October | 14

The influence of fear on the buying behaviour of consumers in case of an animal disease outbreak

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Contents

Introduction

Several newspapers and sites have published articles on a decline of chicken meat consumption in the Netherlands (Digibron, 2003; Distrifood, 2007; Gazet van Antwerpen, 2003). These declines were seen during outbreaks of avian influenza. Consumers stated to have lost trust in the chicken meat industry (Distrifood, 2007). During the outbreak of Bovine Spongiform Encephalopathy (BSE), otherwise known as the mad cow disease, a different trend was observed. Consumers started to spend more money on expensive meat products and the sales of organic and 'green' meat increased (NRC Handelsblad, 2001; Volkskrant, 2000). In both cases the meat sold in the supermarket was under strict control and infected cases were removed before entering the food-chain (Setbon, Raude, Fischler, & Flahault, 2005). It seems that during an animal disease outbreak, consumers start to get more aware of the risks of eating meat and they fear for their health. An event (animal disease outbreak) thus triggers risk perception, which can consequently lead to fear and a change in behavioural intention.

When insight is gained into the process between an event and the change in behavioural intention, marketers and the government could create campaigns that may lead to a smaller impact of animal diseases on the economy. The 2003 outbreak of avian influenza in the Netherlands cost around 80 million euros (Trouw, 2003) and the zoonotic outbreak of Mexican flu (influenza H1N1) resulted in a loss of 340 million euros (NOS, 2011). According to Mecking (2009) only the fear for contamination could have a large impact on the economy. In China, during the large SARS-epidemic, the incomes for tourist attractions and public spaces dropped with 80 per cent (Mecking, 2009). So a reduction in fear of contamination (when the true risk is indeed low), could lead to a reduction of economic losses.

The aim of this empirical research is to gain more insight into the relation between an event, perception of risk, fear and a change in behavioural intention. This process may be moderated by a more sensationalistic view of the media and possibly by the presence of fear preceding the perception of risk. This type of fear can be described as free-floating anxiety, since it has nothing to do with the source of the risk perception (Öhman, 2008). Other moderating factors, like individual traits, will be briefly discussed, but they will not be the main focus of this research.
The theoretical contribution of this report is to provide an elaborated view on the relation between the outbreak of an animal disease and the ensuing decrease in the consumption of meat. Not a lot of research has focussed on the consequences of animal diseases and especially not in relation to fear. Literature often combines fear and perception of risk under one heading. In this report, however, it was deliberately decided to keep them distinct and look at both their moderating as well as their correlated effects to gain more insight in the process.
The emotion fear is still very underexposed in literature. This research may contribute to the existing knowledge of fear as it gains more insight into the relation with risk perception and behavioural intention.

In accordance with preceding information, this leads to the following research question:

"What is the influence of fear with regard to behavioural intention towards meat consumption in case of an animal disease epidemic?"

In order to answer the research question the following sub questions are derived:

1. What is the relation between risk perception and fear in case of an animal disease outbreak?
2. Why does an outbreak of animal disease lead to perception of risk?
3. How do fear and risk perception lead to a reduction in meat consumption in case of an animal disease outbreak?

4. What is the influence of a state of anxiety on the perception of risk in case of an animal disease outbreak?
5. What is the influence of media amplification/personal relevance on the perception of risk in case of an animal disease outbreak?

Figure 1 shows the conceptual framework that follows from the main and sub questions and consecutively the hypotheses. The framework shows the relation between an event and behavioural intention, with risk perception and fear as mediators. The media amplification/personal relevance and an anxious state are possible moderators for risk perception. Although Zajonc (1980) states that cognition does not necessarily precede affect, literature with regard to risk perception and fear implies that risk perception precedes fear and not the other way around (Rountree & Land, 1996; Warr, 1987). The current study will follow the approach as defined by Rountree and Land (1996) and Warr (1987).

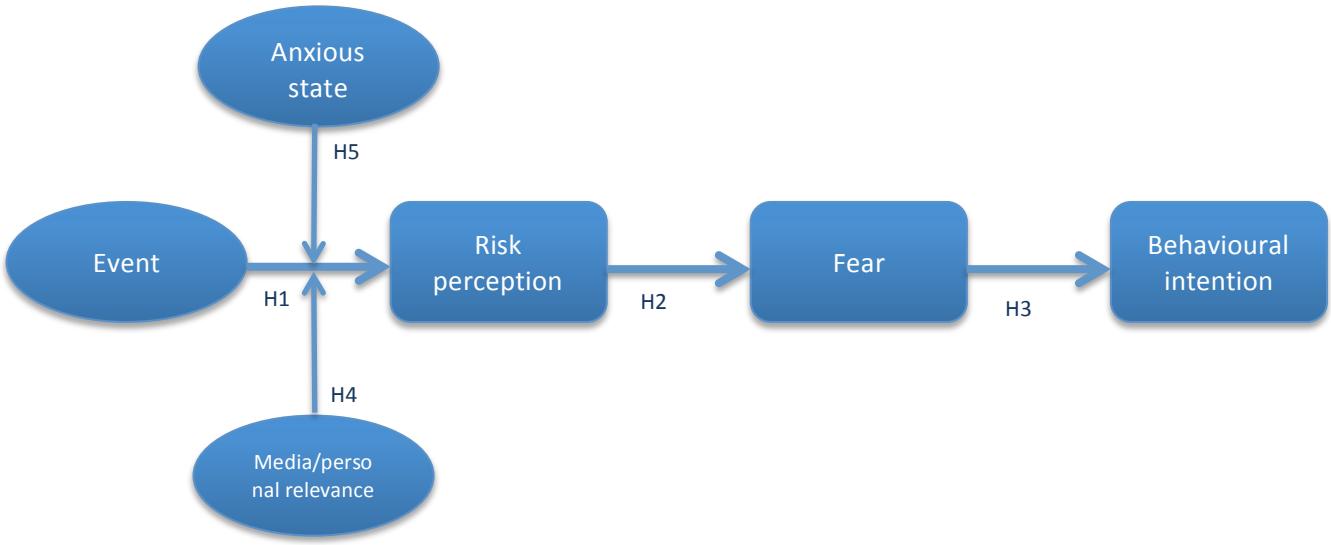

Figure 1 - Conceptual framework for the relation between an event and a change in behavioural intention

This report will start with the theoretical background for the conceptual framework. Chapter one will contain a theory on risk perception and the emotion fear. The relation between these two concepts will also be enlightened. Chapter two contains the concept of behavioural intention and it will elicit the factors that can alter intention. Chapter three will focus on different moderators that may influence the process between and event and behavioural intention. Chapter four will show the materials en methods for the research, followed by the results in chapter five. The report will end with the discussion and conclusion and the reference list. The last pages of this report contain the appendices.

1. Perception of risk and fear

In order to comprehend risk perception and the emotion of fear, it is important to create a clear definition of both concepts and their distinction. The literature contains several approaches to emotions and risk. The definitions given in this chapter are not meant to be exclusive, but are considered most relevant in the context of this paper.

1.1 Risk perception

In case of an animal disease outbreak, consumers create a perception of risk which changes their attitudes accordingly (Lobb, Mazzocchi, & Traill, 2007). Risks can be described as potential threats to the health or welfare of an individual (Wildavsky & Dake, 1990). Risk perceptions are intuitive judgements of potential risks (Slovic, 1987). Risk perception can be distinguished in an associative/experiential system and an analytical/consequentialist system. The associative system comprises a quick, automatic response, based on former experiences and intuition, while the analytical system is based on rational thinking and weighing of the different outcomes (Loewenstein, Weber, Hsee, & Welch, 2001; Slovic, Finucane, Peters, & MacGregor, 2002). Research has long taken a more analytical perspective of risk, but Slovic et al. (2002) eventually criticized this perspective and emphasized the role of affect. The extent to which an individual relies on affect is defined as the "affect heuristic" (Slovic, Finucane, Peters, & MacGregor, 2004).

