and perceived risk knowledge less than individuals who scored low in avoidance. Results were in line with the first three expectations. Support for the fourth was partial insofar as this was only confirmed regarding systematic processing. The final prediction was not confirmed; individuals who scored high in avoidance decreased the positivity of their attitudes and increased their perceived knowledge in a similar fashion to those who scored low in avoidance. These changes stood over the two-week follow-up period. Results are discussed in accordance with cognitive dissonance theory, with the possible use of suppression strategies, and with the corresponding implications for risk communication practice.

Keywords: information avoidance; cognitive dissonance; risk communication; red meat; risk perception

1. Introduction

The communication of food risk presents an ongoing challenge for public health experts, stakeholders and policy makers (Barnett et al. 2011). Ideally, individuals would be motivated to know or learn about risks to their health in order to enable them to minimize adverse effects, for example, by reducing consumption of foods with an associated health risk. Nonetheless, years of research in health psychology (e.g., Hankonen et al. 2013), as well as in risk analysis (e.g., Kuttschreuter 2006), suggest that this is often not the case. Different individuals have different levels of motivation to seek additional information (Kuttschreuter et al 2014), different degrees of engagement with and deliberation on information about risk (Rutsaert et al 2015), and while some use it for their benefit, some do not. Several psychological factors influence an individual's motivation to seek and attend to risk information. Avoidance of information is one such factor. It refers to not wanting to know information that will cause uncomfortable conflict in the individuals' minds (Case et al. 2005; Narayan, Case, and Edwards 2011). This "not wanting to know" is an initial barrier to effective risk communication, given that even if the communication is done in the most effective format and with the most effective content, this information will not even be attended to in the first place. Therefore, individuals self-exclude themselves from the communication process, right from the beginning. This is a practical problem in risk communication that needs to be addressed.

To do this, we aimed to draw on cognitive dissonance theory to explore individual differences in the tendency to avoid risk-related information and corresponding effects on the way individuals deal with risk information. In particular,

we explored the effects of presenting red meat risk information to a sample of red meat consumers that varied in their tendency to avoid red meat risk information. In recent years there has been considerable media coverage of research on the links between red meat consumption and early mortality, particularly of the results of the Pan and colleagues' study (2012) according to which red meat consumption is associated with an increased risk of cardiovascular diseases, and cancer. Pan and colleagues' study results were reported by the media in many countries, including the UK (BBC online), Belgium (the newspaper *De Standaard*), and Portugal (the weekly magazine *Visão*). Therefore, as a result of this increased social interest in the issue even if people sought to avoid information it is likely that they were still involuntarily exposed to it to some extent. This gives us an interesting opportunity to study the effects of information exposure on people that did not want to receive it in the first place. This can allow us to understand if risk information avoiders are "lost causes" for risk communicators or if, under certain circumstances, being exposed to risk information may have positive effects on them.

We explored the effects of presenting red meat risk information on two variables that we expected to change after the communication of risk. One was the individuals' attitude towards red meat, i.e., the evaluations of whether red meat is good or bad. There is evidence that risk information about food negatively influences attitudes (e.g. Verbeke et al 2007), which in turn influence intentions to purchase risk-related food (e.g. Lobb, Mazzocchi, and Traill 2007). Another was the individuals' knowledge regarding red meat risk, in particular the individuals' perceived knowledge regarding the risk of consuming red meat. Following a communication of red meat risk to

consumers, it is expected that individuals' attitude towards red meat should become more negative and the perceived knowledge to increase. However, when people tend to avoid risk information will this also prove to be the case? One might think that there is no use in presenting risk information to individuals who usually tend to avoid risk information. As such, we explored whether the communication of risk information to 'avoiders' may be considered a "lost cause" or whether there is indeed a benefit of devising a strategy to communicate information and expose 'avoiders' to it.

