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A Comparative Analysis of Consumer Attitudes Towards Food Safety, Animal Testing and Traceability in the Meat Industry: Japan and Canada

By

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Abstract

In this research consumers' attitudes towards general food safety and their perceptions of the safety of beef in Japan and Canada are examined. Risk perceptions, the willingness to pay for beef traceability from farm to final consumer and the willingness to pay for animal testing for bovine spongifrom encephalopothy (BSE) are measured through a stated preference exercise, provided as part of national surveys in each country. Japanese respondents continue to have higher risk attitudes and perceptions about beef than Canadian respondents in 2009 as compared to 2006. In each country survey respondents strongly prefer domestic beef over imports from any other country. However, interest in beef from other countries increases as full traceability, or one hundred % animal testing for BSE or both attributes are incorporated into the markets. The willingness to pay increases at a diminishing rate, from either traceability or BSE animal testing to both attributes. In latent class models the Japanese data suggest that there are three distinct classes of survey respondents, where class 1 respondents are characterized as being more trusting and willing to pay for beef from different countries, class 2 respondents strongly prefer domestic beef and their willingness to pay for imported beef does not increase with traceability or animal testing and class 3 respondents would only be willing to pay for traceable and a combination of traceable and animal tested domestic beef. Similarly, Canadian survey respondents can be segregated into two classes. Class 1 consumers are more trusting and will be willing to pay for both domestic and imported beef. Class 2 consumers are more cautious.

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CHAPTER 1 : FOOD SAFETY IN JAPAN

1.1 INTRODUCTION

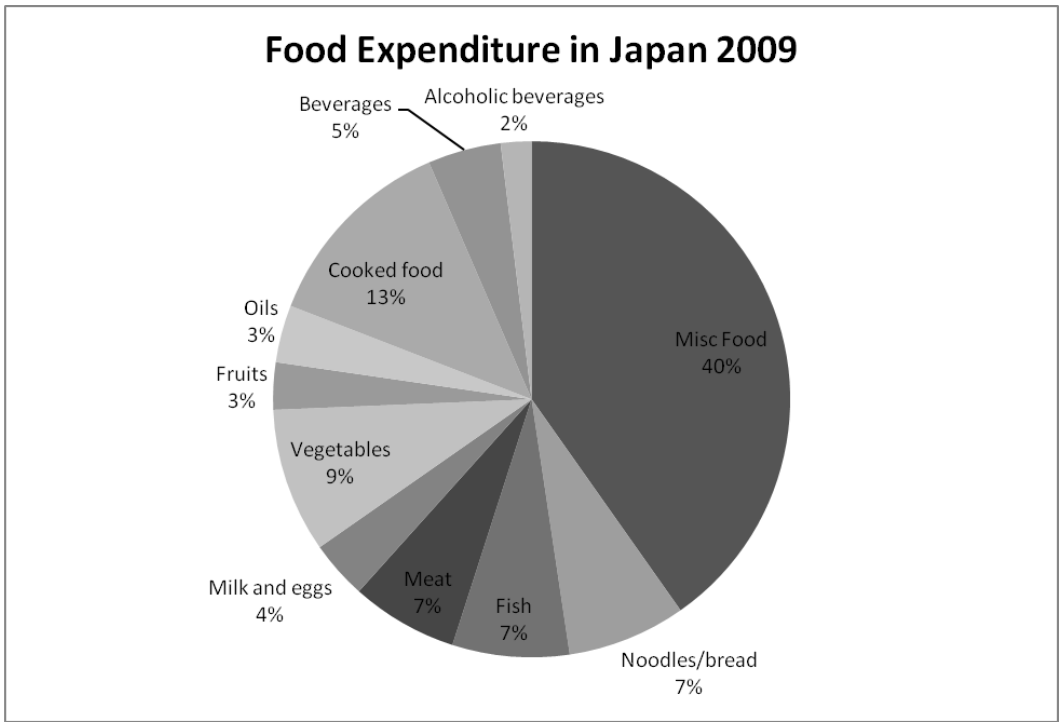
Food safety is an important element in consumer's food choice behaviour. At present, consumers are well aware of any food safety incidents that take place as such information is readily available. Consumers are becoming more demanding and expect a higher level of food safety assurances (Tonsor et al., 2007). In the wake of this trend in food safety over the past couple of years, governments and food industries have had to meet the requirements of the public by introducing new policies or by adopting more stringent food safety protocols during production and processing.

Japanese customers are known to be more concerned about the safety, quality and taste of their food. Smith and Riethmuller (2000) reported that Japanese consumers were less confident than Australian customers regarding the safety of the food they consume. While investigating cross cultural food safety risk perceptions in four countries, namely Japan, US, Canada and Mexico, Schroeder et al. (2006) revealed that Japanese customers had a higher level of risk aversion towards beef based on safety concerns than did consumers from other countries. However, they also found that consumers from Japan, US and Canada were not well informed about the risk levels associated with certain food borne pathogens such as *Listeria, Campylobacter,* and *Staphylococcus aureus.* They attribute that to the low number of incidents and low level of media coverage associated with those pathogens. Their study also showed, in comparison to other consumers, Japanese consumers perceived bovine spongiform encephalopathy (BSE) to be a high risk disease (Tonsor et al., 2007).

BSE is a degenerative brain disease also known as "mad-cow disease" which occurs in cattle. It is caused by an infectious agent called a prion which builds up in the nerve cells in the brain. The incubation period ranges between two and five years before signs of the disease become apparent. In humans, the disease is known as the variant Creutzfeldt-Jakob disease which is characterized by holes in the brain tissue (Encyclopædia Britannica 2008).

The past decades have been characterized by rapid increases in income and changes in the eating habits of people in Asia. Japan was the world's biggest importer of meat in 2003, 1 m tonnes of beef, 1.14 m tonnes of pig meat and 650, 000 tonnes of poultry meat (Seng and Laporte 2005). In 2008, it became the world's third biggest importer of beef, importing 458,018 tonnes (Meat and Livestock Australia 2009). Japanese consumers in 2008 spent 30 percent of their total expenditure on food (Agriculture and Livestock Industries Corporation 2009). Figure 1.1 shows how Japanese food expenditure is divided.

Figure 1. 1 Share of Food Expenditure in 2008

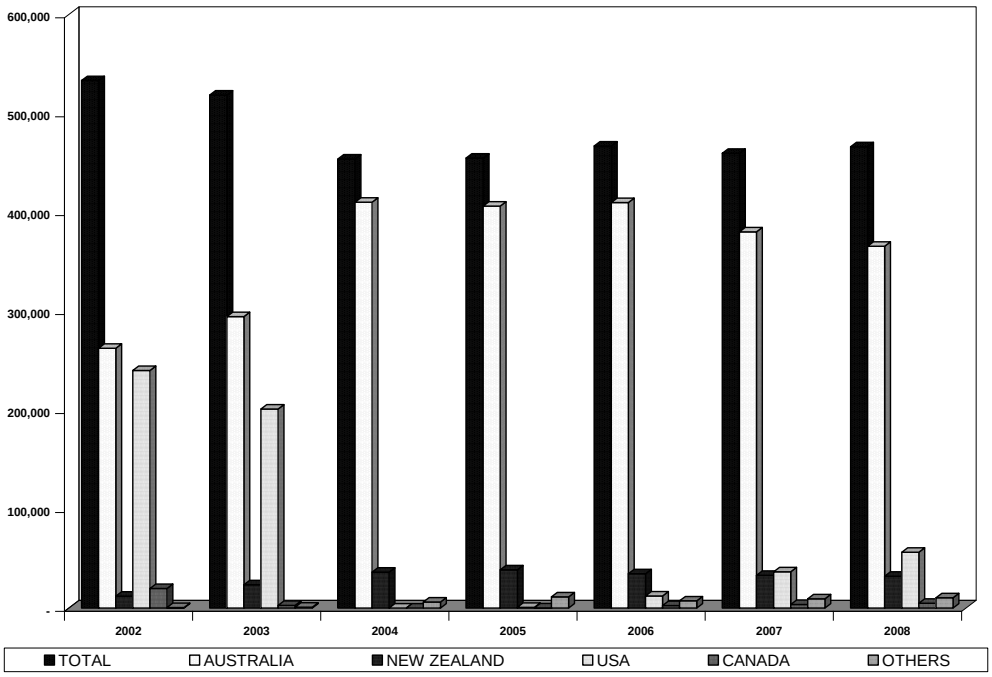


Source: (Statistics Bureau Japan, 2010)

With a population of 127.293 million as of 2009 (IMF 2009) exporting countries are particularly interested in the Japanese market because it represents a huge and attractive market to supply and has considerable future market potential. According to Clemens (2007), Japan will have a hard time to even maintain 40 percent self-sufficiency in beef production because of the aging population and

because fewer young people are entering farming unless prices and preferences change. Figure 1.2 shows the amount of beef Japan has imported since 2002. Australia dominates the market followed by New Zealand and USA. Japan had closed its borders to beef from Canada and United States in 2004. As of December 2005, Canadian access to the Japanese market was regained (CBEF, 2010)

Figure 1. 2 Beef Imports by Country of Origin



Source: (Agriculture and Livestock Industries Corporation 2009)

1.2 FOOD SAFETY SCARES

Japan has been hit by numerous food safety incidents which have led to policy changes and government intervention. The food safety scares that Japan has had to face since the year 2000 are briefly described. In March 2000, Japan was hit by an outbreak of foot and mouth disease which had been absent since 1908. A month later, they had 3 confirmed cases of foot and mouth disease. 700 cattle were slaughtered to contain the disease (USDA 2008). As a result the Japanese government fumigated straw and forages imported from other countries

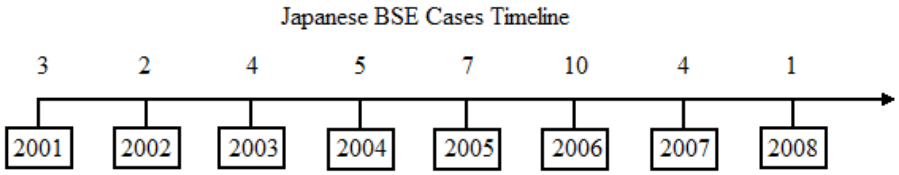
and also temporarily stopped the importation of meat and meat products of cloven-hoofed animals from the Republic of Korea (Clemens 2007; Sugiura et al., 2001). On March 2001, it banned meat from France, Belgium and Denmark. Canada benefited from the ban at the expense of Denmark as exports of pork from Canada increased from 14,000 to 23,000 tonnes (USDA International Agricultural Trade Report 2001).

The first case of BSE was reported in England in 1986 (OIE 2008c). In December 1987, UK found that MBM (meat-and-bone meal) was the likely source of BSE but it did not ban its use locally until 7 months later. However, they continued exporting it to other countries. Between 1988 and 1996, UK exported close to a million tonnes of MBM to Asian nations alone (Cowley 2001). The Japanese government implemented certain regulations to reduce the risk of BSE. The MAFF[1] which, is in charged of the agriculture sectore, banned importation of live cattle from UK in July 1990 and introduced the process of heating MBM. In March 1996, the British government announced that there was a risk of BSE affecting human beings. As a result, the Japanese government banned the importation of MBM from UK but did not ban its importation from the other 15 EU countries until February 2001 (Kamisato 2005).

In 2001, three cases of BSE were reported in Japan. The MAFF had collected a sample of 300 cattle in order to pass the standards set by OIE on risk assessment when they discovered the first BSE case (Kamisato 2005). It took more than two weeks to be diagnosed and was finally reported on September 10 2001 (McCluskey et al., 2005). Despite all the efforts to shield Japan from BSE, the disease had finally reached its borders. A second case was reported in November of 2001. Two out of the three cases in 2001 were discovered during screening at the abattoir. The total number of BSE cases discovered is shown in Figure 1.3.

[1] Ministry of Agriculture, Forestry and Fisheries

Figure 1. 3 BSE Case Timeline in Japan



Source: (OIE 2008b)

None of the BSE cases were imported cases. By the end of 2008, there had been a total of 35 BSE cases (OIE 2008b). The first Japanese case of BSE in humans, known as variant Creutzfeldt-Jacob Disease, was confirmed on February 4, 2005 in a 51 year old man in Japan. The assumption was that he had contracted the disease during his 24 day stay in Britain in 1990. However, experts cannot exclude Japan and France from being the source (Euro Surveillance 2006). Following the first BSE case in Canada in May 2003, Japan banned Canadian beef (Clemens 2007).

In January 2004, after an outbreak of avian influenza in Thailand, Japan temporarily closed its borders to imports of Thai chicken. Japan is a major importer of Thailand's chicken (BBC News 2004).

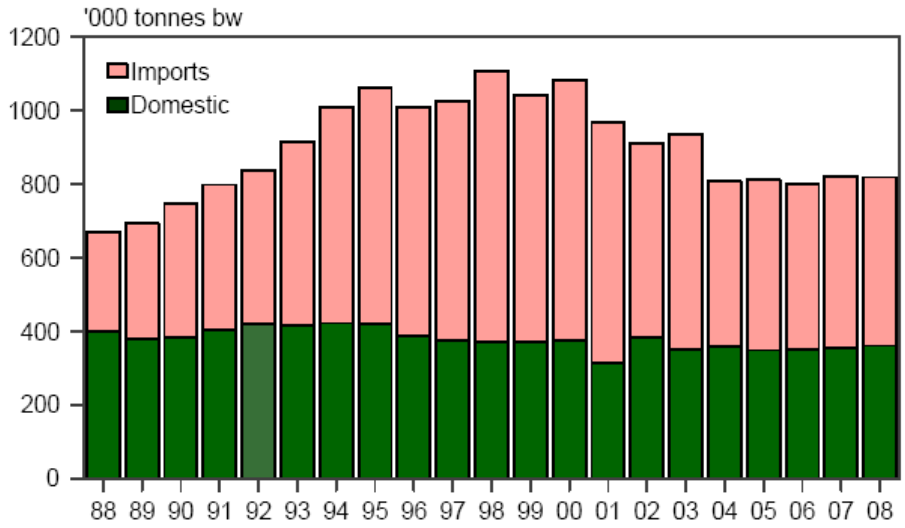
In 2006, Newcastle disease hit Fukuoka, Japan. A hawk in Kumamoto was confirmed with avian influenza in January 2007. In September 2007, 40 cattle in Hiroshima, Japan were found to be affected by Brucella spp. In March 2008, 4 swans in Akita and a swan in Hokkaido, Japan were found dead from avian influenza H5N1. In May 2008, a swan in Hokkaido, Japan was found dead from avian influenza H5N1 (OIE 2008a).

All these perceived food safety incidents have shattered the confidence the Japanese have in their food system. Other incidents such as fraud discussed in the Section 1.4 have not helped the situation. With the government subsidizing domestic beef, in 2002 two Japanese companies, were mislabeling imported beef as domestic beef (Sugiura et al., 2008; Steinhoff 2005).

1.3 BEEF CONSUMPTION IN JAPAN

Beef consumption in Japan has tripled over the last 40 years and the government has liberalized the market allowing for increases in the imports of fresh and frozen beef. There are four different types of beef in Japan. Japanese consumers consider Wagyu, the beef from the native beef breed, to be the best and it is the most expensive beef in Japan followed by domestic dairy beef, US and Australian beef. The dairy beef animals are fed grains, bone meal and other concentrates to fatten them for slaughter. The BSE cases in the Japanese cattle were found in dairy cattle and not in Wagyu cattle (Yeboah and Maynard 2004). Beef had been a promising market until the outbreak of BSE. In 2000, Japan imported 738,415 tonnes of beef of which 28,390 tonnes of beef and veal were imported from Canada. Figure 1.4 shows the total domestic consumption of beef from 1988.

Figure 1. 4 Consumption of Beef in Japan

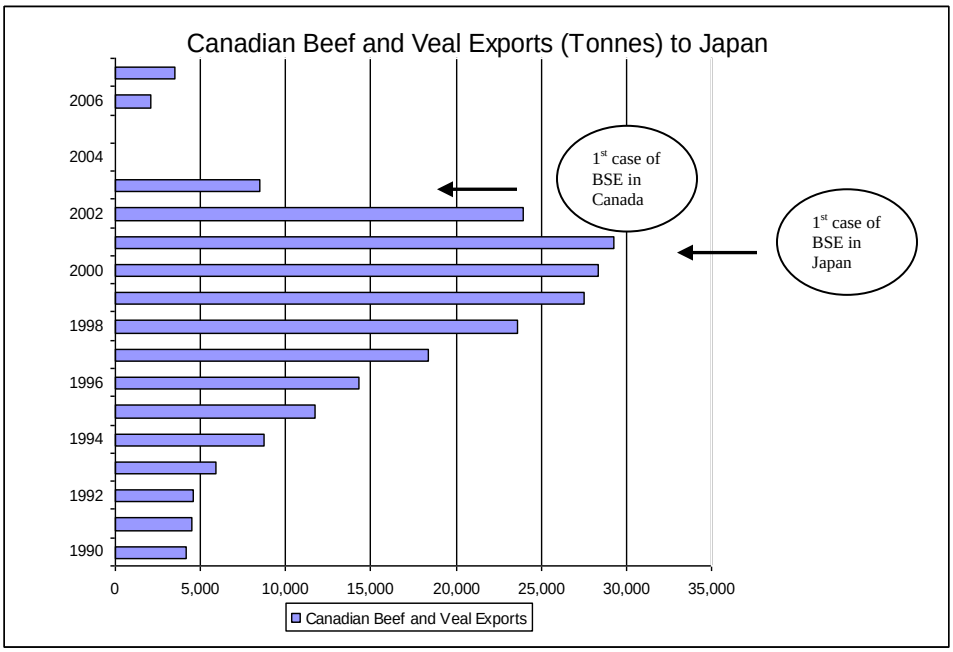


Source: (Agriculture and Livestock Industries Corporation 2009)

Between September and November 2001 even though the two major exporters namely Australia and the United States certified their beef to be "BSE-free" they lost around 50 percent of their export sales (McCluskey et al., 2005).

Figure 1.5 shows the level of Canadian beef and veal exports to Japan from 1990 to 2007.

Figure 1. 5 Canadian Beef and Veal Exports to Japan



Source: (Canadian Food Inspection Agency, 2009)

Japanese consumers may have a lower level of confidence in their food safety system as compared to consumers in other countries. Concerning the willingness to pay for an 80% increase in food safety, Tonsor et al (2007) discovered that Japanese customers were willing to pay $13/lb while U.S customers were only willing to pay $4/lb. The premiums for the increase in food safety are however similar in percentage terms across countries because the relative prices across countries are different.

1.4 ACTIONS TAKEN BY THE GOVERNMENT

Japanese consumers' lower level of confidence in food safety may be blamed on a number of incidents. They may feel that the government did not handle the BSE scandal properly (Nature 2001). Furthermore, the Japanese government had proven to its people numerous times that it did not make correct

decisions with respect to public-health scandals. The government took no action and even covered up the spread of mercury poisoning in Minamata in the 1950s and 1960s. In 1985 and 1986, the government was slow to switch to heat-treated blood instead of giving HIV-tainted blood to haemophilia patients (Nature 2001). The list goes on and BSE was the newest example of how slowly the Japanese government reacts. Even after the UK had announced that they suspected that MBM was the cause of BSE, Japan made no attempt to ban its use. Eventually in 1988 UK banned its use and destroyed all BSE-infected cows but they continued to export the MBM to 15 Asian and 27 European countries until 1996. Japan continued to import MBM from the UK until then (McCluskey et al., 2005). However, they still continued to import MBM from other EU countries until 2000 (Cowley 2001). Japan banned the use of ruminant products to feed domestic cattle more than four years after the US had implemented the same policy (Kamisato 2005). Given the fact that MBM was the cause of BSE, the lag in government response and banning of its use was another reason why the Japanese people may have had a low level of confidence in the government.

In 1997, the MAFF (Ministry of Agriculture, Forestry and Fisheries) and MHLW (Ministry of Health, Labor and Welfare) formed research groups to investigate prion diseases. Active surveillance which included sampling farm cattle and testing for BSE started in April 2001 (Yamanouchi and Yoshikawa 2007). A cow was slaughtered on suspicion of food poisoning on August 6, 2001 but it was not until September 10 that the cow was confirmed positive for BSE. To add insult to injury, the first infected cow had been processed into MBM instead of being incinerated. Poor communication between the central and local governments did not improve the situation. Consumers found the mistake in processing the infected carcass to be further eveidence of the government's incompetence (Kamisato 2005).

Japanese consumers believe that domestic products are of higher quality and safer than imported beef and to their dismay the first few BSE cases were all domestic dairy cows. After the first case of BSE, the government removed cattle older than 30 months from the human food chain (Peterson and Chen 2005). As

well, the government spent more than $1 billion over six months to try to restore confidence in beef (Peterson and Chen 2005). The government made an attempt to subsidize domestic beef in the hope of restoring confidence led to fraud. Two Japanese companies, Snow Brand and Nippon Ham were found to have been mislabeling imported beef as domestic beef in 2002 (Sugiura et al., 2008; Steinhoff 2005).

Mandatory BSE testing started in October 2001 for all bovines intended for human consumption. As of July 2003, Japan brought in a system of full traceability for all domestic cattle where consumers can access the full history of the meat they are purchasing at retail outlets. The MAFF created a nationwide database for the 4.5 million Japanese cattle by tagging their ears and each animal having a 10 digit identification number (Steinhoff 2005). The government introduced the Food Safety Commission in 2003 to undertake risk assessment. Since October 20, 2001, Japan established mandatory BSE testing for all cattle for human consumption (Onodera and Chi-Kyeong, 2006). The government relaxed BSE testing in Japan as of August 2005 by exempting cattle aged 20 months or younger as studies had found that it was pointless to test for BSE on cattle less than 30 months old (Ozawa, 2007). Although Japan is trying to reassure its people, there still remain underlying doubts. For instance, it imports fertilizer and animal feed from other countries and those countries do not provide data on the origin of their products. There is also a lack of third party organizations to monitor business and government (Steinhoff 2005).

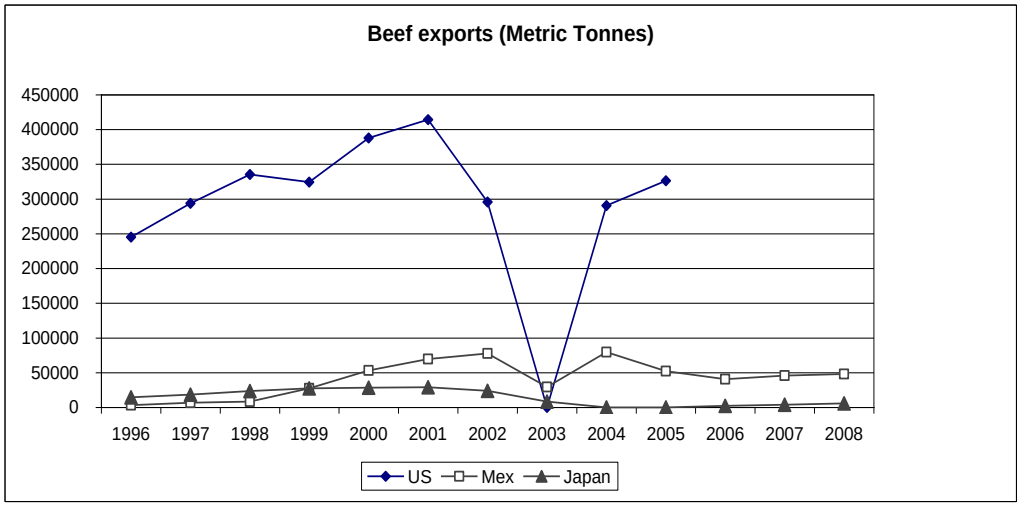
1.5 OBJECTIVES OF THE STUDY

Globally, there have been numerous food safety issues which had decreased the general food safety confidence. In 2000, a survey carried out by Ipsos-Reid, a market research company, found that the majority of the respondents from nineteen out of thirty-four countries felt their food were not as safe as 10 years earlier (Tonsor et al., 2009). For instance, events such as the bovine spongiform encephalopathy (BSE), foot and mouth disease have led to a

decline in consumption of beef in numerous countries. The UK lost an estimated $1.7 B of its export markets in 1996 and 4,500,000 cattle had to be destroyed in 2001 (Lloyd et al. 2006). This had resulted in a loss in income and from a consumers' perspective may have led to a decrease in food safety confidence.

Similarly, when BSE hit Canada in 2003, exports of beef came to a halt as shown in Figure 1.6. The Canadian beef industry had been growing rapidly from 1980. In 2001, Canadian beef and veal exports were $2.2 B and they were $1.4 B in 2009 (Canadian Food Inspection Agency, 2009). The Canadian beef industry lost a significant share of its global market. The industry also has a number of competitors in global markets, namely the U.S., Australia, New Zealand, Brazil, Argentina, and Uruguay (Schroeder 2003). Referring back to Figure 1.2, after 2003, Australia's market in Japan grew forcing Canadian beef to find ways to remain competitive in this global market.

Figure 1. 6 Canada Beef Exports



Source: (Agriculture and Agri-Food Canada 2010)

Japan represents a huge potential market for exports from North America and further studies on Japanese consumer attitudes will allow exporters to be better able to satisfy demand. Consumers' concerns evolve over time and are different across countries. The discovery of BSE in Japan has shifted Japanese consumers' demand, substituting other type of meats and fish for beef. After the

first case of BSE in U.S in December 2003, Japan banned U.S beef for 2 years. Post BSE in Japan and North America, Australia became the main exporter of beef to Japan. Australia and New Zealand have invested heavily in a program that manages animal identification, quality assurance and product differentiation to try to improve consumers' safety confidence on beef (Clemens 2007).

Japan installed a system of traceability for beef which also might imply that it will eventually expect the same for pork and other meat products (Clemens 2007). Since October 20, 2001, Japan established mandatory BSE testing for all cattle for human consumption (Onodera and Chi-Kyeong, 2006). As of August 2005, Japan relaxed BSE testing to only test cattle greater than 20-month-old (Ozawa, 2007). It is important to understand consumers' attitudes towards beef to be able to improve their level of confidence in beef safety, to advise on policies which can help the public, industry and government. Furthermore, the information can be used to help the Canadian beef industry maintain a competitive edge in the domestic and international market by looking at consumers' attitudes and willingness to pay for beef with food assurance attributes such as traceability and animal testing. .

As a major exporter and producer of meat, Canada not only needs to look into how Japanese consumer attitudes towards beef and general food safety are changing over time on their own merits but also investigate how Canadian consumers differ from their Japanese counterparts. This can guide policy on whether to develop /allow different levels of traceability and BSE animal testing for domestic versus exported beef. The most important question addressed in this study is whether there is a niche or general market in Japan and in Canada for Canadian beef that is traceable and/or BSE tested.

In summary, the aims of the study are to

(i) quantify Japanese trust in various agents in the food system namely government, farmers, manufacturers and retailers;

(ii) provide more information about concerns about beef safety, comparing the countries Canada and Japan;

(iii) determine what consumers are willing to pay for animal testing (for BSE) and traceability (farm to fork) in Japan and in Canada for domestic and foreign (Canadian or Australian/American) beef with the same attributes.

1.6 OUTLINE OF THESIS

This section illustrates how the study is organized. In Figure 1.7 the structure of the thesis is outlined. In Chapter 2, previous studies on consumer attitudes, their methods and a theoretical background for this work are examined. The framework for consumer confidence previously developed by de Jonge (2008) focusing on identifying different trust levels for agents in the food system, namely the government, farmers, retailers and manufacturers and on different individual traits (pessimism, optimism and worry) is described. Based on these previous studies, an online survey is designed for implementation in Canada and Japan. The survey also provides a set of stated preference questions with regards to beef to determine the willingness to pay for traceability, animal testing and both forms of intervention.

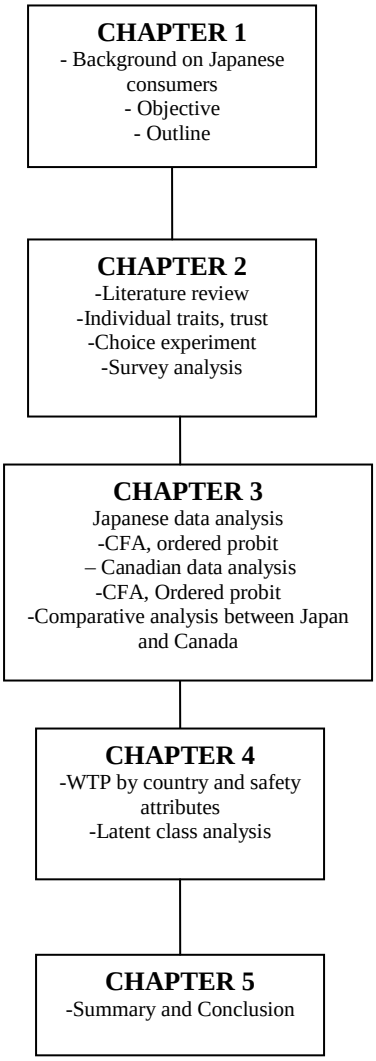
In Chapter 3, Japanese and Canadian consumer attitudes, perceptions towards beef, BSE and traceability are investigated. A comparative factor analysis is used to develop a model of consumer confidence in food safety and to check whether consumers' attitudes towards the industry actors, individual traits and safety perceptions of different product groups provide a good fit. Structural equation modeling is used to determine two dimensions – pessimism and optimism related to general food safety confidence. Finally, an ordered probit model is used to find the determinants of people's general food safety and beef safety concerns. Understanding the strength of differences in attitudes about food safety can provide useful information on whether not to adopt different standards for exported versus domestic beef. How different Japanese attitudes are from Canadian attitudes, risk perceptions is described. The results of the survey question analysis for Japan and Canada are compared. A standardized

confirmatory factor analysis is estimated to be able to compare individual traits and trust components across countries.

In Chapter 4, the stated preference questions are analysed to estimate the probability that consumers will choose a certain beef product using multinomial logit models. Then the willingness to pay for beef with different food safety attributes is derived for Japanese and Canadian consumers. A latent class logit model can also be estimated for both countries to identify sub-groups within each population with potentially different behaviours towards traceability and animal testing attributes. There may be different categories of consumers, those who are, for instance, more trusting and thus are willing to buy imported beef while others who are more cautious and would be willing to pay more for food safety reassurances. The willingness to pay for food safety assurances by different classes of people in the two countries and the determination of whether there is a niche or general market for tested traceable are also presented.

Finally, in Chapter 5 a summary of the study and conclusions are presented. The limitations and recommendations for further studies are discusssed.

Figure 1. 7 Structure of Thesis



CHAPTER 2 LITERATURE REVIEW- AN ANALYTICAL APPROACH

The purpose of this chapter is to review previous research done on the subject of consumer confidence, willingness to pay and latent class analysis. Literature suggests that confidence in the safety of food is based on a number of factors namely trust, individual differences, and media coverage. Other studies have found that socio-demographics and attitudes towards risk are important determinants of the level of food safety confidence. In the chapter the importance of choosing the most appropriate survey design, methods and survey questions for this study are presented.

First, previous studies on consumers' confidence in food safety are presented in this chapter. Trust in societal actors, individual's differences and sociodemographic characteristics are investigated. The second part of the chapter provides a description of consumers' risk attitudes and perceptions and the definition of the concept of traceability. In the third part, the different statistical approaches used in the survey analysis are reviewed. The concept of using multinomial logit models for choice analysis is introduced. In the fourth section of the chapter the importance of carrying out survey analysis and survey design is explored.

2.1 LITERATURE REVIEW

2.1.1 CONSUMER CONFIDENCE IN FOOD SAFETY

In order to understand what factors affect the level of food safety confidence, a framework developed by de Jonge (2008) is reviewed. The objective of her research was to develop a framework to identify factors which influence consumer confidence in the safety of food and to determine the impact of changes in consumer confidence on consumer behaviour. Her aim was to provide risk managers, communicators and other stakeholders with insights to better understand consumers' concerns about food safety issues. She also studied the impacts of the actions made by food safety institutions on risk analysis. de

Jonge (2008) showed that general consumer confidence in food safety is determined by four main factors, namely:

- consumer trust in societal actors,
- consumer recall of food safety incidents and media coverage,
- safety perceptions of different product groups, and
- socio-demographic and personality characteristics (de Jonge et al., 2008b; de Jonge, 2008).

She compiled a list of questions on personality characteristics based on the previous literature, questions that were designed to measure general consumer confidence in the safety of food. These questions are shown in Table 2.1 and answers were rated on 5-point Likert scales ranging from 'disagree strongly (1) to 'agree strongly'. Her final list below (in bold) was selected after a pilot study in September 2003. The method used in selecting those questions was principal component analysis with varimax rotation. Items were excluded on a number of criteria namely on the basis of low communality (< 0.40), asymmetric distribution, overlap in content, on a high number of 'don't know' answers, too broad item content and confirmatory factor analysis.

Table 2. 1 Consumer Attitudes Questions – de Jonge (2008)

Statements
Food products have never been as safe as nowadays
I believe food products are becoming increasingly safe
Food scares increase my concern about food safety
In recent months my confidence in food products has decreased
Generally there are few risks involved with food
Too often it happens that food products are sold in the Netherlands that are dangerous to consumed
I worry about the safety of food
I do not have faith in the safety of food
I am afraid to become ill as a consequence of the products I eat
I am confident that food products are safe
I get very stressed when I think about food safety

I think the quality of food will increase
I feel uncomfortable regarding the safety of food
Generally food products are safe
As a result of the occurrence of food safety incidents I am suspicious about certain food products
I feel frustrated about the problems that come up in the area of the safety of food
I believe few risks are involved in the consumption of food products
It scares me that there are problems with managing the safety of food
I am calm about all discussions about the safety of food
Problems that occur in the area of food safety make me angry
I feel hopeful about the developments in the area of food safety
I feel nervous when I think about the safety of food products
I am optimistic about the safety of food products
I panic as a result of food safety incidents that occur
I feel helpless as a consumer, with regard to the safety of food
I am satisfied with the safety of food products

The questions in bold were used in comparing consumer attitudes between consumers in Canada and the Netherlands. A market research company recruited the participants in the Netherlands and Canada. The survey questionnaire was available through the internet and took place in November/December 2005 (The Netherlands) and in June 2006 (Canada). In Canada, French speaking respondents were excluded. 528 Canadian and 657 Dutch respondents filled out the survey. Confirmatory factor analysis using Maximum Likelihood in LISREL 8.50 was used to validate the constructs for general consumer confidence in the safety of food (de Jonge, 2008).

de Jonge et al. (2008, 2008a, 2008b) developed specific measures for important personality characteristics from the questions. She identified two dimensions – optimism and pessimism that affect the general consumer confidence in the safety of food, dimensions which are themselves differently influenced by other determinants. Pessimism and optimism about safety of food can co-exist and they should not be considered as the two ends of a uni-

dimensional scale. Her first step was to perform confirmatory factor analysis followed by structural modelling using maximum likelihood methods to test the structure of each dimension. Four questions were found to determine the level of optimism and three werefound to determine the level of pessimism as shown in Table 2.2.

Table 2. 2 Questions to Determine Level of Optimism and Pessimism – de Jonge (2008)

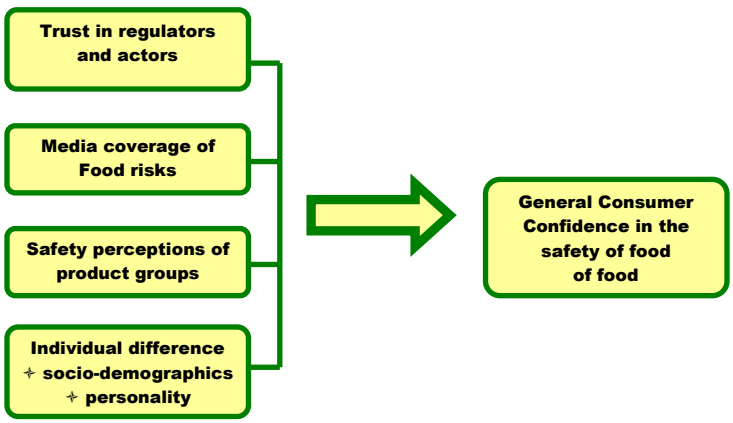
OPTIMISM	PESSIMISM
I am optimistic about the safety of food products	I worry about the safety of food
I am confident that food products are safe	I feel uncomfortable regarding the safety of food
I am satisfied with the safety of food products	As a result of the occurrence of food safety incidents, I am suspicious about certain food products
Generally, food products are safe	

de Jonge et al.'s (2008, 2008b) results indicated that Dutch consumers had a higher level of optimism and a lower level of pessimism regarding the safety of food, which appeared to be mainly related to Dutch consumers' lower level of concern about factors related to production. The worry tendencies of individuals were determined using a set of three questions namely: "Many situations make me worry", "I know I shouldn't worry about things, but I just cannot help it", and "I notice that I have been worrying about things". The 5-point Likert scale responses range from 1 ("not at all typical") to 5 ("very typical"). The software used to investigate these dimensions in the framework of consumer confidence in the safety of food was LISREL 8.72 (de Jonge et al., 2008b; de Jonge, 2008).

de Jonge (2008) also looked into trust in societal actors namely government, retailers, manufacturers and farmers. The responses were on 5-point Likert scales ranging from "strongly agree" to "strongly disagree" with an "I don't know" option. The questions investigated competence, knowledge, honesty, openness, care and attention by the societal actors (de Jonge, 2008). The questions can also be found in Table 2.3.