The associative and analytical systems work together in decision-making processes and risk perception. When in conflict, the associative system will most often prevail (Damasio, 2008; Loewenstein et al., 2001).

Although studies have shown that in nature often risk and benefit are positively correlated, in the mind of a consumer they are perceived to be negatively correlated (Finucane, Alhakami, Slovic, & Johnson, 2000). According to the empirical study of Finucane et al. (2000), time pressure even increases the negative correlation; a higher risk results in a lower perceived benefit. The perception of risk and benefit also depends on whether a consumer has a positive or a negative attitude towards the activity. When positive, a higher benefit is perceived and when negative, a higher risk (Slovic & Peters, 2006). When a consumer perceives a certain risk, they are inclined to look for confirmation of their perception and quickly discard evidence against their beliefs (Slovic, 1987). These findings can be extrapolated to the buying of meat after an animal disease outbreak has taken place. It depends on the benefit associated with the buying of meat how high a risk will be perceived.

It seems that perception of risk depends on many factors. Remarkably, risk perception does not always comply with technical risk assessment. One of Slovics' earlier works includes a principal component analysis, which shows the analytical position of several risks in consumers' minds (Slovic, 1987). The axes are labelled as dread and (un)known risk. This empirical study showed that consumers for instance perceive the risk associated with planes higher than the risk associated with cars, which is in contrast with technical risk perception. Media focus may be a possible explanation for this phenomenon. This will be further elaborated upon in chapter 3.1.

Animal diseases tend to a feeling of high dread and high unknown, since the process in itself is unobservable (Leppin & Aro, 2009).

The concept of time plays a significant role in the perception of risk. The experiential system guides humans to make an instant decision that will affect the present. It therefore underestimates the risks that are posed further into the future (Slovic et al., 2002). In other words: A risk in the near future will be perceived higher, compared to a risk in a more distant future.

Pennings, Wansink, and Meulenberg (2002) used a different definition of risk perception and they introduced the concept of risk attitude. In their opinion, risk perception comprises the consumer's idea of the probability to become the subject at risk, while risk attitude focuses at the risk's content and consequently a consumer's judgment of the risk. Pennings et al. (2002) state that there was a larger decrease in meat consumption in Germany, compared to the Netherlands, during the BSE-

crisis. According to them, this was due to a higher focus on risk perception in the Netherlands and a stronger influence of risk attitude in Germany.

All literature combined, it is shown that the event of an animal disease would elicit a high perception of risk, whereas a neutral event would not. This leads to the following hypothesis:

H1. The event of an animal disease elicits a higher perception of risk compared to a neutral event.

1.2 The emotion fear

Emotions are an element of a group of affective mind states. Affect includes all positive and negative experiential concepts like moods, emotions and attitudes (Zeelenberg, Nelissen, Breugelmans, & Pieters, 2008). All emotions are affective, either positive or negative, but not vice versa. According to Zeelenberg et al. (2008) emotions exist to help us make the right decisions and evaluate them. Each emotion has its own purpose and goals. They are acute and either about something or someone.
Visceral factors are used to refer to certain negative states, like negative emotions or negative states of feeling (Loewenstein, 2000). These factors can have a strong influence on behavioural choices (Slovic et al., 2004). Fear is an example of a visceral emotion and can also be experienced anticipatory (Loewenstein et al., 2001). Fear exists as a self-protection mechanism, it often results in withdrawal (flight) or escape and is associated with "a bad outcome" (Loewenstein & Lerner, 2003; Plutchik, 1984). It is meant to remove oneself from a potential dangerous situation, in other words, reduce and avoid risks (Weber, 2006; Zeelenberg et al., 2008). Fear has a high importance in acute threat situations, like for instance outbreaks of animal disease (Leppin & Aro, 2009).
According to Taylor (1998), fear results from a specific order of causative factors, a range from exact to wide-ranging. The exact factors refer to a certain fear inducing stimulus and the wide-ranging factors include more personal fear proneness-factors (Taylor, 1998).
Fear is an evolutionary emotion and has resulted in an innate fear of certain stimuli, like predators and poisonous food products. It has however not prepared humans for 'modern' dangerous stimuli, like weapons or car-accidents (Loewenstein et al., 2001; Öhman, 2008). Though these dangers are recognized, Loewenstein et al. (2001) states that these modern stimuli will always elicit less fear compared to evolutionary dangers.
Fear can be divided into several subgroups (Taylor, 1998):

- Social fear
- Fear of physiological harm
- Fear of (harmless) animals
- Agoraphobic fears (anxiety disorders)

Fear of meat can be categorized under fear of physiological harm, since contaminated meat can cause disease.

Fear versus anger and disgust

Fear and anger are both strong visceral emotions, and although they are both negative emotions, they elicit different responses (Slovic & Peters, 2006). Fear can be associated with pessimistic choices, which are aimed at the aversion of risk. Anger, on the other hand, is more aimed at the seeking of risks and optimism (Lerner & Keltner, 2001). Therefore fear is moving away from a threat, while anger stimulates to move towards a threat (Zeelenberg et al., 2008). According to Lerner and Keltner (2001), anger is more closely associated with the emotion of happiness, compared to the emotion of fear.
When meat consumption is decreasing, this could possibly be due to an influence of disgust. Rozin and Fallon (1987) look at disgust as an emotion related to food consumption and associate it with revulsion. Fear involved with disgust is more related to the psyche (mind), in contrast with danger, which is related to bodily harm (Rozin & Fallon, 1987).

1.3. Relation between fear and risk

Fear and risk are often taken together as one concept. The previous definitions have shown conversely, that risk and fear are two quite different notions, which is supported by Rountree and Land (1996) and Zajonc (1980). However, fear and risk are related to each other.
According to Weber (2006) fear functions as a motivation to decrease or remove a feeling of risk and take action accordingly. This relationship between fear and risk is however not linear. A higher level of fear after the first risk perception does not necessarily correlate with an increase in risk. This can for instance be due to the temporal perception of increased fear when a risk draws near. Thus fear and risk have different determinants (Loewenstein, 2000).

According to Warr (1987) and Rountree and Land (1996) perceived risk is an antecedent to the experience of the emotion of fear. So a high-perceived risk would elicit more fear compared to a low perceived risk, when risk sensitivity is also high. Warr (1987) states that humans interpret stimuli in their surroundings and use these to create a perception of risk, which can consequently elicit a feeling of fear when a threshold point is met, and therefore results in withdrawal or flight.
Combining this knowledge with the aforementioned literature, the following hypothesis of the relation between fear and risk is proposed:

H2. A high perception of risk subsequently results in a higher sense of fear, compared to a low perception of risk.

Some literature states that fear may also precede risk perception, which would make the relation correlated in stead of causal (Slovic & Peters, 2006; Weber, 2006). Slovic and Peters (2006) argue that the affect heuristic in general can help predict as well as explain different properties of risk perception. For this study it was however chosen to only include a relation from risk perception to fear. It is assumed that the fear preceding risk perception has not arisen from the specific event, but was already present from another cause. It is therefore referred to as a state of free-floating anxiety and will be further elaborated upon in chapter 3.2.

2. Behavioural intention

When looking at a change in behaviour, one quickly comes down to the theory of planned behaviour (Ajzen, 1991). An attitude towards a product determines the likelihood of purchase (Lobb et al., 2007).

According to Ajzen (1991), behaviour is determined by attitudes, subjective norms and perceived behavioural control. In case of an animal disease outbreak, the perception of risk and the feeling of fear may lead to a change in attitude and intention towards meat products. Maddux and Rogers (1983) have shown that fear appeals can change purchase intentions towards a behaviour that reduces the risk, also called the protection motivation theory (Rogers, 1975). It is also stated that a high risk perception is negatively correlated with purchase intention (Yeung & Morris, 2001). So, behaviour is affected by purchase intention, which is determined by the perception of risk towards a product.