1.1 Information avoidance and cognitive dissonance theory

Information avoidance is a relatively understudied phenomenon in the risk communication literature but work in this area has been growing in recent years. Case et al. (2005) suggested that most theories and communication practice assume that individuals actively seek information on health risk. However, much research has showed that sometimes people avoid information. Information avoidance has been illustrated among people living with HIV or AIDS (Brashers, Neidig and Goldsmith 2004), with regard to cancer information and genetic screening for cancer (Case et al. 2005), and in the food risk context (Kuttschreuter 2006), among others. It is important to note that information avoidance is not the mere absence of seeking information. Several researchers have stressed that seeking and avoiding are related but conceptually distinct, it being necessary to understand each concept in its own right (e.g. Case et al 2005; Kahlor et al. 2006; Narayan, Case, and Edwards 2011). For instance, screening the news to avoid reading about the risks of red meat (information avoidance) is quite different from not engaging in an online search for more information on the risks of red meat (absence of information seeking). Researchers on information avoidance assume

that information may be avoided because it will cause cognitive dissonance (e.g., Case et al. 2005; Narayan, Case, and Edwards 2011). However, it remains unclear if, and how, information avoidance induces cognitive dissonance.

Cognitive dissonance theory (Festinger 1957; see Gawronski 2012, for a review) postulates that inconsistent cognitions (such as contradictory beliefs, attitude, or behaviors) elicit an aversive state of psychological arousal or psychological discomfort: the state of dissonance. One area of research spawned by cognitive dissonance theory focuses on the effects of selective exposure to information (e.g., Adams 1961; Hart et al. 2009; Lowin 1967; Meertens and Lions 2011; Rhine 1967; Taber and Lodge 2006). Insight into the concept of selective exposure to information allows better understanding of information avoidance. Accordingly, people are motivated to actively seek information that is consistent with their beliefs and to avoid information that is not, because they anticipate that information will induce inconsistency. Inconsistency between cognitions induces cognitive dissonance. Research results have not always been supportive of the predicted effects of selective exposure to information. However, a recent meta-analysis does confirm a moderate preference for information that is consistent with people's cognitions, in comparison to information that is not consistent (Hart et al. 2009). This preference has also been conceptualized as congeniality bias (e.g., Hart et al. 2009; Eagly and Chaiken 1993) or confirmation bias (e.g., Taber and Lodge 2006).

People are able to maintain and defend their attitude, beliefs, and behaviors by avoiding information that is likely to contradict it and by seeking information that is likely to be consistent with it. For example, supporters of gun control avoid information

against gun control and seek information that confirms gun control measures. On the contrary, opponents of gun control avoid information that favors gun control and seek information against gun control (Taber and Lodge 2006). Hence, cognitive dissonance enables predictions about which individuals will tend to avoid risk information.

By avoiding negative information, people can prevent being in a state of cognitive dissonance. However, what happens when individuals that avoid risk information are exposed to risk information? A practical question for risk communicators is whether presenting information on risk can still have an effect on the attitude and knowledge of the people who would otherwise avoid it. It is psychologically difficult to highly value or consume red meat and, at the same time, believe that red meat consumption may pose serious health risks. In this line, Verbeke and Vackier (2004) showed that the heaviest meat consumers reported relatively lower risk importance and risk probability than other consumers. Berndsen and van der Pligt (2004) also found that attitudinal ambivalence toward meat was related to reduced meat consumption and that ambivalent consumers had greater intentions to further reduce their meat consumption in the future.

1.2.2 Resolving cognitive dissonance

Individuals who avoid risk are expected to experience cognitive dissonance processes, following exposure to risk-related information. Dissonance produces a desire to reduce the underlying inconsistency and to maintain a state of consonance among one's beliefs (Festinger 1957). One might expect that individuals would revise their prior cognitions and change them in accordance to new information. Nevertheless, one of the central assumptions derived from cognitive dissonance research is that

individuals will not necessarily change their cognitions in the presence of contrary information (Festinger 1957). Some ways of achieving consistency do not imply change, as for example strategies that induce the distortion of the communication content or that discredit the information source (Adams 1961). What is crucial is that, in the end, the individual's system of cognitions remains consistent (Gawronski 2012).

Following on from the heuristic-systematic model (e.g., Chaiken, Liberman, and Eagly 1989) we might try to anticipate more in detail how avoided information will be dealt with. Accordingly, individuals process information in two qualitatively different fashions: systematic or heuristic. Systematic processing is "*a comprehensive, analytic orientation in which perceivers access and scrutinize all information input for its relevance and importance to their judgment task, and integrate all useful information in forming their judgment*" (Chaiken, Liberman, and Eagly 1989, 212). Heuristic processing relies on the use of heuristics, and requires less cognitive effort and less cognitive resources. In line with cognitive dissonance theory, Chaiken, Giner-Sorolla and Chen (1996) proposed that individuals have defense motivations when they desire to form judgments congruent with their interests, personal attributes or self-definitional beliefs. Information seeking has been related to defense-motivated processing (e.g., Scherer, Windschitl, and Smith 2013) and it might stimulate both heuristic and systematic processing. We suggest that information avoidance, on the contrary, is likely to diminish processing. Individuals who avoid information do not want to deal with information and they might simply not be willing to integrate the new information - either heuristically or systematically.