As part of the development of the framework for confidence in food safety, she also found that safety perceptions for different product groups were significant factors (de Jonge et al., 2008a; de Jonge et al., 2008b; de Jonge, 2008). If consumers perceive a certain product group to be risky, they might have the same perceptions for specific products. Therefore, safety perceptions in product groups is an important item when developing a food safety confidence framework which could potentially be useful in this study. The following question has been used in her research to identify safety perceptions for product groups: "Please indicate how much confidence you, generally, have in the safety of the following product groups namely beef, pork, chicken/poultry, fish, meat replacers/substitutes, canned products, products in jar, fresh vegetables and fruit, precut and washed fresh, milk products, cheese, eggs, bread products, frozen products, ready-to-eat meals, vitamin supplements." The responses are on a 5–point Likert scale ranging from 1 ('no confidence at all') to 5 ('complete confidence'). The respondents are also given the "I don't know" option. Each of these items can be categorized in the four different groups – meat and fish, fresh produce, preserves and processed foods (de Jonge, 2008). A summary diagram of the framework for general consumer confidence is depicted in Figure 2.1.

Figure 2. 1 Framework for General Consumer Confidence- de Jonge (2008)



Brewer in collaboration with different authors at three different periods in time, 1994, 2002, and 2008, studied consumer attitudes toward food safety.

People were surveyed face to face at several locations. The survey questions were used to probe general attitudes towards food safety concerns and issues and behaviours towards technologies. They used 5-point Likert scales where 1 = very safe, not a concern and 5 = very strong concern to investigate the general attitudes of the respondent ("How safe is the food you eat?"). Frequencies and means were determined for the concern levels on "chemical", "regulatory", "health", "microbiological" issues and "deceptive practices" over the different years (Schroeder et al., 2006; Brewer et al. 1994; Brewer and Prestat, 2002; Brewer and Rojas, 2008). Their analysis has some differences and similarities to that of de Jonge (2008). The survey method differs from de Jonge's (2008) method in that they did a face to face survey at the same university location over different time periods. On the other hand, they also factor-analyzed the items using the principal components method and the varimax rotation method.

Costa-Font and Gil (2009) investigated consumers' potential reactions to the GM foods. They summarized previous work on the willingness to pay for non-GM food and made use of structural modeling to create constructs. Their structural model assumes that consumers' perceptions of GM food can be expressed both as the interactions of positive and negative dimensions, as well as moral concerns. The set of constructs were obtained using confirmatory factor analysis on the following: "attitudes towards science and technology; trust; benefit perceptions; risk perceptions; GM food attitudes and consumer intentions towards GM food in each country". In this case, they used Weighted Least-Squares (WLS) method which is different from that of de Jonge (2008) who had used Maximum Likelihood (ML). This is because the data used in their analysis has a non-normal distribution and a weighting matrix necessary for their analysis cannot be employed using ML. Their results showed that perceived risks are an important construct determining attitudes and purchase intentions towards GM food (Costa-Font and Gil, 2009).

2.1.2 TRUST IN SOCIETAL ACTORS

Recent food scandals and scares of which some have been linked to a lack of transparency by food authorities (in the case of BSE in Portugal and UK) have also brought trust to the forefront in determining consumer confidence. It is argued that there are two types of trust, namely interpersonal trust and social trust. Interpersonal trust is associated with the source of information and the target audience while social trust refers to the trust that people have in institutions (Trautman at al., 2008). Gianluca et al. (2008) conducted a survey in Italy in 2004 by interviewing, face to face, 580 individuals. They organized their questionnaire into three sections: in the first section food-consumption habits were considered, in the second, lifestyle patterns and trust towards actors in the food-supply chain were questioned and in the third, socio-demographic information was acquired. They used exploratory principal component analysis to find out which items should be included in the constructs. They then used maximum likelihood to estimate the structural equation modeling parameters, similar to what de Jonge (2008) did. In 1996, Frewer et al. used open-ended questions to find the determinants of trust in different information sources. Fifteen male and twenty female respondents were recruited and interviewed at their homes (Frewer et al., 1996). The sample size is very small and would have a high marginal error. The questions that are of interest are the following:

"1. Information about food-related hazards can come from many different sources. Can you name three such sources?

2. Which of the sources listed in your answer to question 1 would you trust the most to provide information about food-related hazards?" (Frewer et al., 1996)

Those questions helped compile a list of sources of information which were later used in surveys to determine how trust in information source affects consumer confidence.

Trust in societal actors such as manufacturers, farmers, retailers and the government or regulatory authorities can help boost the level of consumer confidence in food safety. Becker et al. (2000) concluded that most consumers

were incapable of predicting the quality of meat by looking at it and would rather trust an expert. The societal actors can narrow consumers' lack of knowledge on the cultivation and production processes of foods. In 1991, a study identified five factors that influence trust: a) perceived competence of the other party; b) the objectivity of the party in providing information; c) the degree to which the party takes into account all relevant points of view; d) consistency of information; and e) the "good will" of the information provider (Renn and Levine, 1991). de Jonge (2008) analysed trust in societal actors by structuring the questions to investigate competence, knowledge, honesty, openness, care and attention. The questions used for analysing trust in societal actors are shown in Table 2.3 (de Jonge, 2008).

Table 2. 3 Trust in societal actors – de Jonge (2008)

GOVERNMENT/ RETAILERS/ MANUFACTURERS/ FARMERS	**strongly disagree**	**disagree**	**neither agree, nor disagree**	**agree**	**strongly agree**	**I don't know**
	1	**2**	**3**	**4**	**5**	**6**
The actor has the competence to control the safety of food	❒	❒	❒	❒	❒	❒
The actor has sufficient knowledge to guarantee the safety of food products	❒	❒	❒	❒	❒	❒
The actor is honest about the safety of food	❒	❒	❒	❒	❒	❒
The actor is sufficiently open about the safety of food	❒	❒	❒	❒	❒	❒
The actor takes good care of the safety of our food	❒	❒	❒	❒	❒	❒
The actor gives special attention to the safety of food	❒	❒	❒	❒	❒	❒

Glaeser et al. (2000) did a survey to measure trust and trustworthiness. One of the attitudinal survey question used came from the American General Social Survey (GSS) which is “Generally speaking, would you say that most people can be trusted or that you can’t be too careful in dealing with people?”. The respondents were given three options namely “people can be trusted”, “can’t be too careful in dealing with people” and “don’t know”. They concluded that asking this question actually determines whether an individual considers others trustworthy. The results showed that 44.4% of the Harvard undergraduates answered “..most people can be trusted” which was higher than the GSS’s results which showed that the responses depend on cohort, education, and race (Glaeser et al., 2000).

Tonsor et al. (2009) looked into the level of trust in other sources of food safety information. They asked how trustworthy respondents found each of the following sources (i) Family Physicians; (ii) Dieticians; (iii) Government Food Agencies; (iv) University Scientists/Educators; (v) Private Researchers/Consultants; (vi) Retail Grocers or Butchers; (vii) Food Industry Sources; and (viii) Consumer Groups to be to the respondents. The responses were on a five-point Likert scale from 'not at all trustworthy' to 'extremely trustworthy'. The questions were factor-analysed using principal component analysis with varimax rotation. Trust in food safety information sources categorized in three groups such as ‘trust in industry, grocer and government', 'trust in researchers and consumer groups' and 'trust in doctors', affected risk perceptions of consumers in Japan, Canada and United States. They found that Japanese consumers who had a higher level of trust in industry, grocery stores and government had lower food safety risk attitudes towards beef consumption. The same conclusion applies to Canadian consumers trust in researchers and consumer groups (Tonsor et al., 2009).

Schroeder et al. (2006) and Tonsor et al. (2009) designed their survey to investigate supply chain management strategies in the beef industry. In other words, they included questions regarding what consumers find important in selecting beef. Furthermore, they also investigated consumer perceptions of beef

food safety by looking at how the country-of-origin affects the food safety perceptions as shown in Table 2.4.

Table 2. 4 Perceptions of Food Safety by Country of Origin - Tonsor et al. (2009) ; Schroeder et al. (2006)

Whether you have ever knowingly purchased beef produced in another country or not, what is your perceptions of the level of food safety of beef by country of origin?						
Your Perceived Level of Food Safety	**Very Low**	**Low 2**	**Moderate 3**	**High 4**	**Very High 5**	**No Opinion 6**
1. Unknown Country of Origin	❒	❒	❒	❒	❒	❒
2. Australia	❒	❒	❒	❒	❒	❒
3. Brazil	❒	❒	❒	❒	❒	❒
4. Canada	❒	❒	❒	❒	❒	❒
5. Japan	❒	❒	❒	❒	❒	❒
6. Mexico	❒	❒	❒	❒	❒	❒
7. USA	❒	❒	❒	❒	❒	❒

Their approach was intended to capture information about reliance on, and trust in various information sources by asking the following questions. For instance: 'When you purchase beef how much do you rely on each of the following sources for accessing food safety information ⁄ assurance? (i) Price Level; (ii) Brand Name; (iii) Purchased from Reputable Store; (iv) Country of Origin; (v) Package ⁄ Product Date; (vi) Government Inspected; (vii) Labeled Organic; (viii) Labeled Natural; (ix) Product Colour; (x) Product Smell; (xi) Product Texture; and (xii) Labeled Traceable to Farm.' The question is captured on a five-point Likert scale from 'not at all' to 'extremely'. They assumed that the

higher level of trust consumers have in a particular source the greater will be its impact on food safety risk perceptions and attitudes and vice versa. They then used principal component analysis with varimax rotation for their analysis.

They also investigated what people consider to be important product traits when purchasing beef products. They asked the respondents to check five product traits of those listed, which they would consider most important from 1. Price 2. Product Food Safety Assurance 3. Product Nutritional Information 4. Product Leanness (Less Fat) 5. Product Flavor 6.Product Tenderness 7. Product Juiciness 8. Product Preparation Ease 9. Product Preparation Time 10. Product Freshness (i.e., "Sell by Date" in U.S.; "Packaged on Date" in Canada; "Best Before" Date in Japan) 11. Product Color 12. Product Labeled 13. Natural 14. Product Labeled Organic 15. Traceability of Product to Farm 16. Country of Origin of Product.

Most of the respondents answered *product freshness* as one of the most important attributes. In Canada only 4% listed *traceability* as their top 5 attributes while 25% listed it as their top 5 in the survey when making purchasing decisions. Japanese respondents are highly concerned about beef products' *country of origin* with 76% citing this as one of the five most important attributes affecting purchase decisions while in Canada the figure is only 25% (Schroeder et al., 2006). Therefore, non-economic factors such as origin, freshness and location at which the product was purchased were also identified as some of the determinants of consumer safety-related concerns (Schroeder et al., 2006).

Results from other research on consumption of certain meats in Brazil showed that the nutritional attributes carried more weight in determining consumption of certain meats than the attributes related to safety (Conceicao Pereira da Fonseca and Salay, 2008). Becker et al. (2000) found that "Country of origin" was the most important attribute followed by "place of purchase" for assessing beef purchases in shops.

A survey was done in Belgium on beef consumers to investigate what information cues on beef labels attract consumer interest. An ordered probit model was used to estimate the importance and attention to labels. The

explanatory variables used in the estimation are demographics and campaign awareness (Verbeke and Ward, 2006).

Buyers hesitate on what to buy because it might involve the risk of incurring some type of loss. The potential buyer is uncertain how to go about reducing risk and is uncertain about whether to make the purchase. Another way to rank the importance of any of the items from a survey is to use "net favorable percentage". For instance, the attitudes of housewives from Colorado toward risk relievers measured on a 5-point scale which ranged from 'almost always helpful' to 'almost never helpful' can be ranked using average scores or by using the gross percent of favorable response from the scales. The net favorable percentage (NFP) response can be calculated as follows:

"The number of unfavorable responses (rarely helpful and almost never helpful) was subtracted from the number of favorable responses (usually helpful and almost always helpful). It is then divided by the total number of responses and multiplied by 100" (Roselius, 1971, pg 58).

NFP ranges from +100 to -100, which implies that it ranges from completely favorable to completely unfavorable (Roselius, 1971, pg 58).

Socio-demographic variables such as sex, race, and age, presence of a child in a household, education and income have been identified as determinants of risk perceptions and food safety concerns (Knight and Warland, 2004). Tucker et al. (2006) found certain characteristics determine risk perceptions. For instance, he found that individuals who had lower household incomes had higher food safety risk perceptions than those with higher household incomes. Individuals with higher education levels had lower food safety risk perceptions than those with less formal education. He also claimed that people who had children in their households were more likely to perceive higher levels of food safety risk than individuals without children in their households. Knight and Warland (2004) also claim that individuals' food risk perceptions increase with age.

In this section previous studies on the determinants of consumer food safety confidence were reviewed. Questions which define consumer behaviour, the level of trust in societal actors and safety perceptions for different food groups

are summarized. Certain authors have found that sociodemographic variables influence individual's perceptions of food safety. There are different ways of asking survey questions. Some of the trust questions that were reviewed were open ended questions while others were close ended with Likert scales. The general trust questions were used in numerous surveys. In addition, numerous studies used confirmatory factor analysis and principal component analysis in estimating consumer confidence.

2.1.3 RISK ATTITUDES AND PERCEPTIONS

Risk attitudes and perceptions are important factors that affect the level of consumer confidence. Numerous studies claim that the main determinant of meat consumption is the individual perceptions of health risks, in other words positive health perceptions resulted in positive attitudes towards meat. Forty-two percent of Europeans believe their health will be affected by the food they eat (Eurobarometer, 2006; Banati, 2008). Another study found that food scares in recent years had an impact on attitudes and concluded that if beef producers wanted to maintain consumption levels, they will have to have higher standards (McCarthy et al., 2003). Pennings et al. (2002) decoupled the risk response behavior of consumers into two separate components, namely risk perceptions and risk attitudes, to help marketers deal with different segments of consumers in a crisis situation. They conducted two field studies on consumers in Germany, the Netherlands, and the United States to see how they reacted to the BSE crisis. For instance if risk perceptions is the main driver in consumers' reactions this implies that establishing effective communication information might change consumer behaviour. If risk attitudes is the main driver then to change consumer behaviour marketers should focus on ways to eliminate risk such as total recall of products (Pennings et al., 2002). Mannion et al. (2000) found that factors that influence meat consumption can be separated into economic, such as income and price, and non-economic factors, such as consumers' perceptions of quality.

> *"Risk perceptions represent a person's views about the risk inherent in a particular situation […] Risk attitudes are a person's overriding tendencies toward risk across different risky situations. Risk attitudes refer to how willing a person is to accept risk"* (Mannion et al., 2002)

Knight and Warland (2005) investigated the risk perceptions of three food risks, pesticides, Salmonella and fat, using data gathered from a nationwide telephone survey in 48 U.S contiguous states in 1999. The sample size was 1400 adults and 59% completed the survey. The respondents were asked questions about whether they were concerned about each of the risks and if the answer was positive for any of them, follow-up questions were applied. A logistic regression was used to estimate the models linking the independent variables which include knowledge, control, experience, worldview, trust, and socio-demographics and each of the risk variables for pesticides, Salmonella and fat. They specified their model through a multi-disciplinary approach based upon psychometric, cultural, and reflexive modernization perspectives on risk perceptions. They found that even when people thought they had the knowledge and control over risks, in their case the fat component, trust remained an important determinant of risk perceptions. They also found that trust in the food system was negatively related to concerns about pesticides, Salmonella, and fat (Knight and Warland, 2005).

Pennings et al. (2002) used a number of questions on a 9-point Likert scale to investigate risk perceptions and attitudes about beef in the Netherlands, Germany and United States, shown in Table 2.4. They used a scaling procedure to measure risk perceptions and attitudes by calculating the respondent's average score. They also analysed the relationship between demographic variables and risk measures. Pennings et al. (2002) found that Germans have reacted most strongly to the BSE crisis. They also ran logistic regressions on the dependent variable "Did you reduce your beef consumption because of the BSE crisis (0=no, 1=yes)?" which indicated that differences in the countries were not demographically driven (Pennings et al., 2002).

Similarly, Tonsor et al. (2009) and Schroeder et al. (2006) used the same questions, on a 10-point Likert scale, to investigate consumer risk attitudes and perceptions in Canada, US and Japan (and Mexico in the case of Schroeder et al. (2006). They used confirmatory factor analysis to investigate the quality of the constructs (Schroeder et al., 2006; Tonsor et al., 2009). de Jonge (2008) also used the same questions in her survey modifying the questions to a 5-point Likert scale. Another study explored consumer perceptions of beef safety by doing focus groups in four European countries. The participants were categorized as beef eaters with and without children and with varied employment status. The participants associated their experiences with beef safety with current issues, for instance BSE (Van Wezemael et al., 2010).

Table 2.4 Risk Attitudes or Perceptions - Tonsor et al. (2009) ; Schroeder et al. (2006)

Risk Attitudes	
My willingness to accept food safety risk when eating beef, I am …	1= Very Willing, …, 10 = Not at all Willing
I rarely think about food safety when eating beef	1= Strongly Agree, …, 10 = Strongly Disagree
For me, eating beef is worth the risk.	1= Strongly Agree, …, 10 = Strongly Disagree
Risk Perceptions	
I consider eating beef	1= Not at all Risky, …, 10 = Highly Risky
When eating beef I am exposed to	1= No Risk at all, …, 10 = Very High Risk
Eating beef is risky	1= Strongly Disagree, …, 10 = Strongly Agree

In 2007, Schroeder et al. (2007) investigated whether beef consumption in North America had changed over time and measured the attitudes and risk perceptions of consumers across the different countries. Risk attitude and perception questions based on the work of Schroeder et al. (2007) are used in the

survey in this study. They use the Arrow-Pratt[2] measure to calculate the risk premium which is associated with the food safety risk when consuming food. They also estimated a two-stage model to determine whether the differences in risk attitudes and perceptions were linked to changes in beef consumption. They employed a double-Hurdle regression model which revealed that Japanese consumers are more risk aversed is compared to U.S or Canadian consumers. In the double hurdle model, they used maximum likelihood with a probit model in the initial stage and a tobit model in the second stage. They found that consumer food safety risk attitudes and risk perceptions heavily influenced consumers' reactions to beef safety. Their research also revealed that Japanese customers were more risk averse than Canadian or U.S consumers and concluded that consumer risk perceptions were very important. Regardless of the actual risks of a given product, if consumers perceived higher risk levels, the demand for the product will decrease. Risk perceptions therefore depend on the media, policy makers and industry (Schroeder et al. 2007).

In another survey conducted, consumers were segmented according to their safety perceptions. Their willingness to pay for labeled beef was then calculated. Angulo et al. (2007) found that consumers' risk perceptions about food influence their purchasing behaviour for food. They also studied the relationship between risk perceptions and willingness to pay for certified beef. Structural equation modeling was used to investigate attitudes toward food safety and beef safety perceptions. Their results showed that education and trust in information sources affected confidence in food safety (Angulo and Gil, 2007). These results are interesting and the analysis is similar to what is intended in this study.

Schroeder et al. (2006) and Tonsor et al. (2009) conducted surveys on approximately 1,000 consumers from each of four countries namely Canada, United States, Japan and Mexico (only Schroeder et al. (2006) used results from

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[2] The *Arrow–Pratt measure of relative risk aversion* is defined by $R(y) \equiv \frac{-v''(y)}{v'(y)}$, *(http://econ.ucsb.edu/~sleroy/235a/ch9.pdf)*

Mexico) on beef food safety from February to March 2006. Schroeder et al.'s (2006) research indicated that consumers from United States, Canada, Mexico and Japan have changed their consumption of beef based on their level of risk aversion and perception with regards to information about beef food safety.

Risk attitudes and perceptions are important determinants of consumers' food perceptions. Questions have been compiled to directly determine consumers' risk attitudes and perceptions on beef. Previous survey questions that looked into what attributes people find important when purchasing beef and their trust level in different information sources were also reviewed.

2.1.4 TRACEABILITY AND ANIMAL TESTING

As a fundamental part of the survey, traceability and animal testing are important attributes to be used in the choice experiment. This section first introduces and explains the concept of traceability followed by animal testing.

"Traceability is the ability to follow an item or a group of items - be it animal, plant, food product or ingredient - from one point in the supply chain to another, either backwards or forwards. Livestock traceability systems are based upon three basic elements: animal identification; premises identification; and animal movement" (Canadian Food Inspection Agency, 2009).

Mennecke et al.'s (2007) definition of traceability is as follows:

"Traceability: The ability to retrieve the history, treatment, and location of the animal that a cut of meat comes from, through a recordkeeping and audit system or registered identification program. Traceability usually refers to the ability to track meat to the animal from which it was produced.

Traceable to the birth farm: Meat that you purchase can be traced back to a specific animal on the farm on which it was born.

Traceable to the feed lot: Meat that you purchase can be traced to the feed lot on which a group of animals were finished before processing and slaughter. Feed lot operators can combine animals from a variety of sources and may have lots that

are all locally produced, lots that are a mix of local and non-local cattle, or lots that are entirely a single breed.

Traceable to processing plant only: Processors frequently take animals from one and more feed lots and combine them into a process lot that are slaughtered together. Animals may be from the same farm, region, or country of origin, depending on how the processor constructs the lot. The information about the region of origin, farm ownership, etc. can be maintained with the meat in some, but not all, cases (e.g., if a processor runs a lot only with animals from a single region, or only from organic farms, then the lot can be regionally certified or organically certified). Regardless of the "type" of meat you purchase, it can only be identifiably traced to a processing plant and a specific slaughter lot" (Mennecke et al., 2007, pg 34).

Traceability brings benefits at different stages of food processing. It can minimize the liability of each agent from the farm stage to the distribution stage and maintain consumer confidence. There is also the claim that traceability will increase productivity of the agents by allowing verifiable and complete records of vaccinations and production. Traceability can help create food assurances which are beneficial to the government and public since it can reduce food borne illness, thus reducing societal and health costs (Trautman at al., 2008).

In Japan, the government introduced regulations in 2002 and 2003 which required traceability of cattle from the packing plant to feedlot and from consumption through distribution to production, using an internet based system. Furthermore, the retail chains in Japan have adopted voluntary systems to reassure their consumers by having certification from export organizations such as the Australian Feedlot Association and BSE testing certificates (Trautman at al., 2008).

The BSE crisis brought awareness to governments and industries about the importance of risk management and how a food safety event can disrupt the industry and market. Trade between countries relies on the agreements they have with each other. In the case of most countries, the World Trade Organization (WTO) sets the general rules for trading relationships. The report talks about

market integration and governments have three options where they can opt for (i) policy coordination in which they reduce differences in policy, (ii) equivalence agreements where they agree to accept the regulatory program of the trading partner and (iii) harmonization where they adopt identical standards and enforcement mechanisms (Caswell and Sparling, 2005). Canada has been a net exporter of beef and cattle and having trade restrictions on beef is detrimental for its economy.

Traceability in Japan can be regarded as a marketing tool. After BSE, retailers tried to bridge the gap in consumers' lack of confidence in the government regarding food safety by incorporating traceability to protect the safety of the food supply. Clemens (2003) found that Japanese consumers will pay 20 percent more for domestic foods which included safety assurances and production information. Japan has developed an assurance system which enables consumers to look up information as to where their beef come from. Australia has adopted the same assurance program to cater to its Japanese consumers and has thus acquired a huge market in Japan. There is an ongoing debate as to whether exporters providing a fully documentable traceability system could capture some of the Japanese market. However, Japanese industry participants do not believe that Japanese buyers will pay higher prices for imported beef (Clemens, 2003). The aim of this study is to help identify whether there is a market for imported beef in Japan and more precisely whether Canada can actually enter this market and how much Japanese consumers are willing to pay for animal tested and /or fully traceable Canadian beef.

In 2009, a benefit-cost analysis was done of the United States National Animal Identification System (NAIS) by the NAIS Benefit Cost research team. NAIS came about because there were concerns about the inability of US health officials to trace animals given an animal health issue. It was only after the discovery of BSE in Canada and US in 2003 that interest in national animal identification systems grew in the US and they further developed and renamed NAIS in the US (NAIS benefit-cost research team, 2009).

In Canada, traceability systems have been developed on a sector-by-sector basis. Currently, there are established regulated animal identification programs for the beef cattle, dairy cattle, bison, and sheep sectors. The Canadian Cattle Identification Program (CCIP) is mandatory in all provinces and was introduced in 2001, where all bovine animals must bear a registered ID tag (Canadian Food Inspection Agency, 2010b). To enhance traceability, Can-Trace and the Canadian Livestock Identification Agency (CLIA) were created in 2003 and 2005 respectively (Ontrace, 2010). Although according to federal regulations cattle cannot be moved from the herd of origin without an approved tag, the tags on the other hand haven't been well accepted at critical points and they tend to get damaged. Furthermore, all the tags need to be linked to a database (Murray 2004).

NAIS is responsible for premise registration, animal identification and animal movement tracking. The NAIS adopts either a bookend or a full tracing practice. The bookend system only identifies the animal individually or in a group at birth and ending the record at the packing plant. There is no record of animal movement. On the other hand, a full tracing system also includes recording the movements of animals through their lifetime. They found that the cost of a bookend system for a typical dairy cow operation is $2.47 per cow and a full tracing system is $3.43. As for a typical beef cow operation the cost is $3.92 per cow for the bookend system and $4.22 per cow for a full tracing system (NAIS benefit-cost research team, 2009).

The study (NAIS benefit-cost research team, 2009) presented different scenarios for the bovine industry in the adoption of NAIS. The first scenario, if NAIS is not adopted, showed that the export market will eventually be lost with or without any major market or animal disease event as the international marketplace is starting to adopt animal identification and traceability. Their result show that the losses could total up to $18.25 per head if NAIS is not adopted and the US ends up losing 25% of their export market. Other scenarios which assumed different percentages of the industry would adopt full traceability found that the increase in export demand would completely pay for the adoption rates. Their study also showed that an increase in demand for domestic beef by 0.67% will

pay for a 70% adoption of cattle ID and tracing, over a ten-year period (NAIS benefit-cost research team, 2009).

The method used for modeling is by estimating changes in consumer and producer surplus as a result of implementing the different animal identification programs premises registration only, bookend animal ID system and full traceability ID system. An equilibrium displacement model was then used to estimate the changes in the welfare effects. The equilibrium displacement model relies on the supply and demand elasticities.

Simulations were used to evaluate the change in consumer demand based on different adoption rates of full animal traceability. A permanent 0.24% increase in domestic beef demand would pay off if the entire beef industry adopted 30% full traceability (NAIS benefit-cost research team, 2009).

As of September 2000, Europe employed a system of traceability in which the label reports information about the beef and where the animal was slaughtered. In 2002, information regarding the animal's origin was also included on the label (Gracia and Zeballos, 2005).

Gracia and Zeballos (2005) analyzed consumer and retailers attitudes toward the mandatory European traceability and labeling system for beef in Spain. The analysis showed that consumers and retailers believe that traceability has led to higher beef prices. The level of confidence in beef safety and consumer-safety perceptions increased. However, consumers and retailers also believed that the traceability and labeling system was unnecessary as they thought that the quality and safety of beef was adequate before the system was established. Gracia and Zeballos (2005) analyzed the data using factor and cluster analysis and cross-tabulation tests (Gracia and Zeballos, 2005).

Angulo and Gil (2007) had 650 responses to their survey and their data was collected via a telephone survey. The questionnaire had four sections with the first part providing information on consumers' concerns about food safety and how information has been received. The second part dealt with safety perceptions towards certain food products. The third part addressed questions on traceability and certification and the final section used a contingent valuation method to elicit

WTP for certified beef. Their approach to calculating WTP was in question format. They explained to the respondents the meaning of traceability and the respondent had six choices for the WTP: (1) nothing; (2) up to 0.6 per kilogram; (3) up to 1.2 ; (4) up to 1.8; (5) up to 2.4; and (6) more than 2.4 (Angulo and Gil, 2007).

A survey had been administered in 2006 in Europe to investigate traceability. The questions that are of interest are compiled as follows (Exposium-GS1 Europeans and Traceability, 2006):

"1. Have you ever heard of traceability? Yes No

2. Here are some phrases that could describe the use of traceability. From this list, in your opinion, which are the main uses of traceability? -You may select 3 possible answers

-To withdraw products should they prove to be dangerous

-To offer reassurance as to the quality of products that people purchase

-To provide information about every stage of the manufacturing process

-To provide better information on product ingredients

-To fight counterfeiting

-To offer guarantees as to sustainable development or fair-trade

-To help people in choosing "healthy" products

-To follow dangerous or "at risk" individuals

-To provide additional services that can be used everyday (e.g. Loyalty Cards).

3. Tell me which of the following phrases you consider it to be essential, important or secondary?

-The list of ingredients that make up a product

-The list of allergens Information about GMOs

-The place of origin of a product

-Information about labels or norms

-The name of a product's manufacturer (the brand)

-The different intermediaries involved in the manufacture of a product

-The path of the product through the supply chain

4. If you had a problem with a product, who would you hold responsible?
-The manufacturer
-The retailer" (Exposium-GS1 Europeans and Traceability, 2006)

The discovery of BSE in May 2003 in Canada led to an immediate drop in beef exports leading to a decrease in prices of fed-cattle and cull-cows. Schroeder and Pendell's (2007) research found that there would be a greater demand for domestic beef products with animal ID and traceability. The term 'traceability' is very complex and should be clarified. According to a report by Trautman et al. (2008), there is a distinction between farm-to-fork and farm-to-slaughter whereby the former is defined by the animal being traced back from consumer purchase to farm of origin and the latter by the animal being traced back from slaughter to the farm of origin (Trautman at al., 2008). The USDA has launched a National Animal Identification System (NAIS) with the aim of being able to trace the movement of infected animals within 48 hours (Schroeder et al., 2006). The Canadian Cattle Identification Agency (CCIA) was established in 2001 but the national cattle identification system only became mandatory in July 2002 (Hobbs et al., 2005). Federal and provincial governments in Canada are currently working towards establishing national traceability systems although currently the traceability is not proposed to flow all the way to final consumers. The question remains whether a traceability system should be installed in Canada to help secure potential foreign markets and/or to provide a higher level of food safety confidence to the people in the domestic market. It is thus important to understand what consumers want and are willing to pay for traceability domestically and internationally.

According to the CFIA (2010), there is currently no validated live animal test for BSE. Tests for BSE can only be done on the brains of dead animals using rapid tests (Canadian Food Inspection Agency, 2010a). Since October 20, 2001, Japan established mandatory BSE testing for all cattle for human consumption. In August 2005, the Japanese government however, exempted cattle aged 20 months or younger from being tested (Ozawa, 2007). In between those two periods, around 5 million animals had actually undergone testing in Japan. The fact that it

is hard to detect abnormal protein levels in cattle under a certain age, specified risk material (SRM) from all cattle is therefore, removed (Onodera and Chi-Kyeong, 2006). The same is done in Canada. The SRM includes the skull, brain, trigeminal ganglia, eyes, tonsils, vertebral column, spinal cord, and dorsal rood ganglia of cattle older than 30 months of age. The small intestine of cattle of all ages is also removed. In comparison to the number of animals tested in Japan, since the first case of BSE in 2003 up to August 2005, Canada had tested around 64,000 animals (Canadian Food Inspection Agency, 2010c).

Previous studies had asked questions on BSE which are important to understand how consumers feel about the issue. de Jonge (2008) asked respondents to rate the extent they are concerned about BSE and Creutzfeldt Jakob Disease (vCJD). The question is rated on a 5-point Likert scale from 'not at all concerned' to 'very concerned'. Moore (2005) surveyed respondents face to face in Seattle in 2004. His objective was to understand consumer preferences for beef after BSE in the United States. His survey is of particular interest as his research looked into consumers' knowledge of BSE, their food safety attitudes towards beef, and their level of trust in beef products (Moore, 2005). Question 4, 5, 6 and 8 as shown below look into safety perceptions and consumer attitudes, question 12 investigates how knowledgeable consumers are about BSE. These questions are as follows:

"Q4. How do you feel overall about the safety of US beef?

1. Very safe 2. Somewhat safe

3. Somewhat unsafe 4. Very unsafe

5. Don't know

Q5. Please rank your preferred beef products (**1 is the most preferred product and 5 is the least preferred**)

____beef produced in Washington State

____beef produced in US

____beef tested for BSE

____beef produced in Canada

____beef produced in Australia

Q6. How often do you eat beef?

1. Daily
2. At least once a week
3. At least once a month, but less than once a week
4. Less than once a month
5. Never

Q8. When you buy beef, how important are the following factors to you? (Please check)

	Very Important	**Somewhat Important**	**Not Important**
1. Cholesterol and fat	_____	_____	_____
2. Food borne disease	_____	_____	_____
3. Antibiotics in food	_____	_____	_____
4. Hormones in food	_____	_____	_____
5. Mad cow disease	_____	_____	_____
6. Organic	_____	_____	_____
7. Price	_____	_____	_____

Q9. How important is testing for BSE (mad cow disease)?

1. Very important
2. Somewhat important
3. Somewhat unimportant
4. Not important at all

Q12. By which of the following ways, may humans get mad cow disease? **(Check all that apply)**

Touching the contagious meat_____

Eating beef steak_____

Blood transfusions from people who have variant Creutzfeldt-Jakob disease_____

Drinking milk_____

Eating beef brain_____

Q13. If you had the opportunity to buy a beef product that was tested for BSE, would you buy it rather than other beef products, assuming equal price and equal taste?

1. Yes **(if yes go to Q14a)**
2. No **(if no go to Q14b)**

Q14 (a). Would you be willing to purchase this product if it cost 5% more than other beef products? **(Go to Q15)**

1. Yes 2. No

Q14 (b). Would you be willing to purchase this product if it cost 5% less than other beef products?

1. Yes 2. No

Q15. How has your consumption of beef changed since you heard the BSE news in the US?

1. Increase dramatically **(skip to Q17)**
2. Increase slightly **(skip to Q17)**
3. Remain the same **(skip to Q17)**
4. Decrease slightly
5. Decrease dramatically

Q16. If you are not consuming conventional beef, what are you substituting? **(Check all that apply)**

1. Seafood 2. Pork
3. Chicken 4. Lamb
5. Organic beef 6. Grass-fed beef
7. Other _____"(Moore, 2005)

In this section the meaning and importance of traceability in the meat industry was described. In Japan, traceability represents a marketing tool whereby consumers have a level of safety assurance and can trace back the beef to the farm. The question that arises is whether there is an incentive for Canada to do the same.

2.2 STATISTICAL APPROACH - WILLINGNESS TO PAY

In this section, studies done using stated preference questions and measuring willingness-to-pay (WTP) using multinomial logit models are reviewed. Schroeder et al. (2006) undertook a stated preference analyses to identify the consumers' willingness to pay for various beef steak production, food safety and product quality attributes. As specified earlier, the survey containing the stated preference questions was administered on-line in Canada, the United States and Japan and in Mexico, face-to-face interviews were used. The consumers were presented with a set of 21 different purchasing scenarios where the consumers had options between two differentiated strip steaks and neither of the two. One of the scenarios is shown in Table 2.6 and the attributes are presented in Table 2.7:

Table 2. 6 Choice Set – Schroeder et al. (2006)

CHOICE SET 20			
Steak Attribute	**A**	**B**	**C**
Price ($/lb.)	$5.50	$9.00	
Country of Origin	USA	Mexico	
Production Practice	Approved Standards	Natural	
Tenderness	Assured Tender	Assured Tender	
Food Safety Assurance	Enhanced 80%	Enhanced 80%	Neither A nor B is preferred
I would choose . . .	○	○	○

Table 2. 7 Attributes for survey- Schroeder et al. (2006)

"In this final section of this survey you are provided with 21 different pairs of alternative top loin beef steaks (also known as Kansas City strip and New York steak) that could be available for purchase in the retail grocery store or butcher where you typically shop that possess differing attributes. Steak prices vary from CN $5.50/lb. to $16.00/lb. For each pair of steaks, please select the steak that you would purchase, or neither, if you would not purchase either steak. It is important that you make your selections like you would if you were actually facing these choices in your retail purchase decisions

• **Country of Origin** refers to the country in which the cow was raised and includes Canada, Japan, Mexico, or USA.
• **Production Practice** is the method used to produce the cow where
  • **Approved Standards** means the cow was raised using scientifically determined safe and government-approved use of synthetic growth hormones and antibiotics (typical of cattle production methods used in USA and Canada)
  • **Natural** is the same as typical except the cow was raised without the use of synthetic growth hormones or antibiotics
• **Tenderness** refers to how tender the steak is to eat and includes
  • **Assured Tender,** which means the steak is guaranteed tender by testing the steak using a tenderness measuring instrument
  • **Uncertain** means there are no guarantees on tenderness level of the steak and the chances of being tender are the same as typical steaks you have purchased in the past
• **Food Safety Assurance** refers the level of food safety assurance with the steak
  • **Typical** food safety means the steak meets current minimum government standards for food safety
  • **Enhanced 40%** means measures have been taken to reduce risks of illness associated with food safety from consuming the product by 40% relative to typical
  • **Enhanced 80%** means measures have been taken to reduce risks of illness associated with food safety from consuming the product by 80% relative to typical"

In their analysis, a conditional logit model was used to measure the probability of respondent choices. The utility of an alternative *j*, in choice situation *t*, is given by:

$$U_{jt} = B * V_{jt} + \varepsilon_{jt} \qquad -(1)$$

where B is the vector of coefficients to estimate, V_{jt} is the systematic, observable portion of the consumer's utility function and ε_{jt} is the stochastic error characteristic of logit models, independently and identically distributed over all

alternatives and choice situations (Schroeder et al., 2006). The conditional logit model can thus be written as follows:

$V_{jt} = b_o (P_{jt}) + b_1 (Canada_{jt}) + b_2 (US_{jt}) + b_3 (Japan_{jt}) + b_4 (Natural_{jt}) + b_5 (AssuredTender_{jt}) + b_6 (EnhancedFS40_{jt}) + b_7 (EnhancedFS80_{jt}), \forall j = A, B$ (2)

$V_{jt} = b_8 \quad j = C$ (3) - (2)

V_{jt} is calculated separately for each of the three available alternatives (two steak alternatives and the none option), P_{jt} is the price of alternative *j* in choice situation; $Canada_{jt}$, US_{jt}, and $Japan_{jt}$ are dummy variables equal to one if the alternative is labeled to originate from Canada, the United States, or Japan, respectively (0 otherwise); $Natural_{jt}$, $AssuredTender_{jt}$, $EnhancedFS40_{jt}$, and $EnhancedFS80_{jt}$ denote dummy variables equal to one if the alternative is labeled as being naturally produced, assured to be tender, 40 percent enhanced food safety, and 80 percent enhanced food safety, respectively (0 otherwise); b_k (k=0, 1, .. ,8) are parameters to be estimated (Schroeder et al., 2006).