This change is highly dependent on level of education (Lobb et al., 2007). Consumers with a higher educatory level, are more trusting of public authorities and less prone to the effects of the media, compared to consumers with a lower education (Lobb et al., 2007).

Vermeir and Verbeke (2006) state that consumers are very reluctant to change. When there is no animal related disease present, the intention of consumers towards buying sustainable and healthy products is positive, however, this does not lead to a behavioural change and actual buying of these products. Consumers can report a high concern for the environment and state an intention of purchasing 'green products', however, when in the supermarket, they often still buy the convenience goods. This is an often-observed gap between intention and behaviour (Young, Hwang, McDonald, & Oates, 2010). According to Saba and Di Natale (1998), habit is stronger than intention. So, although a change in intention might occur, habit can still restrain a consumer to their habitual choice. The change in intention needs to be strong enough and driven by fear for the consumers' health, before a change in behavioural intention will occur. Consumers are often willing to take a risk with cheaper meat products, however, this risk is perceived too high when a danger for public health is established (Angulo & Gil, 2007). A change in intention and therefore in behaviour with regard to meat consumption, occurs after a feeling of insecurity (risk) and a decrease in trust (Verbeke & Viaene, 1999). Continuing from this line of thinking, the following hypothesis is derived:

H3. When fear with regard to an animal disease is high, behavioural intention towards the purchase of meat products is lower, compared to low fear with regard to an animal disease.

According to Lobb et al. (2007) there is also a direct relationship between risk perception and behavioural intention. They state that a higher trust in meat products will lead to a lower perception of risk and therefore a higher intention, thus leaving out the influence of emotions (Lobb et al., 2007). It is however possible, that emotions are not included in this line of thinking and that they are therefore not mentioned. For the current research it is assumed that emotions are an intermediate step between risk perception and behavioural intention.

3. Moderating factors

This chapter focuses on what factors may play a role in the elicitation of fear and risk perception.
As mentioned previously, risk and fear are responses to potential threats. An outbreak of an animal disease, like for instance BSE, poses a threat to human welfare (Pennings et al., 2002). The response to this threat, however, depends on the information provided to consumers and the perception of risk that is gained through their environment. This can be seen collectively as the influence of the media and personal relevance. Also, personal traits determine the proneness of an individual to a high sense of risk and subsequently a high feeling of fear. Furthermore, a potential moderating factor is a state of anxiety already present when the risk perception process starts. All these factors will be enlightened in this chapter.

3.1 Media influence and personal relevance

The media influences highly which events will get and remain under the attention of consumers. According to Loewenstein et al. (2001) fear can result from events that are focussed on by the media. So, in other words, media make the information available to the consumer (Wahlberg & Sjoberg, 2000) and therefore causes availability bias (Johnson & Tversky, 1983). However, it is still unclear whether the media truly influences the behaviour of consumers. Media tends to focus on dramatic events which results in an overestimation of rare risks (Kasperson et al., 1988; Wahlberg & Sjoberg, 2000). When consumers do not have personal experiences with a risk, they create their perception through the media (Kasperson et al., 1988).
When information is scarce, or a more technical/scientific language is being used, consumers tend to fill in the gaps, which could also result in a different perception of risk than previously anticipated (Freimuth, Greenberg, DeWitt, & Romano, 1984). Wahlberg and Sjoberg (2000) make a distinction between general and personal risk perception. Media can alter the general judgment of risk, but the personal judgment will often remain less affected. Consumers tend to retain a feeling of immunity, thinking that they, and people in their close proximity, will have a lower risk of experiencing a certain event, compared to others. However, when people in their proximity are affected, the perception of risk and subsequently fear will increase significantly, compared to consumers without personal experiences (Wahlberg & Sjoberg, 2000). They will ignore the information of the media and will form their own risk perceptions (Wiegman & Gutteling, 1995).

Risk assessment through the media is also strongly influenced by the language use and the way the information is presented. Sinaceur, Heath, and Cole (2005) showed a strong influence of emotional response to different ways of reporting the number of cases of BSE. When the disease was referred to as 'Mad cow disease', the meat sales dropped significantly more, compared with a reference to the disease with a more scientific name. The scientific name seemed to incur more analytical risk perception, compared to the more emotional feeling of "mad cow disease" (Sinaceur et al., 2005).
This can also be extrapolated to the use of either frequencies or probabilities. The use of probabilities, (10%), elicits a lower perception of risk, compared to the use of frequencies (10 in a hundred) (Slovic et al., 2004).
According to Sharlin (1986) there is a difference in perception when risks are mentioned at macro level (scientific numbers) or micro-level (personally directed). Micro-level will elicit a higher sense of risk, since it will tell consumers what they should avoid. Chung and Yun (2013) have conducted an empirical study in Korea to research the different responses of consumers with regard to BSE and the Mexican flu. They showed that the media reported more scientifically with the Mexican flu, which led to a significantly lower risk perception, compared to the non-scientific approach with BSE.
The effect of the media can also be extrapolated to the fact that lowered attention to a risk over time, decreases the perception of the risk, and thus increasing the distance (Wahlberg & Sjoberg, 2000).

With regard to the notification on an animal disease outbreak, it follows from previous information that risk perception is possibly influenced through the media via the use of language and the information provided. Personal relevance may also alter the perception of risk. This leads to the following hypothesis:

H4. When a news article on an animal disease is strengthened by media amplification and personal relevance (micro, personal, frequencies), consumers will perceive a higher risk, compared to a news article without media amplification and personal relevance (macro, scientific, probabilities).

3.2 Anxiety

A distinction can be made between fear and anxiety. Fear can be described as more object-oriented, while anxiety comprises more a feeling of unaccountable fear, also called "free-floating" (Öhman, 2008). Öhman (2008) describes fear as a feeling after a certain stimulus and anxiety as a feeling preceding a stimulus. Anxiety is more difficult to averse, since the source is often not really clear.
When in a anxious state, consumers are inclined to averse risks and are more quickly to evaluate an ambiguous stimulus as risky (Lerner & Keltner, 2001). In other words, anxiety (free-floating fear) increases the perception of risk (Slovic & Peters, 2006). This feeling of aversion is even stronger when the source of fear is personally relevant (Loewenstein et al., 2001). According to Loewenstein et al. (2001) the emotion fear in case of a decision-making process while under risk, contains an "all-or-none" principle. Consumers "may be sensitive to the possibility rather than the probability of negative consequences" (Loewenstein et al., 2001). Following from these literature statements, the subsequent hypothesis is proposed:

H5. When a consumer is in an anxious mood, risks of an animal disease are perceived higher, compared to a consumer without an anxious mood.

3.3 Individual differences

When looking at the perception of risk and subsequently the feeling of fear, differences can be observed among consumers. Though these differences can moderate the relations between fear and perception of risk, this is outside the scope of this report. Only gender and cultural background are briefly highlighted as possible explanatory variables in this empirical research.
According to Gustafsod (1998), gender plays an important part in the perception of risk. Females experience emotions more powerfully (Loewenstein et al., 2001) and are therefore more inclined to perceive risks higher, compared to males (Flynn, Slovic, & Mertz, 1994; Gustafsod, 1998). The genders also differ in their focus of concerns and a threat for a male can be perceived differently for a female and vice versa (Gustafsod, 1998). This difference can also be extrapolated to the experience of fear. Women are more prone to experience fear compared to men. However, when a threat is present, men are more reactive, while women are more alert for possible threats (McLean & Anderson, 2009).
Despite gender, cultural background is also a predisposition for the perception of risk. Flynn et al. (1994) have shown that at average, white males perceive risk lower, compared to non-white women and men.