1.2 Hypothesis development

This study goal was to analyze the effects of presenting red meat risk information to individuals who naturally tend to avoid red meat risk information. We conducted a longitudinal study based on a pre/post-test design with a follow up two weeks later. Red meat consumers were presented with risk information pertaining to various red meat risks, in a sequence of seven internet pages (the content testers) that had to be browsed. Changes in the attitude towards red meat and perceived knowledge of red meat risk were explored. Measures were therefore taken at three time points: immediately before (T1) and after (T2) exposure to the information, and again two weeks after exposure (T3). These timings allowed us to analyze if changes occurred and if these were sustained over a longer time period.

We had several hypotheses to test if risk information avoidance could be explained based on cognitive dissonance theory.

Information avoidance would be positively related to the experience of dissonance. Information avoidance appears to protect against dissonance. Exposure to avoided information should lead to cognitive dissonance. Given that cognitive dissonance is a state of psychological discomfort, we expected avoidance of red meat risk information to relate to greater discontentment with the study.

Information avoidance would be positively related to attitude. Information avoidance appears to protect against dissonance by shielding attitudes from the "threat" that inconsistent information might represent. Information avoidance should happen to a greater extent when the individuals' attitudes are inconsistent with the information. Having an attitude that positively supports red meat is cognitively more inconsistent

with information on red meat risk. As such, avoidance of red meat risk information should relate to having a more positive attitude towards red meat.

Information avoidance would be negatively related to information seeking. Avoiding and seeking information are related but conceptually distinct concepts. As studies on selective exposure to information have shown, individuals are not likely to seek information that causes dissonance. Information avoidance should inhibit information seeking. Hence avoidance of red meat risk information should relate to less seeking for additional information on red meat risk, which could be accessed in the content testers.

Information avoidance would be negatively related both to systematic and heuristic information processing. Avoidance of information should override the cognitive processing of information, upon exposure to information that tends to be avoided. Building on the heuristic-systematic model, we envisaged that information avoidance should relate to a decrease in the willingness to integrate the avoided information. Therefore, we expected avoidance of red meat risk information to relate to less cognitive processing of information - both systematic and heuristic processing.

Information avoidance would relate to fewer changes in cognitions following exposure to avoided information. Less processing of the avoided information should be related to fewer changes in attitudes and perceived knowledge, for individuals who avoid red meat risk.

In sum, we posed the following hypotheses:

- Hypothesis 1: Avoidance of red meat risk information is related to greater discontent with the study;

- Hypothesis 2: Avoidance of red meat risk information is positively related to the attitude towards red meat;
- Hypothesis 3: Avoidance of red meat risk information is negatively related to seeking for additional information on red meat risk;
- Hypothesis 4: Avoidance of red meat risk information is negatively related to both systematic and heuristic information processing;
- Hypothesis 5: Following exposure to the risk information, individuals that avoid this information would show less change in their attitude towards red meat and their perceived risk knowledge than individuals who do not avoid red meat risk information.

2. Method

2.1 Participants

Two hundred and forty four consumers were recruited to take part in the study (80 from the United Kingdom; 80 from Belgium and 84 from Portugal). An international recruitment agency (Toluna) organized the recruitment of participants for the study in all countries. The recruitment involved quota sampling, aimed at achieving an equal proportion in terms of gender, country and those living with and without children. The following criteria for sampling were applied: a) all non-vegetarian, consuming red meat at least once a week; b) all with English/Dutch/Portuguese as their first language, respectively in the UK/Belgium/Portugal; c) minimum age of 18; d) 20 parents living with young children under 10 for more than 50% of the time; 10 females, 10 males; aged 18 to 35; e) 20 parents living with young children under 10 for more