The results from the logit model are used to find the stated preferences of consumers for the various steak attributes. The average willingness to pay can then be calculated by adjusting the price until the utility of steaks with or without the attributes are equal. Schroeder et al. (2006) also performed a cluster analysis and used a random parameters logit model to estimate WTP for each of the clusters.

A study by Gonul and Srinivasan (1993) identified multiple sources of heterogeneity in multinomial logit models. The study revealed that unmeasured, household-specific factors may also influence a household's choice behaviour. One method they used to capture heterogeneity was by including a measure of brand loyalty which is obtained by calculating a utility function from past purchase behaviour (Gonul and Srinivasan, 1993)

Angulo and Gil's (2007) approach to calculating WTP was in question format. They explained to the respondents the meaning of traceability and the respondent had six choices for the WTP: (1) nothing; (2) up to 0.6 per kilogram; (3) up to 1.2 ; (4) up to 1.8; (5) up to 2.4; and (6) more than 2.4 (Angulo and Gil, 2007).

McCluskey et al. (2005) did a survey in Japan in 2001 at grocery stores and estimated the WTP for BSE-tested beef by using a dichotomous choice contingent valuation methodology (CVM) which enabled them to consider one specific attribute to evaluate the WTP for BSE-tested beef. In the case of a dichotomous choice CVM, the respondents are asked whether they would be willing to pay a particular price for a particular good in a hypothetical market. They have the choice of a 'yes' or 'no' to the price or bids. The WTP question is as follows:

"Would you be willing to purchase beef if it was tested for BSE and offered at a price that is (The premium was set at one of the following levels: 5, 10, 25,40 and 50 per cent) more than other domestic beef?

1. Yes

2. No"

The WTP for BSE-tested beef for individual *i is*

$$WTP_i = \alpha + \rho B_i + \boldsymbol{\lambda}\_\mathbf{z}_i + \varepsilon_i \; i = 1, \ldots, n, \qquad \text{- (3)}$$

where WTP_i is consumer i's unobservable true willingness to pay, B_i is the premium individual i faces for BSE-tested beef; z_i is a column vector of observable characteristics of the individual; ε_i is a random variable accounting for random noise and possibly unobservable characteristics (McCluskey et al., 2005).

Hobbs et al. (2005) did a study on the WTP of Canadian consumers for a traceability assurance, food safety assurance and a production method assurance. They performed experimental auctions in Saskatchewan and Ontario in 2002 which ran in groups of 12-14 people. The participants were paid $20 for their participation and were given a beef sandwich with the possibility to bid and exchange the sandwich for another with different attributes namely animal welfare assurance, extra food safety assurance, meat that was traceable to the farm of origin, and a sandwich that combined all three attributes. They used a Vickrey second-price auction format, with 10 rounds of bidding for each auction to find the willingness to pay for the sandwich. The participants wrote down their bid for the sandwich. Zero and negative bids were allowed (Hobbs et al., 2005).

Alfnes et al. (2003) did an experimental auction market to investigate European consumers'willingness to pay for U.S beef. They designed their experimental auction to avoid hypothetical bias which assumes that consumers tend to overstate their willingness to pay (WTP) by having consumers faced with a non-hypothetical tradeoff between money and four different types of beef. They conducted 10 sessions and had a total of 106 participants. They used a second-price sealed bid auction to elicit WTP and ran four auctions simultaneously. The winner during the auctions had to pay the price of the second highest bid and had to give up the base product. They concluded that the differences in WTP depended on the base product. The majority of the respondents were willing to pay more for domestic than imported beef. However, some of the participants preferred U.S hormone-free beef and were willing to pay 10% more which showed that there is a niche market to be exploited (Alfnes and Rickertsen, 2003).

Lusk et al. (2003) used choice experiments to investigate the differences in the demand for beef between cattle administered with growth hormones and those fed genetically modified corn among consumers from different countries. Consumers were given choices between rib-eye steaks with different attributes. The attributes were price, marbling, tenderness, use and non-use of growth hormones and GM corn in livestock production. They used a random utility function and derived a multinomial logit regression model for their analysis. Their results showed that consumers from France were willing to pay more for cattle not administered with growth hormones as compared to U.S consumers (Lusk et al., 2003).

Umberger et al. (2003) surveyed consumers in Chicago and Denver to evaluate consumers' preferences and willingness-to-pay for country-of-origin labeling of beef products and steaks. They performed an experimental auction where the participants could bid on steak and that bids would determine the price paid for the steaks. Each auction would either have one, two or three winning bids and the winner(s) would pay the second, third or fourth highest bid price. They used a logit analysis and found that consumers who desired beef attributes such as freshness, source assurance, locally-raised, and country-of-origin labels were

more likely to pay for a steak labeled "USA Guaranteed." During the auctions, consumers were willing to pay a 19% premium for steak labeled "USA Guaranteed" (Umberger et al., 2003). In 2004, Umberger et al. applied a choice experiment to determine consumer preferences on beef attributes. They presented consumers with two alternative options for their rib-eye steaks with different attributes. They used a multinomial conditional logit to calculate the WTP for each of the attributes (Food Safety Commission, 2006).

Carlsson et al. (2004) used a choice experiment analysis to investigate consumer benefits of labels and bans on GM foods. The survey was conducted during May to September 2003. Their analysis used a random parameter logit model. The results showed that consumers were WTP more for a total ban on the use of GM in animal fodder (Takashi and Chi-Kyeong, 2006).

There are different ways of administering surveys either through the internet, telephone, mail or face to face. Each of the type of surveys reviewed in this section has pros and cons. They were chosen to be discussed as they were directly relevant to this research. WTP is instigated by performing choice experiments or contingent valuations by doing auctions or surveys in question format. Most of the literature reviewed in this section used stated preference analysis to calculate willingness to pay. They also made use of conditional logit models or random parameter logit models in the estimation of consumer responses.

2.3 STATED PREFERENCE SURVEYS

A survey is a form of data collection which elicits preferences from respondents (Louviere, Hensher, and Swait 2000). Economists use stated preference (SP) data whereby respondents provide choice responses in hypothetical markets for numerous reasons. Stated preference data enables organizations to test the market for new products or products with new attributes. In comparison to revealed preference data, stated preference data are less time consuming and cheaper to collect. One advantage of SP data is the fact that the

data will be reliable if the respondents understand and are committed to the task at hand. Another advantage is obtaining numerous observations from each respondent which permits more diverse data analysis (Louviere, Hensher, and Swait 2000). SP data are also considered to be more flexible as they can be used to test for a bigger range of utility functions (Louviere and Timmermans, 1990).

The current survey is based on the literature discussed in the above sections. A summary of some of the literature used is depicted in Appendix A. The design of the survey is composed of two parts. The first part consists of questions regarding general trust in societal actors and the respondents' habits in food consumption, individual differences, socioeconomic, demographic questions, traceability and BSE questions. All of these questions are illustrated in Appendix B. The descriptive analysis of the responses are presented in Chapter 3 and 4. One particular descriptive statistic, the Net Favourable Percentage (NFP), as described earlier, will be calculated to rank items within some of the questions. The survey questions for this study were basically drawn from previous studies[3]. Trust in social actors and individual difference questions were modified from de Jonge (2008) to eliminate the "I don't know" option. She took out respondents who replied "I don't know" from her analysis. That option is eliminated in this study to ensure a higher number of respondents to perform analysis. Furthermore, option 3 which is "neither agree or disagree" can be considered similar to the "I don't know" option. The risk perceptions and attitudes questions similar to Pennings et al. (2002) and Schroeder et al. (2006) are modified to a 5-point Likert scale instead of 10. Food quality and safety concerns have become increasingly important considering the numerous "crises" recently occurring in the food industry (Arvanitoyannis et al., 2003). The demographics, BSE and traceability questions are included to investigate whether these variables affect general consumer confidence in food safety and consumer confidence in beef. Structural

[3] 'Attitudes of Retailers and Consumers toward the EU Traceability and Labeling System for Beef' by Gracia et al. (2005), 'Consumer attitudes toward issues in food safety' by Brewer et al. (2007), 'Consumer Risk Perceptions and Attitudes about Beef Food Safety: Implications for Improving Supply Chain Management' by Schroeder et al. (2007), 'BSE in North America: Consumer perceptions and willingness to pay for tested beef' by Moore (2005), Trust in Food Survey, SIFO (2003) and Exposium-GS1 Europeans and Traceability (2006), 'A monitor for consumer confidence in the safety of food' by de Jonge, J (2008).

equation modeling will be undertaken for consumer attitudes and safety perceptions of food groups, similar to the methods employed by de Jonge (2008). The determinants of general consumer confidence in food safety and beef can be estimated using ordered probit models.

The second part of the survey is comprised of choice experiment questions which follow those developed by Schroeder et al. (2006). The description for the attributes has been modified to better represent the objectives of this survey. The food assurance criterion has been changed to provide a description of animal testing and traceability. The criteria of tenderness is kept in the survey because Schroeder et al. (2006) found that consumers in Canada and United States were willing to pay sizable premiums for steak products that were guaranteed tender. This implies that product development work is multidimensional and thus keeping tenderness or production practice in the survey while investigating the willingness to pay for other attributes is important. A snap shot of the Canadian choice experiment questions used is given in Table 2.8.

Table 2.8 Stated Preference

"***Stated Preference***
In this final section of this survey you are provided with 14 different pairs of alternative strip loin beef steaks (also known as Kansas City strip and New York steak) that could be available for purchase in the retail grocery store or butcher where you typically shop that possess differing attributes. Steak prices vary from CN $5.50/lb. to $16.00/lb. For each pair of steaks, please select the steak that you would purchase, or neither, if you would not purchase either steak. It is important that you make your selections like you would if you were actually facing these choices in your retail purchase decisions.

For your information in interpreting alternative steaks:
• ***Country of Origin*** *refers to the country in which the cow was raised and includes Canada, Australia and USA.*
• ***Production Practice*** *is the method used to produce the cow where:*
- ***Approved Standards*** *means the cow was raised using scientifically determined safe and government-approved use of synthetic growth hormones and antibiotics (typical of cattle production methods used in USA and Canada)*
- ***Natural*** *is the same as typical except the cow was raised without the use of synthetic growth hormones or antibiotics*
• ***Tenderness*** *refers to how tender the steak is to eat and includes*
- ***Assured Tender*** *means the steak is guaranteed tender by testing the steak using a tenderness measuring instrument*
- ***Uncertain*** *means there are no guarantees on tenderness level of the steak and the chances of being tender are the same as typical steaks you have purchased in the past*
• ***Food Safety Assurance*** *refers the level of food safety assurance with the steak*
- ***Traceable*** *means the product is fully traceable back to farm of origin from your point of purchase*
- ***Animal Tested*** *means that all animals are tested for BSE prior to meat being sold at your point of purchase"*
- ***Both*** *means that it is both traceable and animal tested"*
- ***None*** *means that there is no food safety assurance"*

For the analysis, a choice experiment (CE) is used instead of a contingent valuation method (CVM) to determine the willingness to pay. One of the major differences between CVM and CE is that CVM asks people to choose between a base case and a specific alternative while CE is set up to get people to choose between cases depicting different attributes (Brewer et al., 1994). CE can be used to estimate marginal rates of substitutions between different attributes (Takashi and Chi-Kyeong, 2006). CE has a number of advantages. It relies on attributes,

thus allowing researchers to evaluate the attributes and situational changes (Brewer et al., 1994).

In the choice experiment, consumers were given the choice (Option A, B and C) between two steaks with different level of attributes as shown in Table 2.9. The attributes were price per pound, country of origin, production practice, level of tenderness and food safety assurance and none. For the Japanese version of the survey, the prices varied from ¥528/100gms ($26/lb) to ¥1536 ($75/lb) and the options for the country of origin were Japan, Canada and USA. Respondents were also given the option of not buying either of the two steaks. Table 2.9 summarizes the options that were available in the stated preference survey.

Table 2.9 Survey options in Japan and Canada

Steak Attributes	Japan	Canada	NONE
Price (¥/100gms / $/lb)	¥528/ ¥865/ ¥1200/ ¥1536	$5.50/ $9.00/ $12.50/ $16.00	
Country of Origin	Japan/Canada/ USA/	Canada/Australia/USA	
Production Practice	Natural/ Approved standards	Natural/ Approved standards	
Tenderness	Assured Tender/ Uncertain	Assured Tender/Uncertain	
Food Safety Assurance	Traceable/ Animal Tested/ Both/ None	Traceable/ Animal Tested/ Both/ None	I would not purchase any of these products

The different options were created by employing a fractional factorial experimental design where price (4), food safety assurance (4), countries (3), production practices (2) and level of tenderness (2) were the attributes. The combinations were generated in SAS giving a total of 192 choices with two options. One of the resulting combinations was deleted from the survey questionnaire because both options - A and B had the same attributes. The 191 choices were distributed across 14 versions of the survey, most containing 14

questions with the exception of version 10 which contained 13 questions and version 14 which had 10 questions.

Table 2. 10 Example of a Stated Preference Question

CHOICE SET 4			
Steak Attribute	**A**	**B**	**C**
Price ($/lb.)	$12.50	$5.50	I would not purchase any of these products
Country of Origin	Australia	USA	
Production Practice	Natural	Natural	
Tenderness	Assured Tender	Assured Tender	
Food Safety Assurance	None	Traceable and Animal Tested	
I would choose . . .	○	○	○

2.5 SUMMARY

Different studies on food safety confidence were reviewed. A list of survey questions which can identify consumer behaviour, the level of trust in societal actors and safety perceptions of different food groups were compiled. Risk attitudes and perceptions questions are included as they have been found to be important determinants of consumers' food perceptions. In this chapter the importance of traceability in the meat industry was also summarized. Survey questions, methods used to investigate consumer attitudes, risk perceptions and attitudes towards general food products from previous studies and their respective results were discussed at length. Reviewing different types of surveys provides the background necessary in the design of this study's particular survey to estimate consumer attitudes and WTP for traceability and animal testing.

In the next chapter, the analysis of survey responses is undertaken and structural equation modeling is used to investigate individual differences, trust in societal actors, consumers' general attitudes towards food and beef. In Chapter 4, further analysis is presented to show whether the data can be segmented into different latent classes before calculating the willingness to pay (WTP) for traceability, animal testing or both. The results will suggest whether there might

be a niche market for tested, traceable Canadian beef in Japan and/or whether there is a market for traceable, animal tested (or both) domestic beef in Canada itself.

CHAPTER 3 JAPANESE AND CANADIAN DATA ANALYSIS

3.1 INTRODUCTION

The objective of this chapter is to describe the analysis of the Japanese and Canadian survey data. Trust in societal actors, individual differences, demographics and safety perceptions for food product groups were introduced as some of the determinants of consumer confidence in Chapter 2 (de Jonge, 2008; de Jonge et al., 2008b). In order to understand consumers' willingness to pay for beef with different attributes, the ground work has to be laid to, first understand what affects consumers' confidence in general food safety and their confidence in the safety of beef. As part of understanding their confidence in the safety of beef, it is important to gather information about how consumers feel about BSE and what are their attitudes towards traceability.

This chapter therefore, sets the ground work in determining whether there might be a market for traceability and animal testing based on an understanding of consumer confidence in food safety and in beef food safety. The Japanese survey was administered through a marketing research company TNS Global Market Research in 2009. The company translated the survey into Japanese. The Canadian respondents were selected by Leger Marketing and the survey was compiled on the University of Alberta server. The details of the survey are discussed in the next sections. This chapter is set up as follows: in the first two sections the demographic profile and the survey responses on BSE and attitudes towards traceability of the Japanese and Canadian respondents are described. In section three the concept of risk perceptions and attitudes are investigated. In the fourth section, confirmatory factor analysis is done to estimated the relationships between the observed variables and latent factors. This is followed by structural equation modeling in section five to estimate a pessimism and optimism model. In section six, principal component analysis is undertaken for various segments of the survey responses to create variables potentially important in explaining perceptions of beef and general food safety confidence and the results for the

ordered probit models is presented in section seven . In the last section, the results obtained from both countries are compared.

3.2.1 DEMOGRAPHIC PROFILE OF JAPANESE RESPONDESNTS

In this section, the demographics of the respondents in Japan are summarized. The survey was completed over the internet by a research company, TNS Global Market Research from their national Japanese panel. The Japanese data was collected over 1 week from the 25th of May until the 1st of June of 2009. 1940 Japanese consumers responded. The sample had a greater percentage of respondents in the 18-24 years old category and significantly fewer respondents in the 50-64 years old category than the population census would suggest. The average age of the respondents was 39.9 years old. The ratio of females to males in the sample is a 1 to 1 ratio which is representative of the population. However, in the survey sample the number of people living in the household seems to show a discrepancy with the population. The sample of respondents has more people living in each household than what the general population census indicates. In terms of education, the sample is very different from the population census. The sample has a higher percentage of people with university and post graduate degrees than what the population census indicates. The majority of the respondents in the sample have an income range between $40,000-$64,999. Japanese consumers are culturally more private and as a result, the survey provided them the option of not disclosing their level of income. 12.8% opted for the “don’t know” option regarding their household income. 56% of the respondents live in a city. A large number of the respondents, around 65%, had no children living at home. Overall, only some of the observable variables are similar to the population. It is worth noting, as well that, apart from observable characteristics, individuals who agree to participate in consumer panels for market research companies, may differ from the general population in curiosity, in motivation or other unobservable characteristics.

Table 3. 1 Summary Statistics of Japanese Respondents

Total Respondents	**1940**	**Population Census (2005)**
In which of the following age groups do you fall?	**Sample (%)**	**Population (%)**
18-24	14.3	9.5
25-29	11.9	10.7
30-39	25.5	23.9
40-49	21.8	20.4
50-64	26.6	35.6
65+		
Please indicate your gender		
Male	50	48.8
Female	50	51.2
How many people live in your household?		
1	14.6	28.2
2	21	28.0
3 +	64.4	43.9
What is the approximate range of your total household income?		
$24,999 or under	10.7	8.5
Between $25,000 and $39,999	17.4	
Between $40,000 and $64,999	25.4	27.9
Between $65,000 and $79,999	12.9	19.6
Between $80,000 and $99,999	10.3	
Between $100,000 and $119,999	4.6	
$120,000 or more	5.9	29.2
Refuse	12.8	
Region		
Hokkaido / Tohoku	12.2	12.1
Kanto / Koshinetsu	29.9	33.1
Chubu / Hokuriku / Tokai	17.4	17.2
Kinki region	15.7	17.8
Chugoku region	7.9	6.1
Shikoku	4.5	3.5
Kyushu	12.4	10.6
Do you live in a city, in a town or in the countryside?		
In a city (>100.000 inhabitants)	56	65.8
In a town (> 10.000 inhabitants)	34.3	30.9
In the countryside/rural district	9.7	3.2
Education		

Elementary school	0.1	
Junior high school	2.7	17
High school	30.6	49
Technical/Business school	12.4	
Community college	11.5	
University	38.6	
Post graduate studies	4.1	34
Number of Children Living at home		
No home living children < 18 years	65	55
1	16.7	
2	14.2	
3	3.4	
4	0.5	
5	0.1	
More than 5	0.1	44.4

(Statistics Bureau, 2010)

3.2.2 SURVEY RESPONSES OF JAPANESE RESPONDENTS

The following analysis will illustrate how Japanese respondents feel about BSE, traceability and what other factors affect their consumption of beef. Moore (2005), as discussed in Chapter 2, used some of the BSE questions to better understand consumer preferences after BSE. Numerous studies have found that non-economic factors such as origin, labels, traceability and nutrient information represent some of the determinants that affect food safety confidence (Schroeder et al., 2006; Conceicao Pereira da Fonseca and Salay, 2008 ; Becker et al., 2000).

People's perceptions of BSE, and/or country of origin and/or traceability might affect consumers' confidence in food and in beef. Over half of the respondents are concerned about BSE and variant Creutzfeldt Jakob disease (vCJD) as shown in Figure 3.1. Figure 3.2 shows that 42% of the respondents thought that BSE is an important risk to human health. Figure 3.3 shows that 39% of the respondents think that BSE is a very important criterion when buying beef as compared to 73.4% in the US in 2004 (Moore, 2005; Van Wezemael et al., 2010). Figure 3.4 shows the percentage of respondents who have changed their consumption of beef since they first heard of BSE. The current survey shows that 27% of the respondents say they decreased their consumption of beef slightly

while 12% believe they have decreased consumption dramatically. Moore (2005) found that 18.5% of the respondents had decreased their consumption slightly and 16% decreased consumption dramatically in the US in 2004. In Japan approximately 23% of the respondents had reduced consumption of beef by 80% or more in 2006 (Schroeder et al., 2006). Figure 3.5 shows almost a quarter of the total respondents stated they were willing to pay a premium for beef that would not transmit the human variant of BSE. This implies there might be a niche market for beef that would guarantee it could not transmit the human variant of BSE. Figure 3.6 shows that over half of the respondents hadn't heard of traceability. This is surprising since Japan brought in a system of full traceability for all domestic cattle and consumers can access the full history of the meat they are purchasing since July 2003. The same question was asked in Europe in 2006 and 41% hadn't heard of traceability (Exposium-GS1 Europeans and Traceability, 2006).

Figure 3. 1 Concern About BSE – Japan, 2009

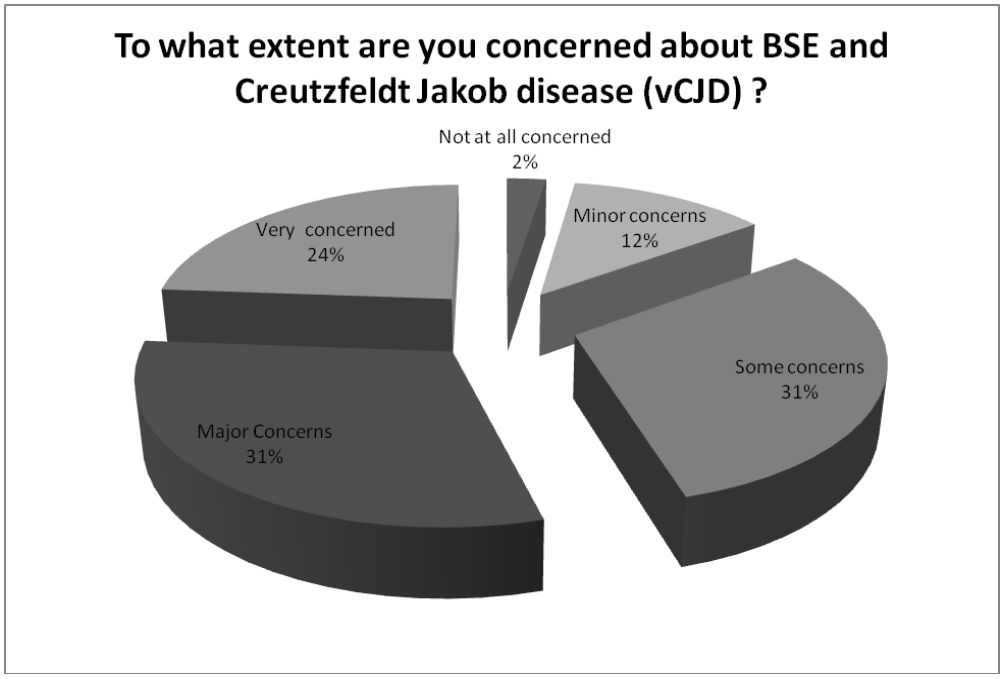


Figure 3. 2 Importance of BSE to Human Health – Japan 2009

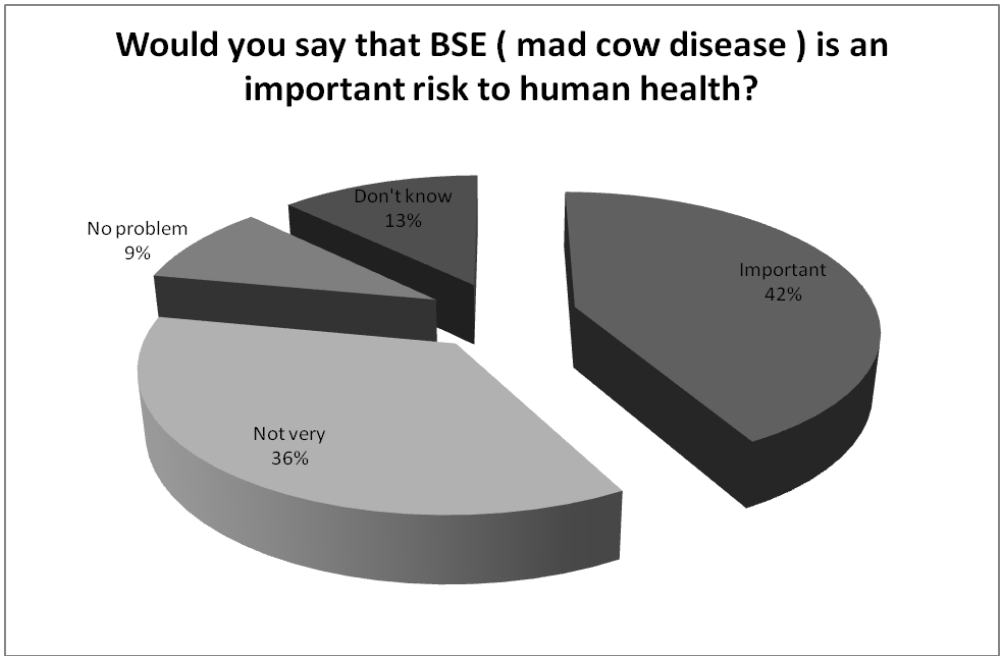


Figure 3. 3 Importance of BSE When Buying Beef – Japan 2009

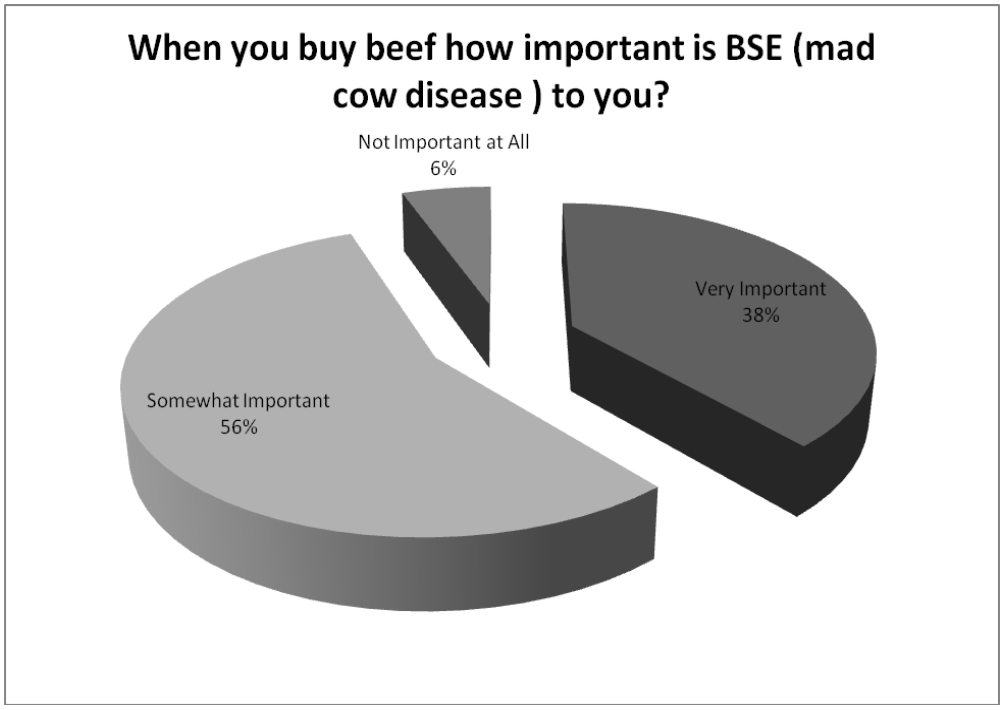


Figure 3. 4 Change in Consumption of Beef After Hearing of BSE – Japan 2009

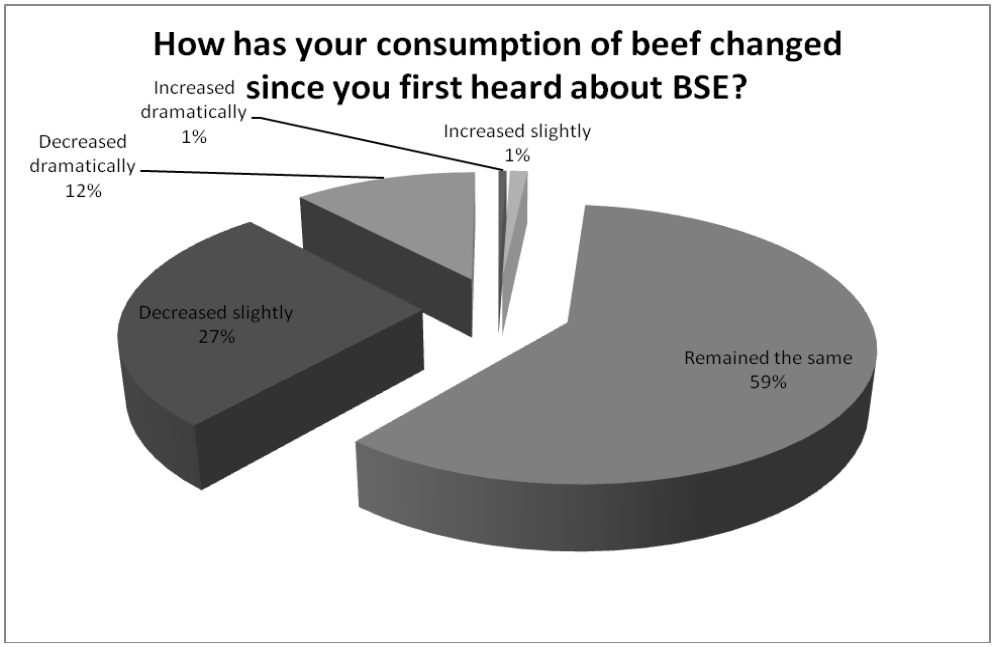


Figure 3. 5 WTP for Beef That Would Not Transmit the Human Variant of BSE – Japan 2009

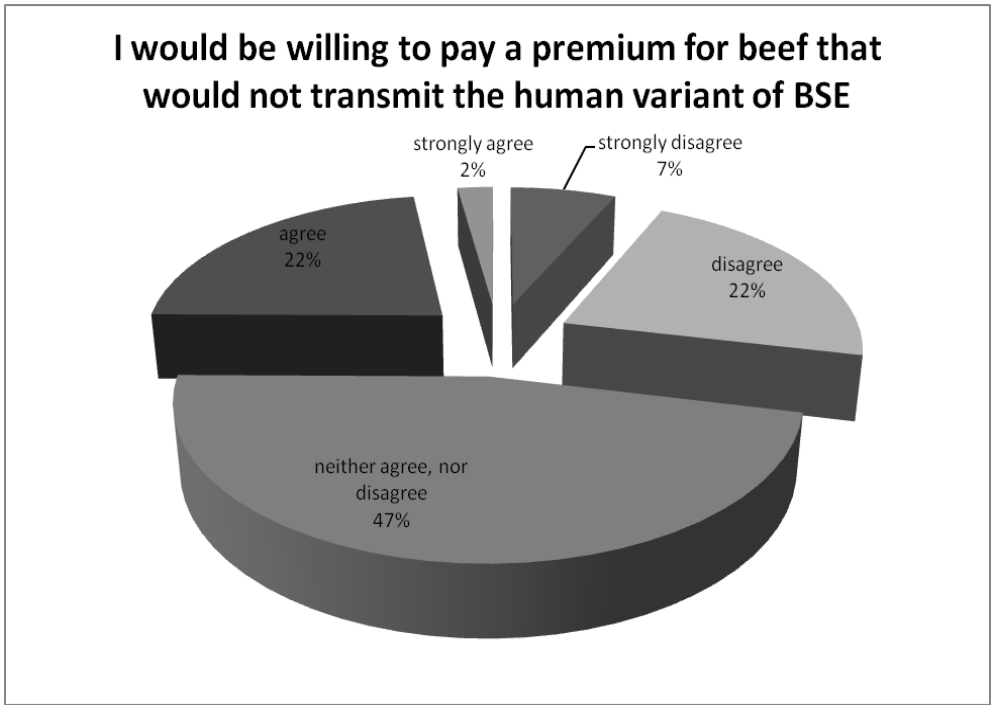
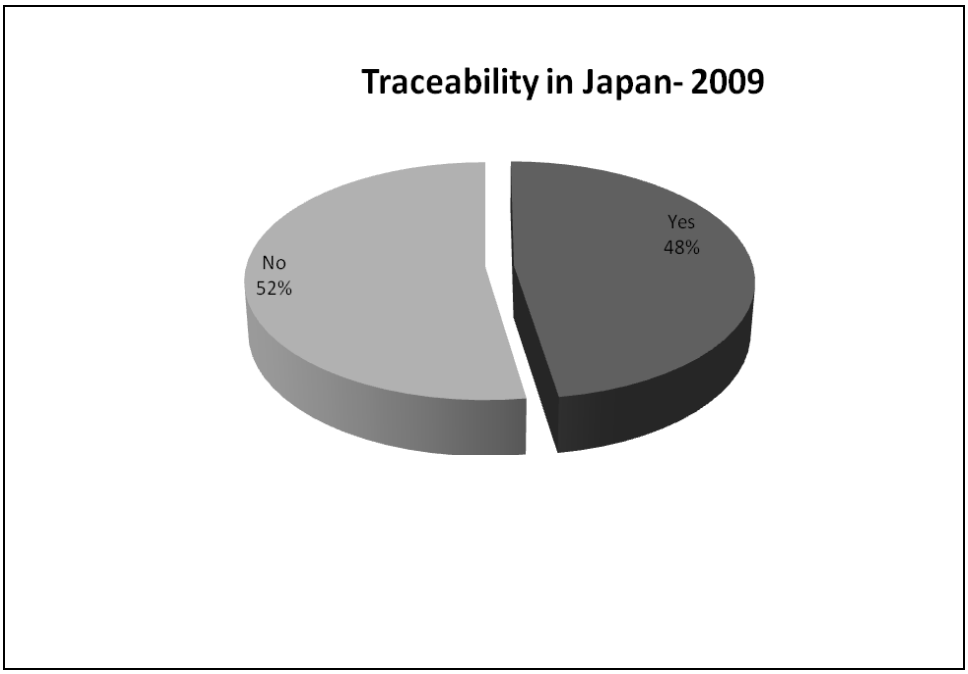


Figure 3. 6 Heard of Traceability - Japan 2009



Respondents were asked to rate the factors that determine their purchases of beef, the importance of different uses of traceability and their expectations forwhat should be on food labels. The ratings for the questions under discussion below ranged from a 3 to 6 point Likert scale (for example, not important to very important). Roselius (1971) identified a scaling approach called the "net favorable percentage" (NFP) which can be used to rank the responses to each question by using their average scores. NFP ranges from +100 to -100 implying completely favourable to completely unfavourable.