4. Materials and methods

The current chapter describes the approach for the empirical research to answer the main research question: *"What is the influence of fear with regard to behavioural intention towards meat consumption in case of an animal disease epidemic?"*

4.1 Study Objectives and Design

The objective of this study is to gain a better insight into the relation between fear, risk perception and a subsequent change in behaviour, all in the context of an animal disease. In the theoretical framework, 5 hypotheses were proposed.

H1. The event of an animal disease elicits a higher perception of risk compared to a neutral event.

H2. A high perception of risk subsequently results in a higher sense of fear, compared to a low perception of risk.

H3. When fear with regard to an animal disease is high, behavioural intention towards the purchase of meat products is lower, compared to low fear with regard to an animal disease.

H4. When a news article on an animal disease is strengthened by media amplification and personal relevance (micro, personal, frequencies), consumers will perceive a higher risk, compared to a news article without media amplification and personal relevance (macro, scientific, probabilities).

H5. When a consumer is in an anxious mood, risks of an animal disease are perceived higher, compared to a consumer without an anxious mood.

The study is of a 3*2 full factorial design. Half of the individuals involved had a state of induced anxiety at the start of the questionnaire. The two groups were subsequently divided among events. One group received a scientific report on an animal disease, one an amplified media report and the last group received an article on a neutral related subject and functioned as a control group. In total, 6 different groups were created, three groups that had induced anxiety and three groups without induced anxiety. Subsequently the level of risk perception, fear and behavioural intention were measured. Media amplification and personal relevance were combined, in order to create a large enough difference. All information provided was in the context of an animal disease, in this case bird flu. Bird flu was chosen since it is currently a relevant threat. The neutral article was more focussed on chicken meat, but also included bird flu as a comprehensive concept. The control group was not amplified, since it consisted of a neutral event. Table 1 shows the different groups.

Table 1 - Group division of the full factorial design

Event	Induced anxiety
Animal disease (scientific)	Yes
	No
Animal disease (amplified)	Yes
	No
Neutral article	Yes
	No

Each group consisted of at least 20 respondents, which made 120 in total. The experiment comprised an online questionnaire via the program Qualtrics. Respondents were randomly assigned to a group with each group evenly presented. Respondents were asked to comply with a research on consumer behaviour in exchange for some sweets and the opportunity to win a gift card. The questionnaire was completed in a separate quiet computer room at Wageningen University. Most respondents were (Dutch) students from Wageningen University.

4.2 Manipulations

In order to differentiate between the groups that experienced media amplification/personal relevance and the control group, three different fictional newspaper articles were created. Appendix 1 shows a neutral article on chicken meat, appendix 2 an article on bird flu with a scientific approach and appendix 3 an article on bird flu with media amplification. To enhance the article of amplified media with personal relevance, the following sentence was added: "Now imagine someone in your family close to you contracting the disease. They have survived, but they are still showing signs of the disease and the recovery tract is long and tough."

The state of anxiety was manipulated via de use of two open questions. The first question consisted of the respondents describing three to five things that elicit most fear to them. The second question consisted of a description in more detail of the one situation that has made the individual most afraid. The description needed to be so vivid, that someone reading it would also experience fear. This method of fear induction was adapted from Lerner and Keltner (2001).

4.3 Measures

To measure the perception of risk, fear and behavioural intention, the following statements were provided and rated on a 7-point likert like scale. The words 'high' and 'low' were placed at the ends of the scale and respondents could use the points in between to indicate their perceptions. 7 Points were chosen in order to have a wide enough range of answers and give respondents the opportunity to give a neutral answer. This way of questioning was used to gain as much insight into the different concepts as possible. Different angles of the same questions were used and together they contributed to a combined view on perception of risk, fear and behavioural intention. Respondents were also asked about gender and country of origin as possible background variables.

Risk perception. This way of questioning is adapted from Eiser, Miles, and Frewer (2002).

- I perceive the risk of bird flu for me personally as …
- I perceive the risk of bird flu for individuals like me as …
- I perceive the risk of bird flu for the Dutch society in general as …

Fear. This way of questioning is adapted from Simard and Savard (2009).

- My feeling of fear of the consequences of bird flu is …
- My feeling of fear of contracting bird flu and becoming ill is …
- My feeling of fear of someone I know contracting bird flu and becoming ill is …
- My feeling of fear about bird flu in general is …

Behavioural intention. This way of questioning is adapted from Ajzen (2002).

- After reading all provided information, my intention to buy chicken meat is …

A pre-test was performed in order to verify the differences between the three articles and to confirm the effect of the anxiety inducing method. After the pre-test, it was decided to add a sentence on the way the questions should be answered. Respondents were asked to imagine that the situation described in the articles is the actual current reality. This addition was necessary in order to assess the respondents' fear in case of an animal disease, and not their current perception.
The statistical analysis will be performed with the program SPSS statistics via analysis of variance (ANOVA). Media amplification and state anxiety are tested for moderation with the different events and risk perception. Since the event was established through the articles, no interaction can be tested between the event and media amplification with regard to risk perception. The influence of media amplification is therefore tested on risk perception directly.
The relation between risk perception, fear and behavioural intention will be tested via regression analysis. Following paragraph 3.3, the analyses will be corrected for gender and cultural background. An alpha of 0.05 will be used as a level of significance.

4.4 Procedure

Respondents received the link of the questionnaire and were subsequently automatically divided into one of the six groups. This subdivision was random, with each group being evenly represented. The questionnaire started with a word of welcome and an indication of the time needed to complete the form. This time needed was at average 10-15 minutes. Subsequently the respondents were either asked to complete the questions for fear induction, or they were immediately asked to read one of the three articles. Following the articles, the respondents were asked to fill in the questions on risk perception, fear and behavioural intention. The questionnaire ended with several queries on general aspects, like age and background. Ensuing the questions, the form closed with an explanation of the questions and a statement that all articles were fictional and that fear induction has taken place in order to look at the relation between risk perception and fear.

5. Results

The total number of respondents is n=134 with at least 20 respondents per group.

In order to combine the different questions of risk perception and fear into one construct, a reliability analysis is performed. For risk perception, Cronbach's alpha is 0.851. Since this alpha is high enough, no items need to be deleted. For fear, Cronbach's alpha is 0.897 and neither needs to be deleted here as well.

Gender (main effect) is a significant explanatory factor in the ANOVA analyses that examine the relation between the different articles and risk perception ($F(1,130)=6.109$; $p<.02$; $\beta=-0.538$), fear ($F(1,130)=8.199$; $p<.01$; $\beta=-0.648$), and behavioural intention ($F(1,130)=5.125$; $p<.03$; $\beta=0.681$). The female group is set as a reference. Gender is also a significant explanatory factor in the relation between anxiety and risk perception ($F(1,131)=5.597$; $P<.02$; $\beta=-0.553$), fear ($F(1,131)=7.125$; $p<.01$; $\beta=-0.668$) and behavioural intention ($F(1,131)=5.083$; $p<.03$; $\beta=0.692$). Gender is therefore included in these analyses as a covariate in order to create a reduction of the error term.

Cultural background is not included as an explanatory variable in the analyses, since 122 out of 134 respondents were Dutch.

The following section will illuminate the results for the different hypotheses. This chapter will close of with the original conceptual framework complemented with the significant relations and parameter estimates.

H1. The event of an animal disease elicits a higher perception of risk compared to a neutral event.

This hypothesis can be confirmed via the comparison of the neutral article with the two articles on an animal disease with regard to risk perception. This is done via one-way ANOVA, using a contrast test. The model contains risk perception as a dependent variable and the condition of the article as a fixed factor. Risk perception for the neutral article is lower compared to the two articles on an animal disease (Mean difference= -1.062; $t(131)=-4.623$; $p<.01$). A custom hypothesis test is used for the F-value of the complete corrected model, including gender ($F(2,130)=11.156$; $p<.01$). The partial eta squared for the article condition is 0.146, which equals 14.6% explained variance. Figure 2 shows a graph of the height of risk perception for each article type (on a scale of 1 to 7). The accompanying lines indicate the 95% confidence intervals.