than 50% of the time; 10 females, 10 males; all aged 35 to 50; f) 40 participants who don't have children (25 females, 25 males) spread over three age groups: 18 to 35; 35 to 50; 50 to 65; g) soft quotas for rural urban vs. rural divide and age when leaving full-time education; h) diversity in occupational backgrounds. In addition the following exclusion criteria were applied: a) no potential communication or reading difficulties (such as dyslexia); b) not having participated in an online survey in the last month. Of the 244 consumers recruited to complete the two-stage study, 174 agreed to participate, with 161 of them (65.98%) completing all three time points, and an additional 13 participants (5.33%) completing T1 and T2, thus achieving a valid sample of 174 respondents in total (71.31%). Regarding the socio-demographic characteristics, there were 50.6% women and 49.4% men. The most frequent age-group in the sample (21.8%) was between 30 and 35 years old; 54.6% of the sample reported that they did not have children; and 51.1% lived in a rural area, village or small town, and 48.9% in a large town or city. When asked about their educational level, the majority of the sample (53.4%) said they completed college education. With regard to the financial situation during the last twelve months, on a scale from 1 to 7 (where 1 meant "I am very well off" and 7 "I have difficulties in paying the bills"), the mean value in the sample was close to the mid-point ($M = 4.14$; $SD = 1.51$).

The remaining 70 participants (33%) dropped out of the study before completing the first stage. With the goal of assessing the possible reasons for this drop out, we checked for differences between participants who dropped and those who did not. No differences were found between them with regard to country of origin, gender, age group, having children, living place, or financial situation. Nevertheless, a marginally

significant difference emerged regarding the education level, as more individuals with a secondary education dropped out of the study than individuals with lower or higher levels of education, χ^2 (2, N = 241) = 5.90, p = .052, Cramer's V =.156. We further analysed if the education level was related to the avoidance of information on red meat risks but no statistical relation emerged.

2.2 Procedure and instruments

This study was conducted using the online deliberation tool VIZZATA™ (1). VIZZATA™ allows presenting the target audience with pieces of information – termed content testers. These can consist of text, images, or videos. The tool collects data about information seeking pertaining to the content testers. For example, text based content testers include 'glossary terms' – highlighted words in the online text which can be clicked on to reveal further information.

The procedure was as follows. At T1, participants were invited to the website of the study and completed an initial series of measures: red meat risk information avoidance, attitude towards red meat, and perceived knowledge about red meat risk. Immediately after T1, in a series of seven content testers participants were presented with information pertaining to red meat risk and benefits. Thus the study interest in risk was not obvious to the participants. Information was included about health and nutritional risks and benefits, as well as about non-health risks and benefits, (e.g. environmental, cultural, and socioeconomic) (Rutsaert et al 2015).

Within content testers, glossary terms were highlighted and could be clicked on by the participants in order to access additional information on risk or benefits. The number of clicks each participant made was registered. For instance, the following

information appeared in one content tester: "*While red meat is generally safe and is widely consumed by the public, its consumption has been linked to certain risks of chronic disease. Chief among these are cardiovascular diseases and colorectal cancer (also known as bowel cancer)*". The term "*cardiovascular diseases*" was highlighted and when clicked on the following additional information appeared: "*Cardiovascular disease (CVD) is a broad class of diseases that involve the heart or blood vessels (arteries and veins). The three main types of CVD are coronary heart disease, stroke, and peripheral arterial disease. Blood flow to the heart, brain or body can be reduced mainly because of a blood clot or a build-up of fatty deposits inside an artery, leading to hardening and narrowing of the artery*". In sum, all participants received the same information and were able, if they wished, to access additional information.

After exposure to information, we collected measures of attitude towards red meat, perceived knowledge of red meat risk, systematic processing, and heuristic processing (thus at T2).

T3 occurred approximately two weeks after T2. At this point participants were asked to respond to a final set of questions measuring again their attitude towards red meat, perceived knowledge, as well as indicating their overall satisfaction with the study. The various measures used across the study are described in detail, below.

2.2.1 Information avoidance measure

The information avoidance measure was adapted from Shepherd and Kay (2012). Participants were asked to what extent they agreed with the following four affirmations on a 7- point scale ranging from 1 (strongly disagree) to 7 (strongly agree): (1) *When it comes to the risk of eating red meat, I would be more comfortable to just*

turn a blind eye to the issue; (2) *When it comes to the consequences of eating red meat, I would rather not know just how bad it is*; (3) *I would prefer to know the whole story when it comes to the risk of eating red meat, regardless of how much the truth hurts* (inverted item); (4) *While there may be problems with consuming red meat, I would rather not know just how serious those problems are*. Responses were averaged into a composite measure with an adequate level of internal consistency reliability (α_{T1} = .82).