The scale for each question and the NFP are calculated as follows:

"When you buy beef, how important are the following factors to you?" is on a 3-point Likert scale ranging from very important to unimportant. NFP =(Number of very important responses - Number of unimportant responses)/ Total responses *100

"Please indicate the importance of the use of traceability under each of the following circumstances" is on a 4-point Likert scale ranging from very important

to not important at all. NFP =(Number of very important responses – Number of Not important at all responses)/ Total responses *100

“Whether you have ever knowingly purchased beef produced from another country or not, what is your perceptions of the level of food safety of beef by country of origin” is on a 5-point Likert scale ranging from very high to very low with a no opinion option. NFP=[(Number of very high responses + Number of high responses) – (Number of very low responses + Number of low responses)]/Total responses *100

“Tell me which of the following phrases you consider to be important information provided on food labels?” is on a 5-point Likert scale ranging from very important to not important at all. NFP =[(Number of Very important responses + Number of important responses) – (Number of somewhat unimportant responses + Number of not important at all responses)]/ Total responses *100

Table 3. 2 Factors That Affect the Purchase of Beef- Japan 2009

When you buy beef, how important are the following factors to you?	
	NFP
BSE or Mad cow disease	32.94
Product Freshness (i.e., "Sell by Date" in U.S.; "Packaged on Date" in Canada; "Best Before" Date in Japan)	26.91
Country of Origin of Product	23.25
Price	16.65
Antibiotics in food	15.98
Product Flavor	15.67
Product Labeled Natural	15.52
Food borne disease	14.28
Product Color	10.57
Product Juiciness	9.33
Product Tenderness	8.92
Hormones in food	7.32
Traceability of Product to Farm	4.74
Product Labeled Organic	-2.89
Product Nutritional Information	-7.58
Product Preparation Ease	-16.39
Product Leanness (fat)	-18.45
Product Preparation Time	-21.70

Table 3. 3 Importance of Traceability - Japan 2009

Please indicate the importance of the use of traceability under each of the following circumstances	
	NFP
To withdraw products should they prove to be dangerous	58.56
To fight counterfeiting	51.13
To provide better information on product ingredients	40.00
To provide information about every stage of the manufacturing process	39.90
To offer reassurance as to the quality of products that people purchase	39.07
To provide specific information for "at risk" individuals (weakened immune system, for example)	35.67
To help people in choosing "healthy" products	31.49
To offer guarantees as to sustainable development	27.58

Table 3. 4 BSE and Traceability Questions - Japan 2009

By which of the following ways, may humans get mad cow disease?	**%**
Eating beef brain	72.58%
Blood transfusions from people who have variant Creutzfeldt-Jakob disease	66.80%
Eating beef steak	26.34%
Touching the contagious meat	22.63%
Drinking milk	8.04%
None of the above	6.75%
If you are not consuming conventional beef, what are you substituting?	
Pork	27.42%
Seafood	24.33%
Chicken	23.97%
Lamb	3.35%
Grass-fed beef	2.22%
Organic beef	1.70%
Other _____	1.19%

Do you prefer imported beef from Canada, Australia, United States or other?	
Imported beef from Australia	56.80%
I avoid imported beef as much as possible	35.82%
Imported beef from the United States	4.18%
Imported beef from Canada	2.63%
Imported beef from _____ please identify	0.57%
For you, who should guarantee the traceability of a product?	
Manufacturers	55.36%
Government	37.94%
Consumer associations	5.15%
Scientists	0.82%
Media	0.72%
If you had a problem with a product, who would you hold responsible? More than one may apply	
Manufacturer	72.99%
Government	17.94%
Retailer	6.96%
Restaurant	2.11%
Which of the following best describes your food preferences?	
I eat meat and fish	93.5%
I eat fish and don't eat meat	2.5%
I do eat meat but I don't eat fish	3.2%
I am a vegetarian (I don't eat either meat or fish)	0.8%

Table 3. 5 Perceptions of the Level of Food Safety of Beef by Country of Origin- Japan 2009

Whether you have ever knowingly purchased beef produced in another country or not, what is your perceptions of the level of food safety of beef by country of origin?	
Your Perceived Level of Food Safety	**NFP**
Japan	76.2
Australia	39.7
Canada	2.5
Brazil	-20.8
USA	-29.3
Unknown	-76.5

Table 3. 6 Information on Food Labels - Japan 2009

Tell me which of the following phrases you consider to be important information provided on food labels?	
	NFP
The list of ingredients that make up a product	88.45
The country of origin of a product	85.21
The list of allergens	80.11
Information about GMOs	74.84
The different intermediaries involved in the manufacture of a product	51.44
The path of the product through the supply chain	51.14
The name of a product's manufacturer (the brand)	47.84
Information about dietary norms (recommended daily allowances)	43.46

Based on the frequencies, BSE, product freshness and country of origin are the top 3 factors that determine consumers' purchase decisions for beef as shown in Table 3.2. The calculation and the frequencies for the tables above can be found in Appendix C. Schroeder et al. (2006) revealed that freshness, country of origin and price were the top three attributes in consumers' beef purchase decisions in Japan. However, Schroeder et al. (2006) did not give BSE as an option for affecting consumers' purchase decisions. Moore (2005) found that sell-by (expiration) date, tested for BSE, grade, country of origin, and unit price were the top factors that respondents in the US considered when buying beef. The results in this study imply that BSE continues to be on the minds of Japanese consumers in 2009. It also shows that product freshness and country of origin are very important across time.

To better understand Japanese consumers' perceptions about traceability, the respondents were asked to rate the importance of its potential uses (Table 3.3). The majority answered that traceability was important "to withdraw products should they prove to be dangerous" and "to fight counterfeiting" which indicates that traceability could actually improve the level of trust Japanese consumers have in the food supply chain. A similar study in Europe showed that "to withdraw products should they prove to be dangerous" and "to offer reassurances to the

quality of products that people purchase" were the most important (Exposium-GS1 Europeans and Traceability, 2006).

As shown in Table 3.4, questions were included to determine the respondents' knowledge about BSE. They were asked to select in what ways humans could get mad-cow disease. The results suggest a high level of knowledge of BSE. Respondents who have reduced beef consumption have switched to pork, chicken and seafood post domestic BSE. Another important response in Table 3.4 is that consumers prefer to have 'imported beef from Australia' and 'not to import beef' at all rather than import from the US or Canada. They believe that manufacturers should guarantee traceability and are the ones who should be held responsible if there is any problem with food products, similar to the survey results from Europe (Exposium-GS1 Europeans and Traceability, 2006). Over 90 percent of the respondents eat both meat and fish and there is a very low percentage of the respondents who are vegetarian.

In Table 3.5 consumers' safety perceptions of beef from different countries of origin are presented. Beef from Japan and Australia followed by Canada were felt to be safer than USA, Brazil which is in line with the results from Table 3.4 where consumers prefer imported beef from Australia rather than the other countries. Consumers' preference for Australian beef could be the result of them finding Australian beef to be safer. There may also be other factors influencing consumers purchase decisions such as Japanese consumers' preferences to not having their beef lean as shown in Table 3.2. Beef imported from Canada are from 20 months of younger cattle and would therefore not have much fat or marbling. Schroeder et al. (2006) also found that the country-of-origin affects Japanese consumer perceptions of beef food safety. As in this study, Schroeder et al. (2006) found that products of unknown origin have low levels of consumer confidence especially in the case of Japanese and Mexican respondents. They also found that consumers are more confident in the safety of beef from their own country which is similar to these results.

Quality of food products is identified through signals such as branding, quality or geographic origin (Verbeke et al., 2009). Table 3.6 indicates what

Japanese survey respondents feel is important information to see on food labels. They find that "the list of ingredients that make up a product" and "the country of origin" are the most important factors. Overall, Japanese respondents show that "country of origin" is an important determinant in their purchase habits. The question was used in a survey in Europe in 2005 but on a three point Likert scale resulting with 70% of the respondents finding it essential to list the ingredients that make up the product and 49% finding it essential to know the place of origin (Exposium-GS1 Europeans and Traceability, 2006). In another study "list of ingredients that make up a product" and "list of allegens" were the most important factors (Schroeder et al., 2006).

Those questions enable us to understand a little more about Japanese consumer's perceptions of beef food safety and indicates people's awareness of BSE and its level of importance. The responses also help to identify whether consumers know what traceability means and what are its advantages. The survey questions revealed that country-of-origin is an important factor in Japanese beef purchasing decisions, as well as information on food labels. The Japanese respondents generally perceived domestic goods to be safer than any imports. In a subsequent Section (3.4.1) more detailed analysis of Japanese risk perceptions and attitudes is presented.

3.3.1 DEMOGRAPHIC PROFILE OF CANADIAN RESPONDENTS

The Canadian data was collected during the first week of September 2009. The sample was recruited by Leger Marketing and the survey was compiled on the University of Alberta server. The survey was administered both in French and English. There were a total of 1,716 respondents of which 1,337 were English speakers and 379 were French speaking who responded to the first section of the survey. 1,293 respondents completed the second, stated preference questions of the survey out of which 267 were French. All respondents who missed a part of a stated preference question were eliminated from the analysis of that data because

they might have not been paying attention to the whole question. To have a consistent sample, those who did not answer the general trust question, and whether they eat meat, fish, both or neither were also eliminated which brought the number of respondents to 1,174. Furthermore, respondents who did not answer the questions for individual differences, trust in societal actors which are government, manufacturers, farmers and retailers and some of the demographic questions (age, gender, education, number of children, number of people living in the household and region) were eliminated which brought down the number of respondents to 948. The individual differences and trust in societal actors are essential to perform confirmatory factor analysis and for estimating the constructs. A summary of the demographic characteristics of the sample can be found in Table 3.7. The group of the sample in the age category of 25 to 49 is a close representation of the population. The average age of the sample is 44.5 years and that of the population is 43 years old. The sample has a greater percentage of males than females in comparison to the population. The level of income is not representative of the population. There is a large number of respondents in the sample who earn $100,000 and higher as compared to the 4% from the population census. The percentage of people in the $24,999 bracket is much lower than the population census indicates. Also the sample had a greater percentage of respondents from Ontario and a smaller representation from British Columbia as compared to census data. Similar to the Japanese respondents, Canadian respondents selected on the panel may also differ from the general population in non-observable ways.

Table 3. 7 Summary Statistics for Canadian Respondents

Total Respondents	**948**	**Census (2006)**
In which of the following age groups do you fall?	**Sample (%)**	**Population (%)**
15-19	0.5	8.5
20-24	11.3	8.1
25-29	7.8	7.8
30-39	19.4	19.0

40-49	21.3	20.2
50-64	28.9	20.4
65+	10.8	16.0
Please indicate your gender		
Male	54.7	48.5
Female	45.3	51.5
How many people live in your household?		
1	18.6	
2	37.1	
3 +	44.3	
What is the approximate range of your total household income?		
$24,999 or under	8.2	51.5
Between $25,000 and $39,999	11.6	19.2
Between $40,000 and $64,999	20.1	
Between $65,000 and $79,999	16.6	29.3
Between $80,000 and $99,999	14.5	
Between $100,000 and $119,999	13.1	
$120,000 or more	13.5	6.7
I don't know	2.4	
Region		
Maritimes	5.7	6.0
Quebec	23.3	24.6
Ontario	43.1	38.8
Manitoba	6.0	3.8
Saskatchewan	2.5	3.3
Alberta	11.0	10.1
British Columbia	8.1	13.3
Do you live in a city, in a town or in the countryside?		
In a city (>100.000 inhabitants)	67.0	
In a town (> 10.000 inhabitants)	18.8	
In the countryside/rural district	14.2	
Education		
Elementary school	0.4	
Secondary (high) school	21.0	22.7
Technical/ business school/ Community college	34.1	28.1
University	33.2	
Post graduate studies	11.3	15.2
Number of Children		
No children less than 18 years	69.6	38.5
1	14.6	27.3

2	11.4	24.0
3	3.3	
4	1.1	
More than 4	0.1	10.3

(Statistics Canada 2010(b,c,d))** Less than High school: 29%. Data is from 2001 for population 25 and over (Statistics Canada 2010a).

3.3.2 SURVEY RESPONSES OF CANADIAN RESPONDENTS

Learning about how Canadian consumers feel about BSE and traceability, can provide insights on what Canadian consumers perceive to be important in food selection. Understanding consumers' attitudes towards beef could help determine whether there is a consumers' demand for animal testing and traceability beef in the domestic market. The statistics are depicted in Figures 3.7 to 3.12 and Tables 3. 8 to 3.12. The questions had been previously discussed in both Chapter 2 and earlier in Section 3.2.2. Figure 3.7 shows that the majority of the respondents are concerned about BSE. More than half of the respondents think that mad cow disease is an important risk to human health as shown in Figure 3.8 and the majority find that BSE is an important factor when purchasing beef as shown in Figure 3.9. 18% of the respondents said they had decreased consumption of beef since they first heard of BSE and 79% said their consumption remained the same. Moore's (2005) results in 2004 showed that 73% of the respondents in the US found BSE to be an important factor when purchasing beef. In 2006, Schroeder et al. (2006) found that 19.6% had reduced their consumption of beef due to food safety concerns relative to four years earlier. Moore (2005) found more than half of the respondents did not change their consumption patterns for beef after BSE was found in the United States. 36% of the respondents agree or strongly agree that they would be willing to pay a premium for beef that would be guaranteed to not transmit BSE as shown in Figure 3.11. These results are interesting since it would imply that even though the majority of the respondents hadn't changed their consumption of beef, they would still be willing to pay a premium to have the safety assurance of no BSE.

Figure 3.12 shows that almost half of the respondents have never heard of traceability.

Figure 3. 7 Concern About BSE- Canada 2009

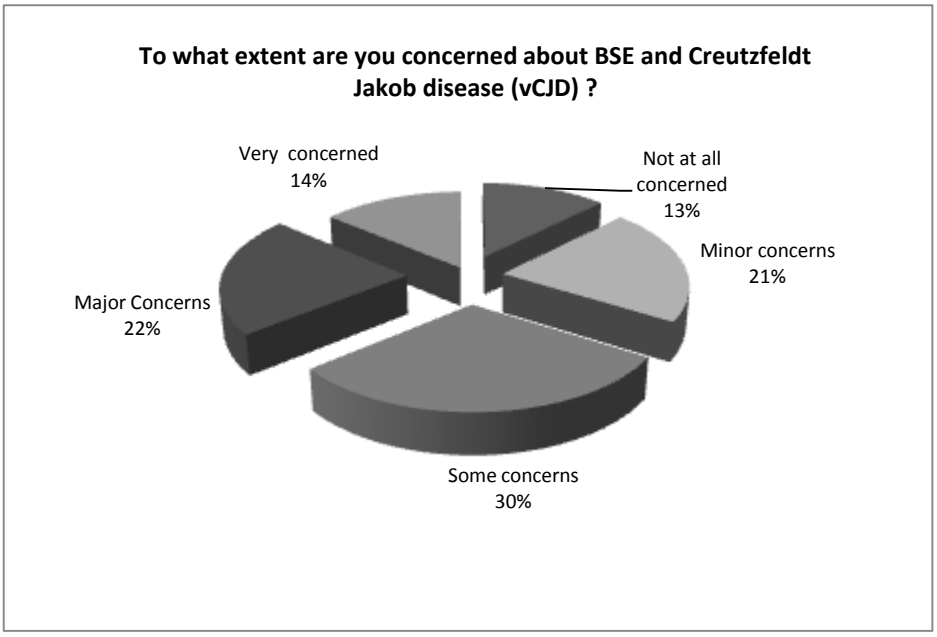


Figure 3. 8 Importance of BSE to Human Health- Canada 2009

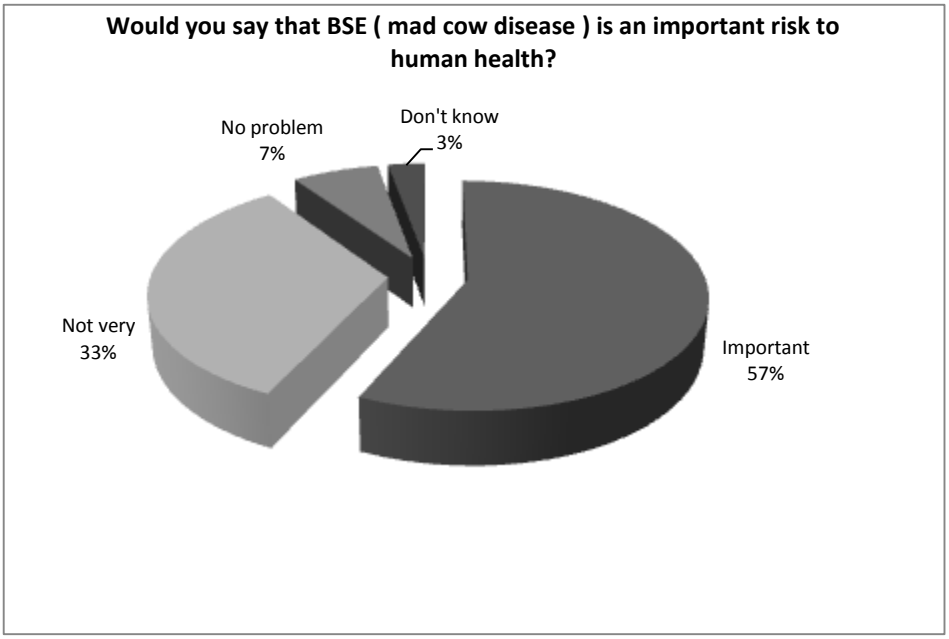


Figure 3. 9 Importance of BSE When Buying Beef – Canada 2009

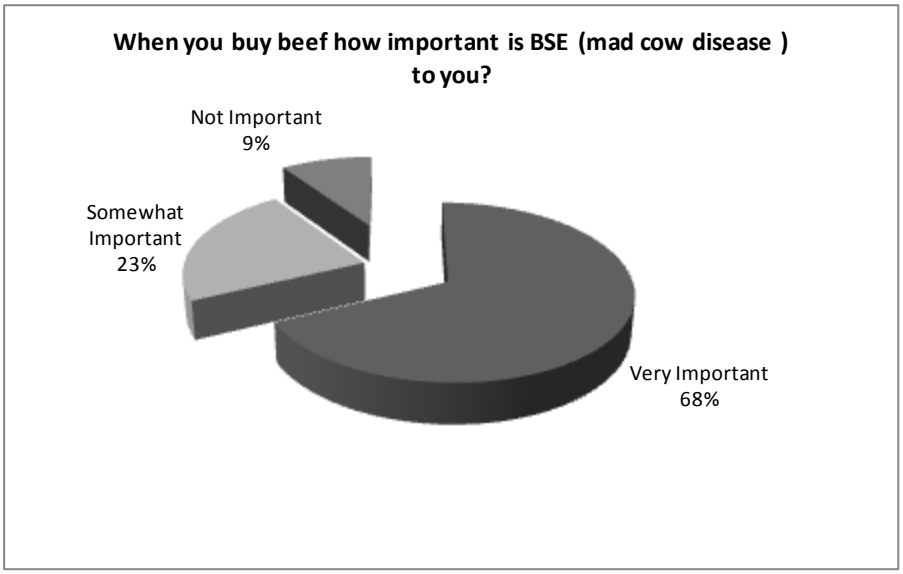


Figure 3. 10 Change in Consumption of Beef After Hearing of BSE- Canada 2009

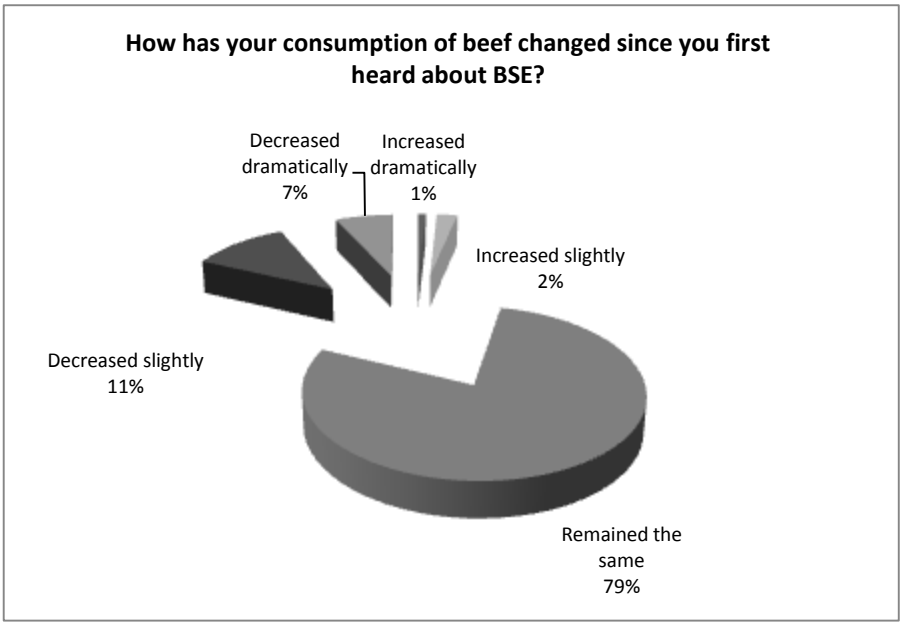


Figure 3. 11 WTP for Beef That Would Not Transmit the Human Variant of BSE- Canada 2009

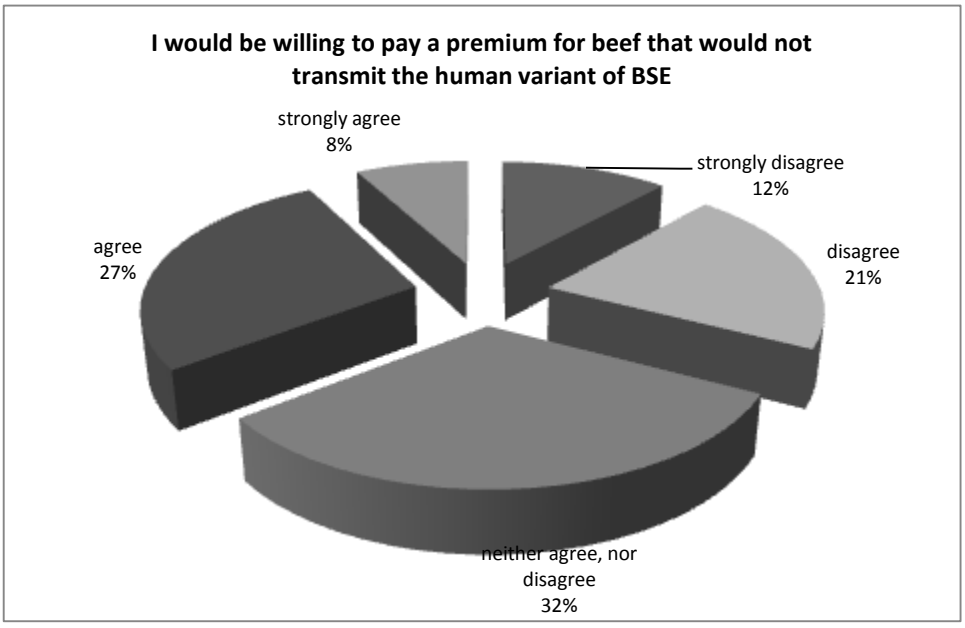
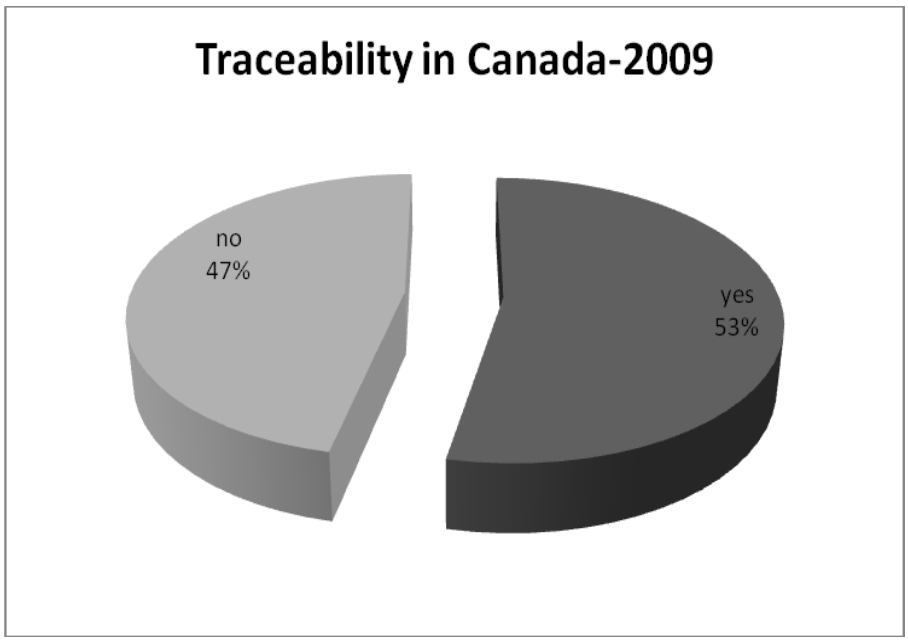


Figure 3. 12 Heard of Traceability- Canada 2009



Based on the NFP estimation, the top three factors that Canadian consumers find important when purchasing beef are product freshness, flavor and

tenderness. BSE is ranked 6th, country of origin is 10th and traceability is 13th on the scale. In 2006, Schroeder et al.'s (2006) report showed that freshness, leanness and price were the top factors when purchasing beef in Canada. This also implies that traceability is ranked the same by Canadians and Japanese consumers in the present study. BSE on the other hand, is ranked 1st in Japan compared to Canada.

In Table 3.9, the top two reasons for traceability are to 'withdraw products should they prove to be dangerous' and to 'offer reassurance as to the quality of products that people purchase' which is similar to the results in Europe (Exposium-GS1 Europeans and Traceability, 2006). Canadians also hold manufacturers responsible for any problem with food products and expect them to guarantee traceability. The respondents also showed a higher level of perceptions of safety in domestic beef and beef from New Zealand. In Table 3.10, Canadians perceive Candian beef to be very safe and this is similar to the result found in 2006 (Schroeder et al., 2006). They had also concluded that respondents have higher safety perceptions about domestic beef. They also claimed that 'the list of ingredients that make up a product' and the 'country of origin of a product' are two of the most important criteria that consumers would like to see on labels, similar to the results from this study shown in Table 3.11. 83.3% of the Canadian respondents eat both fish and meat which is almost 10% less than the Japanese respondents. There is no differences in the ranking of what respondents consider important on food labels between Canada and Japan.

Table 3. 8 Factors That Affect the Purchase of Beef- Canada 2009

When you buy beef, how important are the following factors to you?	
	NFP
Product Freshness (i.e., "Sell by Date" in U.S.; "Packaged on Date" in Canada; "Best Before" Date in Japan)	87.40
Product Flavor	79.90
Product Tenderness	76.00
Food borne disease	67.70
Product Juiciness	66.50
BSE or Mad cow disease	60.00

Product Color	53.40
The use of hormones in livestock production	52.80
Product Leanness (fat)	52.50
Country of Origin of Product	52.3
The use of antibiotics in livestock production	51.10
Price	45.10
Traceability of Product Back to Farm	43.80
Product Nutritional Information	41.50
Product Preparation Ease	23.20
Product Preparation Time	16.20
Product Labeled Natural	16.70
Product Labeled Organic	7.20

Table 3. 9 Importance of Traceability- Canada 2009

Please indicate the importance of the use of traceability under each of the following circumstances	
	NFP
To withdraw products should they prove to be dangerous	87.7
To offer reassurance as to the quality of products that people purchase	63.6
To provide specific information for "at risk" individuals (weakened immune system, for example)	59.9
To provide better information on product ingredients	57.4
To fight counterfeiting	50.6
To offer guarantees as to food being produced using environmentally sustainable production methods	49.4
To provide information about every stage of the manufacturing process	49.5
To help people in choosing "healthy" products	48.6

Table 3. 10 BSE and Traceability Questions- Canada 2009

By which of the following ways, may humans get mad cow disease?	**%**
Eating beef steak	51.4%
Eating beef brain	49.1%
Blood transfusions from people who have variant Creutzfeldt-Jakob disease	42.3%
Touching the contagious meat	17.5%
None of the above	13.7%
Drinking milk	5.6%
If you are not consuming conventional beef, what are you substituting?	
Chicken	40.8%
Seafood	24.5%
Pork	23.7%
Grass-fed beef	7.6%
Organic beef	7.5%
Other _____	7.5%
Lamb	7.4%
Do you prefer imported beef from Canada, Australia, United States or other?	
I avoid imported beef as much as possible	72.3%
Imported beef from the United States	15.7%
Imported beef from _____ please identify	6.4%
Imported beef from New Zealand	3.0%
Imported beef from Australia	2.6%
For you, who should guarantee the traceability of a product?	
Manufacturers	47.6%
Government	43.7%
Consumer associations	6.2%
Scientists	2.0%
Media	0.4%
If you had a problem with a product, who would you hold responsible? More than one may apply	
Manufacturer	83.8%
Retailer	62.3%
Restaurant	60.9%
Government	46.6%
Farmer	32%
Which of the following best describes your food preferences?	
I eat meat and fish	83.3%
I eat fish and don't eat meat	2.6%

I do eat meat but I don't eat fish	12.4%
I am a vegetarian (I don't eat either meat or fish)	1.6%

Table 3. 11 Perceptions of the Level of Food Safety of Beef by Country of Origin – Canada 2009

Whether you have ever knowingly purchased beef produced in another country or not, what is your perceptions of the level of food safety of beef by country of origin?	
Your Perceived Level of Food Safety	**NFP**
Canada	50.9
New Zealand	32.4
USA	30.8
Australia	29.6
Brazil	-6.8
Unknown Country of Origin	-34.1

Table 3. 12 Information on Food Labels- Canada 2009

Tell me which of the following phrases you consider to be important information provided on food labels?	
	NFP
The list of ingredients that make up a product	95.9
The country of origin of a product	84.8
The list of allergens	78.8
Information about GMOs	78.2
The different intermediaries involved in the manufacture of a product	75.1
The path of the product through the supply chain	71.9
The name of a product's manufacturer (the brand)	62.5
Information about dietary norms (recommended daily allowances)	95.9

3.4.1 RISK PERCEPTIONS AND ATTITUDES - JAPAN

According to Schroeder et al. (2006) risk perceptions and attitudes influence consumers' purchasing decisions and can act as an important signal to industry. There are a number of questions that can be used to assess risk perceptions and attitudes. The questions used in the current study were not exactly the same as Schroeder et al.'s (2006) and Pennings et al.'s (2002) questions. Schroeder et al.'s (2006) questions were on a 10-point Likert scale while Pennings et al.'s (2002) were on a 9-point Likert scale. This has been discussed in Chapter 2. The questions in this study are on a 5-point Likert scale.

Schroeder et al. (2006) provided results of risk perceptions and attitudes in Japan, it seemed logical to compare the current results for Japan with theirs. The current survey only reproduced 4 of Schroeder et al.'s questions namely:
"When eating beef I am exposed to", "I think eating beef is risky", "For me, eating beef is worth the risk" and "I am..the risk of eating beef".

This survey had two more questions to measure risk perceptions and attitudes respectively which are "For me eating beef is" and "I accept the risks of eating beef". Those questions can be found in Appendix 2A. Summary statistics are provided for both Schroeder et al.'s (2006) and for the current survey (2009) in Japan. To be able to compare Schroeder et al.'s results, the frequencies in each of the 10 Likert scale were subdivided into 10 bins. The frequency for every 2 bins are summed and they represent the new frequencies as if they were on a 5 point Likert scale. For instance, 1 and 2 on Schroeder's Likert scale would now represent only 1 on the new scale. As shown in Table 3.13 there is a greater difference for the question "For me, eating beef is worth the risk". There is a higher percentage of the respondents at the mid point and less respondents who strongly disagree in 2009 which is indicative of a lower level of risk attitude

towards beef. Both risk perception questions show that more respondents chosed the mid range on the Likert scale in 2009 compared to 2006.

Table 3. 13 Summary for Risk Attitudes and Perceptions – Japan 2009

Risk Attitudes	**Schroeder (2006)**	**Current (2009)**
	Frequency (%)	**Frequency (%)**
I am … the risk of eating beef		
1= willing to accept	4.3	4
2=	23.1	20.7
3=	42.3	49.1
4=	19.7	18.2
5=not willing to accept	10.7	8.1
For me, eating beef is worth the risk		
1=Strongly agree	2.1	1.7
2=	7.9	10.9
3=	27.6	49.1
4=	26.3	25.8
5=Strongly disagree	36.2	12.5
Risk Perceptions		
When eating beef, I am exposed to		
1=Very little risk	9.9	6.4
2=	25.3	30.3
3=	34.9	52.7
4=	24.1	10
5=a great deal of risk	5.9	0.6
I think eating beef is risky		
1=Strongly disagree	13.9	9.5
2=	27.7	35.1
3=	34.8	47.2
4=	18	7.7
5=Strongly agree	5.7	0.6

3.4.2 RISK PERCEPTIONS AND ATTITUDES - CANADA

In this section, the Canadian risk perceptions and attitudes are analysed and compared for 2006 and 2009. Again the results from Schroeder et al. (2006) are presented in 5 segments as opposed to their resported 10 segments. The summary statistics in Table 3.14 shows the frequency for each of the categories for the questions for 2006 and 2009. The percentage of respondents choosing the lower end of the Likert scale in 2009 is higher than in 2006 for both risk attitude questions. This is indicative that the risk attitudes towards beef has decreased. As for the risk perception questions, a greater percentage of the respondents chosed the lower mid range of the scale in 2009 compared to 2006. Both questions showed a higher percentage of the respondents at the mid point.

Table 3. 14 Summary Statistics for Risk Attitudes and Perceptions -Canada 2009

Risk Attitudes	**Schroeder (2006)**	**Current (2009)**
I am … the risk of eating beef		
1= willing to accept	29.8	32.3
2=	26.2	31.8
3=	21.9	25.1
4=	9.7	7.1
5=not willing to accept	12.6	3.7
For me, eating beef is worth the risk		
1=Strongly agree	22.5	31.3
2=	19.1	28.6
3=	26.3	26.2
4=	12.3	8.6
5=Strongly disagree	20	5.4
Risk Perceptions		
When eating beef, I am exposed to		
1=Very little risk	46.2	28.2
2=	29.1	33.2
3=	14.6	26.4
4=	7	11.6
5=a great deal of risk	3.2	0.6
I think eating beef is risky		

1=Strongly disagree	47.8	31.6
2=	26.8	38.3
3=	13.4	22.4
4=	7.8	6.2
5=Strongly agree	4.4	1.5

3.4.3 RISK MEASUREMENTS - JAPAN AND CANADA

The next step is to combine the set of perceptions and attitudes questions into single indices by calculating an average response to each of the series of questions for both countries across time. In Table 3.15 the risk measurements are shown. The average risk perceptions or attitudes indices reflect the overall level of risk perceptions or attitudes for Japanese consumers. In comparison, the results indicate a decrease in risk perceptions and attitudes across time. The decrease in risk aversion and risk attitudes are statistically significant. A lower percentage of consumers perceive beef to be unsafe and they have a lower level of risk aversion in 2009 in comparison to Schroeder et al.'s results in 2006. The reason could possibly be attributed to the possibility that consumers are more forgiving about the BSE crisis with time or there have been fewer food or beef safety incidents recently.

Canada has experienced an increase in risk perceptions and a decrease in risk attitudes across time. The increase in risk perceptions could be because Canada had another case of BSE in May 2009 (Monk 2010). The level of risk aversion on the other hand has decreased. The changes in risk perceptions and attitudes were statistically significant.

Table 3. 15 Risk Perceptions and Attitudes Indices across countries and time

Risk Measurement				
Risk Perceptions	**Schroeder Canada(2006)**	**Canada (2009)**	**Schroeder Japan(2006)**	**Japan (2009)**
1 -Perceptions beef is safe	47	29.9	11.9	7.95
2	27.95	35.75	26.5	32.7
3	14	24.4	34.85	49.95
4	7.4	8.9	21.05	8.85
5-Perceptions beef is unsafe	3.8	1.05	5.8	0.6
Average Risk Perceptions Index Value	**1.935**	**2.1545**	**2.8265**	**2.616**
Differences across time	**0.2195****		**-0.2105****	
Differences across countries	**-0.8915***	**-0.4615****	**0.8915***	**0.4615****
Risk Attitudes				
1 -Low risk aversion	26.15	31.8	3.2	2.85
2	22.65	30.2	15.5	15.8
3	24.1	25.65	34.95	49.1
4	11	7.85	23	22
5-High risk aversion	16.3	4.55	23.45	10.3
Average Risk Attitudes Index Value	**2.6925**	**2.233**	**3.483**	**3.2125**
Differences across time	**-0.4595****		**0.2705****	
Differences across countries	**-0.7905****	**-0.9795****	**0.7905****	**0.9795****

* 10% significant level; ** 5% significant level; *** 1% significant level

The results for risk attitudes and perceptions in beef are larger in Japan than in Canada in both years. In other words, a greater percentage of Japanese consumers find beef to be risky and are less willing to accept the risks of eating beef as compared to Canadians. The changes in risk perceptions and attitudes were statistically significant across time and differences across countries. The risk attitudes and perceptions have decreased across time in Japan which could be an indication that the respondents might be ready to increase beef consumption. In Canada, risk perceptions have increased, indicating an increase in the likelihood that respondents feel more negatively about beef (Schroeder et al., 2006). Risk attitudes, on the other hand, have decreased over time. According to Schroeder et al. (2006), consumers will only take precautions when consumers are both risk-averse and perceive risk at the same time. The entire behavioural outcome

depends on consumer risk attitudes, perceptions and their interaction (Pennings et al., 2002). Therefore, it appears that Japanese consumers are slightly less risk averse and have a lower perceptions of risk now as compared to 2006, an indication that beef is perceived somewhat more positively. Since risk perceptions in Canada are going in opposite ways, Canadian consumer's general assessment regarding beef cannot be determined. Japan has much higher risk perceptions and risk aversions regarding beef.

3.5.1 COMFIRMATORY FACTOR ANALYSIS - JAPAN

Understanding general consumer confidence in the safety of food is a first step to finding out if there is a market for domestic or imported beef that is animal tested, traceable or both. In order to identify the determinants of general consumer confidence, a framework developed by de Jonge (2008) as discussed in Chapter 2, is used. In this section, the main aim is to examine these constructs with the current data set, bringing all these determinants together and creating an empirical model for confidence.

In this case, structural equation modeling is used to investigate the links between the observed variables as shown in the general consumer confidence framework in Figure 2.1 (Costa-Font and Gil, 2009). Confirmatory factor analysis can be used to establish the relationship between the observed variables and latent factors or constructs. According to Byrne (1998), CFA is used when the researcher has some knowledge of the theory, empirical research, or both. To calculate the constructs, the work of de Jonge (2008) and Conta-Font et al. (2009) are used and maximum likelihood (ML) is used to calculate the constructs. The data was analyzed using LISREL 8.72. The estimates that are produced first are unstandardized (the observed variables in original metrics). The result is sufficient to check for the overall fit of the model. The standardized solution is used to make comparisons (Byrne, 1998).