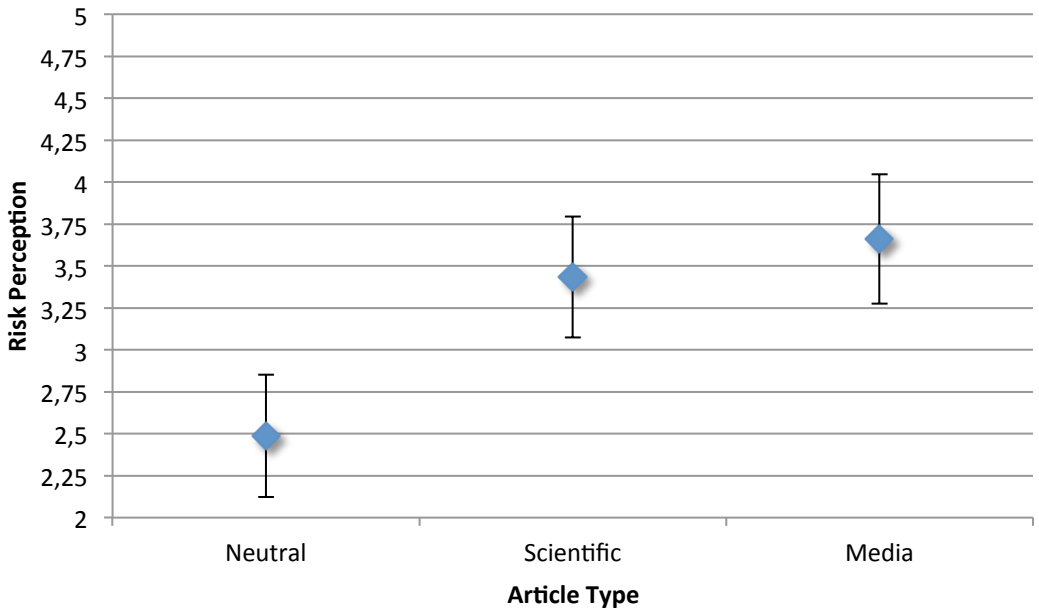

Figure 2 - Relation between risk perception and article type with corresponding 95% confidence intervals

This analysis can be repeated for the direct relation between the event of an animal disease and fear. Fear is the dependent variable and the condition of the article is the fixed factor. Fear for the neutral article is lower compared to the two articles on an animal disease (Mean difference= -1.240; t(131)=-5.162; p<.01).
The F-value for the complete corrected model including gender is F(2,130)=15.435; p<.01. Figure 3 shows a graph of the height of fear for each article type (on a scale of 1 to 7). The accompanying lines indicate the 95% confidence intervals.

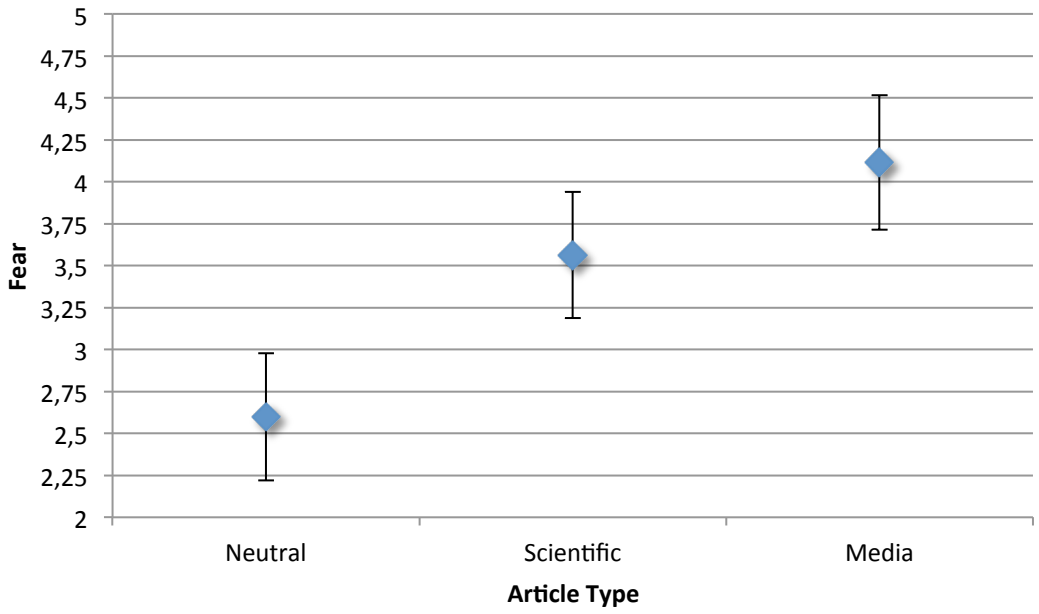

Figure 3 - Relation between fear and article type with corresponding 95% confidence intervals

In order to verify the necessity of risk perception as a mediator in the process between an event and fear, linear regression is used to compare two models, with fear as a dependent variable. The first model contains only risk perception as an explanatory variable, whereas the second model adds the articles. The articles are inserted as dummy variables, with the first group as a reference.
Table 2 shows the change statistics for the model comparisons. The table shows a change of the F-statistic of 5.037. Though more degrees of freedom are used, the change in F is significant. This therefore shows that there is also a direct relation between an event and fear, beyond the relation being mediated by risk perception.

Table 2. Change statistics of model 2 compared to model 1 with regard to fear

R Square Change	*F Change*	*Df1*	*Df2*	*Sig. F Change*
.039	*5.037*	*2*	*130*	*.008*

Model 1. Predictors: (Constant), average risk perception
Model 2. Predictors: (Constant), average risk perception, articles

The analysis is again repeated for the direct relation between the event of an animal disease and behavioural intention. Behavioural intention is the dependent variable and the condition of the article is the fixed factor. Behavioural intention for the neutral article is higher compared to the two articles on an animal disease (Mean difference=-0.871; t(131)=2.767; p<.01) The F-value for the complete corrected model including gender is F(2,130)=3.867; p<.01). Figure 4 shows a graph of the height of behavioural intention for each article type (on a scale of 1 to 7). The accompanying lines indicate the 95% confidence intervals.

In order to check the necessity of fear as a mediator in the process between an event and behavioural intention, linear regression is used to compare these two models. Behavioural intention is set as the dependent variable. The first model contains only fear as an explanatory variable, whereas the second model adds the articles. The articles are inserted as dummy variables, with the first group as a reference.

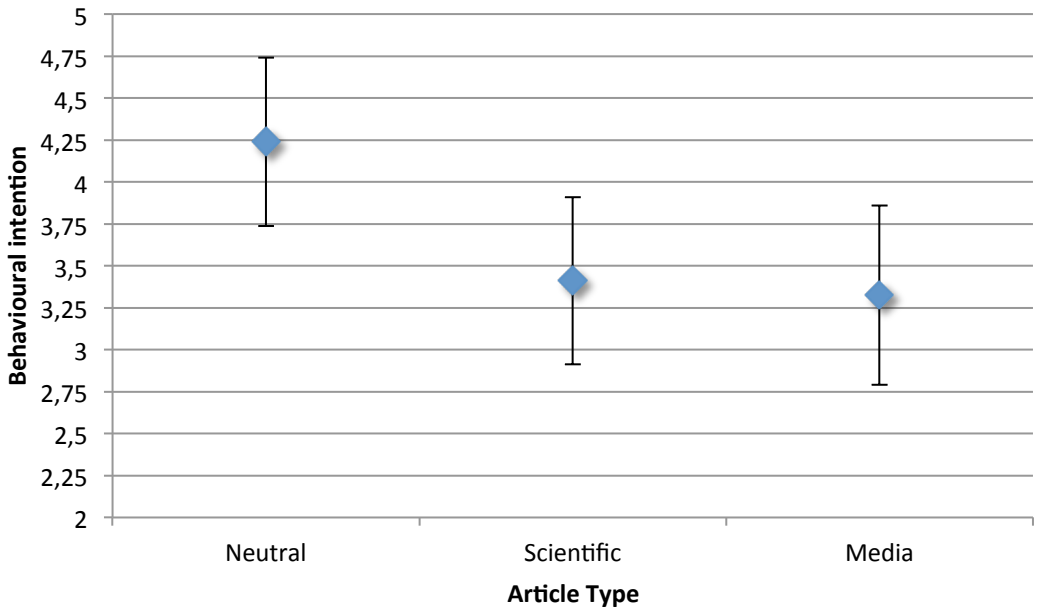

Figure 4 - Relation between behavioural intention and article type with corresponding 95% confidence intervals

Table 3 shows the change statistics for the model comparisons. The table shows a change of the F-statistic of 0.887, which is not significant (p>.4). This therefore shows that there is no direct positive effect between an event and behavioural intention if fear is in the model.