2.2.2 Study discontentment measure

Most measures of cognitive dissonance have been developed in the area of consumer research and focus on inconsistency between cognitions and consumption behavior (e.g., Sweeney, Hausknecht and Soutar 2000). By contrast, our study focuses on inconsistency between various cognitions, which demanded the development of new measures. In line with cognitive dissonance theory, inconsistency between cognitions is expected to induce the state of psychological discomfort. Therefore, we measured the individuals' overall subjective experience of the study as an indicator of the cognitive dissonance processes occurrence. At T3, four affirmations on a 7- point scale ranging from 1 (strongly disagree) to 7 (strongly agree) assessed the participants' feelings towards the study: (1) *I felt engaged during this study*; (2) *I valued having the opportunity to ask questions and make comments in relation to red meat*; (3) *I very much enjoyed reading about the risk and benefits of red meat;* (4) *I found the information presented on the benefits and risk of red meat very stimulating*. Responses were then reversed to provide a study discontent scale that would reflect a subjective negative experience of the study. These were averaged into a composite measure which evidenced an adequate level of internal consistency reliability (α_{T3} = .91).

2.2.3 Attitude and perceived risk knowledge measure

Attitude towards red meat was measured through a semantic differential-type measure (Osgood, Tannenbaum, and Suci 1957). Participants were presented four pairs of opposite adjectives (*Bad–Good*, *Unsatisfied–Satisfied*, *Unpleasant–Pleasant*, and *Negative–Positive*) that ranged from 1 (the negative pole) to 7 (the positive pole) and asked to circle the numbers best describing red meat. Responses were averaged into a composite measure which evidenced adequate levels of internal reliability consistency in each of the three time periods it was collected (α_{T1} = .86; α_{T2} = .94; α_{T3} = .93).

The perceived knowledge measure was adapted from Shepherd and Kay (2012). Participants were asked to what extent they agreed with the following four affirmations on a 7- point scale ranging from 1 (strongly disagree) to 7 (strongly agree): (1) *I know many of the negative aspects of eating red meat*; (2) *I am confident I know enough about the risk of eating red meat*; (3) *I am not satisfied with my knowledge about the risk of red meat for human health* (inverted item); (4) *Overall, the risk of red meat are something that I just "don't get*" (inverted item). Responses were averaged into a composite measure which evidenced adequate levels of internal consistency reliability in the three periods it was collected (α_{T1} = .77; α_{T2} = .66; α_{T3} = .70).

2.2.5 Information seeking measure

The number of participants' clicks on red meat risk-related glossary terms was registered. As the average number of clicks per participant was low (M = 0.98, SD = 1.74), a dichotomous variable based on this was created: no clicks (62.4%), clicks (37.6%).

2.2.6 Systematic and heuristic processing of information measures

The systematic and heuristic processing measures were based on the self-report measures validated by Smerecnik et al. (2012). Systematic processing assessed the participants' in-depth engagement with the information they read. Participants were asked to what extent they agreed with the following five affirmations on a 7- point scale ranging from 1 (strongly disagree) to 7 (strongly agree): (1) *I thought about what actions I myself might take based on what I read*; (2) *I found myself making connections between the information and what I have read or heard about elsewhere*; (3) *I thought about how the information on the benefits and risk of red meat relates to other things I know*; (4) *I tried to think about the importance of the information for my daily life*; (5) *I tried to relate the details of what I read to my health*. Responses were averaged into a composite measure which evidenced an adequate level of internal consistency reliability ($\alpha_{T2} = .81$).

Heuristic processing assessed the participants' use of heuristics to process the new information received. Participants were asked to what extent they agreed with the following three affirmations on a 7- point scale ranging from 1 (strongly disagree) to 7 (strongly agree): (1) *I spent little time thinking about the information presented*; (2) *The pages I read did not contain useful information on which to base my thinking about the risks and benefits of red meat*; (3) *While reading about the positive and negative aspects of red meat I did not think about the details included*. Responses were averaged into a composite measure which evidenced an adequate level of internal consistency reliability ($\alpha_{T2} = .71$).

3. Results

Mean values and correlations between red meat information avoidance, study discontentment, initial attitude towards red meat, information seeking on red meat risk and information processing, are presented in Table 1. On average, participants had low risk information avoidance, were not discontented with the study, had a positive attitude towards red meat, sought little additional information on risk and used more systematic processing to integrate the information received than heuristic processing.