CFA is used to estimate the relationships for (i) individual differences (ii) trust in regulators and actors and (iii) safety of product groups. The CFA structure to investigate the individual differences comprises three factors ($\xi_{1\text{-}3}$) namely

worry, pessimism and optimism. Optimism is measured by four observed variables (x_{1-4}) while worry and pessimism are each measured by three observed variables (x_{5-7}; x_{8-10}). The reliability of each of these indicators is influenced by random measurement error (δ_{1-12}). Each of the observed variables (x_{1-12}) is then regressed on their respective factor (λ_{1-12}) also known as the factor loadings. The model also shows the intercorrelation (φ) between the factors. The trust actors are comprised of four actors, namely government, farmers, retailers, and manufacturers. Trust in each of the actors is measured by six observed variables (x_{11-16}; x_{17-22}; x_{23-28}; x_{29-34}). The perceptions of the safety of product groups is important in determining consumer safety confidence as the different products are considered to be part of consumers' daily nutritional intake. Confidence levels for meat and fish are measured by four observed variables, preserved and processed foods by three and fresh food by four observed variables ($x_{35-38;}$ $x_{39-41;}$ $x_{42-44;}$ x_{45-48}). A summary of the constructs and the observed variables is presented in Table 3.16.

Table 3. 16 List of Indicators Used for Each Construct

Optimism (C1)	X1: I am optimistic about the safety of food products
	X2: I am confident that food products are safe
	X3: I am satisfied with the safety of food products
	X4: Generally, food products are safe
Pessimism (C2)	X5: I worry about the safety of food
	X6: I feel uncomfortable regarding the safety of food
	X7: As a result of the occurrence of food safety incidents I am suspicious about certain food products
Worry (C3)	X8: Many situations make me worry
	X9: I know I shouldn't worry about things, but I just cannot help it
	X10: notice that I have been worrying about things
Trust in Government (C4)	X11: The government has the competence to control the safety of food
	X12: The government has sufficient knowledge to guarantee the safety of food products
	X13: The government is honest about the safety of food
	X14: The government is sufficiently open about the safety of food
	X15: The government takes good care of the safety of our food
	X16: The government gives special attention to the safety of food
Trust in Farmers (C5)	X17: Farmers have the competence to control the safety of food
	X18: Farmers have sufficient knowledge to guarantee the safety of food products
	X19: Farmers are honest about the safety of food
	X20: Farmers are sufficiently open about the safety of food
	X21: Farmers take good care of the safety of our food
	X22: Farmers give special attention to the safety of food
Trust in Retailers (C6)	X23: Retailers have the competence to control the safety of food
	X24: Retailers have sufficient knowledge to guarantee the safety of food products
	X25: Retailers are honest about the safety of food
	X26: Retailers are sufficiently open about the safety of food
	X27: Retailers take good care of the safety of our food
	X28: Retailers give special attention to the safety of food
Trust in Manufacturers (C7)	X29: Manufacturers have the competence to control the safety of food
	X30: Manufacturers have sufficient knowledge to guarantee the safety of food products
	X31: Manufacturers are honest about the safety of food
	X32: Manufacturers are sufficiently open about the safety of food
	X33: Manufacturers take good care of the safety of our food
	X34: Manufacturers give special attention to the safety of food

Meat and Fish(C8)	X35:Beef
	X36: Pork
	X37: Chicken
	X38: Fish
Preserve (C9)	X39: Products in Cans
	X40: Products in Jar
	X41: Frozen Products
Processed (C10)	X42: Pre-cut and washed vegetables
	X43: Ready-to-eat meals
	X44: Vitamin Supplements
Fresh(C11)	X45: Fruits and vegetables
	X46: Milk Products
	X47: Cheese
	X48: Bread Products

The factor loadings or constructs can be estimated by two different approaches. The first approach is done by constraining the first observed variable to a value of 1.00 which is generally done to check the fit of the model and to see whether the constructs are statistically significant. The second approach standardizes the latent factors. In that case the factor loading parameters are freely estimated (Byrne, 1998).

The first part is to establish whether the determinants of food safety confidence provide a good fit for the model. The questions on individual differences (ii) trust in regulators and actors and (iii) safety of product groups for the data set were rated on a 5-point Likert scales, ranging from 'disagree strongly' (1) to 'agree strongly' as shown in Table 3.9 and in Appendix B. This analysis determines the construct validity of the model. de Jonge (2008) had also determined the construct validity of a similar model in the Netherlands in 2006. The latent variables were allowed to correlate freely and yielded an overall good fit. This study followed the same steps. Table 3.17 shows the CFA results for the unstandardized estimates for the whole model. The Chi-square (χ^2) statistic is used to check for model fit and the value is 10841.58 (P = 0.0), with degrees of freedom equal to 1025. The Goodness-of-Fit statistic (GFI) also known as an alternative to the chi-square test is 0.81 indicating that it is an acceptable fit. The cut-off point is generally considered to be 0.90 (Hooper et al., 2008). Furthermore the comparative fit index (CFI) which assumes that all latent variables are uncorrelated is greater than 0.97, implying a good fit. The cut-off point for CFI is

0.90. The GFI may have a downward bias since the degrees of freedom are large in comparison to the sample size (Hooper et al., 2008). The root mean square error of approximation (RMSEA) is considered to be a well-fitting model if the lower limit is close to 0 while the upper limit is less than 0.08. Therefore, in this study the RMSEA is 0.070 indicating an acceptable fit (Hooper et al., 2008). The t-values for all the factor loadings for all 48 indicators, as shown in Table 3.10, are all reasonable and statistically significant. The majority of the R-squared values for the individual differences were all above 0.50 with the exception of the optimistic question "I am optimistic about the safety of food products". The two first questions for the trust in societal actors namely, "_____ have the competence to control the safety of food" and "_____have sufficient knowledge to guarantee the safety of food products" had a lower level of R-squared values. As for the safety perceptions in product groups the following questions on the level of confidence on "Frozen Products", "Pre-cut and washed vegetables", "Vitamin Supplements" and "Fruits and vegetables" had lower R-squared values. The strongest indicators of individual differences are worry. In the case of safety perceptions in the product groups, meat and fish are the strongest.

A way of testing the reliability of the constructs is to calculate the composite reliability (CR) and the average variance extracted (AVE).

"Composite reliability is a measure of the overall reliability of a collection of heterogeneous but similar items. It can be calculated as follows:

Composite Reliability = (sum of standardized loading)^ 2 / [(sum of standardized loading)^ 2 + sum of indicator measurement error (the sum of the variance due to random measurement error for each loading- 1 minus the square of each loading] (ZenCaroline Blog 2007)

The average variance extracted (AVE) measures the amount of variance captured by a construct in relation to the variance due to random measurement error. It can be calculated as follows:

AVE= sum of squared standardized loading / (sum of squared standardized loading + sum of indicator measurement error--sum of the variance due to

random measurement error in each loading=1 minus the square of each loading)" (ZenCaroline Blog 2007).

The fact that AVE for the constructs are all above 0.5 is an indication that the constructs are reliable with convergent validity (Koufteros and Marcoulides, 2006). The correlation among the latent variables is less than 1, which is one of the indications of a good fitting model (Carlsson et al., 2004). There was no need to rerun the model which would exclude the factors that yielded lower R-squares as LISREL cannot estimate only two items (de Jonge, 2008). Overall the model is a good fit and the latent variables can all be considered different constructs in a structural model (Carlsson et al., 2004).

Table 3. 17 CFA for Confidence in Food Safety Model – Japan 2009

Construct	Indicators	Factor Loadings	t-value	R-square	Composite reliability	AVE	M
Optimism (C1)					0.84	0.58	1.97
	X1	1.00		0.43			
	X2	0.96	28.08	0.59			
	X3	1.08	29.46	0.68			
	X4	1.07	28.39	0.61			
Pessimism (C2)					0.80	0.57	2.59
	X5	1.00		0.51			
	X6	1.21	29.24	0.73			
	X7	1.01	26.35	0.46			
Worry (C3)					0.91	0.77	2.79
	X8	1.00		0.72			
	X9	1.11	49.45	0.80			
	X10	1.11	49.90	0.81			
Trust in Government (C4)					0.91	0.65	1.92
	X11	1.00		0.45			
	X12	1.00	27.17	0.45			
	X13	1.13	33.98	0.74			
	X14	1.13	34.63	0.77			
	X15	1.11	34.86	0.79			
	X16	1.08	33.69	0.72			
Trust in Farmers (C5)					0.92	0.65	2.29
	X17	1.00		0.45			
	X18	1.07	28.63	0.51			
	X19	1.12	32.91	0.70			
	X20	1.13	32.64	0.68			
	X21	1.24	35.26	0.82			

	X22	1.17	33.86	0.74			
Trust in Retailers (C6)					0.89	0.67	2.05
	X23	1.00		0.49			
	X24	0.99	29.77	0.50			
	X25	1.10	35.22	0.72			
	X26	1.12	36.11	0.76			
	X27	1.15	37.07	0.80			
	X28	1.11	35.43	0.73			
Trust in Manufacturers (C7)					0.90	0.60	2.20
	X29	1.00		0.36			
	X30	0.99	22.37	0.36			
	X31	1.25	28.33	0.71			
	X32	1.26	28.46	0.72			
	X33	1.35	29.36	0.80			
	X34	1.28	28.16	0.69			
Meat /Fish(C8)					0.92	0.75	2.70
	X35	1.00		0.74			
	X36	1.05	59.67	0.88			
	X37	1.02	58.08	0.86			
	X38	0.79	36.86	0.50			
Preserve (C9)					0.88	0.72	2.55
	X39	1.00		0.88			
	X40	0.96	68.75	0.87			
	X41	0.75	33.72	0.41			
Process (C10)					0.76	0.51	2.12
	X42	1.00		0.49			
	X43	1.15	30.57	0.62			
	X44	0.95	25.74	0.42			
Fresh(C11)					0.91	0.71	2.78

	X45	1.00		0.49			
	X46	1.31	38.60	0.86			
	X47	1.30	38.87	0.87			
	X48	1.14	32.44	0.59			

Normal Theory Weighted Least Square Chi-square=10841.58 df=1025, pvalue=0 RMSEA=0.070 NFI=0.96 CFI=0.97 GFI=0.81

3.5.2 COMFIRMATORY FACTOR ANALYSIS - CANADA

Table 3.18 shows the CFA results for the unstandardized estimates for the Canadian model. GFI is 0.77 which indicates that it is an acceptable fit. The fact that CFI is greater than 0.95 implies that it is a good fit. The root mean squared error of approximation (RMSEA) 0.076, also indicates an acceptable fit. The t-values for all the factor loadings are reasonable and statistically significant.

With the exception of the question 'as a result of the occurrence of food safety incidents I am suspicious about certain food products', the R-squared values for the individual differences were all above 0.50 indicating that the factor loadings are statistically significant. The two first questions for the trust in societal actors namely "_____ have the competence to control the safety of food" and "_____have sufficient knowledge to guarantee the safety of food products" have lower R-squared values. Fish, frozen products, pre-cut and washed vegetables, vitamin supplements, fruits and vegetables and bread products are part of the different product groups (meat/fish, processed, preserved and fresh) that have low R-squared values.

Composite reliability (CR) and the average variance extracted (AVE) are also ways of checking whether the constructs, optimism/pessimism, etc. are reliable. Composite reliability for all the constructs is above 0.75. The AVE for the constructs is above 0.5 indicating that the constructs show convergent validity (Koufteros and Marcoulides, 2006). The correlation among the latent variables is less than 1, which is one indication of a good fit model (Carlsson et al., 2004). Overall the model is a good fit and the latent variables can all be considered as different constructs in a structural model (Carlsson et al., 2004).

Table 3. 18 CFA for Confidence in Food Safety Model- Canada 2009

Construct	Indicators	Factor Loadings	t-value	R-square	Composite reliability	AVE	M
Optimism (C1)					0.92	0.73	3.07
	X1	1.00		0.67			
	X2	1.15	34.89	0.83			
	X3	1.16	33.93	0.80			
	X4	0.88	28.17	0.62			
Pessimism (C2)					0.80	0.58	2.08
	X5	1.00		0.63			
	X6	0.96	23.37	0.63			
	X7	0.96	20.40	0.47			
Worry (C3)					0.91	0.76	2.26
	X8	1.00		0.72			
	X9	1.19	33.00	0.77			
	X10	1.16	33.37	0.79			
Trust in Government (C4)					0.89	0.59	2.55
	X11	1.00		0.27			
	X12	0.97	12.99	0.28			
	X13	1.66	17.28	0.80			
	X14	1.67	17.20	0.78			
	X15	1.56	17.07	0.75			
	X16	1.53	17.02	0.69			
Trust in Farmers (C5)					0.91	0.64	2.69
	X17	1.00		0.43			
	X18	1.03	17.91	0.42			
	X19	1.24	22.28	0.71			
	X20	1.30	22.69	0.74			
	X21	1.26	23.33	0.80			
	X22	1.27	22.76	0.74			
Trust in Retailers (C6)					0.86	0.57	2.20
	X23	1.00		0.32			

	X24	0.99	14.09	0.31			
	X25	1.31	18.37	0.70			
	X26	1.31	18.34	0.70			
	X27	1.27	18.47	0.72			
	X28	1.24	17.90	0.64			
Trust in Manufacturers (C7)					0.89	0.59	2.87
	X29	1.00		0.27			
	X30	0.93	12.40	0.25			
	X31	1.82	16.91	0.76			
	X32	1.80	16.73	0.72			
	X33	1.78	17.13	0.81			
	X34	1.67	16.61	0.70			
Meat /Fish(C8)					0.89	0.68	2.64
	X35	1.00		0.85			
	X36	1.01	39.28	0.75			
	X37	0.87	36.57	0.70			
	X38	0.71	23.50	0.42			
Preserve (C9)					0.86	0.68	2.77
	X39	1.00		0.79			
	X40	0.92	35.55	0.80			
	X41	0.73	23.17	0.44			
Process (C10)					0.75	0.50	2.20
	X42	1.00		0.45			
	X43	1.26	19.52	0.59			
	X44	1.06	17.52	0.45			
Fresh (C11)					0.87	0.64	2.86
	X45	1.00		0.44			
	X46	1.40	24.24	0.83			
	X47	1.37	24.41	0.85			
	X48	1.10	18.10	0.42			

Df: 1025 RMSEA: 0.076 NFI: 0.95 CFI:0.96 GFI:0.77

3.5.3 STANDARDIZED STRUCTURAL MODEL - JAPAN AND CANADA

A standardized structural model is derived for the individual differences – 'optimism' and 'pessimism'. The 'optimism' structural model has a higher R-squared than the 'pessimism' one as shown in Table 3.19. Some similarities exist across both dimensions in Japan and include the fact that in both cases, meat/fish, processed foods, and fresh fruits and vegetables, gender, age and worry are statistically significant but with opposite signs. Trust in government and manufacturers in Japan increase the optimism level while trust in farmers increases the level of pessimism in the respondent's safety of food confidence level. Trust in retailers actually reduces the level of pessimism. The coefficients for the rest of the societal actors in both cases are statistically insignificant. These results are different from what de Jonge (2008) found. de Jonge (2008) found that trust in government and manufacturers were the only significant trust variables in the Netherlands for both optimism and pessimism. In other words, trust in government and manufacturers increased optimism level and decreased pessimism level in her study.

Perceptions of safety in product groups, with the exception of preserved foods are all statistically significant. Higher safety perceptions of meat and fish and processed food increases the level of optimism and decreases the level of pessimism in food safety confidence. On the other hand, safety of fresh fruits and vegetables yields the opposite effect. Education level is negatively related to pessimism. Worry is positively related to pessimism and negatively related to optimism. In other words, people who tend to be more worried also tend to be more pessimistic and have less confidence in food safety (Carlsson et al., 2004). The signs on the coefficients make sense except for the positive relationship between trust in farmers and pessimism. One might expect that trust in farmers would be negatively related to pessimism. Furthermore, contrary to de Jonge's (2008) results for the Netherlands, the Japanese data showed that people with higher levels of education and who are older are more pessimistic and have lower

levels of consumer confidence. de Jonge's (2008) results showed that trust in manufacturers and government, meat/fish, education were statistically significant and positively related to optimism. Age on the other hand was negatively related to optimism. Trust in manufacturers and government, meat/fish, education were negatively related to pessimism. Recall, age, worry, allergies were positively related to pessimism (de Jonge, 2008). It should be noted that, recall and allergies were not included in the current model. Further research could examine whether these variables are important in Japan. Another study showed that older individuals have a higher level of food risk safety perceptions (Knight and Warland 2004). With respect to gender, males appear to be more pessimistic and less optimistic about the level of food safety confidence in this dataset. The covariance between optimism and pessimism is -0.313. The optimism and pessimism concepts are related (de Jonge, 2008). It is thus expected that some of the same independent variables will affect both optimism and pessimism.

The estimation for the Canadian data is also depicted in Table 3.19. The estimates for trust in societal actors are positive and statistically significant for the optimism model. This implies that an increase in trust in the societal actors increases the level of optimism of the food safety confidence level. Meat/fish is the only product that is statistically significant indicating that safety perceptions for that product group leads to an increase in optimism level. Males tend to have a lower level of optimism in food safety. The optimism model has a higher R-squared value than the pessimism model indicating a better fit. de Jonge (2008) results for Canada and the Netherlands indicated that the trust in societal actors, meat and fish, preserved and processed foods, worry, recalls and production-related concerns were all statistically significant for the optimistic structural model. Recalls and production-related concerns were not included in the current model and are variables that might be included in future research. Furthermore, preserved and processed foods were used as variables in the current model.

In the case of the pessimism model, trust in manufacturers is statistically significant indicating that an increase in that trust component leads to a reduction in the level of pessimism in food safety confidence levels. An increase in safety

perceptions about meat/fish leads to a reduction in pessimism while safety perceptions about preserved foods, increases the pessimism level about food safety. The coefficient on preserved food is statistically significant and has a negative relationship with pessimism. The worry variable enhances the level of pessimism in confidence in food safety. de Jonge (2008) results indicate that only trust in manufacturers, meat/fish, preserved and processed foods, production-related concerns, recalls, worry and education were statistically significant for the Netherlands and Canada in 2006. Production-related concerns and recalls were not included in the estimation of the current model.

Table 3. 19 Regression Coefficients (standardized) – Japan and Canada 2009

Construct	Optimism(R^2 = 0.366) JAPAN		Pessimism (R^2 = 0.210) JAPAN		Optimism (R^2 = 0.536) CANADA		Pessimism (R^2 = 0.373) CANADA	
	Beta	**t-value**	**Beta**	**t-value**	**Beta**	**t-value**	**Beta**	**t-value**
Trust in government	0.09***	3.951	0.12***	3.930	-0.06	-1.644	-0.02	-0.917
Trust in Farmers	0.02	-0.659	0.07***	2.722	0.01	0.445	0.12***	4.669
Trust in Retailers	0.04	1.477	0.07**	2.215	0.03	0.922	-0.11***	-3.356
Trust in Manufacturers	0.19***	6.617	0.27***	7.462	-0.22***	-5.082	-0.04	-1.377
Meat/Fish	0.12***	4.102	0.24***	6.446	-0.31***	-7.180	-0.07**	-2.362
Preserved	-0.04	-1.319	0.06	1.614	-0.14***	-3.232	0.02	0.498
Processed	0.41***	11.157	0.02	0.527	0.09	1.773	-0.41***	-10.100
Fresh fruits and vegetables	-0.11***	-3.518	0.06	1.507	-0.0008	-0.018	0.24***	6.810
Gender	-0.08***	-4.352	-0.09***	3.449	0.04	1.395	0.11***	5.086
Edu	-0.02	-1.296	0.03	1.404	-0.05	-1.872	0.04**	2.113
Age	-0.07***	-3.655	0.05	1.997	0.004	0.134	0.11***	5.263
Trait worry	-0.05***	-2.927	-0.01	-0.519	0.22***	7.698	0.14***	6.898

On two-tailed t-test: significant level 5%**:t> 1.96 1%***:t>2.58

3.6.1 PRINCIPAL COMPONENT ANALYSIS - JAPAN

In this section, the data are analyzed to identify the factors that determine general food safety perceptions and food safety perceptions of beef for the Japanese data. This helps to build the groundwork to understanding the attitudes of Japanese consumers and thus find ways to improve the level of beef safety confidence. The general food safey perceptions and food safety perceptions of beef can be estimated using ordered probit models. Previous studies have used principal components and ordered probit to estimate similar models. Negatu and Parikh (1999) modeled the two-way relationship between perceptions using an ordered probit model. Principal components analysis was used to get the best possible linear combination of variables (Negatu and Parikh, 1999; Angulo et al., 2005). Lobb et al. (2005) used a modeling process based on Ajzen's Theory of Planned Behaviour to investigate risk perceptions and trust in food safety information. They aggregated trust in food safety information using principal component analysis to investigate the correlations across information sources and to find the estimates for the latent trust constructs (Lobb et al., 2007).

Principal component analysis is a method used to examine similarities in data. The method will generate a new set of variables or factors based on the original variables which explain the variance of the original series. 34 explanatory variables are considered which in this case include the three worry questions, three pessimism questions, four optimism questions and six trust questions for each social actor (government, manufacturers, farmers and retailers). The questions can be found in Appendix 2A and Table 3.16. Principal component analysis is useful since the variables can be replaced in a regression by a smaller number of variables which explains most or all of the variation in the exploratory variables (Barnes et al., 2007). Each of the principal components contains no redundant information since most of the variance is captured in the first few components (Barnes et al., 2007).

Principal component analysis is used to estimate consumer's general level of food safety and their perceptions of beef food safety. The general level of food

safety question is "Generally, food products are safe" (strongly disagree to strongly agree) and that of beef food safety "What do you think about beef?" (not safe to safe) are on 5-point Likert scales. When it comes to measuring consumer's perceptions of beef food safety, many studies only focus on beef eaters (Van Wezemael et al., 2010; Gracia and Zeballos, 2005). Therefore, principal component analysis is applied to only the beef eaters in the Japanese data when analyzing consumers' perceptions of beef and their general level of safety perceptions. The total number of beef eaters is 1786 out of 1940 and the demographics for this sample are depicted in Table 3.20. The sample of beef eaters are similar to the general sample.

Table 3.21 and 3.22 report the factor loadings for the socio-demographics and the trust components. The principal components are estimated using TSP (statistical software). In this case, if 75% of the variance of each of the set of variables can be explained by fewer than two components, the program will stop there. The number of principal components actually constructed in any given procedure is the minimum of the number requested. The factor loading indicates how well the factor serves to represent the original data. A general form for computing the scores on the first component can be illustrated below:

$$c_1 = b_{11}(x_1) + b_{12}(x_2) + ..b_{1p}(x_p)$$

where

c_1 = the score on principal component 1

b_{1p} = the regression coefficient for observed variable p

x_p = the respondent's score on observed variable p (Hatcher, 2003, pg 6).

In this case, the observed variables are the responses that the respondents gave for each of the sets of questions on Likert scales. The factor loadings are considered to be the optimal weights since it accounts for the variance in the observed variables (Hatcher, 2003).

The first set of principal components for each of the data sets for the worry are all similar to each other. The factors are used as variables in the regressions, in the ordered probit models which is explained in more detail in the next section.

Table 3. 20 Demographics for Beef Eaters – Japan 2009

Total Respondents	**1940**	**1786 (Beef Eaters)**	**Population Census (2005)**
In which of the following age groups do you fall?	**Sample (%)**	**Sample (%)**	**Population (%)**
18-24	14.3	14.6	9.5
25-29	11.9	11.8	10.7
30-39	25.5	25.3	23.9
40-49	21.8	22.2	20.4
50-64	26.6	26.1	35.6
65+			
Please indicate your gender			
Male	50	48	48.8
Female	50	52	51.2
How many people live in your household?			
1	14.6	13.4	28.2
2	21	34.6	28.0
3 +	64.4	65.4	43.9
What is the approximate range of your total household income?			
$24,999 or under	10.7	9.9	
Between $25,000 and $39,999	17.4	17.3	8.5
Between $40,000 and $64,999	25.4	26.1	27.9
Between $65,000 and $79,999	12.9	13.2	19.6
Between $80,000 and $99,999	10.3	10.5	
Between $100,000 and $119,999	4.6	4.8	
$120,000 or more	5.9	6.1	29.2
I don't know	12.8	12.1	
Region			
Hokkaido / Tohoku	12.2	11.6	12.1
Kanto / Koshinetsu	29.9	29.7	33.1
Chubu / Hokuriku / Tokai	17.4	17.1	17.2
Kinki region	15.7	16.3	17.8
Chugoku region	7.9	8.2	6.1
Shikoku	4.5	4.5	3.5
Kyushu	12.4	12.6	10.6
Do you live in a city, in a town or in the countryside?			
In a city (>100.000 inhabitants)	56	56.4	65.8
In a town (> 10.000 inhabitants)	34.3	34.1	30.9
In the countryside/rural district	9.7	9.5	3.2

Number of Children Living at home			
No home living children < 18 years	65	64	55
1	16.7	16.9	44.4
2	14.2	14.8	
3	3.4	3.6	
4	0.5	0.5	
5	0.1	0.1	
More than 5	0.1	0.1	

(Statistic Bureau 2010)

Table 3. 21 Factor Loadings for Principal Components for the Socio-Demographics- Japan 2009

OPTIMISM	**Japanese data**	
	Factor loadings 1	**Factor loadings 2**
I am optimistic about the safety of food products	0.76	0.64
I am confident that food products are safe	0.83	-0.04
I am satisfied with the safety of food products	0.85	-0.22
Generally, food products are safe	0.83	-0.31
PESSIMISM		
I worry about the safety of food	0.85	0.37
I feel uncomfortable regarding the safety of food	0.86	0.17
As a result of the occurrence of food safety incidents I am suspicious about certain food products	0.82	-0.56
WORRY TRAITS		
Many situations make me worry	0.91	
I know I shouldn't worry about things, but I just cannot help it	0.92	
I notice that I have been worrying about things	0.93	

Table 3. 22 Sets of Factor Loadings for the Trust Components-Japan 2009

	Manufacturers		Retailers		Government		Farmers	
	1st	2nd	1st	2nd	1st	2nd	1st	2nd
The _____has the competence to control the safety of food	0.73	0.60	0.79	0.51	0.77	0.51	0.76	0.55
The _____ has sufficient knowledge to guarantee the safety of food products	0.73	0.60	0.80	0.48	0.77	0.52	0.80	0.46
The _____ is honest about the safety of food	0.85	-0.21	0.87	-0.14	0.88	-0.09	0.87	-0.17
The _____ is sufficiently open about the safety of food	0.83	-0.36	0.87	-0.29	0.87	-0.29	0.84	-0.37
The _____ takes good care of the safety of our food	0.88	-0.23	0.89	-0.22	0.89	-0.24	0.90	-0.17
The _____gives special attention to the safety of food	0.84	-0.23	0.86	-0.25	0.86	-0.28	0.86	-0.20

3.6.2 PRINCIPAL COMPONENT ANALYSIS- CANADA

Principal component analysis is also applied to beef eaters in the Canadian sample data to analyze consumers' perceptions of beef and their general level of food of safety perceptions. The total number of beef eaters is 869. The demographics for this sample are depicted in Table 3.23. There are no major differences between the original and the beef eater sample. The sample has a greater percentage of respondents in the ages between 20 to 24 but a much lower percentage of the respondents are between 15 to19 and above 65 as compared to the census.

Table 3.24 and 3.25 reports the factor loadings for the socio-demographics and the trust components. The principal components are estimated using TSP (statistical software). The commands specify that 2 principal components are to be found for each of the variables. If 75% of the variance of each of the set of variables can be explained by fewer than two components, the program will stop there. The number of principal components actually constructed in any given procedure is the minimum number of factor loadings such that the factor can serve to represent the original data. The first set of principal components for each of the data set for the worry variable are all similar to each other. The factors are used when in subsequent regressions.

Table 3. 23 Demographics For Beef Eaters– Canada 2009

Total Respondents	**948**	**869 (beef eaters)**	**Population Census (2006)**
In which of the following age groups do you fall?	**Sample (%)**	**Sample (%)**	**Population (%)**
15-19	0.5	0.3	8.5
20-24	11.3	10.8	8.1
25-29	7.8	8.1	7.8
30-39	19.4	19.8	19.0
40-49	21.3	20.9	20.2
50-64	28.9	29.5	20.4
65+	10.8	10.6	16.0
Please indicate your gender			
Male	54.7	54.5	48.5

Female	45.3	45.5	51.5
How many people live in your household?			
1	18.6	18.5	
2	37.1	37.2	
3 +	44.3	44.3	
What is the approximate range of your total household income?			
$24,999 or under	8.2	7.6	51.5
Between $25,000 and $39,999	11.6	11.7	19.2
Between $40,000 and $64,999	20.1	20.1	
Between $65,000 and $79,999	16.6	16.9	29.3
Between $80,000 and $99,999	14.5	14.3	
Between $100,000 and $119,999	13.1	13.5	
$120,000 or more	13.5	13.1	6.7
I don't know	2.4	2.8	
Region			
Maritimes	5.7	5.4	6.0
Quebec	23.3	25.1	24.6
Ontario	43.1	41.5	38.8
Manitoba	6.0	6.1	3.8
Saskatchewan	2.5	2.7	3.3
Alberta	11.0	10.8	10.1
British Columbia	8.1	8.3	13.3
Do you live in a city, in a town or in the countryside?			
In a city (>100.000 inhabitants)	67.0	65.2	
In a town (> 10.000 inhabitants)	18.8	19.2	
In the countryside/rural district	14.2	15.3	
Number of Children			
No home living children less than 18 years	69.6	69.0	
1	14.6	14.5	
2	11.4	11.9	
3	3.3	3.6	
4	1.1	0.9	
More than 4	0.1	0.1	

Table 3. 24 Factor Loadings for Principal Components for the Socio-Demographics- Canada 2009

OPTIMISM	**Canadian data**	
	Factor loadings 1	**Factor loadings 2**
I am optimistic about the safety of food products	0.879	
I am confident that food products are safe	0.915	
I am satisfied with the safety of food products	0.902	
Generally, food products are safe	0.854	
PESSIMISM		
I worry about the safety of food	0.866	0.209
I feel uncomfortable regarding the safety of food	0.850	0.348
As a result of the occurrence of food safety incidents I am suspicious about certain food products	0.800	-0.595
WORRY TRAITS		
Many situations make me worry	0.904	
I know I shouldn't worry about things, but I just cannot help it	0.913	
I notice that I have been worrying about things	0.920	

Table 3. 25 Principal Components in Trust in Societal Actors- Canada 2009

	Manufacturers		Retailers		Government		Farmers	
	1st	2nd	1st	2nd	1st	2nd	1st	2nd
The _____has the competence to control the safety of food	0.678	0.639	0.708	0.626	0.691	0.623	0.762	0.544
The _____ has sufficient knowledge to guarantee the safety of food products	0.644	0.681	0.701	0.637	0.686	0.627	0.753	0.550
The _____ is honest about the safety of food	0.862	-0.296	0.828	-0.312	0.872	-0.267	0.840	-0.317
The _____ is sufficiently open about the safety of food	0.838	-0.357	0.819	-0.347	0.855	-0.324	0.851	-0.341
The _____ takes good care of the safety of our food	0.892	-0.188	0.852	-0.199	0.875	-0.210	0.889	-0.154
The _____gives special attention to the safety of food	0.846	-0.177	0.823	-0.216	0.855	-0.195	0.865	-0.156

3.7 ORDERED PROBIT

The next step in this analysis is to estimate ordered probit models to explain (i) food safety perceptions of beef, and (ii) general food safety. Scale usage heterogeneity can be a cause of upward bias in correlation especially if some respondents tend to use either the low or high end of the scale (Rossi et al., 2001). The distribution of some of the questions were estimated for both Canada and Japan and most of the responses were in the mid-range as illustrated in Appendix J and K.

The general food safety is characterized by the question "Generally, food products are safe" which is on 5-point Likert scale ranges from "strongly disagree to strongly agree". Since the responses to the questions are in an ordered form, an ordered probit model is appropriate. The ordered probit model is a discrete-choice probability model mostly used to analyze attitudes, behaviours and choices. Lobb et al. (2008) suggested two reasons for using an ordered probit model. Firstly, the 'individual difference' and 'trust' questions are measured with discrete five-point Likert scales which suggests avoiding standard multiple regression because the dependent variables are discrete, nominal, ordered and non-continuous (Mazzocchi et al., 2008; Goldberg et al., 2008). Furthermore, the random error in an ordered probit model is assumed to follow a normal distribution which is a desirable trait (Kockelman and Kweon, 2002). An ordered probit model can be used to find factors that determine people's general perceptions of beef safety and food safety.

Greene et al. (2009) (pg 83) defines the platform for an ordered probit model as follows:

$y_i^* = \beta' \mathbf{x}_i + \varepsilon_i,\ i = 1,...,N, \quad (1)$

y_i^* is the latent continuous utility- the dependent variable. β is a vector of K parameters that is the object of estimation and inference and the vector $\mathbf{x}_i$ is a set of K covariates that are assumed to be strictly independent of ε_i.. $i = 1,...,N$ is the number of sample observations.

$y_i = 1$ if $\mu_0 < y_i^* < \mu_1$,

$= 2 \quad \text{if} \quad \mu_1 < y_i^* < \mu_2$

$= \ldots$

$= J \quad \text{if} \quad \mu_{J-1} < y_i^* < \mu_J.$

where $\mu_{1\ldots}\ \mu_J$ are threshold variables in the probit model (Greene and Hensher 2009). The threshold variables are not known and are estimated with β (Greene, 1990).

3.7.1 ORDERED PROBIT MODEL FOR BEEF PERCEPTIONS – JAPAN AND CANADA

According to de Jonge (2008), general food safety perceptions depends on a number of factors such as demographics, personality traits, trust in societal actors, etc. The same concept is applied to modeling beef perceptions in Japan. This section follows the work of Verbeke et al. (2006) where an ordered probit model was used to estimate the importance of labeling in beef. The independent variables tested for the initial ordered probit model were age, gender, number of children, education, BSE, first factor for worry (worry1), optimism (OPT1), pessimism (PES1), manufacturers (MAN1), government (GOV1), retailers (GROC1) and farmers (FAR1). Age has been characterized into 7 age groups, gender is 1 if male and 0 if female, number of children is 1 if the respondents have children and 0 otherwise, and BSE was the question 'To what extent are you concerned about BSE and Creutzfeldt Jakob Disease (vCJD)' on a 5-point Likert scale ranging from "not at all concerned" to "very much concerned".

The final latent regression with the statistically significant independent variables can be formulated as:

$$y_i = \beta_0 + \beta_1 AGE_i + \beta_2 OPT1_i + \beta_3 MAN1_i + \beta_4 GROC1_i + e_i \qquad (2)$$

where, the dependent variable y_i is for the question 'What do you think about beef?' (5 point Likert scale ranging from 'not safe' to 'safe'). It is assumed that e_i is normally distributed across observations and is normalized with the mean and variance of zero and one. The results are shown in Table 3.26. Three (five categories minus two) threshold values are estimated jointly with the regression coefficients

Table 3. 26 Ordered Probit Model to Estimate Perception of Beef-Japan 2009

Parameter	Estimate	Standard Error	t-statistic	P-value
C	2.148	0.115	18.714	0.000
AGE	0.045**	0.020	2.255	0.024
OPT1	0.231***	0.029	7.842	0.000
MAN1	0.267***	0.035	7.534	0.000
GROC1	0.080**	0.034	2.310	0.021
MU3	1.247	0.077	16.137	0.000
MU4	3.086	0.086	36.000	0.000
MU5	4.753	0.118	40.377	0.000

Scaled R-squared = .154

* 10% significant level; ** 5% significant level; *** 1% significant level

The marginal effects are depicted in Table 3.27. The probability that the household agree that beef is safe decreases by 0.01% with a one unit change in age. A change in optimism increases the probability of finding beef safe by 0.01%. The probability of finding beef safe increases by 0.06% with a unit increase in trust level in retailers (Groc1). Strongly agreeing that beef is safe increases by 0.01% with a one unit increase in trust in manufacturers (MAN1).

Table 3. 27 Marginal Effects for Perceptions of beef - Japan 2009

MARGINAL EFFECTS					
	Y=1	Y=2	Y=3	Y=4	Y=5
AGE	-0.01	-0.01	-0.04	-0.01	0.00
OPT1	-0.01	-0.04	-0.02	0.06	0.01
GROC1	-0.00	-0.02	-0.01	0.02	0.00
MAN1	-0.01	-0.05	-0.02	0.08	0.01

The same model is estimated for the Canadian data to determine the perceptions of beef food safety. The same independent variables were tested for the initial ordered probit model ie. age, gender, number of children, education,

BSE, the first factors for worry, optimism, pessimism, trust in manufacturers, trust in government, trust in retailers and trust in farmers. The latent regression with the significant variables is formulated as:

$y_i = \beta_0 + \beta_1 AGE_i + \beta_2 GENDER_i + \beta_3 OPT1_i + \beta_4 PES1_i + \beta_5 MAN1_i + \beta_6 FAR1_i + \beta_7 BSE_i + e_i$ (3)

where, the dependent variable y_i is for the question 'What do you think about beef?' which is on a 5 point Likert scale ranging from 'not safe' to 'safe'. PES1 is the first factor for the pessimism question, and FAR1 is the first factor for trust in farmers. Three (five categories minus two) threshold values are estimated jointly with the regression coefficients. The regression estimates are depicted in Table 3.28.