Table 3 - Change statistics of model 2 compared to model 1 with regard to behavioural intention

R Square Change	*F Change*	*Df1*	*Df2*	*Sig. F Change*
.012	*0.887*	*2*	*130*	*.415*

Model 1. Predictors: (Constant), average fear
Model 2. Predictors: (Constant), average fear, articles

H2. A high perception of risk subsequently results in a higher sense of fear, compared to a low perception of risk.

The relation between risk perception and fear can be verified via linear regression. Risk perception is the independent variable and fear is dependent. The model is significant with F(1,132)=110.086; P<.01 and the R^2 is 0.455. So 45% of the variance in fear is explained through risk perception.

H3. When fear with regard to an animal disease is high, behavioural intention towards the purchase of meat products is lower, compared to low fear with regard to an animal disease.

This hypothesis states a linear regression between fear and behavioural intention. Fear is an independent and behavioural intention a dependent variable. The model is significant with F(1,132)=17.452; P<.01. The R^2 is calculated at 0.117. So 11.7% of the variance in behavioural intention is explained through fear.

In order to verify the necessity of fear as a mediator between risk perception and behavioural intention, the regression is tested between risk perception and behavioural intention directly. The model is significant with F(1,132)=12.527; P<.01. The R^2 is 0.087, so approximately 9% of the variance in behavioural intention is explained through risk perception.

Two models are compared to see whether it is necessary to add the direct relation between risk perception and behavioural intention to the model. The first model only includes fear as an explanatory variable for behavioural intention, whereas the second model adds risk perception. Table 4 shows the change statistics for the model comparison.

Table 4 - Change statistics of model 2 compared to model 1 with regard to behavioural intention

R Square Change	F Change	Df1	Df2	Sig. F Change
.008	1.123	1	131	.291

Model 1. Predictors: (Constant), average fear
Model 2. Predictors: (Constant), average fear, average risk perception

The table shows a change of the F-statistic of 1.123, which is not significant (p>.2). The extended model is not significantly different from the model with only a direct relation between fear and behavioural intention. Therefore, no direct relation between risk perception and behavioural intention is required if fear is in the model.

H4. When a news article on an animal disease is strengthened by media amplification and personal relevance (micro, personal, frequencies), consumers will perceive a higher risk, compared to a news article without media amplification and personal relevance (macro, scientific, probabilities).
Since there is no amplification of the neutral event, interaction between the event and media amplification cannot be tested with regard to risk perception. However, in order to verify the relation between the different articles and the perception of risk, a univariate analysis is performed using general linear models. Gender is added as a covariate. Levene's test for the equality of variances is not significant with F(2,131)=2.452; P>.09. So equal variances can be assumed.
The articles show a significant difference with respect to the means with F(2,130)=11.156; p<.01. An LSD-test via pairwise comparisons is subsequently performed in order to gain insight into which means significantly deviate. The LSD-test shows a significant difference between the neutral article and the two articles on an animal disease. The mean difference of the neutral article and the scientific article is 0.948; p<.01. The mean difference of the neutral article and the media amplified article is 1.175; p<.01. The difference between the amplified media article and the more scientific article is however not significant (mean difference=0.226; p>.1).

When looking at a direct relation between the different articles and the elicitation of fear, different results are seen. Levene's test again shows that equal variances can be assumed with F(2,131)=0.610; p>0.5.
The analysis shows a significant difference in means with regard to the articles and their relation with fear; F(2,130)=15.435; p=<.01. When looking at the pairwise comparisons, all articles differ significantly from one another. The mean difference between the neutral article and the scientific article is 0.964; p<.01. The mean difference between the neutral article and the media amplified article is 1.516; p<.01. The media amplified article and the scientific article show a mean difference of 0.552; p<.05. There is no significant interaction between risk perception and media amplification with regard to fear, filtering out the neutral condition (F(1,84)=0.639; P>.4).

These analyses can be repeated for behavioural intention with variances assumed equal (Levene's test, F(2,131)=0.057; p>0.9). The effect of the articles in the model is significant with F(2,130)=3.867; p<.03. The subsequent analysis of the pairwise comparisons shows a significant difference between the neutral article and the scientific article and the neutral article with the amplified media article.

The mean difference between the neutral article and the scientific article is 0.828; p<.03. The mean difference between the neutral article and the media amplified article is 0.914; p<.02. There is no significant difference between the scientific article and the amplified media article, with a mean difference of 0.086; p>.8. There is also no significant interaction between fear and media amplification with regard to behavioural intention, filtering out the neutral condition (F(1,84)=1.992; P>.1).

H5. When a consumer is in an anxious mood, risks of an animal disease are perceived higher, compared to a consumer without an anxious mood.

The influence of induced anxiety can be shown via general linear models, using univariate analysis. Gender is added as a covariate to the model. A test of between subjects effect shows that there is no significant difference between the group that has been anxiety-induced and the group that was not, with F(1,131)= 1.025; p>.3. Repeating this analysis for fear and behavioural intention gives us F(1,131)=0.621; p>.4 for fear and F(1,131)=1.134; p>.2 for behavioural intention, which are both not significant. Anxiety is additionally not significant as an interaction term with the different articles with F(2,122)=0.173; p>.8. Analysis via general linear models also shows that there is no significant interaction with risk perception (F(1,130)=0.014; p>.9), when fear is the dependent variable and there is no significant interaction with fear (F(1,130)=0.029; p>.8), when behavioural intention is the dependent variable.

Figure 5 shows the conceptual framework combined with the results from the empirical research and supplemented with parameter estimates. A linear relation is found between an event, risk perception, fear and behavioural intention. The corresponding regression coefficients of the significant relations are displayed next to the arrows. The red crosses show the non-significant relations.