Hypotheses 1 to 4 were almost entirely corroborated (see Table 1). We expected to find a positive relation between avoidance of red meat risk information and study discontentment (hypothesis 1). Data analysis sustained this hypothesis. We found a moderate positive relationship between information avoidance and study discontentment.

Second, we expected to find a positive relationship between avoidance of red meat risk information and attitude towards red meat (hypothesis 2). Data analysis also supported this hypothesis. We found a moderate positive relationship between information avoidance and attitude.

Avoidance of red meat risk information was further expected to be negatively related with seeking for additional information on red meat risk (hypothesis 3). Data analysis supported this hypothesis. We found a moderate negative relation between information avoidance and clicking on additional information on red meat risk.

Hypothesis 4 concerned the processing of avoided information. We expected to find a negative relationship between avoidance of red meat risk information and processing of information. Data analysis sustained the hypothesis for systematic

processing but not for heuristic processing. We found a moderate negative relationship between information avoidance and systematic processing of the information. However, no relation was found with heuristic processing.

The results presented in Table 1 also provides support for the claim that information avoidance and information seeking are related but might be conceptually distinct (Case et al 2005; Kahlor et al. 2006; Narayan, Case, and Edwards 2011). The behavioral indicator of information seeking behavior was not related to attitude towards red meat and had different relationships with information processing, being positively related to systematic processing and negatively to heuristic processing.

Our last hypothesis concerned the changes in attitude and perceived knowledge. Mixed-design ANOVAs with time (T1, T2, T3) as a within-subjects factor and risk avoidance (low, high) as between-subjects factor, were conducted to explore the effects that red meat risk information would have on attitudes and perceived knowledge. The exposure to the information occurred between T1 and T2, with no manipulation performed between T2 and T3. As such, we did not expect changes in attitude and perceived knowledge from T2 to T3, only between before (T1) and after the exposure (T2/T3). To assess this we used the Helmert contrast, comparing T1 to the average of T2 and T3. Low and high avoiders were distinguished based on their scores on the risk avoidance measure. A sub-sample of low and high avoiders of red meat risk was extracted from the total sample in order to clearly understand the effects of information avoidance. Individuals who scored below the 25 percentile on the red meat risk information avoidance measures ($P_{25} = 2.00$, $N = 44$) were considered low avoiders of risk information. Individuals who scored above the 75 percentile on the red meat risk

information avoidance measures (P_{75} =4.00, N = 44) were considered high avoiders of risk information. We expected that, following exposure to the risk message, individuals high in avoidance of red meat risk information would change less their attitude towards red meat and their perceived risk knowledge than individuals low in avoidance of red meat risk information (hypothesis 5). However, results did not support our expectations, as no interaction effects between time and avoidance emerged. High avoiders and low avoiders similarly decreased the positivity of their attitude towards red meat and increased their perceived knowledge of red meat risk following exposure (see Table 2).

We first conducted the ANOVA including attitude as the dependent measure. We found main effects of time and risk avoidance, but their interaction was not significant (see Table 2). Results evidenced a decrease in attitude positivity from T1 onwards, $F(1,81) = 8.94$, $p = .004$. However, we also checked for differences between T2 and T3, and, consistent with expectations, found none, $F < 1$. Results also evidenced that high avoiders had a more positive attitude towards red meat than low avoiders. This is in line with our hypothesis that the avoidance of risk information is functional in protecting a positive attitude. The interaction between time and risk avoidance was not significant, $F < 1$. Thus, both high avoiders and low avoiders expressed a less positive attitude towards red meat after exposure to the risk message.

We repeated the ANOVA considering perceived knowledge as the dependent measure. We found a main effect of time (see Table 2). Neither the risk avoidance nor the interaction effect were significant, $F < 1$. Results evidenced an increase in perceived risk knowledge from T1 onwards, $F(1,80) = 18.72$, $p < .001$. No differences emerged between T2 and T3, $F < 1$. This shows that at least subjectively, participants have

learned something from the information received, and retained it in the two week follow-up period.