Table 3. 28 Ordered Probit Model to Estimate Perception of Beef – Canada 2009

Parameter	Estimate	Standard Error	t-statistic	P-value
C	3.375	0.293	11.516	0.000
AGE	0.073***	0.026	2.766	0.006
GENDER	0.185**	0.079	2.336	0.019
OPT1	0.262***	0.056	4.692	0.000
PES1	-0.199***	0.052	-3.812	0.000
MAN1	0.198***	0.049	4.063	0.000
FAR1	0.209***	0.044	4.740	0.000
BSE	-0.135***	0.034	-3.948	0.000
MU3	1.108	0.234	4.727	0.000
MU4	2.528	0.245	10.328	0.000
MU5	4.149	0.251	16.503	0.000

Scaled R-squared = .32

* 10% significant level; ** 5% significant level; *** 1% significant level

The marginal effects for beef safety perceptions are depicted in Table 3.29. Age has no effect on the perceptions of beef food safety. The probability that the households strongly agree that beef is safe is 0.04% if the respondent is male. A one unit change in optimism, trust in manufacturers increases the probability that households strongly agree that beef is safe by 0.02% and 0.04%

respectively. There is no marginal effect for trust in farmers. A one unit change in the level of concern about BSE leads to a decrease of 0.01% in the probability that the respondent will strongly agree that beef is safe.

Table 3. 29 Marginal Effects for Perceptions of Beef - Canada 2009

MARGINAL EFFECTS					
	Y=1	**Y=2**	**Y=3**	**Y=4**	**Y=5**
AGE	0.00	0.00	0.00	0.00	0.00
GENDER	0.00	-0.01	-0.07	0.05	0.04
OPT1	0.00	0.00	-0.03	0.02	0.02
PES1	0.00	0.02	0.10	-0.07	-0.06
MAN1	0.00	-0.01	-0.07	0.05	0.04
FAR1	0.00	0.00	0.00	0.00	0.00
BSE	0.00	0.00	-0.02	0.01	-0.01

3.7.2 ORDERED PROBIT MODEL FOR GENERAL FOOD SAFETY-JAPAN AND CANADA

In the ordered probit regression presented in this section, the general food safety confidence is estimated first for Japan, followed by Canada. The agreement of independent variables tested for the initial ordered probit model for general food safety were age, gender, number of children, education, BSE, worry, optimism, pessimism, trust in manufacturers, trust in government, trust in retailers and trust in farmers. The final latent regression is as follows:

$$y_i = \beta_0 + \beta_1 AGE_i + \beta_2 EDU1_i + \beta_3 PES1_i + \beta_4 MAN1_i + \beta_5 GOV1_i + \beta_6 FAR1_i + \beta_7 BSE_i + e_i \quad (4)$$

where the dependent variable, y_i in that case is "Generally, food products are safe" which is on a 5 point Likert scale ranging from strongly disagree to strongly agree. The BSE variable refers 'To what extent are you concerned about BSE and Creutzfeldt Jakob Disease (vCJD)'. The regression is shown in Table 3.30.

Table 3. 30 Ordered Probit Model to Estimate the Factors That Determine General Confidence on Food Safety- Japan 2009

Parameter	Estimate	Standard Error	t-statistic	P-value
C	1.600	0.154	10.363	0.000
AGE	0.059***	0.020	2.992	0.003
EDU	0.041***	0.018	2.265	0.024
PES1	-0.315***	0.029	-10.965	0.000
MAN1	0.326***	0.033	9.887	0.000
GOV1	0.122***	0.030	3.981	0.000
FAR1	0.072***	0.030	2.376	0.018
BSE	-0.091***	0.027	-3.369	0.001
MU3	1.489	0.054	27.816	0.000
MU4	2.695	0.062	43.141	0.000
MU5	4.762	0.151	31.561	0.000

Scaled R-squared = .241

* 10% significant level; ** 5% significant level; *** 1% significant level

Angula et al.'s (2007) study in Spain used maximum likelihood estimation and found a positive correlation between education and confidence in food safety, and a negative correlation between mass media (trust in information sources) and confidence in food safety. In this case, mass media as one of independent variables was not included. They also found that perceived risk associated with beef also affects confidence in food safety (Angulo and Gil, 2007).

Another study used an ordered probit model to investigate Japanese consumers' food safety attitudes. The significant variables were membership in a consumer co-operative, households with annual income of about $A30000, age of respondents (Smith and Riethmuller, 2000). This is consistent with the results in this study since education is positive, BSE has a negative marginal effect, trust in societal actors and age are positive.

The results for the marginal effects for general confidence in food safety are depicted in Table 3.31. The probability that the household agrees that generally food is safe is 0.01% with a one unit increase in age. A one unit increase in trust level in farmers (Far1), manufacturers (man1) and government (gov1) increases the probability that the respondents will "agree" that generally food is safe by 0.02%, 0.08% and 0.03% respectively. BSE and pessimism decrease the probability of agreeing that food is safe by 0.02% and 0.08% respectively. A one unit change in education leads to an increase in probability of 'agreeing' that general food is safeof 0.01%. The results also show that none of the variables affect the probability that the household 'strongly agrees' that generally food is safe.

Table 3. 31 Marginal Effects for General Confidence in Food Safety-Japan 2009

MARGINAL EFFECTS					
	Y=1	**Y=2**	**Y=3**	**Y=4**	**Y=5**
AGE	-0.01	-0.02	0.01	0.01	0.00
FAR1	-0.01	-0.02	0.01	0.02	0.00
PES1	0.03	0.09	-0.04	-0.08	0.00
MAN1	-0.03	0.10	0.05	0.08	0.00
GOV1	-0.01	-0.04	0.02	0.03	0.00
EDUCATION	-0.00	-0.01	0.00	0.01	0.00
BSE	0.01	0.03	-0.01	-0.02	0.00

The latent regression for the Canadian model looks as follows:

$$y_i = \beta_0 + \beta_1 AGE_i + \beta_2 GENDER_i + \beta_3 PES1_i + \beta_4 MAN1_i + \beta_5 GOV1_i + \beta_6 GROC1_i + \beta_7 FAR1_i + e_i \quad (5)$$

where the dependent variable, y_i is "Generally, food products are safe" which is on a 5 point Likert scale. The regression is depicted in Table 3.32.

Table 3. 32 Ordered Probit Model to Estimate the Factors That Determine General Confidence on Food Safety- Canada 2009

Parameter	Estimate	Standard Error	t-statistic	P-value
C	2.992	0.158	18.899	0.000
GENDER	0.312***	0.088	3.564	0.000
PES1	-0.567***	0.049	-11.607	0.000
MAN1	0.250***	0.060	4.164	0.000
GROC1	0.179***	0.053	3.370	0.001
GOV1	0.180***	0.054	3.362	0.001
FAR1	0.150***	0.047	3.170	0.002
MU3	0.969	0.137	7.068	0.000
MU4	2.055	0.151	13.638	0.000
MU5	4.881	0.184	26.548	0.000

Scaled R-squared = .432

* 10% significant level; ** 5% significant level; *** 1% significant level

The results for the marginal effects for general confidence in food safety are depicted in Table 3.33. A one unit change in age leads to a probability of strongly agreeing that generally food is safe of 0.01%. The probability that the household strongly agrees that generally food is safe decreases by 0.09% as age increases. The probability of choosing 'strongly agree' that food is safe increases with higher trust in manufacturers (Man1), retailers (Groc1), government (Gov1) by 0.06%, 0.03%, 0.09%. Trust in farmers has no marginal effect on the level of confidence in food safety. A one unit change in pessimism decreases the probability of 'strongly agreeing' that generally food is safe by 0.08%.

Table 3. 33 Marginal Effects of General Food Safety -Canada 2009

MARGINAL EFFECTS					
	Y=1	Y=2	Y=3	Y=4	Y=5
AGE	0.00	0.00	-0.01	0.00	0.01
GENDER	0.00	0.00	-0.04	0.00	0.05
PES1	0.00	0.01	0.06	0.01	-0.08
MAN1	0.00	-0.01	-0.05	-0.01	0.06
GROC1	0.00	0.00	-0.02	0.00	0.03
GOV1	0.00	0.00	-0.07	-0.01	0.09
FAR1	0.00	0.00	0.00	0.00	0.00

3.8 CONCLUSION – CANADA AND JAPAN

3.8.1 DIFFERENCES BETWEEN JAPAN AND CANADA

In this section, the differences in the responses between Japanese and Canadian consumers are compared. In Japan, 24% of the respondents said they are very concerned about BSE and variant Creutzefeldt Jakob disease (vCJD) while in Canada the same number is 14%. 67% of Canadian consumers as compared to 39% of Japanese consumers consider BSE to be an important criterion when buying beef. Japanese respondents preferred Australian beef and also perceived Australian beef to be safer than Canadian beef. In Japan, 6% felt BSE was not important as compared to 10% in Canada. 25% of Japanese respondents as opposed to 36% of Canadian consumers agree (and strongly agree) to pay a premium for beef, which would not transmit the human variant of BSE. Both Canadian and Japanese respondents ranked the importance of food labels exactly the same.

Table 3. 34 Ranking for Purchase Decisions of Beef

	Schroeder et al. Canada (2006)	**Canada (2009)**	**Schroeder et al. Japan (2006)**	**Japan (2009)**
Product freshness	1	1	1	2
BSE		6		1
Country of Origin	8	10	2	3
Price	3	12	3	4
Leanness	2	9	8	17

Japanese and Canadian consumers identify different factors in making purchase decisions for beef. The top three for Japanese consumers are BSE, product freshness and country of origin while Canadian consumers find product freshness, flavor and tenderness to be the most important factors. For Canadians, BSE is ranked 6^{th} and country of origin is 10^{th} on the NFP scale. In Japan, Schroeder et al. (2006) found that the top three factors were freshness, country of origin and price while in Canada they found freshness, leanness and price to be

the most important. This implies that Canadian and Japanese consumers have different perceptions when it comes to buying beef and those differences can also be found in an earlier study by Schroeder et al. (2006). This shown in Table 3.34. This is intriguing considering that compared to Japanese consumers a higher percentage of Canadian respondents had said they were willing to pay more for beef that would not transmit the human variant of BSE as shown in Figure 3.11. Yet in Table 3.8, BSE is not one of the main factors when purchasing beef. Both Canadian and Japanese consumers hold manufacturers responsible for any problems related to food products and to guarantee traceability. Both Canadian and Japanese consumers prefer domestic beef which is similar to the results of Schroeder et al. (2006).

3.8.2 RISK PERCEPTIONS AND ATTITUDES- CANADA AND JAPAN

As shown in Table 3.15 both risk attitudes and perceptions differ across time and countries. The results for risk attitudes and perceptions in beef are larger in Japan than in Canada in both years. In other words, a higher percentage of Japanese consumers find beef to be risky and are less willing to accept the risks of eating beef as compared to Canadians. Risk attitudes and perceptions have decreased across time in Japan while in Canada, risk perceptions have increased. The changes were all statistically significant. In Canada the survey was conducted in the middle of a Listeriosis outbreak which although unrelated to beef, may have generated concerns among respondents and thus had increased the likelihood that respondents feel more negatively about beef. Risk attitudes, on the other hand, have decreased over time. Therefore, it appears that Japanese consumers are slightly less risk averse and have a lower perceptions of risk now as compared to earlier, an indication that beef is perceived somewhat more positively. Since risk perceptions and attitudes in Canada have moved opposite directions, Canadian consumer's general assessment regarding beef cannot be determined. Overall,

Japanese consumers have much higher risk perceptions and risk aversions regarding beef as compared to Canadians.

3.8.3 CONFIRMATORY FACTOR ANALYSIS- CANADA AND JAPAN

In the results from the previous sections the factors determining– 'pessimism' and 'optimism' in Japan and Canada are identified. For Japan, the study shows that trust in manufacturers and government are statistically significant and increase the level of optimism about food safety. Worry was positively related to the level of pessimism about food safety and negatively related to optimism. In Canada, increases in the trust levels in all four societal actors and safety perceptions of meat/fish products increase the levels of optimism about food safety. An increase in trust in manufacturers leads to a reduction in the level of pessimism in general food safety confidence. Worry increases the level of pessimism about of food safety. Therefore, trust in societal actors, worry and safety perceptions of food products affect the level of optimism or pessimism in food safety confidence.

In the models estimated for consumers' food safety perceptions about beef and general food safety in both countries various factors have been identified. When it comes to consumer safety perceptions of beef, age, optimism, trust in manufacturers and retailers are statistically significant for Japanese consumers. For Canadian consumers, the estimates for age, gender, optimism, pessimism, BSE and trust in manufacturers and farmers are statistically significant. Therefore, age, optimism and trust in manufacturers are common determinants of consumers' safety perceptions of beef in both countries. BSE is not statistically significant for the safety perceptions of beef in Japan, which is contrary to what would have been expected since the Japanese respondents had rated BSE as the number one factor when purchasing beef but it was significant in the general food safety perceptions .

In Japan, the determinants of general food safety confidence were age, education, pessimistic traits, BSE and three of the societal actors namely manufacturers, government and farmers. In Canada, age, gender, pessimism and trust in all four of the societal actors are statistically significant in determining general food safety. There are some similarities across countries for general food safety determinants namely age, pessimism and three of the societal actors.

CHAPTER 4 WILLINGNESS TO PAY FOR JAPAN AND CANADA

4.1 INTRODUCTION

In this chapter, the choice experiment section of the survey is analysed. The concept of random utility theory is introduced in the first section. The stated preference responses are used in the estimation of multinomial logit models on the probability of choosing specific steak products. From these regressions, the willingness to pay for steak with traceability, BSE testing or both in Japan and Canada can be calculated. In the third section, the latent class modelling of the same preference data are introduced and the willingness to pay for each of the identified classes are calculated. The results of the general model and the latent class models for each country are compared in section four.

4.2 MODEL FOR MULTIPLE CHOICES

Numerous studies have examined the willingness to pay for different product attributes (Angulo and Gil, 2007; Schroeder et al., 2006; McCluskey et al., 2005; Hobbs et al., 2005; Alfnes and Rickertsen, 2003; Lusk et al., 2003). In most cases the theory on which regression models of consumer choice are based is random utility theory. This theory is based on the assumption that people are rational and they select among alternatives the product giving them the highest utility. As a result, if the utility of an alternative is highest among the choices, then it is also assumed that the probability of choosing that particular alternative is highest. The utility function can be depicted as follows:

$$U_{ij} = \hat{U}_{ij} + \varepsilon_{ij} \qquad \text{-(1)}$$

where i is the utility of an individual and j is the choice of the alternative and ε_{ij} is a random error (Loureiro and Umberger, 2007). In this study respondents were given choices of two different strip loin steaks or not choosing either option. A multinomial logit model is used to represent the ith consumer's probability of choosing the jth steak choice. A multinomial logit model is generally used when data are individual specific (Greene, 1990). The model can be expressed as:

$$P(y_i = j) = \frac{e^{x_j\beta}}{\sum_{j=1}^{J} e^{x_i\beta}} \quad for \ j = 1,....J. \text{-(2) (Loureiro and Umberger, 2007, pg 503)}$$

where β represents the weight of exogenous variables in determining the utility, x_{ij} is an arrow vector which represents the steak attributes and socio-demographics of the *i*th consumer, y_i represents the *i*th consumer's probability of selecting the *j*th steak choice (Loureiro and Umberger, 2007). The equations provide a set of probabilities for the J choices for the respondent with different characteristics x_i (Greene, 1990).

In the case of this choice experiment, the respondents were offered three options with different attributes as explained in Chapter 2. The attributes of the steak were price per pound or price per 100 gms, country of origin, production practice, level of tenderness and food safety assurance (traceable, animal tested or both traceable and animal tested). The regression model is used to calculate the probability of choosing a particular steak with certain attributes. The respondents were told to make their selections as if they were facing these choices in their retail purchase decisions.

4.2.1 WILLINGNESS TO PAY IN JAPAN

The willingness of Japanese consumers to pay for beef with different attributes can be calculated from the multinomal logit regressssion results. The multinomial logit models are run with different interaction terms using TSP version 5.0 software. The model is depicted as follows and a full set of the interaction terms as well as the estimation of the model can be found in Table E.1. The variables below are interaction terms between the demographics, country and food safety assurance, alternative specific constants for production practice and tenderness, and interaction terms. The attributes are summarized in Table 4.1.

$$U_{ij} = \beta_1 \mathrm{Price}_{ij} + \beta_2 Japnon_{ij} + \beta_3 USnon_{ij} + \beta_4 Cannon_{ij} + \beta_5 CanTR_{ij} +$$
$$\beta_6 CanAT_{ij} + \beta_7 CanATTR_{ij} + \beta_8 JapTR_{ij} +$$
$$\beta_9 JapAT_{ij} + \beta_{10} JapATTR_{ij} + \beta_{11} USTR_{ij} + \qquad \text{--(3)}$$
$$\beta_{12} USAT_{ij} + \beta_{13} USATTR_{ij} + ...$$
$$+ \beta_{141} EATNCanATTR_{ij} + \varepsilon_{ij}$$

Table 4. 1 Summary of Attributes for Japan and Canada

Steak Attributes	Japan	Canada	NONE
Price (¥/100gms / Can$/lb)	¥528/ ¥865/ ¥1200/ ¥1536	$5.50/ $9.00/ $12.50/ $16.00	
Country of Origin	Japan (Jap)/ Canada (Can)/ USA (US)	Canada (Can)/ Australia (Aus)/ USA(US)	
Production Practice	Natural (NA)/ Approved standards (AS)	Natural (NA)/ Approved standards (AS)	
Tenderness	Assured Tender (AT)/ Uncertain (U)	Assured Tender (AT)/ Uncertain (U)	
Food Safety Assurance	Traceable (TR)/ Animal Tested (AT)/ Both(ATTR)/ None (non)	Traceable (TR)/ Animal Tested (AT)/ Both(ATTR)/ None (non)	I would not purchase any of these products (neither)

The socio-demographics variables and their distribution can be found in Table 4.2 and the questions can also be found in Appendix F. It should be noted that 'Eat meat', 'Eat meat and fish', 'Eat fish' and 'Eat none' are dummy variables that add up to 1.

Table 4. 2 Socio-demographics variable in Japan and Canada

Variable name	Description (coding)	Japan (%)		Canada (%)	
Age (AGE)	Numeric	1	0	1	0
	1. 15 -19			0.5	
	2. 20 -24	14.3		11.3	
	3. 25 -29	11.9		7.8	
	4. 30 -39	25.5		19.4	
	5. 40 -49	21.8		21.3	
	6. 50 -64	26.6		28.9	
	7. 65+			10.8	
Type of Community (REGION1)	1 if from city, 0 if otherwise	56	44	67	33
Gender (GEN)	1 if male , 0 if otherwise	50.1	49.9	54.7	45.3
Education (EDUC)	1 if in technical/business school , community college, University , post graduate studies, 0 if otherwise	65.2	34.7	78.6	21.4
Children (KIDS)	1 if children <18 living in the household, 0 if otherwise	35.1	64.9	30.4	69.6
General trust (TRUST)	1 if people can be trusted, 0 if otherwise	44	56	51	49
Eat meat (EATM)	1 if eat meat but do not eat fish, 0 if otherwise	3.2	96.8	12.4	87.6
Eat meat and fish (EATMF)	1 if eat meat and fish, 0 if otherwise	93.6	6.4	83.3	16.7
Eat fish (EATF)	1 if eat fish but do not eat meat, 0 if otherwise	2.5	97.5	2.6	97.4
Eat none (EATN)	1 if vegetarian, or 0 if otherwise	0.8	99.2	1.6	98.4

The choice of these demographics variables was discussed in Chapter 2. Income was not included as 12% of the Japanese respondents preferred not to

reveal their level of income. Correlation between income and education for the Japanese and Canadian data was found to be statistically significant at 0.01 level as shown in Table E.2 and Table G.2.

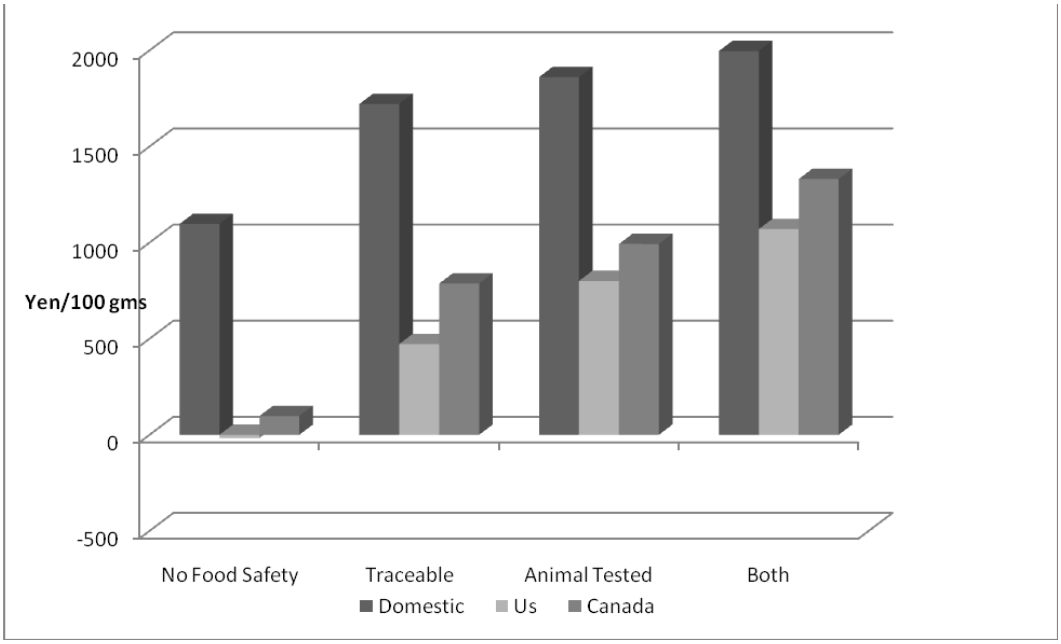
The multinomial logit regression model gives an insight as to how the individual variables (coefficients) affect the probability of selecting a particular strip loin steak. In this case, as price increases, utility decreases as expected by economic theory. Futhermore, the interaction terms between source (domestic or imported) country and food safety assurance are all statistically significant and positive which imply that as food safety attributes are added to beef, the probability of selecting the product also increases as depicted in Appendix E.

The coefficients of the model are then used to calculate the willingness to pay for strip loin steak with different attributes. A snap-shot of one of the choice experiment question in the survey is depicted below. The average price of beef in ku-areas of Tokyo is ¥ 870/100gms ($47/lb) in 2009 (Statistics Bureau, 2010). The willingness to pay is therefore calculated from the conditional logit model where all the interaction terms are taken into consideration.

Figure 4. 1 Choice set for choice experiment- Japan

Steak Attribute	**A**	**B**	**C**
Price (¥/100gms.)	1200	1536	I would not purchase any of these products
Country of Origin	Canada	USA	
Production Practice	Approved Standards	Approved Standards	
Tenderness	Uncertain	Uncertain	
Food Safety Assurance	Traceable and Animal Tested	Traceable and Animal Tested	
I would choose . . .	○	○	○

Figure 4. 2 Comparing WTP for Striploin steak - Japan 2009



The reported WTP (see Figure 4.2) is calculated at the mean across all independent variables with interaction terms for the four categories of safety attributes, namely none, traceable, animal tested and traceable and animal tested. In other words, the WTP is not being calculated for each consumer and aggregated. There is one set of parameters for all consumers. The base case is choosing neither steak option. Relative to choosing neither steak option, the domestic steak without any safety assurances is preferred and the WTP is ¥1096.96/100gms ($60/lb). The WTP increases with safety assurances to ¥1996.52/100gms ($109/lb) (traceability and animal tested). Therefore, the willingness to pay for traceability and animal testing of Japanese beef steak is ¥900/100gms ($49/lb). The graph also shows that respondents are willing to pay more for domestic steak without any food safety attributes as compared to imported steak. Japanese respondents are willing to pay more for safety assurances for both domestic and imported steak. Respondents are willing to pay more for a combination of traceable and animal tested rather than just traceability or animal tested. The chart also shows that Japanese consumers are willing to pay more for Canadian steak with or without food safety assurances in comparison to US steak. The willingness to pay for Canadian steak without any safety

assurances increases from ¥97.9/100gms ($5.3/lb) to ¥1330.97/100gms ($73/lb) for traceable and animal tested Canadian steak. The premium is therefore ¥1233.07/100gms ($67/lb) for traceable and animal tested Canadian steak. The willingness to pay increases from -¥16.88/100gms (-$0.9/lb) for US steak without safety assurances to 1070.06/100gms ($58/lb) for traceable and animal tested US steak. Except for the willingness to pay for US, all the variables are statistically significant at the 0.01 level as shown in Table E.3 and in Table 4.3. This shows that Japanese consumers are not at all willing to pay for US steak without safety assurances. The premiums for animal tested and traceable imported steak are greater than that of domestic steak relative to the steak from each of the respective countries without any safety assurance. The graph indicates that when it comes to imported steak, safety assurances such as traceable and animal tested are important attributes to help increase sales of steak. The utility achieved with traceability and animal tested products may be directly related to a lack of confidence in food safety. Schroeder et al.'s (2006) results in the stated preference survey for the WTP for steak with different level of safety assurances showed that in some cases the WTP was higher than the price options offered. The safety attributes they had in their study were 40%, 80% increase in food safety assurances and typical. Their interpretation is that relative to Mexican steak, Canadian steak is strongly preferred (Schroeder et al., 2006). The results for the current study indicate that Japanese consumers have a high level of loyalty towards domestic beef and rely strongly on food safety assurances.

4.2.2 WILLINGNESS TO PAY IN CANADA

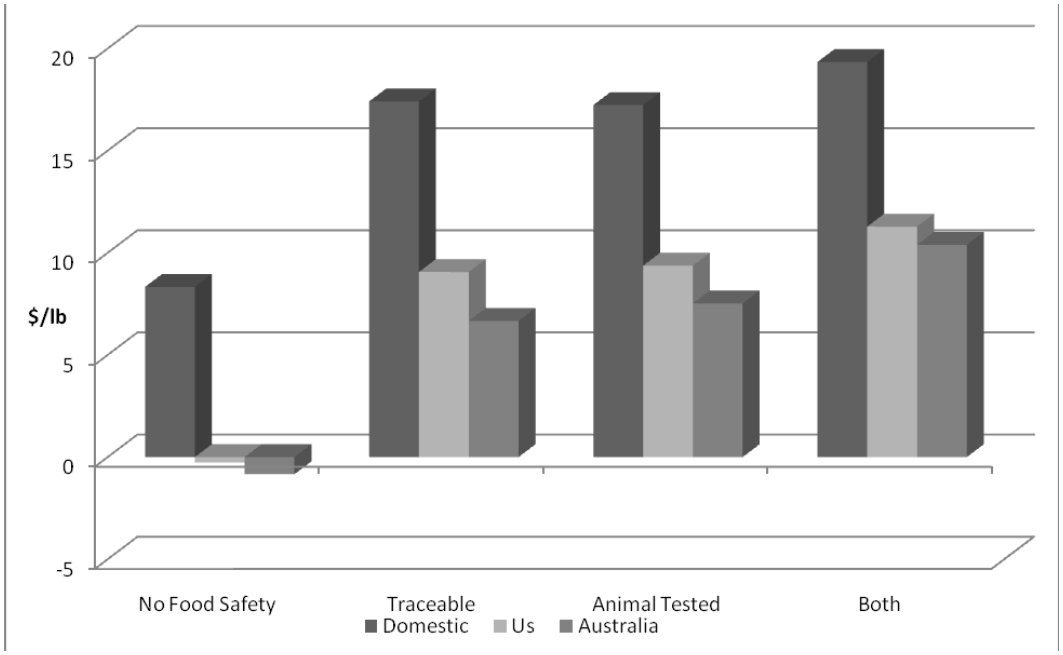
In this section, a multinomial logit model is estimated for the Canadian responses to stated preference questions. The mathematical equation is summarized below but a full set of all the interaction terms can be found in Appendix G and the definitions of the terms can be found in Table 4.1 and 4.2 :

$$U_{ij} = \beta_1 \mathrm{Pr}ice_{ij} + \beta_2 Cannon_{ij} + \beta_3 USnon_{ij} + \beta_4 Ausnon_{ij} + \beta_5 CanTR_{ij} + \beta_6 CanAT_{ij} + \beta_7 CANATTR_{ij} + \beta_8 AusTR_{ij} + \beta_9 AusAT_{ij} + \beta_{10} AusATTR_{ij} + \beta_{11} USTR_{ij} + \beta_{12} USAT_{ij} + \beta_{13} USATTR_{ij} + Natural + \ldots\ldots + \beta_{141} EATNCanATTR_{ij} + \varepsilon_{ij} \quad \text{---4}$$

The socio-demographics are found in Table 4.2 and the questions can also be found in Appendix D.

The results are similar to that of the Japanese model. The coefficient on price is negative indicating that as price increases the utility of consuming steak decreases. The willingness to pay of Canadian consumers for steak with different attributes are estimated and depicted in Figure 4.3. The estimates can be found in Appendix G.

Figure 4. 3 Comparing WTP for Striploin Steak – Canada 2009



The price options in the choice experiment in Canada were $5.50/lb, $9.00/lb, $12.50/lb, $16.00/lb. The base case is choosing the 'neither steak' option. WTP for steak without safety assurances in Canada is $8.33/lb for Canadian steak, -$0.27/lb for US steak and -$0.84/lb for Australian steak relative to choosing no steak. The results for the WTP are statistically significant except for the WTP for US and Australian beef steaks without safety assurance as shown in Table 4.3. Looking at the chart for domestic steak, the consumer would pay $8.33/lb for domestic steak without any safety assurances and would be willing to pay up to $19.34/lb for animal tested and traceable domestic steak. McCluskey et al. (2005) found that Japanese consumers were willing to pay a 50% premium for BSE tested beef relative to domestic beef. The premium for traceability and animal domestic steak is $11.01/lb relative to domestic steak without any safety assurances. Again, respondents are willing to pay a higher premium for traceable and animal tested rather than just one of the two attributes. Overall, Canadian consumers are willing to pay more for safety assurances on steak regardless of country of origin. Consumers also have a higher willingness to pay for US steak as compared to Australian steak. The difference in the willingness to pay for animal tested or traceable for imported steak is very narrow, indicating that consumers make no major difference between those two safety assurance criteria. The result indicate that consumers were indifferent as to the level of safety assurance as long as there was one. Overall, a food safety assurance criterion is important for both domestic and imported steak. Therefore, there is a market for steak that is traceable and/or animal tested.

Table 4.3 Willingness To Pay –General Model- Japan and Canada 2009

	Japan(¥/100gms)	Canada ($/lb)
WTP for domestic steak with no safety assurance	1096.96***	8.33***
WTP for domestic traceable steak	1720.82***	17.41***
WTP for animal tested domestic steak	1861.18***	17.23***
WTP for traceable and animal tested domestic steak	1996.52***	19.34***
WTP for US steak with no safety assurance	-16.88	-0.27
WTP for US traceable steak	472.29***	9.06***
WTP for animal tested US steak	800.63***	9.37***
WTP for traceable and animal tested US steak	1070.06***	11.28***
WTP for Canadian/ Australian steak with no safety assurance	97.9***	-0.84
WTP for Canadian /Australian traceable steak	787.12***	6.66***
WTP for animal tested Canadian/ Australian steak	992.84***	7.52***
WTP for traceable and animal tested Canadian/Australian steak	1330.97***	10.39***

* 10% significant level; ** 5% significant level; *** 1% significant level

In conclusion, respondents in Japan and Canada have similar behaviours. They are both willing to pay more for domestic steak as compared to imported beef steak with or without safety assurances. However, Japanese consumers are willing to pay much more for domestic steak than imported steak from Canada or US with safety assurances. In Canada, consumers have a higher willingness to pay for domestic steak as compared to only animal tested or traceable Australian steak. The premium for American steak with the different safety assurances is also higher than Australian steak with the same safety assurances. The results

indicate that premiums increase at a diminishing rate with more safety assurances, indicating that consumers have declining utility for additional steak assurance.

4.3 LATENT CLASS MODEL (LCM)

The purpose of estimating the latent class regressions for both sets of data is to identify heterogeneity in consumer responses in each country and identify groups of respondents with similar characteristics with the same preferences. This is helpful for both marketing purposes and policy recommendations. This analysis will also enable the identification of individuals with extreme preferences. Latent class models are a way of modeling taste variation across consumers. "The underlying theory of the LCM posits that individual behavior depends on observable attributes and on latent heterogeneity that varies with factors that are unobserved by the analyst." (Greene and Hensher, 2003 (pg 682)). The model used is a logit model for discrete choice among J_i alternatives, by individual i observed in T_i choice situations,

Prob [choice j by individual i in choice situation $t|classq$] =

$$\frac{\exp(x'_{it,j}\beta_q)}{\sum_{j=1}^{J_i}\exp(x'_{it,j}\beta_q)} = F(i,t,j|q)$$

"$U^r_{i|s} = \beta_s X^r_i + \varepsilon^r_{i|s}$ where X^r_i is the vector of product attributes and context characteristics and $\varepsilon^r_{i|s}$ is an error term" (Swait and Adamowicz, 2001 (pg 139)).

In latent class model estimation it is assumed that there are a number of classes or segments (S) in the sample and each would have a different parameter vector β_s. Latent Gold software is used for the analysis (http://www.statisticalinnovations.com/). If multiple segments are identified, the program provides estimates for the different segment at the same time (Magidson and Vermunt, 2003; Onyango and Govindasamy, 2005). The number of latent classes is identified using both the Akaike Information Criterion (AIC) and the Bayes Information Criterion (BIC). The AIC is calculated as $[-2(L_s + K_s)]$,

where L_s is the log likelihood and K_s is the number of free parameters, for a model with *S* latent segments. The BIC is similarly defined but considers sample size in addition to the number of parameters: $-2L_s + K_s \times \ln(N)$ (Swait and Adamowicz, 2001).

Another test used is the consistent Akaike information criterion, $CAIC_J = -2\ln L + P_J \ln(N+1)$, where N is the sample size (Swait and Adamowicz, 2001; Morey et al., 2006). The model with smallest AIC and/or BIC and /or CAIC is selected. In Section 4.3.1 the Japanese results are presented and in Section 4.3.2 the Canadian results are presented

4.3.1 JAPANESE RESULTS (LCM)

Table 4.4 shows the log likelihood, AIC, BIC and CAIC and the number of parameters from estimates of different latent class models from one to five-classes. The one-class model provides the worst fitting model. The two models selected are the two and three-class models. Those two classes show larger differences in the information criteria from class one. Other studies have used bootstrapping techniques to determine the best model (Morey et al., 2006). Based on the bootstrap value, the best model in this case is a three-class model (bootstrap p-value is 0.692).

Table 4.4 Class selection - Japan 2009

Class selection	LL	BIC(LL)	AIC(LL)	CAIC(LL)	Npar
1-class	-22541.94	45197.44	45113.88	45212.44	15
2-class	-17979.68	36269.75	36041.36	36310.75	41
3-class	-17185.22	34877.67	34504.45	34944.67	67
4-class	-16564.49	33833.04	33314.98	33926.04	93
5-class	-16049.02	32998.92	32336.03	33117.92	119

Appendix H (H.1) shows the parameters and profile (H.2) for the three class model. The attribute coefficients are all statistically significant. However, in the case of the covariates, ‘education’, ‘region’ and ‘eating neither meat or fish’

and ‘eat none’ (vegetarian) are statistically insignificantly different from zero. The respondents are divided into three different classes according to the predisposition towards their value which is in this case their attitudes towards price and the different attributes (Schroeder and Pendell, 2007). Table H.2 shows the profile of the three class model. The profile indicates that segment 1 consists of approximately 58% of the sample, segment 2, 32% and segment 3, 10%. Segment 1 is characterized by consisting of more male respondents and more trusting respondents. The average age across all three segments is almost the same.

The respondents can be grouped into different segments based on similarities in their utility functions as illustrated in Table 4.5 and Figure 4.4. In all three segments, the willingness to pay for Japanese steak compared to steak from US and Canada is high and increases with safety assurances.