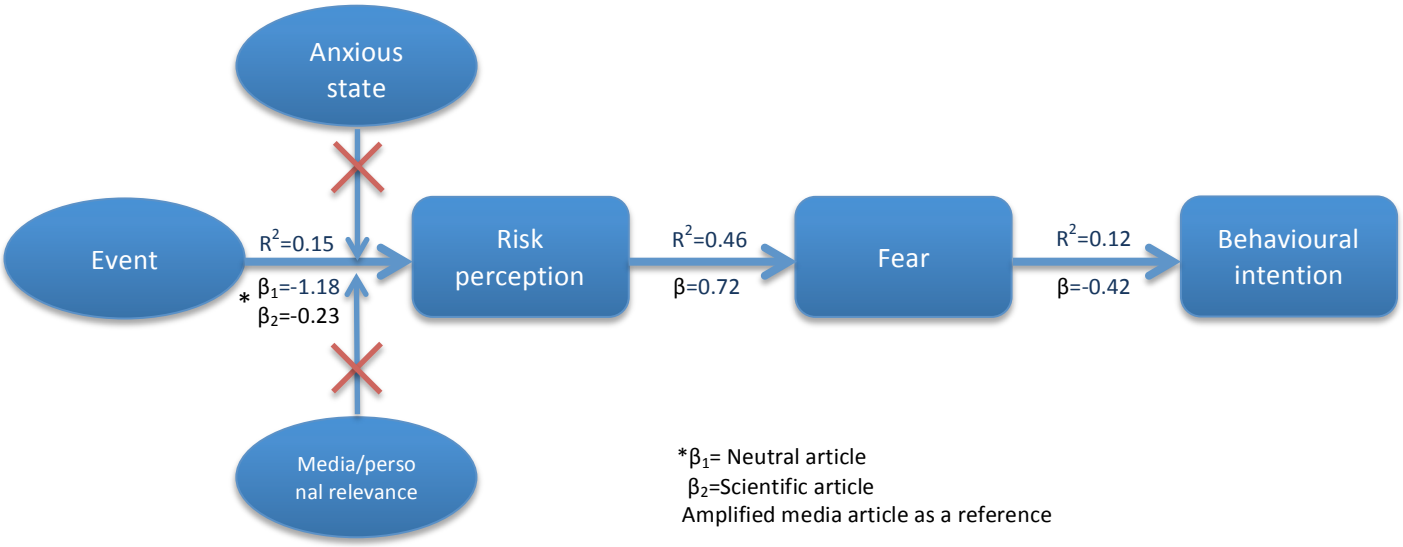

Figure 5 - Conceptual framework with corresponding parameter estimates and regression coefficients

6. Conclusion/Discussion

This study aimed to gain more insight into the relation between the outbreak of an animal disease and consequently the elicitation of risk perception, fear and a decrease in behavioural intention.

The empirical research has shown that there is indeed a relation between an outbreak of an animal disease and risk perception. Respondents reported a higher risk perception on the articles regarding an animal disease, thus indicating that an animal disease is perceived as a higher risk, compared to a neutral event. However, despite of the statement that risk perception precedes fear, fear also shows an additional direct relation with the different events. Therefore, an event can trigger both fear as well as risk perception directly. This suggests a contradiction to the literature stating that risk perception always precedes fear (Rountree & Land, 1996; Warr, 1987). Nevertheless, it is unknown whether fear will subsequently lead to risk perception. The results have indicated that there is indeed a relation between risk perception and fear. This indicates that when risk perception is perceived as high, fear is subsequently also perceived as high. Still, this analysis only shows that there is a correlation between fear and risk perception, it does not state which concept precedes which.
Future research could aim at gaining more insight into the exact order of the processes. This research could indicate whether risk perception is always present in a process with fear, or if fear can lead directly from an event to behavioural intention. A possible approach could be to medically examine the occurrence of fear in the brains in combination with risk perception through an MRI or EEG. This insight would help to better understand the different concepts and apply this knowledge in consumer settings.

The results from the empirical research have also shown a negative relation between fear and behavioural intention. When fear was perceived high, behavioural intention was subsequently perceived low. Since there was no additional value in adding a direct relation between perceived risk and behavioural intention, it is suggested that behavioural intention and risk perception are only related through fear. A large part from behavioural intention however, remains unexplained. This indicates that there are more factors that affect behavioural intention than were researched in this study. Future research could aim at focussing on more factors that may increase or decrease behavioural intention. These factors may come to light when more diverse respondents are used. This research used a convenience sample from Wageningen University. However, no insight is subsequently gained into the effect of educational background, or the influence of culture. More insight into the factors that influence behavioural intention could help marketers in developing product strategies.

When looking at the influence of media amplification, only the concept of fear shows a direct difference between the media amplified article and the more scientific article on bird flu. However, no such effect was found with behavioural intention. This refutes the hypothesis that the media article increases risk perception, however, it creates a different hypothesis. Consumers will experience more fear when an article on an animal disease is strengthened by media amplification and personal relevance, compared to a news article without those characteristics.
The difference in the results between risk perception and fear confirms the previously made statement that risk perception and fear are two different concepts and thus respond differently to certain stimuli. Future research could aim at further examining the differences in responses between risk perception and fear and thereby gaining more insight into the two different concepts. When this knowledge is gained, methods can be developed to either influence risk perception or fear. This knowledge could help marketers and governments to adapt their protocols and strategies in their advantage.

Since the different articles were used both as an elicitation of the event as well as a differentiation between the scientific approach and the media amplification approach, it was not possible to test for

interaction. The neutral event could not be amplified. The effect of media amplification was therefore tested on risk perception directly, instead on the process preceding risk perception. This approach may have resulted in a distorted view on the moderating effect of media amplification. Future research could create different events with and without media amplification in order to truly gain insight into the moderating effect of an event and media amplification with regard to risk perception.
The effect of media amplification on risk perception may also have been diminished because the questions on risk perception and fear were asked in an anticipatory manner. In order to create a situation from the different articles that elicit risk perception and fear, respondents were asked to imagine reading the article in todays' newspaper. By doing so however, the responses became anticipated. This was necessary in order to create a realistic impact of the articles. The effect of media amplification could be different when the threat is made more vivid for the respondents and the questions are asked on their current state.

This study utilised the concept of bird flu as a representative for animal diseases. It is however unknown, whether this disease is truly comparable to other animal diseases. It could for instance be possible that articles on mad cow disease would elicit different responses, since that disease has different characteristics and more uncertainties. Perhaps utilising mad cow disease would have shown a more prominent difference between the media article and the scientific article with regard to risk perception. A research using a selection of different animal diseases and media amplification as a moderator, could give more clarity on this statement. Such a research could help gaining knowledge on the factors associated with animal diseases that influence risk perception and fear.

During this empirical research, anxiety was induced via the method of Lerner and Keltner (2001). The results however, did not show an effect of anxiety on risk perception. This can be due to the fact that anxiety simply does not influence the height of risk perception and fear, or because anxiety was not truly induced. Both relations were supported by theories and it is therefore striking that no significant results were found.
The difference with the results from the research of Lerner and Keltner (2001) can possibly be explained by the fact that the outcome of their study was a significant higher feeling of fear with the anxiety inducing method, compared to a similar anger inducing method. Therefore the results differ significantly from anger; however, a difference with a neutral state cannot be proven and/or is too small. The effect of anxiety may also have been not solid enough to elicit a difference with regard to risk perception.
Future research could invest in a different form of anxiety or fear induction. Respondents may for instance be asked to watch a scary clip or to imagine experiencing their biggest fear. A probability may also be to divide respondents among different groups with regard to fear proneness. This proneness may be measured via the fear survey schedule (Wolpe & Lang, 1964). This knowledge could help to truly understand the relation between anxiety and risk perception. Though the present research did not prove an effect of anxiety, literature states that free-floating fear heightens risk perception (Slovic & Peters, 2006; Weber, 2006). More research is therefore needed to truly exclude anxiety as a moderator.

During the making of this research it became clear that fear is still a highly underexposed matter. This statement is in compliance with Taylor (1998) and Lewis (2000), who states that self conscious emotions in general are poorly studied. Not a lot of known research is directly aimed at fear and therefore no clear definition or measurement of the construct is available. Existing measurements are often focussed at the inventory of different fears (Taylor, 1998). Fear is often included as a part of other concepts and not seen as a concept in itself. This shows an opportunity for many future researches. These researches could aim at creating a reliable method to induce fear in respondents and to create a definition that truly separates fear from other emotions. This continues the work of Lerner and Keltner (2001). A model can also be created that measures fear with regard to different

concepts, instead of a general fear measurement. These focussed researches could help other researchers that want to include fear into their model.