4. Discussion

This study aimed to provide a better understanding of how avoidance of information on red meat risk might influence the effectiveness of red meat risk communication. Specifically, it aimed to assess the effects of exposing people to information that they would otherwise avoid. Building on cognitive dissonance theory, we illustrated that information avoidance appears to protect people against dissonance by shielding attitudes towards red meat, from information on risk that may be inconsistent with consumer's positive views of it. Indeed, the results indicate that additional information seeking on red meat risk may have been inhibited by an information avoidance tendency. Faced with exposure to the avoided information, the participant's information avoidance related to a decrease in the systematic processing of information. Despite this latter result, when we differentiated between individuals that were low and high in information avoidance we observed that both groups decreased their attitude towards red meat and increased their perceived knowledge of red meat risks, a change that was not predicted for avoiders. In addition, such changes were maintained in the two week follow-up period. Although this is a relatively short time span, nonetheless changes were maintained during this time and were thus not simply an immediate and transitory reaction to the information exposure.

4.1 Risk communication literature

Most expectations derived from cognitive dissonance theory were confirmed. Cognitive dissonance theory appears to be an adequate and fruitful approach for understanding risk information avoidance and considering tailoring risk communication to the individual's cognitions and affect. Indeed, much attention has been given in the risk communication and risk perception literature with regard to information seeking but not so much to information avoidance. The understanding of the effects and processes that occur with regard to avoidance should therefore be given higher attention in the literature, as they may function as a barrier to effective risk communication.

In this regard, cognitive dissonance is a core motivation of individuals (Gawronski 2012), and as such, its understanding might provide novel insights into a wide range of phenomena in the risk perception and communication arena, which have not been frequently studied from a cognitive dissonance perspective. Indeed, although being now a classic theory, cognitive dissonance has recently regained researcher's interest for exploring its implications for risk communication (e.g., Meertens and Lions 2011). We hope that our study may be a starting point in the understanding of information avoidance from a cognitive dissonance perspective. Accordingly, future studies could benefit from exploring and directly manipulating the processes of cognitive dissonance, in risk communication and risk perception research.

4.1.1 *Information avoidance and systematic processing*

Information avoidance was negatively related to systematic processing of information. Nonetheless, individuals that were high in avoidance of red meat risk changed their attitude and perceived knowledge following exposure, similarly to

individuals low in avoidance. This result was unexpected and is quite challenging. It illustrates that lower systematic processing of risk information related to changes that are congruent with a better understanding of red meat risk. In addition, such changes lasted in time. Research on the heuristic-systematic processing of information suggests that new information is likely to more lasting effects when it is processed systematically (Chaiken, Liberman, and Eagly 1989). This was not the case in the present study.

We suggest that suppression literature (see Wegner, 1994) might shed some light on this result. The suppression of unwanted thoughts is a strategy that consists of actively trying to avoid thinking about a risk that is communicated. For example, recent evidence shows that smokers use this strategy to suppress thoughts about smoking-related risk (Kneer, Glock, and Rieger 2012). However, there may be reasons to believe that this strategy may not be very successful. Many studies have shown that attempting to suppress thoughts may actually result in a higher unconscious activation of such thoughts when suppression is stopped, an effect known as rebound (Macrae, Bodenhausen, and Milne 1994). In accordance, Salkovskis and Reynolds (1994) found that smokers trying to suppress thoughts about smoking risk exhibited higher cravings than smokers who did not try to suppress such thoughts. Moreover, Wegner (1994) theorized that this effect is caused by an automatic monitoring process that continues to search for instances of the thought that needs be suppressed, resulting in an increase of its accessibility. In this case, high avoiders of red meat risk information would deliberately aim to suppress the thoughts about the red meat risk information they were provided. The use of this strategy may ironically, automatically increase the accessibility of red meat risk information and, therefore, relate to a less favorable

attitude towards red meat and to an increase in the perceived knowledge of red meat risk.

Information avoidance was not related to heuristic processing of information. It might be the case that information avoidance specifically leads to a deliberate decrease of systematic processing of information as a way to decrease unintended thoughts and it does not trigger more or less heuristic processing. This is a possibility worth examining in future studies.