Table 4. 5 WTP for steak with different food safety attributes for 3 classes – Japan 2009

	Class 1 - 58% (¥/100gms)	Class 2 - 32% (¥/100gms)	Class 3 - 10% (¥/100gms)
WTP for Japanese steak with no safety assurance	1871.50***	632.07	-245.31
WTP for Japanese traceable steak	2270.04***	1684.21**	129.65
WTP for animal tested Japanese steak	2465.63***	1861.00**	-125.54
WTP for traceable and animal tested Japanese steak	2527.29***	2070.79**	153.50
WTP for US steak with no safety assurance	1261.50**	-1530.64	-700.19
WTP for US traceable steak	1457.29**	-779.64	-470.77
WTP for animal tested US steak	1777.79***	-555.86	-282.77
WTP for traceable and animal tested US steak	2061.58***	-172.00	-515.69
WTP for Canadian steak with no safety assurance	983.92**	-1582.36	-676.65
WTP for Canadian traceable steak	1734.42***	-210.07	-1183.50
WTP for animal tested Canadian steak	1941.71***	22.21	-370.73
WTP for traceable and animal tested Canadian steak	2231.67***	398.29	-463.65

* 10% significant level; ** 5% significant level; *** 1% significant level

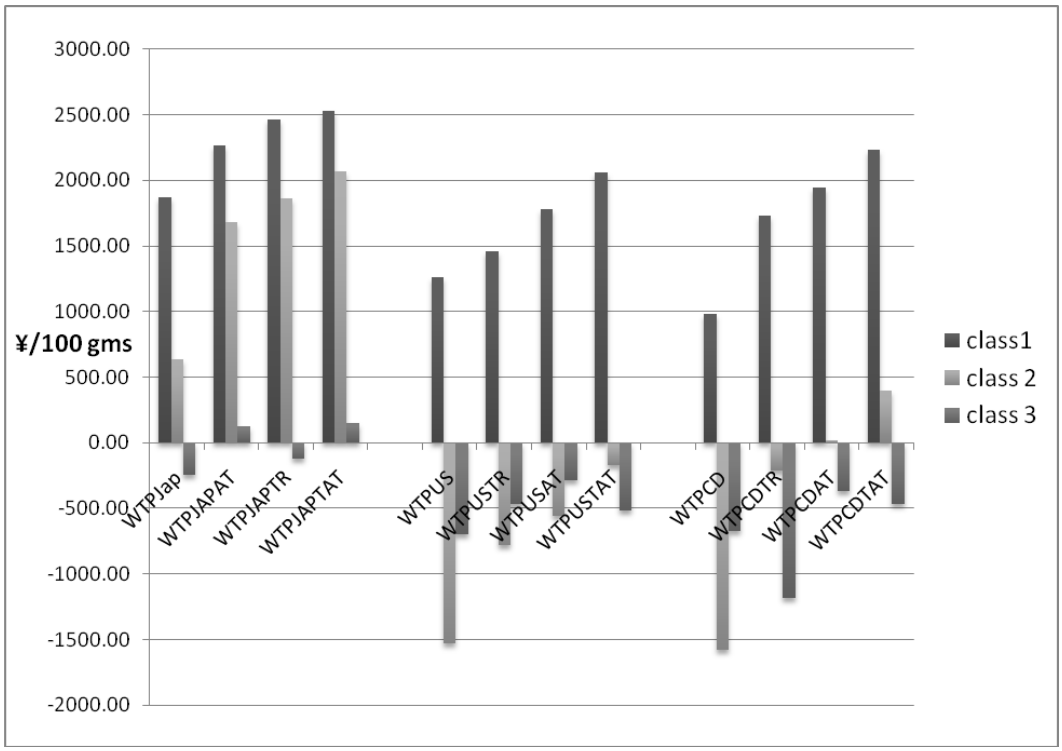
The WTP for domestic steak without safety assurances is ¥1871.50/100gms ($103/lb) and increases to ¥2527.29/100gms ($139/lb) with traceability and animal testing. It should be noted that class 1 consumers are willing to pay for steak coming from the US and Canada irrespective of safety assurances. They would pay more when the steak is traceable and animal tested. The WTP for Canadian steak increases from ¥984/100gms ($54/lb) to ¥2232/100gms ($122/lb) with animal testing and traceable safety assurances. Class 1 consumers might be classified as being more trusting. Class 2 consumers would be characterized as consumers who have higher preferences for Japanese

steak or alternately have extremely low utility for imported steak regardless of source. They are willing to pay for Japanese steak with and without safety assurances. The results also indicate that they would be willing to pay a very small amount for animal tested Canadian steak and $19.5/lb for traceable and animal tested Canadian steak which is much lower that the prices offered. They would thus be categorized as only willing to consume domestic steak.

Class 3 consumers representing around 10% of the respondents are characterized by the fact that they are not interested in paying for steak. They are only willing to pay ¥129.65/100gms ($7/lb) for traceable Japanese steak and ¥153.50/100gms ($8/lb) for animal tested and traceable Japanese steak which is lower than the price option offered in the survey. Class 3 (10% of the sample) would be considered to be the group of consumers who generally would not consume steak. 8% of the Japanese respondents had claimed they do not eat beef steak. Therefore, class 3 might be considered to be the group of non beef eaters.

The results for class 1 and part of class 2 showed that WTP is bigger than the highest value in the survey which could be a result of hypothetical bias. Also it should be noted that results from class 1 are all statistically significant while only the WTP for domestic steak with safety assurances are statistically significant in class 2. Schroeder et al.'s (2006) used cluster analysis to isolate individuals with extreme preferences which could correspond to respondents who did not understand the choice experiment. The clusters were characterized by age, income, gender and education. In their case they identified a preferred model for their analysis (Schroeder et al., 2006). Further analysis can be done to identify the individuals with the extreme preferences and new multinomial logit models could be estimated to find the WTP.

Figure 4.4 WTP for Steak with Different Food Safety Attributes from a Three Class Latent Class Model – Japan 2009



4.3.2 CANADIAN RESULTS (LCM)

The class is selected by running the information criteria for 5 classes. The difference in AIC(LL) and BIC(LL) between the two-class model and the one-class model is the highest compared to the difference for the other classes. In Table 4.6 the information criteria for the two-class model is shown to have a greater decrease in AIC and BIC. In Appendix I the parameters (I.1) and profile (I.2) for the two class model are presented. The attributes are all statistically significant. The covariates, number in household, number of children, education, region and eating meat and fish are statistically insignificantly different from zero. Looking at the profile, class 1 has approximately 60% of the respondents and class 2 has 40%. Class 1 respondents have a higher probability of being male, tend to be more trusting and have an average age of 42 years, 5 years younger than class 2 respondents. Table 4.7 shows the willingness to pay of Canadian respondents, by class. Figure 4.5 gives a graphical depiction of the WTP for steak

for the two classes. Class 1 respondents have a higher WTP for Canadian steak over imported steak. The WTP increases with safety assurances for the domestic and the imported steak. The WTP ranges from $17.62/lb for Canadian steak without safety assurances to $26.25/lb for traceable and animal tested Canadian steak for class 1 consumers. The current price of strip loin beef is $4.99/lb (on sale) in Loblaws (Loblaws, 2010). This result is interpreted as class 1 consumers highly prefer Canadian beef steak and steaks with safety attributes. Also, this is also capturing respondents with extreme preferences.

The result also show that Canadian consumers have a higher WTP for US steak relative to Australian steak. The difference in willingness to pay between domestic and imported steak decreases with food safety assurances. There was approximately a $7 difference between domestic and US steak with no safety assurance which decreases to approximately $5 for traceable and animal tested steak. Canadian consumers would still be willing to pay a higher premium for domestic steak but the difference between the premia for the different safety assurances decreases. Class 2 consumers are characterized by being a more vigilant class of consumers. They are not willing to pay for imported or domestic steak without any safety assurances. In the analysis, there were 37 respondents who always said no to any of the options offered. The Canadian sample had the the same percentage of non-beef eaters as the Japanese sample. It should be noted that only the WTP for class 1 respondents were statistically significant.

Table 4. 6 Class selection – Canada 2009

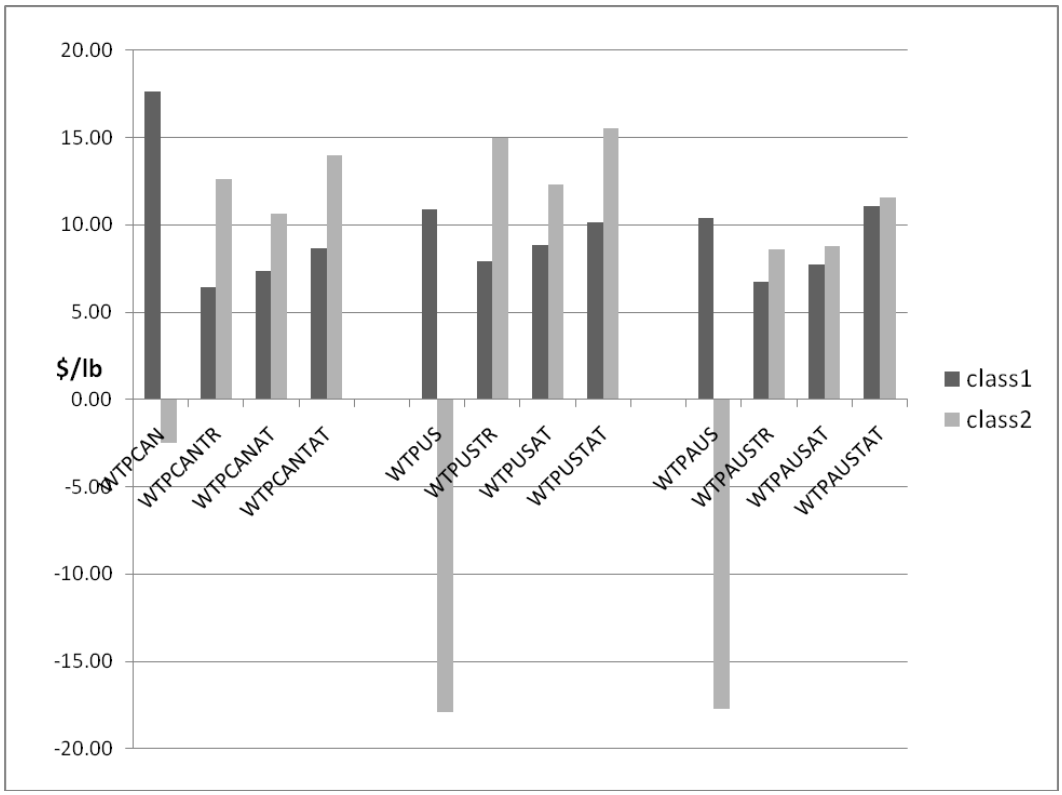
Class selection	LL	BIC(LL)	AIC(LL)	CAIC(LL)	Npar
1-class	-11684.5776	23471.97	23399.16	23486.97	15
2-class	-9879.0196	20039.07	19840.04	20080.07	41
3-class	-9530.589	19520.42	19195.18	19587.42	67
4-class	-9236.1961	19109.85	18658.39	19202.85	93
5-class	-8960.2451	18736.16	18158.49	18855.16	119

Table 4. 7 WTP for steak with different food safety attributes for 2 classes - Canada 2009

	Class 1 - 60% ($/lb)	Class 2- 40% ($/lb)
WTP for Canadian steak with no safety assurance	17.62**	-2.48
WTP for Canadian traceable steak	24.06***	10.15
WTP for Animal tested Canadian steak	24.99***	8.20
WTP for traceable and animal tested Canadian steak	26.25***	11.49
WTP for US steak with no safety assurance	10.93*	-17.92
WTP for US traceable steak	18.85**	-2.91
WTP for Animal tested US steak	19.76**	-5.59
WTP for traceable and animal tested US steak	21.09***	-2.35
WTP for Australian steak with no safety assurance	10.38*	-17.74
WTP for Australian traceable steak	17.11**	-9.12
WTP for Animal tested Australian steak	18.08**	-8.91
WTP for traceable and animal tested Australian steak	21.46**	-6.16

* 10% significant level; ** 5% significant level; *** 1% significant level

Figure 4. 5 WTP for Steak with Different Food Safety Attributes from a two Class Latent Class Model – Canada 2009

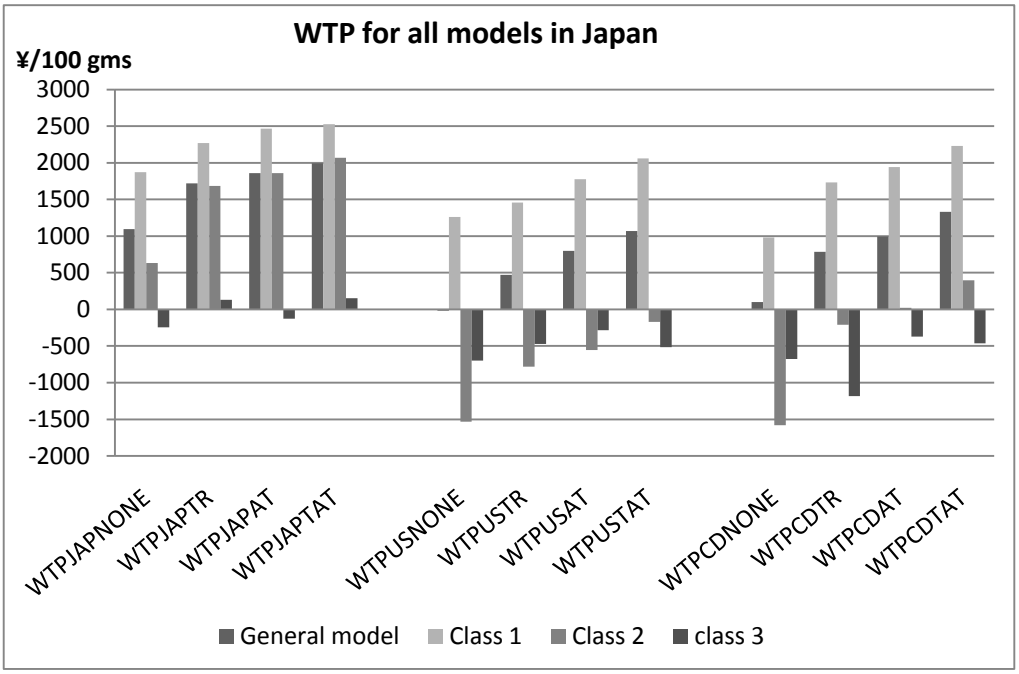


4.4 COMPARISON BETWEEN JAPANESE AND CANADIAN RESPONDENTS' WTP

In this section, the results from the latent class models are compared with the general (single class) model from Section 4.2. Figure 4.6 depicts the models for Japan. The trend of the values in the general model is similar to class 1 consumers for all three source countries. Class 1 consumers have a higher willingness to pay for steak as compared to consumers in the general model. Class 2 consumers provide similar results to the general model for domestic beef/steak, but only for domestic steak. Therefore, class 1 consumers who represent around 58% have higher WTP for steak irrespective of whether there are or there are no safety assurances. That class of Japanese consumers is also willing to pay for imported steak. Class 2 consumers are only willing to pay for domestic steak with or without safety assurances. Class 3 is considered to be the group of consumers

who generally are non steak eaters and would not be willing to pay for steak, under most circumstances.

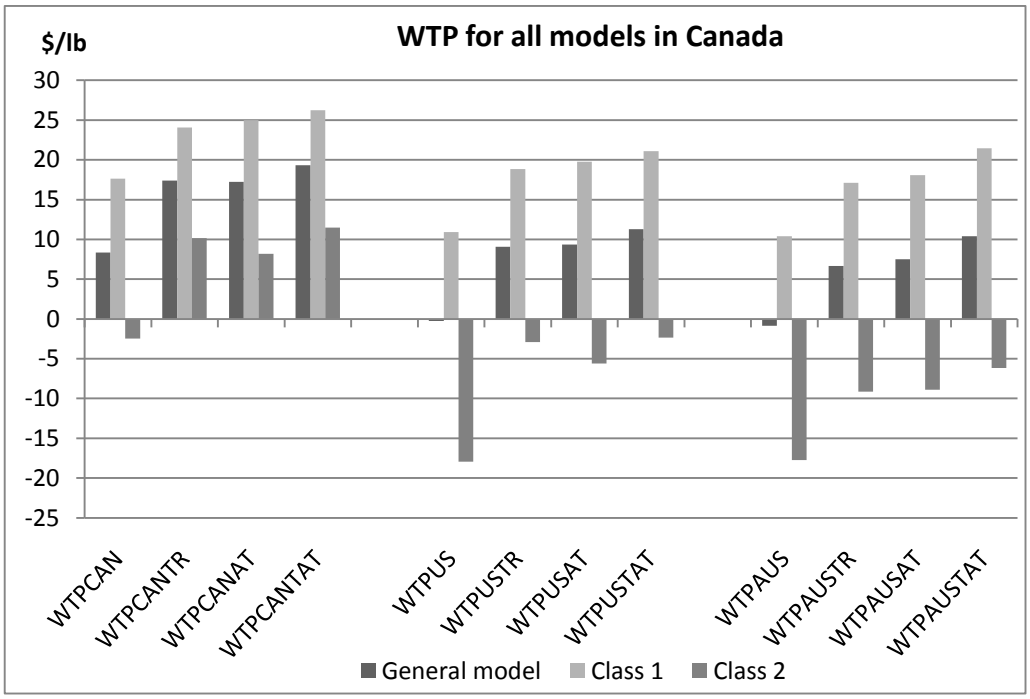
Figure 4. 6 WTP for all models – Japan 2009



The Canadian latent class model had identified two classes of consumers. Figure 4.7 shows the 2 latent classes and the general model for WTP for steak of Canadian respondents. The graph shows the trend for class 1 and the general model are similar. They both indicate that the WTP increases with the level of food safety assurance. The WTP is higher for class 1 consumers compared to the general model over all three countries. Class 2 consumers are only willing to pay for domestic steak with safety assurances. There is approximately a $9 difference in the WTP for domestic steak without safety assurance between class 1 consumers and the general model. Class 1 respondents make up approximately 60% of the respondents and would be considered the trusting group and they are WTP for steak regardless of country of origin. In other words, they are still willing to pay for steak from other countries. Class 2 consumers (40%) would only be willing to pay for domestic steak with safety assurance. This implies that

both classes would be willing to pay for food safety assurances such as traceability and animal testing for domestic steak.

Figure 4. 7 WTP for all models – Canada 2009



4.5 CONCLUSION

Japanese consumers rank BSE and country of origin as the top factors in making their purchasing decisions about beef. As for Canadian respondents, they ranked those same values, 6th and 10th respectively. Both Japanese and Canadian consumers prefer domestic beef. Japanese consumers are more risk averse and have a higher risk perceptions about beef than Canadian consumers. In Canada, risk perceptions increased in 2009 while risk attitudes decreased indicating that Canadian consumers' overall beef attitudes changes are indeterminate. Japanese consumers find social actors to be more competent and have high trust levels in government and retailers while Canadian consumers have higher trust levels in manufacturers and farmers. The willingness to pay for beef steak with different attributes for Canada and Japan is derived from regression models using both a general model and a latent class model. For both countries, the respondents have higher willingness to pay for domestic steak with or without safety assurances. The general model shows that the willingness to pay increases even for imported steak in both countries. In the general model, the WTP for Japanese steak is $60/lb which increases to $109/lb for animal tested and traceable steak. Japanese consumers' WTP increases by $67/lb for animal tested and traceable Canadian steak compared to steak with no safety assurances. In Japan, the retail price of beef ranges from around $60/lb to $ 1090/lb for kobe beef. Therefore, the WTP for Japanese steak is comparable to retail prices.

In the case of Canadian respondents, they are willing to pay $8.33/lb for domestic steak without safety assurances and up to $19.34/lb for animal tested and traceable steak. The results from the latent class models, indicate that class 1 consumers in both countries have higher willingness to pay for beef steak than the general model. The respondents in the latent classes in both countries also have higher willingness to pay for steak with safety assurances. The retail price of Canadian beef is comparable to the result from the WTP for Canadian beef without food safety assurances. However, the result indicates that it more than doubles with traceability and animal testing. This could be an indication that the

willingness to pay is being influenced by respondents with extreme preferences and/or hypothetical bias. Respondents may be tending to overstate what they would pay.

The latent class analysis reveals 3 classes for the Japanese consumers and two for the Canadian consumers. The WTP for domestic steak without safety assurances for class 1 consumers (58% of the sample) is ¥1871.50/100gms ($103/lb) and increases to ¥2527.29/100gms ($139/lb) with traceability and animal testing. In the case of Canadian steak in Japan the WTP for the class 1 consumers increases from ¥984/100gms ($54/lb) to ¥2232/100gms ($122/lb) for traceable and animal tested steak. Class 2 (32% of the consumers) has stronger preferences for Japanese steak. They are willing to pay for Japanese steak with and without safety assurances. They have strong preference towards domestic steak. Class 3 consumers overall are not willing to purchase steak .

Class 1 consumers in Canada (60% of the sample) can be characterised as consumers who are more trusting and have a higher probability of being male. Class 1 respondents have a higher WTP for Canadian steak ranging from $17.62/lb without safety assurances to $26.25/lb for traceable and animal tested Canadian steak. The WTP increases at a dimishing rate with safety assurances for both domestic and imported steak. Class 2 consumers are the more cautious class of consumers. They are not willing to pay for imported steak or for domestic steak without any safety assurances. There might be a demand for Canadian steak with safety assurances both in Canada and Japan which implies that there is a market for the attributes of traceability and animal testing. The analysis showed that overall Japanese consumers have higher risk perceptions and attitudes than Canadian consumers. Furthermore, it has also shown that trust in manufacturers and retailers and the level of optimism influence beef food safety confidence.

Therefore, from a marketing perspective, a way of increasing the market share for Canadian beef in Japanese market, would be by increasing the level of confidence in beef. The Canadian industry could increase the safety confidence in beef by reassuring Japanese consumers that beef is safe and emphasizing that consumers can rely on the retailers and manufacturers. Thus, selling beef steaks

that have been animal tested and traceable might be a marketing strategy to establish a market for Canadian beef with such attributes. Similarly, BSE, trust in manufacturers and farmers were independent variable in determining the safety perceptions of beef. This shows that having animal tested beef will reduce Canadian consumers' concerns have on BSE. Communicating effective information can influence consumer behaviour and thus change risk perceptions which in Canada had increased since 2006. In other words, having animal testing and traceability will reduce the level of risk perceptions in beef. The result from WTP also showed that Canadian consumers are willing to pay more than double for attributes such as traceability and animal testing.

CHAPTER 5 GENERAL DISCUSSION

5.1 SUMMARY AND CONCLUSIONS

The main purpose of this study is to:

(a) quantify Japanese trust in various agents in the food system namely government, farmers, manufacturers and retailers,

(b) provide more information about concerns relative to food safety, comparing the countries Canada and Japan,

(c) determine what consumers are willing to pay for animal testing (for BSE) and traceability (farm to fork) in Japan and Canada for domestic and foreign (Canadian or Australian /American) beef with the same attributes.

Food safety is a prime concern of consumers, governments and retailers. Consumers are more and more concerned about where their food comes from and how it is produced, expecting higher levels of food safety assurances. Outbreaks such as bovine spongiform encephalopathy (BSE) and foot and mouth disease may have decreased confidence in the safety of meat products, world wide.

Since October 20, 2001, Japan established mandatory BSE testing for all cattle for human consumption (Onodera and Chi-Kyeong, 2006). The government in Japan also introduced regulations in 2002 and 2003 which required traceability of cattle from the packing plant to feedlot and from consumption through distribution to production, using an internet based system. Currently, in Canada there are established regulated animal identification programs for beef cattle, dairy cattle, bison, and sheep sectors. All bovine animals must bear a registered ID tag (Canadian Food Inspection Agency, 2010b). Traceability systems are focused on tracing cattle from farm to slaughter rather than from farm to consumer.

In 2003, Japan was the world's biggest importer of meat. Exporting countries are particularly interested in the Japanese market because it represents a huge and attractive market to supply. Canada and Japan have each faced BSE outbreaks although in the case of Japan there was one human death.

As a stepping stone to exploring willingness to pay for traceability and animal testing in Japan and Canada, consumers' general food safety perceptions and beef safety perceptions in Japan and Canada are explored. Identifying significant differences in consumers' views in Japan and Canada on food safety in general and on food safety associated with beef, in particular, would be useful knowledge in the planning of future traceability systems. This research followed closely that of de Jonge (2008) and Schroeder et al. (2006) who compared food safety concerns across different countries.

As part of quantifying Japanese trust in various agents in the food system namely government, farmers, manufacturers and retailers, and providing more information regarding concerns about food safety this research looked at

(a) the differences in consumer perceptions about general food safety between Canada and Japan as well as the sources of these differences,

(b) beef food safety perceptions in Canada and Japan,

(c) changes in risk perceptions and attitudes in both countries over time, and

(d) Canadian and Japanese consumers' willingness to pay for traceability or animal testing and/or both for domestic and imported beef.

The first part of the analysis included quantifying Japanese trust in various agents in the food system and the differences in perceptions of food safety between Japanese and Canadian consumers, as well as the sources of these differences. The results from the analysis showed that since BSE, around 39% and 18 % of survey respondents recall that they decreased their consumption of beef in Japan and Canada respectively. 25% of respondents in Japan would be willing to pay a premium for beef that would not transmit the human variant of BSE as compared to 36% in Canada. BSE and country of origin are the most important factors for Japanese consumers in purchasing beef. In Canada BSE and country of origin were ranked 6^{th} and 10^{th} respectively. Risk attitudes and perceptions are important determinants of consumers' food safety confidence. The analysis of risk perceptions and attitudes in both countries showed a decrease across time. The current results were compared to previous analysis done by Schroeder et al.

(2006). Across time, risk perceptions increased while risk aversion decreased in Canada. Both decreased in Japan. However, Canada's risk perceptions and attitudes indices are lower than Japan in both 2006 and 2009.

Confirmatory factor analysis, used to estimate the model for individual differences, trust in societal actors and safety perceptions of the food groups, showed that the model was a good fit for both countries. This section also identifies Japanese and Canadian consumers' trust in beef and general food safety. The application of structural equation modeling is done for two food safety dimensions- pessimism and optimism. For both the pessimism and optimism models in Japan, meat/fish, processed, and fresh fruits and vegetables, gender, age and worry are statistically significant but with opposite signs. Worry traits were positively related to the level of pessimism about food safety and negatively to optimism. Trust in government, manufacturers affect optimism while trust in farmers and retailers affect pessimism. In Canada, the estimates for trust in societal actors, meat/fish and gender are positive and statistically significant for the optimism model. The pessimism model for food safety confidence indicated that trust in maufacturers, meat/fish, worry, preserved food are statistically significant. The results are similar to the study done by de Jonge (2008) in Canada and Netherlands. In the case of the optimism model, trust in societal actors, meat/fish were also found to be significant. de Jonge (2008) identified trust in manufacturers, meat/fish, worry and preserved food to be statistically significant in the pessimism model.

By running ordered probit models to investigate the factors affecting confidence in general food safety and beef safety, the differences in consumers' perceptions in Japan and Canada are identified. Higher levels of optimism, trust in manufacturers and retailers lead to a safer perceptions of beef in Japan. As for Canada, age, gender, optimism, pessimism, trust in manufacturers, farmers and BSE are statistically significant in determining safety perceptions of beef. Age, education, pessimistic traits, BSE and three of the societal actors namely manufacturers, government and farmers are determinants of general food safety in Japan. In Canada, the significant independent variables in the general food safety

model are age, gender, pessimism, manufacturers, government, retailers and farmers.

The willingness of Japanese and Canadian consumers to pay for domestic and imported beef is also examined. The willingness to pay for Canada and Japan is calculated using a general model (single model) and a latent class model. Respondents have higher willingness to pay for domestic beef with or without safety assurances. In the general model, the WTP for Japanese steak is $60/lb and increases to $109/lb for animal tested and traceable beef. Japanese consumers WTP increases by $67/lb for animal tested and traceable Canadian beef relative to Canadian beef with no safety assurances. In the case of Canadian respondents, they are willing to pay $8.33/lb for domestic beef without safety assurances and $19.34/lb for animal tested and traceable domestic beef. The gap for willingness to pay for US and Australian imported beef steaks seems to narrow when it comes to animal tested and traceable beef. Furthermore, the premiums for animal tested and traceable imported beef are greater than Japanese beef with the same safety assurance relative to the beef from each of the respective countries without any safety assurance. Food safety criteria are important for both domestic and imported beef.

The latent class model showed that there were three classes for Japanese respondents and two for Canadians. Class 1 consumers in both countries has a higher willingness to pay for beef than the general model. The respondents were also willing to pay for premium for imported beef which increased with safety assurances. Class 1 consumers in Japan was willing to pay from $92/lb for domestic beef with no safety assurance to $123/lb with full safety assurances. When it came to Canadian beef, Japanese consumers in class 1 are willing to pay $48/lb with no safety assurances and $108/lb with full safety assurances. Class 2 which comprises 32% of the consumers prefer Japanese beef. They are willing to pay for domestic beef irrespective of safety assurances and an insignificant amount for traceable and animal tested Canadian beef which is lower than the price options offered in the survey. Class 3 consumers were considered to be

mainly non beef eaters as the sample had 5.5% who only ate fish or were vegetarian and 8% had originally claimed not to eat beef.

Class 1 consumers in Canada can be characterised by consumers who are more trusting and consist of 60% of the respondents. They have higher WTP for Canadian beef which, ranges from $17.62/lb without safety assurances to $26.25/lb for traceable and animal tested Canadian beef relative to not having beef. Class 2 consumers are the more cautious group of consumers. They are not willing to pay for imported beef or for domestic beef without any safety assurances.

It is very important to be able to identify consumer heterogeneity as consumers generally have different preferences. The results can be a signal to industry and governments to help them understand the diversity of consumer's preferences. According to Allenby et al. (1998) heterogeneity yields differentiated products, market segments and niches. The results obtained are indicative that consumers prefer domestic products and they have higher preferences for strip loin steaks with food safety assurances.

5.2 IMPLICATIONS

In this study models to explain preferences for traceability and/or animal testing of beef in Japan and Canada and consumers' perceptions toward beef are developed. The results can help Canadian government and food industries make decisions regarding optimal levels of animal testing and traceability in Canada. As this study has shown, 18% of the Canadian sample had reduced their consumption of beef due to BSE, safety assurances may encourage that 18% to consume more beef. This research also indicated that consumers are willing to pay for traceable and animal tested beef steak. There is a niche market for consumers who would be willing to pay a premium for safety assurances - 58% of Japanese respondents would consume imported beef with safety assurances and 40% of Canadian consumers would only be willing to pay for domestic beef with safety assurances. There is heterogeneity across the Canadian consumers and therefore, one policy

will not satisfy everyone. In a similar way a study done in the EU on traceability showed that consumers had three different types of reactions. Some of them thought that traceability raised the prices of beef, another group thought it was not necessary to have traceability or labelling system and the third thought that traceability had increased consumer-safety perceptions and confidence in beef food safety (Gracia and Zeballos, 2005).

In addition, this study also shows that there may be a niche market for Canadian beef in Japan. Canadian beef is indeed preferred over US beef which could potentially imply that Canadian beef could take a share of the US beef market in Japan. Futhermore, with food safety assurances, Canadian beef could become more competitive and may even be able to take a share of the Australian beef market in Japan. Japan is known to have stringent food safety protocols and might eventually expect other exporting countries to start adopting the same food safety protocols or Japan may eventually require more safety assurances from export suppliers of beef and other meats. Canada is one of the biggest exporters of pork to Japan and would thus be affected if that is the case.

Therefore, the results may help the government and the food industries meet the requirements of the public by adopting higher levels of traceability and allowing for some exporters to undertake higher levels of animal testing.

5.3 LIMITATIONS AND FUTURE RESEARCH

There are some limitations to this study. Media was not considered when investigating the confidence in general food safety, beef food safety and willingness to pay. The general food safety framework in the current study is slightly different to that of de Jonge's (2008) which used media. She also used consumer recall, education as a variable when estimating the structural model for general consumer confidence for two dimensions-'optimism' and 'pessimism'. Consumer recall according to de Jonge (2008) increased the level of pessimism but did not affect the level of optimism. Food allergy was another variable not considered in the estimation of the structural equation model. She had found that

consumers who experienced food allergy were more pessimistic about food safety. Further research could highlight the importance of recall in determining attitudes and behaviour.

Since the survey was done over the internet, there is the possibility of hypothetical bias. Respondents tend to overstate what they are willing to pay compared to if they were in an actual market. Schroeder et al (2006) chosed a 'preferred model" to find an estimation for the willingness to pay for beef steak. Further research can be done by removing individuals with extreme preferences and estimating the willingness to pay for steak. Research could also be done to find out how an individual's WTP in affected by their level of optimism, pessimism or trust in societal actors. In addition, the WTP could be calculated only for beef eaters and can be compared to the results obtained.

In addition, this study has not looked at the costs of establishing a traceability system and higher levels of animal testing be in Canada. Another question that arises is whether only BSE should be tested for or should cattle be also tested for other diseases. Future research could focus on meat processors and how they feel about traceability and animal testing. Another question that may arise is how would the policy to have animals tested and traceability be implemented. In other words, would such a policy be mandatory or could companies self select their own levels of animal testing for particular markets. In that case, future research should be done to look into how such a policy would affect farmers and small food processors.

Studies should also be done regarding the cost of recalls. Having an established traceability system may not only increase the level of food safety confidence but also increase the demand for the product, and reduce the cost of recalls due to contamination or diseases.

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APPENDIX A: REFERENCES

NO.	AUTHOR	OBJECTIVE	METHODS	AGGREGATE SUMMARY
1	Tilman Becker, Eckhard Benner, Kristina Glitsch (2000)	Consumer perceptions of fresh meat quality in Germany	Statistical analysis on survey questions	-Country of origin and place of purchase are regarded as most helpful to assess quality of beef in the shop. -More than 50 per cent of respondents regard the price as not being helpful.
2	Mark Tucker, Sherrie R. Whaley and Jeff S. Sharp (2006)	Consumer perceptions of food-related risks	-Approached 7976 Ohioans (56% response rate) - Mail survey techniques - Dillman's (2000) tailored design method -descriptive data analysis - Multiple regression analysis with blockwise variable entry was used to evaluate the utility	-Moderate level of risk perceptions perceived on food safety items - Highest level: Pesticide residues in food and contamination of drinking water -Lowest level: mad cow disease and genetically modified foods
3	Janneke de Jonge, Hans van Trijp, Ellen Goddard and Lynn Frewer	Consumer confidence in the safety of food in Canada and the Netherlands: The validation of a generic framework	-Data collected in November/December 2005 (The Netherlands) and in June 2006 (Canada). -528 were Canadian and 608 were Dutch -Used Exploratory factor analysis on the data sets of both countries separately to examine the underlying dimensional structure of the range of product groups. -structural equation modeling, using LISREL 8.72.	- No differences between Canada and in the relative importance of the determinants, which provides support for the generalizability of the framework. -Results indicated that Dutch consumers had a higher level of optimism and a lower level of pessimism regarding the safety of food. -Results indicated cross-national differences in consumer recall of food safety issues in the media.
4	Andrew Knight and Rex Warland (2004)	The relationship between sociodemographics and concern about food safety issues	-Nationwide telephone survey -Sample size 1400 (59% response rate) -Used different statistical measures	-Women and blacks were more likely to have high levels of concern about food safety than men and whites

			(tabular analysis and chi-squares, logit, probit models)	
5	Michael A. Mannion, Cathal Cowan, Michael Gannon (2000)	Factors associated with perceived quality influencing beef consumption behaviour in Ireland	-Telephone survey on 500 meat eaters in March 1997 - principal components analysis with varimax rotation - Two-way discriminant analysis	- Discriminant analysis found that two of the factors, safety and meat status were different between those who had maintained and those who had reduced beef consumption.
6	Tonsor, Glynn T., Schroeder, Ted C., Pennings, Joost M.E., Mintert, James (2006)	Consumers Valuations and Choice Processes of Food Safety Enhancement Attributes: An International Study of Beef Consumers	-Computer survey (4005 consumers from Canada, US, Mexico, Japan) -Choice experiments -Mixed logit model to determine WTP	-Japanese and Mexican consumers have WTP preferences that are nonlinear in the level of food safety risk reduction.
7	Maria da Conceição Pereira da Fonseca, Elisabete Salay (2007)	Beef, chicken and pork consumption and consumer safety and nutritional concerns in the City of Campinas, Brazil	-Face-to-face interviews (351 individuals) -sample of 351 individuals -survey had closed and semi-open questions - chi-squared test (χ^2) -ANOVA test was also carried out to verify whether or not the level of concern regarding a determined attribute influenced the tendency for consumption of the meats. - Tukey test was applied to identify which concern were statistically different among the consumption tendencies.	-Interviewees were concerned about all the safety and nutritional attributes analysed. -data indicated that the greater the concern with the attributes, the smaller the intent to increase the consumption of beef and pork. - attributes related to meat composition, such as the caloric, fat and cholesterol contents, showed more influence on the intent to consume than the attributes related to safety.
8	Andrew J. Knight, Rex Warland (2005)	Determinants of Food Safety Risks: A Multi-disciplinary Approach	- telephone survey -psychometric, cultural and reflexive modernization	- perceptions of risks do vary by the nature of the risk investigated - knowledge and trust were

			approaches to risk perceptions -factor analysis	significantly related to all three risks (salmonella, fat and pesticides)
9	Ted C. Schroeder, Glynn T. Tonsor, Joost M.E. Pennings, James Mintert (2007)	Consumer Food Safety Risk Perceptions and Attitudes: Impacts on Beef Consumption across Countries	-Sample 4005 consumers -Double-Hurdle model - Confirmatory factor analysis - model for risk attitudes and perceptions estimated using maximum likelihood with a Probit model in the first stage and Tobit model in the second stage.	- Differences between risk perceptions and aversion in regards to beef safety across consumers in 4 countries - Risk-averse consumers require high levels of food safety assurance, especially if a food safety event occurs. - Japanese consumers are more risk averse regarding beef food safety
10	Gianluca S, Cavicchi A, Romano D, Lobb A.E. (2008)	Determinants of Intention to Purchase Chicken in Italy: The Role of Consumer Risk Perceptions and Trust in Different Information Sources	-survey was conducted in Italy during Spring 2004 -580 valid face-to-face interviews -Incentive of 25 Euro per interview was given to each respondent - The structural model - Maximum likelihood -Principal component analysis for trust in media	-perceived risk of eating chicken and variables related to trust in information about chicken safety - perceived risk can affect attitudes toward buying chicken, but attitudes in turn may affect the way risk is perceived
11	De Jonge (2008) Dissertation	A monitor for consumer confidence in food safety	-pilot study in September 2003 - principal components analysis with varimax rotation -internet survey in 2005 (Neverlands) and 2006 (Canada) -528 Canadian and 657 Dutch respondents - Confirmatory factor analysis using Maximum Likelihood	-Factors influence general consumer confidence in food safety -2 dimensions: optimism and pessimism

APPENDIX B: SURVEY QUESTIONS- INDIVIDUAL DIFFERENCES, TRUST IN SOCIETAL ACTORS, RISK PERCEPTIONS AND ATTITUDES, TRACEABILITY