6.1 Revised framework

The empirical research shows some remarkable results with regard to the relation between risk perception, fear and behavioural intention. Since not all hypotheses were confirmed and some new relations were found, a revised framework is proposed. Figure 6 shows a revised framework with all relations made visible. An event will lead to either fear or risk perception and subsequently influence behavioural intention. Media amplification and personal relevance are moderators for fear. It is suggested that risk perception and fear may amplify one another and create a positive feedback loop. Further validation and research is however required in order to gain more insight into the order and relations between the different concepts.

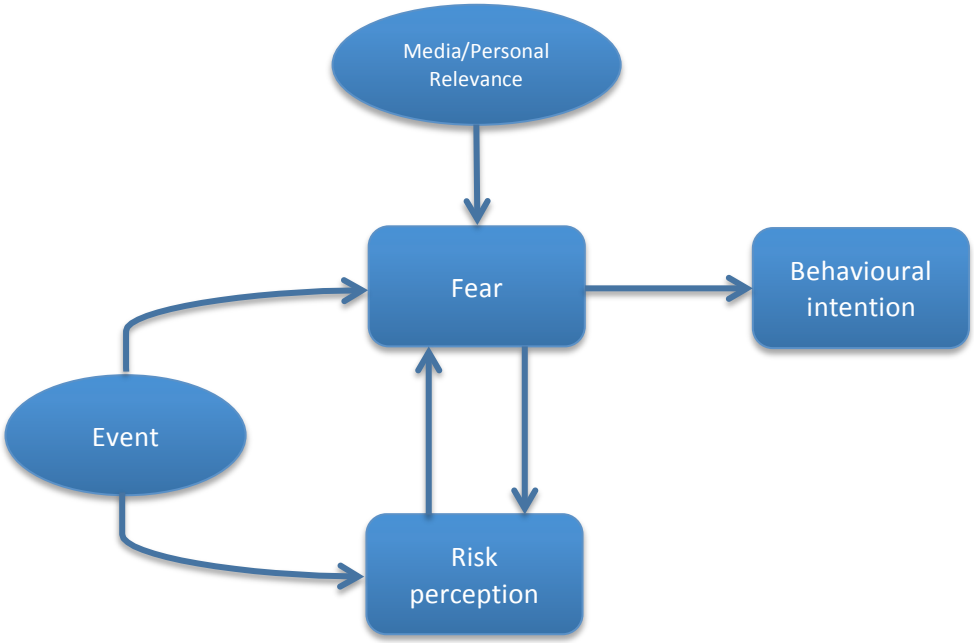

Figure 6 - Revised conceptual framework of the relation between an event and behavioural intention

6.2 Implications

The results emphasize that there is indeed a strong relation between risk perception, fear and consequently behavioural intention. This relation is triggered through an event of an animal disease outbreak, as is shown with the different articles.

The implication of this finding is that fear plays a more prominent role than was previously anticipated. The government needs to be aware that media reports can elicit a (high) feeling of fear in consumers and subsequently alter their intention to consume certain products. Risk perception and fear are also confirmed through the results as two separate concepts that can be influenced in different ways. These findings can have several implications for potential strategies and protocols designed for animal diseases. When strategies are aimed at a reduction of risk perception, it will not automatically reduce fear.

Since fear is heightened when the media use a sensationalistic approach, the results suggest that media articles should be more scientific with regard to the reporting of animal disease outbreaks. This can be done by using frequencies instead of probabilities and not aiming the articles at the person, but making them more general. This may result in a lowering of fear and subsequently a higher behavioural intention and thus a lower decrease in meat consumption.

All in all this research provides a new view on risk perception and fear in the context of an animal disease. The current research suggests that feelings of fear and perception of risk experienced at the moment of decision-making may alter the intention of one to buy a certain product. Since fear and risk perception are present when an animal disease outbreak occurs, this is a relation to keep track of.

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Appendix 1 – News article on a neutral related subject

Chicken meat shows a decreased popularity

Despite of preventive measures to ensure the safety of avian meat products, supermarkets still see a decrease in sales. Consumers more often tend to meat originated from cattle or pigs. The World Health Organisation tries to explain this aversion.

Consumers are more and more aware of the health consequences of the cheaper meat products and the so-called price-fighters. Though all products are under a strict regulation, the image of meat is under fire. Chicken meat industries are especially having a tough time, since the threat of bird flu is still fresh in people's minds. This threat is considerably higher, compared to other animal diseases, since it has been shown that the influenza virus can transfer from avian species to humans. Though no insight is yet gain on the exact process of this transmission, the evidence is enough to cause panic among consumers.
Research centres are already focussing their attention to the development of a potential vaccine, in case the disease does start to spread. The World Health Organisation does however state that as long as the chicken meat is properly cooked, there can be no chance of infection through the meat.

Photo: Chicken meat products in a supermarket

It is therefore not necessary to refrain from chicken meat. All food products continue to be properly checked in accordance with the consumer product safety authority. All suspected cases of bird flu are examined thoroughly to eliminate all risk.

Why chicken is good for you:

- √ **High on vitamin B6**
- √ **Bird fat contains 25% less saturated fat compared to other species**
- √ **Less calories and lean meat**
- √ **Rich on proteins**

Appendix 2 – News article with a scientific approach

Epidemic of avian influenza continues to spread

The current outbreak of avian influenza in Europe has already cost almost a hundred people their lives and the disease continues to spread. The world health organisation has declared avian influenza as an official epidemic and urges people to be very thorough in their preventive health measures.

The outbreak of avian influenza (H5N1) has caused a feeling of panic all over Europe. Estimates of an individual getting the disease are at 0.1%. Although these estimates are lower compared to the previous epidemic of influenza H1N1, the consequences are higher. When one is infected, the chances of survival are only 50%. No vaccination has yet been developed, although research centres are making progress on the biology of the specific influenza strain and its properties. When infected with avian influenza, the symptoms can be recognized as severe headache, nausea, fever, shortness of breath and a heavy cough. In case of a suspected infection it is very important to directly consult a physician. The consumer product safety authority states that it is not necessary to refrain from avian meat products. As long as these products are properly cooked, the disease will not be able to spread.

Photo: Test tubes for the influenza virus

The virus cannot survive in the meat when heated. Also, all products that enter the food chain will be thoroughly checked for the presence of the virus and are therefore no risk for contamination, thus the CPSA. It is still unsure where the virus originated and how it spread so fast.

Preventive health measures.

- √ **The washing of hands after each contact with public spaces**
- √ **Refraining from spaces where avian species are held**
- √ **Cooking meat thoroughly**
- √ **When contact with avian species is necessary, the use of inhalation masks is recommended**

Appendix 3 – News article with media amplification

Outbreak of bird flu, the end of mankind?!

The current outbreak of bird flu in Europe has already cost almost a hundred people their lives and the disease continues to spread. The world health organisation has declared bird flu as an official epidemic and urges you to be very thorough in your preventive health measures.

The outbreak of bird flu, also called the feathery death, has caused a feeling of panic all over Europe. Estimates of an individual getting the disease are at one in every thousand. Although these estimates are lower compared to the previous epidemic of Mexican flu, the consequences are higher. When one is infected, the chances of survival are only one in two. No vaccination has yet been developed, although research centres are working hard and, according to inside sources, they are making a lot of progress. When infected with the feathery death, you can recognize the symptoms as severe headache, nausea, fever, shortness of breath and a heavy cough. In case of a suspected infection it is very important to directly consult your physician. The consumer product safety authority states that you do not need to refrain from avian meat products. As long as these products are properly cooked, the disease will not be able to spread.

Photo: Dead chickens being removed to prevent further contamination

The virus cannot survive in the meat when heated. Also all products that enter the food chain will be thoroughly checked for the presence of the virus and are therefore no risk for contamination, thus the CPSA. The question remains however, where the infection came from in the first place…

What can YOU do to stay healthy?

- √ **Wash your hands after each contact with public spaces**
- √ **Refrain from spaces where avian species are held**
- √ **Cook your meat thoroughly**
- √ **When contact with avian species is necessary, the use of inhalation masks is recommended**