4.2 Risk communication practice

Risk communications may change the evaluation of the risk object. Our main goal in this research was a practical concern for risk communicators, that such outcomes could not be observed when the individuals avoid knowing about risk, thus self-selecting them out from the communication process right at the outset. These individuals could be seen as "lost causes" and that the resources used to communicate with them would be wasted on ineffective communication. Nonetheless, individuals who scored high in avoidance of red meat risk information did decrease the positivity of their attitude towards red meat and increased their perceived knowledge, and these changes were stable within the course of our two-week long study. It was clear that avoidance motivations refrained individuals from seeking risk information. Nevertheless, when individuals were exposed to the information they tend to avoid, there were similar changes to individuals who scored low in avoidance of red meat risk information, i.e. information exposure had the same effects for the two groups. Hence, the challenge for practitioners in this regard may not be so much providing different information content to avoiders and non-avoiders but rather engage consumers in the

communication process before exposure, based on different engagement strategies tailored for avoiders and non-avoiders. This should be done in a way that prevents avoiders of self-selecting themselves out from it, while maintaining or increasing engagement for non-avoiders. In addition, it is also necessary to design strategies to keep individuals with lower levels of education engaged in the communication processes, as we found that these individuals dropped out more than individuals with higher levels of education.

Another important aspect pertains to red meat risk management. Food risk managers may consider that from the public perspective there is information overload. This information has somewhat been perceived as confusing, complex (van Kleef et al. 2006) and even contradictory (Regan et al 2014). The latter study confirmed that individuals exposed to contradictory risk-benefit messages about red meat were more likely to infer perceptions of conflicting information. The negative discourse around red meat has been substantial but often also inconsistent. During the last 15 years, the discourse around red meat was characterized by a focus on hormone residues and BSE at the end of the eighties, and evolving into messages related to the possible impact of red meat intake on the incidence of cardiovascular disease and different types of cancer more recently (McAfee et al. 2010; Micha et al. 2010; Pérez-Cueto and Verbeke 2012). Verbeke et al. (2010, 287) reported that in relation to beef safety information, consumers were generally aware of the issues, but "*some felt there is not enough information about beef safety, while others felt they are faced with an overload of (sometimes conflicting) information*". Therefore, communicating additional red meat risk, instead of managing risk, might have no effect or even end up causing more

confusion for consumers. This was clearly not the case for this study, which provided evidence of lasting effects from red meat risk communication. In particular, the increase of individual's perceived knowledge of red meat risk illustrates that individuals maintained the perception that they had gained knowledge from the study.

Moreover, overall the study participants did not seek much for additional information on red meat risk. Individuals, either avoiders or non-avoiders of risk information, might not be motivated enough to actively seek for risk-related information. Nevertheless, in this study risk information was easily available and presented in an adequate content and format, and participants did benefit from the information that was presented. Therefore, researchers and practitioners need to develop effective strategies to increase consumer engagement. Afterwards, changes in the individual's cognitions appear to be likely, particularly when individuals are exposed to and stimulated to attend to risk information (see Hart et al. 2009).

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Table 1
Measures of central tendency and correlations

Measure	*M (SD)*	1	2	3	4	5	6
1. Information avoidance	3.04 (1.13)	1.00					
2. Study discontentment	2.32 (0.97)	.34***	1 .00				
3. Attitude (T1)	5.20 (1.25)	.24**	.02	1.00			
4. Information seeking	0.32 (0.46)	-.20**	-.21**	.08	1.00		
5. Systematic processing	5.02 (0.86)	-.27***	-.65***	-.08	.14	1.00	
6. Heuristic processing	3.26 (1.16)	.13	.28***	-.08	-.32***	-.40***	1.00

Note. All measures but information seeking ranged from 1 to 7; higher numbers indicate more agreement towards the measures' content. Information seeking varied between 0 (no clicks) and 1(clicks).

* $p < .050$, ** $p < .010$, *** $p < .001$.

Table 2

Measures of central tendency and ANOVAs

	M (SD)	
Variable	Attitude	Perceived knowledge
Time 1		
Low avoidance	4.85 (1.38)	4.32 (1.06)
High avoidance	5.51 (1.19)	4.10 (0.67)
Time 2		
Low avoidance	4.62 (1.46)	4.67 (0.93)
High avoidance	5.01 (1.08)	4.75 (0.88)
Time 3		
Low avoidance	4.58 (1.06)	4.68 (0.99)
High avoidance	5.06 (1.11)	4.58 (0.81)

	F	$\eta_p 2$		
Source	Attitude		Perceived knowledge	
Risk avoidance	5.10*	.059	0.26	.003
Time	5.29**	.061	11.98***	.130

Note. Measures ranged from 1 to 7; higher numbers indicate more agreement towards the measures' content.

* $p < .050$, ** $p < .010$, *** $p < .001$.