Food Safety, Animal Testing and Traceability

ドラフトサーベイ

食品の安全性と動物実験およびトレーサビリティ

1. In which of the following age groups do you fall?
1. 以下の中から、あなたの年齢にあてはまるものをお選び下さい。(SA)

❒ 1. 15 -19
15 ~ 19歳 → 対象外
❒ 2. 20 -24
20 ~ 24歳
❒ 3. 25 -29
25 ~ 29歳
❒ 4. 30 -39
30 ~ 39歳
❒ 5. 40 -49
40 ~ 49歳
❒ 6. 50 -64
50 ~ 64歳
❒ 7. 65+
65歳以上 → 対象外

2. Please indicate your gender.
2. あなたの性別をお選び下さい。(SA)

❒ 1. Male
男性
❒ 2. Female
女性

3. How many people live in your household?
3.
以下の中から、あなたが同居しているご家族の人数（ご自身を含む）をお選び下さい。(SA)

❒ 1. 1
1人暮らし →
❒ 2. 2
2人
❒ 3. 3 +
3人以上

4. How many children younger than 18 live in your house?
4.
あなたのご家庭には、同居している18歳未満のお子様が何人いらっしゃいますか。(SA)

❒ 1. No home living children < 18 years
18歳未満の子どもは同居していない
❒ 2. 1
1人
❒ 3. 2
2人
❒ 4. 3
3人
❒ 5. 4
4人
❒ 6. 5
5人
❒ 7. More than 5
6人以上

5. What is your position in the household? ONLY ONE ANSWER POSSIBLE
5. あなたのご家庭内の役割を次の中からお選び下さい。(SA)

❒ 1. Head of household/main income
世帯主
❒ 2. Partner of head of household
世帯主のパートナー
❒ 3. Child
子ども
❒ 4. Other family member
それ以外の家族
❒ 5. Other person (no family)
その他（家族以外）

6. What is your marital status? ONLY ONE ANSWER POSSIBLE
6. 失礼ですが、あなたの現在の婚姻状況をお教え下さい。(SA)

❒ 1. Married/Living together/Common Law
既婚 / 同居 / 内縁関係
❒ 2. Single
未婚
❒ 3. Divorced/Separated
離婚 / 別居
❒ 4. Widowed
死別

7. What is the highest level of education you've achieved? ONLY ONE ANSWER POSSIBLE

7. 失礼ですが、あなたの最終学歴をお選び下さい。(SA)

❒ 1. Elementary school
小学校

❒ 2. Junior high school
中学校

❒ 3. High school
高等学校

❒ 4. Technical/ business school
専門学校

❒ 5. Community college
短期大学

❒ 6. University
大学

❒ 7. Post graduate studies
大学院

8. Which of the following best describes your employment status? ONLY ONE ANSWER POSSIBLE

8. 失礼ですが、あなたの現在の雇用状況に当てはまるものをお選び下さい。(SA)

❒ 1. Employed full-time or self-employed
フルタイム勤務もしくは自営業

❒ 2. Employed part-time
パートタイム（アルバイト）勤務

❒ 3. Homemaker
主夫 / 主婦

❒ 4. Student and full-time employed
学生でフルタイム勤務

❒ 5. Student and part-time employed
学生でパートタイム（アルバイト）勤務

❒ 6. Student only
学生

❒ 7. Retired
退職

❒ 8. Unemployed
無職

❒ 9. Other
その他

9. What is the approximate range of your total household income? ONLY ONE ANSWER POSSIBLE

9. 失礼ですが、あなたのご家庭の世帯年収をお教え下さい。(SA)

❒ 1. $ 24,999 or under
250万円未満

❒ 2. Between $ 25,000 and $ 39,999
250万円以上、400万円未満

❒ 3. Between $ 40,000 and $ 64,999
400万円以上、650万円未満

❒ 4. Between $ 65,000 and $ 79,999
650万円以上、800万円未満

❒ 5. Between $ 80,000 and $ 99,999
800万円以上、1,000万円未満

❒ 6. Between $ 100,000 and $ 119,999
1,000万円以上、1,200万円未満

❒ 7. $ 120,000 or more
1,200万円以上

❒ 8. Don't know / Refuse
わからない / 回答拒否

10a. あなたのお住まいの地域をお選び下さい。(SA)

01. 北海道	17. 石川県	33. 岡山県
02. 青森県	18. 福井県	34. 広島県
03. 岩手県	19. 山梨県	35. 山口県
04. 宮城県	20. 長野県	36. 徳島県
05. 秋田県	21. 岐阜県	37. 香川県
06. 山形県	22. 静岡県	38. 愛媛県
07. 福島県	23. 愛知県	39. 高知県
08. 茨城県	24. 三重県	40. 福岡県
09. 栃木県	25. 滋賀県	41. 佐賀県
10. 群馬県	26. 京都府	42. 長崎県
11. 埼玉県	27. 大阪府	43. 熊本県
12. 千葉県	28. 兵庫県	44. 大分県
13. 東京都	29. 奈良県	45. 宮崎県
14. 神奈川県	30. 和歌山県	46. 鹿児島県
15. 新潟県	31. 鳥取県	47. 沖縄県
16. 富山県	32. 島根県	

* According to answers to 10a, each code of 10.(not displayed to respondents) is punched automatically.
※10a.
の回答に応じて、↓10.（回答者に呈示しない）の対応する地域コードをパンチ

10. Which region do you live in? ONLY ONE ANSWER POSSIBLE

❒ 1. Hokkaido / Tohoku
北海道 / 東北
❒ 2. Kanto / Koshinetsu
関東 / 甲信越
❒ 3. Chubu / Hokuriku / Tokai
中部 / 北陸 / 東海
❒ 4. Kinki region
近畿
❒ 5. Chugoku region
中国
❒ 6. Shikoku
四国
❒ 7. Kyushu
九州 / 沖縄

11. Do you live in a city, in a town or in the countryside? ONLY ONE ANSWER POSSIBLE
11.
あなたのお住まいの地域として次の中から当てはまるものをお選び下さい。(SA)

❒ 1. In a city (>100.000 inhabitants)
都市部（人口10万人以上）
❒ 2. In a town (> 10.000 inhabitants)
市街地（人口1万人以上）
❒ 3. In the countryside/rural district
地方 / 農村部

Section: General Trust
セクション：一般的な信頼性

12. Generally speaking, would you say that most people can be trusted?
12. 一般的に、あなたにとって人は信用できるものだと思いますか。(SA)

People can be trusted 信用できる	Can't be too careful in dealing with people 信用できない	Don't know わからない
1 ❒	2 ❒	3 ❒

13. We would like to know whether you, in general, worry a lot in daily life. Please indicate to what extent you find the following statements characteristic of yourself. Give your answer on a scale from 1 (“not at all typical”) to 5 (“very typical”).
13.
あなたは日常生活の中で色々なことが気になりますか。以下のそれぞれの内容について、どの程度あなたに当てはまるかを、1(全く当てはまらない)～5(非常に当てはまる)の中からお選び下さい。(SA)

	not at all typical 1 全く当てはまらない 1	2 あまり当てはまらない 2	somewhat typical 3 多少当てはまる 3	4 当てはまる 4	very typical 5 非常に当てはまる 5
1.Many situations make me worry 色々なことが	❒	❒	❒	❒	❒
2.I know I shouldn’t worry about things, but I just cannot help it 気にすべきではないとわかってい	❒	❒	❒	❒	❒
3.I notice that I have been worrying about things 気にしている	❒	❒	❒	❒	❒

14. Please indicate your level of agreement with the following statements 14. 以下のそれぞれの内容について、あなたはどのように思いますか。1つずつお選び下さい。(SA)	strongly disagree 1 全くそう思わない 1	Disagree 2 そう思わない 2	neither agree, nor disagree 3 どちらでもない 3	Agree 4 そう思う 4	strongly agree 5 確かにそう思う 5
1.I am optimistic about the safety of food products 食品の安全性に	❒	❒	❒	❒	❒

2.I am confident that food products are safe 食品は安全だと	❒	❒	❒	❒	❒
3.I am satisfied with the safety of food products 食品の安全性に	❒	❒	❒	❒	❒
4.Generally, food products are safe 概して、食品は	❒	❒	❒	❒	❒
5.I worry about the safety of food 食品の安全性を	❒	❒	❒	❒	❒
6.I feel uncomfortable regarding the safety of food 食品の安全性に	❒	❒	❒	❒	❒
7.As a result of the occurrence of food safety incidents I am suspicious about certain food products 食品の安全性を脅かすようなことがあってから、ある食品については疑いをもっている	❒	❒	❒	❒	❒

Assessment of food industry

15. These statements are about your trust in individuals and institutions with respect to the safety of food. We distinguish between the government, farmers, retailers, and manufacturers of food products. Please indicate to what extent you agree with each statement.

食品業界に対する評価

15.

以下のそれぞれの文章は、政府、農家、小売業者、メーカーの、食品の安全性に対する信頼に関するものです。以下のそれぞれの文章について、あなたはどのように思いますか。1つずつお選び下さい。(SA)

DISPLAY IN DIFFERENT ORDER, I.E.:

1. GOVERNMENT FARMERS RETAILERS MANUFACTURERS
2. FARMERS RETAILERS MANUFACTURERS GOVERNMENT
3. RETAILERS MANUFACTURERS GOVERNMENT FARMERS
4. MANUFACTURERS GOVERNMENT FARMERS RETAILERS

＜プログラマーへの指示＞

以下のように、ローテーションで表示

1. 政府 → 農家 → 小売業者 → メーカー
2. 農家 → 小売業者 → メーカー → 政府

3. 小売業者 → メーカー → 政府 → 農家
4. メーカー → 政府 → 農家 → 小売業者

GOVERNMENT 政府	strongly disagree 1 全くそう思わない 1	disagree 2 そう思わない 2	neither agree, nor disagree 3 どちらでもない 3	agree 4 そう思う 4	strongly agree 5 非常にそう思う 5
1.The government has the competence to control the safety of food 政府には食品の安全性を管理する能力がある	❒	❒	❒	❒	❒
2.The government has sufficient knowledge to guarantee the safety of food products 政府には食品の安全性を保証するだけの十分な知識がある	❒	❒	❒	❒	❒
3.The government is honest about the safety of food 政府は食品の安全性について公正である	❒	❒	❒	❒	❒
4.The government is sufficiently open about the safety of food 政府は食品の安全性についてきちんと公表している	❒	❒	❒	❒	❒
5.The government takes good care of the safety of our food 政府は食品の安全性をきちんと管理している	❒	❒	❒	❒	❒

6.The government gives special attention to the safety of food 政府は食品の安全性について特別に配慮している	❒	❒	❒	❒	❒

FARMERS 農家	strongly disagree 1 全くそう思わ	disagree 2 そう思わない	neither agree, nor disagree 3 どちらでもない	agree 4 そう思う	strongly agree 5 非常にそ
1.Farmers have the competence to control the safety of food 農家には食品の安全性を管理する能力がある	❒	❒	❒	❒	❒
2.Farmers have sufficient knowledge to guarantee the safety of food products 農家には食品の安全性を保証するだけの十分な知識が	❒	❒	❒	❒	❒
3.Farmers are honest about the safety of food 農家は食品の安全性について公正である	❒	❒	❒	❒	❒
4.Farmers are sufficiently open about the safety of food 農家は食品の安全性についてきちんと公表している	❒	❒	❒	❒	❒
5.Farmers take good care of the safety of our food 農家は食品の安全性をきちんと管理している	❒	❒	❒	❒	❒
6.Farmers give special attention to the safety of food 農家は食品の安全性について特別に配慮している	❒	❒	❒	❒	❒

RETAILERS	strongly disagree	disagree	neither agree, nor disagree	agree	strongly agree
小売業者	1 全くそう思わない 1	2 そう思わない 2	3 どちらでもない	4 そう思う 4	5 非常にそう思う
1.Retailers have the competence to control the 小売業者には食品の安全性を管理する能力がある	❒	❒	❒	❒	❒
2.Retailers have sufficient knowledge to guarantee the safety of food products 小売業者には食品の安全性を保証するだけの十分な知識がある	❒	❒	❒	❒	❒
3.Retailers are honest about the safety of food 小売業者は食品の安全性について公正である	❒	❒	❒	❒	❒
4.Retailers are sufficiently open about the safety of food 小売業者は食品の安全性についてきちんと公表している	❒	❒	❒	❒	❒
5.Retailers take good care of the safety of our food 小売業者は食品の安全性をきちんと管理している	❒	❒	❒	❒	❒
6. Retailers give special attention to the safety of food 小売業者は食品の安全性について特別に配慮している	❒	❒	❒	❒	❒

MANUFACTURERS OF FOOD	strongly disagree	disagree	neither agree, nor disagree	agree	strongly agree
	1	2	3	4	5
食品メーカー	全くそう思わない 1	そう思わない 2	どちらでもない 3	そう思う 4	非常にそう思う 5
1.Manufacturers have the competence to control the safety of food 食品メーカーには食品の安全性を管理する能力がある	❒	❒	❒	❒	❒
2.Manufacturers have sufficient knowledge to guarantee the safety of food products 食品メーカーには食品の安全性を保証するだけの十分な知識がある	❒	❒	❒	❒	❒
3.Manufacturers are honest about the safety of food 食品メーカーは食品の安全性について公正である	❒	❒	❒	❒	❒
4.Manufacturers are sufficiently open about the safety of food 食品メーカーは食品の安全性についてきちんと公表している	❒	❒	❒	❒	❒
5.Manufacturers take good care of the safety of our food 食品メーカーは食品の安全性をきちんと管理している	❒	❒	❒	❒	❒
6.Manufacturers give special attention to the safety of food	❒	❒	❒	❒	❒

食品メーカーは食品の安全
性について特別に配慮して
いる

16. To what extent are you concerned about the following issues?
16.
以下のそれぞれの項目について、どの程度あなたに当てはまるかをお選び下さい。(SA
)

	Not at all concerned 1 全く関心がない 1	Minor concerns 2 あまり関心がない 2	Some concerns 3 多少は関心がある 3	Major Concerns 4 やや関心がある 4	Very concerned 5 とても関心がある 5
1. The feed given to livestock 家畜の飼料	❒	❒	❒	❒	❒
2. Conditions in which food animals are raised 食用動物の飼育条件	❒	❒	❒	❒	❒
3. Genetically modified animal feeds 遺伝子組み換え飼料	❒	❒	❒	❒	❒
4. Animal diseases 動物の病気	❒	❒	❒	❒	❒
5. BSE and Creutzfeldt Jakob Disease (vCJD) 狂牛病 (BSEやクロイツフェルト・ヤコブ病	❒	❒	❒	❒	❒
6. The origin of products/ animals 食品 / 動物の原産地	❒	❒	❒	❒	❒
7. Antibiotics in meat 食肉中の抗生物質	❒	❒	❒	❒	❒

8. Animals genetically modified for meat/poultry or dairy production 食肉 / 養鶏あるいは乳製品用に遺伝子組み換	❒	❒	❒	❒	❒

17. To what extent do you think the following individuals and organizations are responsible for guaranteeing the safety of food? Please give your answer on a scale from 1 ("not at all responsible") to 5 ("completely responsible").
17.
以下のそれぞれの個人や団体は、食品の安全性についてどの程度責任があると思いますか。1(全く責任がない)~5(非常に責任がある)の中からお選び下さい。(SA)

	not at all responsible 1 全く責任がない 1	2 責任が	3 どちらともいえない	4 責任がある	completely responsible 5 非常に責任がある 5
To what extent do you think … is/are responsible for the safety of food?					
1. Farmers 農家	❒	❒	❒	❒	❒
2. The government 政府	❒	❒	❒	❒	❒
3. Manufacturers of food 食品メーカー	❒	❒	❒	❒	❒
4. Retailers 小売業者	❒	❒	❒	❒	❒
5. The Japan Consumers' Association CAC) 財団法人日本消費者協会	❒	❒	❒	❒	❒
6. The consumer 消費者	❒	❒	❒	❒	❒

18. Various individuals and organizations provide information about the safety of food. Please indicate to what extent you trust the information provided by the following sources, where 1 refers to "no trust in information at all" and 5 refers to "complete trust in information".
18.
様々な個人や団体が食品の安全性について情報を提供していますが、以下のそれぞれの情報源についてあなたはどの程度信頼していますか。それぞれについて、当てはまるものをお選び下さい。(SA)

	no trust in information at all 1 全く信頼していない 1	2 信頼していない 2	3 どちらともいえない 3	4 信頼している	complete trust in information 5 非常に信頼している 5
To what extent do you trust information about the safety of food provided by …?					
1. Farmers 農家	❒	❒	❒	❒	❒
2. The government 政府	❒	❒	❒	❒	❒
3. Manufacturers of food 食品メーカー	❒	❒	❒	❒	❒
4. Retailers 小売業者	❒	❒	❒	❒	❒
5. The Japan Consumers' Association 財団法人日本消費	❒	❒	❒	❒	❒

19. Please answer the following questions. Give your answer on a scale from 1 ("very little") to 5 ("a great deal").
19.
以下のそれぞれの内容について、1(ほとんどない)～5(よくある)の中からお選び下さい。(SA)

	very little 1 全く思わない 1	2 そう思わない 2	3 どちらでもない 3	4 そう思う 4	a great deal 5 非常にそう思う
1.How much risk do you think there is to you personally of experiencing negative consequences from eating unsafe foods?	❒	❒	❒	❒	❒

あなたが安全でない食品を食べて悪影響を受けるリスクがある。					
2.How much risk do you think there is to the average Japanese person of experiencing negative consequences from eating unsafe foods? 一般的な日本人が安全でない食品を食べて悪影響を受ける	❒	❒	❒	❒	❒
3.How much control do you think you personally have over the safety of food? 食品の安全性について、あなたはきちんと管理できる。	❒	❒	❒	❒	❒
4.How much control do you think the average Japanese person has over the safety of food? 食品の安全性について、一般的な日本人はきちんと管理で	❒	❒	❒	❒	❒
5.How much knowledge do you think you personally have about the safety of food? 食品の安全性について、あなたには知識がある。	❒	❒	❒	❒	❒
6.How much knowledge do you think the average Japanese person has about the safety of food? 食品の安全性について、一般的な日本人には知識がある。	❒	❒	❒	❒	❒

20a. Do you recall a particular incident over the past six months where the safety of food was compromised or threatened? Your memory can be based on personal experience, but also on information you received through the news media.
20a.
あなたは、食品の安全性が脅かされるような出来事で、過去6ヶ月以内に発生したことを特に覚えていますか。個人的な経験でも、ニュースやメディアで知りえた情報でもけっこうです。(SA)

❒ 1. Yes はい [>>20b] → 20bへ

❒ 2. No [>>21]
いい → 21へ

20b. [after this question, continue with 21]
20b. [この質問の後は、21へ]

Which incident(s) do you recall? Could you indicate when the incident occurred? MORE THAN ONE ANSWER POSSIBLE
どのような出来事を覚えていますか。また、それはいつごろ起こったことですか。(OA)
(なるべく1つ以上記入してください。)

	DESCRIPTION OF INCIDENT	WHEN DID THE INCIDENT OCCUR?
INCIDENT 1	_____	_____
INCIDENT 2	_____	_____
INCIDENT 3	_____	_____

	どのような出来事でしたか。	いつ頃起こったことですか。
出来事1	_____	_____
出来事2	_____	_____
出来事3	_____	_____

出来事1」は必須、何も記入せずに進もうとした場合はエラーメッセージを表示

21. Please indicate how much confidence you, generally, have in the safety of the following product groups. Give your answer on a scale from 1 (“no confidence at all”) to 5 (“complete confidence”).
21.
以下のそれぞれの食品について、あなたは概してどの程度その安全性を信頼していますか。1(全く信頼していない)～5(非常に信頼している)の中からお選び下さい。(SA)

	no confidence at all				complete confidence
	1	2	3	4	5
	全く信頼していない	信頼していない	どちらともいえない	信頼している	非常に信頼している
	1	2	3	4	5
1. Beef	❒	❒	❒	❒	❒

牛肉					
2. Pork	❒	❒	❒	❒	❒
豚肉					
3. Chicken / poultry	❒	❒	❒	❒	❒
鳥肉 / 鶏肉					
4. Fish	❒	❒	❒	❒	❒
魚					
5. Meat replacers / substitutes	❒	❒	❒	❒	❒
肉加工品 (ハム					
、ソーセージな					
6. Canned products	❒	❒	❒	❒	❒
缶詰製品					
7. Products sold in jars	❒	❒	❒	❒	❒
瓶詰め製品					
8. Fresh vegetables and	❒	❒	❒	❒	❒
生鮮野菜 /					
9.Precut and washed fresh vegetables	❒	❒	❒	❒	❒
カット済み					
10. Milk products	❒	❒	❒	❒	❒
乳製品					
11. Cheese	❒	❒	❒	❒	❒
チーズ					
12. Eggs	❒	❒	❒	❒	❒
卵					
13. Bread products	❒	❒	❒	❒	❒
パン製品					
14. Frozen products	❒	❒	❒	❒	❒
冷凍食品					
15. Ready-to-eat meals	❒	❒	❒	❒	❒
インスタン					
16. Vitamin supplements	❒	❒	❒	❒	❒
ビタミンサ					
17. Baby food	❒	❒	❒	❒	❒
ベビーフー					
18.Confectionery products	❒	❒	❒	❒	❒

菓子製品

22. We would like to ask some more questions about your opinion regarding chicken and beef.
22. では、鶏肉と牛肉についてお伺いします。

[DISPLAY CHICKEN AND BEEF RANDOMLY, ALSO DISPLAY ITEMS RANDOMLY WITHIN TYPE]

<プログラマーへの指示>

鶏肉と牛肉をランダムに表示する。また、アトリビュートもランダムに表示する。

What do you think about poultry?
鶏肉についてどう思いますか。(SA)

	1	2	3	4	5	
not safe	❒	❒	❒	❒	❒	safe
全く安全でない not trustworthy	❒	❒	❒	❒	❒	非常に安全である trustworthy
全く信頼できない contains harmful substances	❒	❒	❒	❒	❒	非常に信頼できる does not contain harmful substances
有害物質が含まれ						有害物質は含まれて

What do you think about beef?
牛肉についてどう思いますか。(SA)

	1	2	3	4	5	
not safe	❒	❒	❒	❒	❒	safe
全く安全でない not trustworthy	❒	❒	❒	❒	❒	非常に安全である trustworthy
全く信頼できない contains harmful substances	❒	❒	❒	❒	❒	非常に信頼できる does not contain harmful substances
有害物質が含まれ						有害物質は含まれて

23a.

[DISPLAY CHICKEN AND BEEF RANDOMLY, SHOW ITEMS WITHIN TYPE OF MEAT ALSO RANDOMLY]

<プログラマーへの指示>

鶏肉と牛肉をランダムに表示する。また、アトリビュートもランダムに表示。

Do you eat beef?
あなたは牛肉を食べますか。(SA)

❒ 1. Yes — Routing: Continue with [23b]
はい — → 23bへ

❒ 2. No Routing: Continue with [24a]
いい → 24aへ

23b.

What do you think about eating beef?

牛肉を食べることについて、以下のそれぞれの内容をどう思いますか。(SA)

1.When eating beef, I am exposed to …						
牛肉を食べることには						
	1	2	3	4	5	
very little risk	❒	❒	❒	❒	❒	a great deal of risk
全く危険はない						非常に危険があ
2.I accept the risks of eating beef						
牛肉を食べる際の危険性はしかたない						
strongly disagree	❒	❒	❒	❒	❒	strongly agree
全くそう思わない						非常にそう思う
3.I think eating beef is risky						
牛肉を食べるのは危険である						
strongly disagree	❒	❒	❒	❒	❒	strongly agree
全くそう思わない						非常にそう思う
4.For me, eating beef is …						
私にとって、牛肉を食べることは						
not risky	❒	❒	❒	❒	❒	risky
全く危険ではない						非常に危険であ
5.For me, eating beef is worth the risk						
私にとって、牛肉を食べることは危険をおかすだけの価値がある						
strongly disagree	❒	❒	❒	❒	❒	strongly agree
全くそう思わない						非常にそう思う
6.I am … the risk of eating beef						
牛肉を食べる際の危険性について、						
not willing to	❒	❒	❒	❒	❒	willing to accept
受け入れられない						しかたがないと

24a. Do you eat poultry?

24a. あなたは鶏肉を食べますか。(SA)

❒ 1. Yes Routing: Continue with [24b]
はい → 24bへ
❒ 2. No Routing: Continue with [25]
いい → 25へ

24b. What do you think about eating poultry?

鶏肉を食べることについて、以下のそれぞれの内容をどう思いますか。(SA)

1.When eating poultry, I am exposed to …

鶏肉を食べることには

	1	2	3	4	5	
very little risk	❒	❒	❒	❒	❒	a great deal of risk
全く危険はな						非常に危険があ
2.I accept the risks of eating poultry						
鶏肉を食べる際の危険性はしかたない						
strongly disagree	❒	❒	❒	❒	❒	strongly agree
全くそう思わ						非常にそう思う
3.I think eating poultry is risky						
鶏肉を食べるのは危険である						
strongly disagree	❒	❒	❒	❒	❒	strongly agree
全くそう思わ						非常にそう思う
4.For me, eating poultry is …						
私にとって、鶏肉を食べることは						
not risky	❒	❒	❒	❒	❒	risky
全く危険では						非常に危険であ
5. For me, eating poultry is worth the risk						
私にとって、鶏肉を食べることは危険をおかすだけの価値がある						
strongly disagree	❒	❒	❒	❒	❒	strongly agree
全くそう思わ						非常にそう思う
6.I am … the risk of eating poultry						
鶏肉を食べる際の危険性について、						
not willing to	❒	❒	❒	❒	❒	willing to accept
受け入れられ						しかたがないと

25. Imagine you have a question about the safety of your food. To what extent would you use the following information sources to discover more information about food safety?
25.
食品の安全性について疑問があるとします。以下のそれぞれの情報源について、食品の安全性に関する情報を得るのにどの程度その情報源を利用すると思いますか。(SA)

[DISPLAY INFORMATION SOURCES RANDOMLY]
<プログラマーへの指示>
アトリビュートをランダムに表示。

	definitely not				Definitely
	1	2	3	4	5
	全く利用しない	利用しない	どちらともいえない	利用する	絶対に利用する
	1	2	3	4	5
1.Neighbours	❒	❒	❒	❒	❒
隣近所の人					

2.The Japan Consumers' Association 財団法人日本消費者協会	❒	❒	❒	❒	❒
3.Dietician or family doctor 栄養士 / かかりつけの医	❒	❒	❒	❒	❒
4.Product labels 食品の表示ラベル	❒	❒	❒	❒	❒
5.Family 家族	❒	❒	❒	❒	❒
6.Japan MAFF 農林水産省	❒	❒	❒	❒	❒
7.Provincial ministry of agriculture 厚生労働省	❒	❒	❒	❒	❒
8.Research institutes 調査機関	❒	❒	❒	❒	❒
9.Food manufacturers 食品メーカー	❒	❒	❒	❒	❒
10.Friends and acquaintances 友人や知人	❒	❒	❒	❒	❒
11.Scientists 科学者	❒	❒	❒	❒	❒
12.Retailers or supermarkets 小売業者 / スーパーマー	❒	❒	❒	❒	❒

26. The next questions are about news messages in the media about the safety of food. Those messages may concern actual incidents, but may also provide background information about the safety of food products in general, and so not be related to a particular incident. We would like to know to what extent you recall news messages about actual incidents or about background information. Please answer the following questions for the most recent message that you recall.
26.
次の質問は、食品の安全性についての二ュース内容に関するものです。これらの内容は実際に起こった出来事に関連するものもあれば、一般的な食品の安全性に関する背景事情であって実際の出来事とは関連のないものもあります。あなたは、実際に起こった出来事に関する二ュースの内容をどの程度覚えていますか。あなたが覚えている一番最近の二ュース内容について、以下の質問にお答え下さい。

What was the most recent message about?
一番最近の二ュースの内容は、どのようなことに関するものでしたか。(

_____

26b. [after this question, continue with 26c]
26b. [この質問の後は、26cへ]

Was the most recent message positive or negative?

その一番最近の二ュースの内容は、良い出来事に関するものでしたか。それとも悪い出来事に関するものでしたか。(SA)

❒ Positive
良い出来事に関するもの

❒ Negative
悪い出来事に関するもの

26c. [after this question, continue with 27]

26c. [この質問の後は、27へ]

How alarming did you find the most recent message?

その一番最近の二ュースの内容について、どの程度おどろきましたか。 (SA)

not alarming at all				very alarming
全くおどろかなかった	あまりおどろかなかった	どちらともいえない	ややおどろいた	非常におどろいた
1	2	3	4	5
❒	❒	❒	❒	❒

27. The following questions have to do with different factors that influence the safety of food. Could you please indicate to what extent you agree with the following statements?

27.

次の質問は、食品の安全性に影響を与える様々な要素に関するものです。以下のそれぞれの文章について、あなたはどの程度当てはまるかをお選び下さい。(SA)

	strongly disagree 1 全くそう思わない 1	Disagree 2 そう思わない 2	neither agree, nor disagree 3 どちらでもない 3	Agree 4 そう思う 4	strongly agree 5 非常にそう思う 5
1.I am in control over the safety of the food products that I eat 私は自分が食べる食品の安全性を管理している	❒	❒	❒	❒	❒

2.The safety of food products is mainly influenced by how I handle food products 食品の安全性に影響を与えるのは、主に私の食品の取り扱	❒	❒	❒	❒	❒
3.The safety of food products is mainly influenced by parties in the food chain other than myself 食品の安全性に影響を与えるのは、主に私ではなくフードチェーン関係者である	❒	❒	❒	❒	❒
4.The safety of food products cannot be controlled, but is mainly determined by coincidental factors 食品の安全性を管理することはできず、主に偶然の要素による	❒	❒	❒	❒	❒

28. How often are you involved in the daily grocery shopping for your household?
28. あなたは日常の食料品の買い物にどのぐらいの頻度で行きますか。(SA)

never				always
全く買いに行かない	ほとんど買いに行かない	あまり行かないがたまに買	時々買いに行く	いつも買いに行く
1	2	3	4	5
❒	❒	❒	❒	❒

29. Do you ever buy organic products?
29. あなたはオーガ二ック製品を買ったことがありますか。(SA)

never				always
一度も買ったことがない	ほとんど買ったことがない	あまり買わないがたまに買う	時々買っている	いつも買っている
1	2	3	4	5
❒	❒	❒	❒	❒

30. Which of the following best describes your food preferences?
30.
以下のそれぞれの文章について、あなたご自身に最も当てはまると思うものをお選び下さい。(SA)

❒ 1. I eat meat and fish

私は肉も魚も食べる

❒ 2. I eat fish but don't eat meat

私は魚は食べるが肉は食べない

❒ 3. I do eat meat but I don't eat fish

私は肉は食べるが魚は食べない

❒ 4. I am a vegetarian (I don't eat either meat or fish)

私はベジタリアンである (肉も魚も食べない

31. Please answer with the following: 1 = strongly disagree, 2 = disagree, 3 = neither agree or disagree, 4 = agree, 5 = strongly agree)
31.
以下のそれぞれの文章について、あなたはどう思いますか。それぞれについて、1＝全くそう思わない、2＝そう思わない、3＝どちらともいえない、4＝そう思う、5＝非常にそう思う　の中からお選び下さい。(SA)

	strongly disagree 1 全くそう思わない 1	disagree 2 そう思わない 2	neither agree, nor disagree 3 どちらでもない 3	Agree 4 そう思う 4	strongly agree 5 非常にそう思う 5
1. I think that government food safety regulations protect me adequately 食品の安全性に関する政府の規制によって、私たちは適切に保護されてい	❒	❒	❒	❒	❒
2. I would like to see stronger food safety standards imposed in Japan 日本では食品の安全性に関してもっと強力な基準を設けてほしいと思う	❒	❒	❒	❒	❒
3. I would pay more for a product with a higher than average level of food safety 安全性の高い食品に対しては、より多くお金を払ってもいいと思う	❒	❒	❒	❒	❒
4. I do not eat meat prepared by someone outside my household	❒	❒	❒	❒	❒

家庭以外の場所で料理された肉は食べない					
5. I am confident that food in restaurants is safe to eat. レストランで食べる料理は安全だと信頼している	❒	❒	❒	❒	❒
6. I would be willing to pay a premium for beef that would not transmit the human variant of BSE? BSE（狂牛病）に感染しない牛肉には特別にお金	❒	❒	❒	❒	❒
7. I purchase meat based: 私が肉を買うときに基準にしているのは…					
a. on the brand ブランド	❒	❒	❒	❒	❒
b. country of 原産地	❒	❒	❒	❒	❒
c. on the price 価格	❒	❒	❒	❒	❒

32. How often do you buy beef? Is it… 32. あなたはどのぐらいの頻度で牛肉を買いますか。(SA)	Never 全く買わない	Occasionally 時々買う	Regularly いつも買う
	1 ❒	2 ❒	3 ❒

1.「全く買わない」を選んだ場合 → 33をスキップ、34へ

33. When you buy beef, is it usually in.. (One ONLY) 33. なたが牛肉を買うときは、いつもどこで買いますか.SA)	
1. a supermarket, スーパーマーケット	❒
2. a butcher's shop 肉屋	❒
3. another small shop それ以外の店	❒
4. a food market 食料品市場	❒

5.	or another way (from a farm or through acquaintances) その他（農家や知人経由など）	❒

34. Thinking about buying beef, would you say that the following characteristics are unimportant, matter a bit or are important to you? 34. あなたが牛肉を買う場合、以下のそれぞれの項目はどの程度重要だと思いますか。(SA)	Unimportant 重要でない	Matters a bit やや重要である	Important 重要である
	1	2	3
1. the beef tastes good おいしさ	❒	❒	❒
2. the beef is lean 脂肪分の少ない赤身肉	❒	❒	❒
3. the beef is safe to eat 食べても安全	❒	❒	❒
4. the price is low 価格が安い	❒	❒	❒
5. the shop is easily accessible お店が近い	❒	❒	❒

35. When buying beef, would you say that the following safety and quality concerns are unimportant, matter a bit or are important to you? 35. 牛肉を買うとき、以下の安全性や品質に関する項目はどの程度重要だと思いますか。(SA)	Unimportant 重要でない	Matters a bit やや重要である	Important 重要である
1. You know the staff personally 店員を個人的に知っている	❒	❒	❒
2. You know where the beef originates from 牛肉の原産地を知っている	❒	❒	❒
3. Local hygiene inspectors visit the place regularly 現地の衛生監査が定期的に行われている	❒	❒	❒
4. Japanese authorities practice strict hygienic standards for beef 日本の当局が牛肉に関する厳格な衛生基準を順守している	❒	❒	❒
5. Japan establishes good food safety regulations for beef 日本では牛肉の安全規制がきちんと確立している	❒	❒	❒

6. You know the shop from previous experience 以前からそのお店を知っている	❒	❒	❒
7. The beef is labeled with full product information ラベルに製品情報がすべて表示されてい	❒	❒	❒

36. Do you prefer imported beef from Canada, Australia, United States or other?
36.
あなたはカナダ、オーストラリア、アメリカから輸入された牛肉の中で

1. Imported beef from Australia オーストラリアから輸入された牛肉	❒
2. Imported beef from Canada カナダから輸入された牛肉	❒
3. Imported beef from the United States アメリカから輸入された牛肉	❒
4. Imported beef from _____ please identify （具体的に：）_____から輸入された牛肉	❒
5. I avoid imported beef as much as possible 輸入された牛肉はできるだけ選ばない	❒

37. Would you say that the following food issues are an important risk to human health in our society, are not a very important risk or no risk at all?
37.
以下の食品に関するそれぞれの項目は、人間の健康にとってどの程度重大な危険があると思いますか。(SA)

	Important 危険である	Not very それほど危険ではない	No problem 危険ではない	Don't know わからない
	1	2	3	4
1. food poisoning, such as a Salmonella サルモネラ菌などのような食中	❒	❒	❒	❒
2. BSE (mad cow disease) BSE（狂牛病）	❒	❒	❒	❒
3. GM foods 遺伝子組み換え食品	❒	❒	❒	❒
4. pesticides 殺虫剤 / 農薬	❒	❒	❒	❒
5. additives (like preservatives, colouring) 添加物（保存料や着色料など）	❒	❒	❒	❒
6. food allergies 食物アレルギー	❒	❒	❒	❒

7.	unhealthy eating 不健康な食事	❒	❒	❒	❒
8.	Unreasonable food prices 食品の不当な価格	❒	❒	❒	❒

	No いいえ	Yes はい
38. Over the past four years, have you lowered your beef consumption because of food safety concerns? 38a. 4年前と比較して、食品の安全性を理由にあなたの	1 ❒	2 ❒

（改ページ） 「はい」の場合、38bへ

If yes, reduced by roughly _____% (please give your best estimate

38b.

さきほど4年前と比較して牛肉の消費量が減ったとお答えになりましたが、どのぐらい減りましたか。

（数字を入力してください）約_____%減った。

If answer to 23a is "1. Yes" → 39
"2. No" → Skip 39 and go to 40

※23a の回答が「1. はい」の場合 → 39へ
「2. いいえ」の場合 → 39をスキップして40へ

39. Please provide the approximate percentage of your beef consumption over the past year that would include the following beef products (your best guess is fine, they should add to 100%, skip question if you do not consume beef):

39.

過去1年間で、あなたはどのような牛肉を、どのぐらい消費しましたか。以下のそれぞれについて、おおよその割合を数字で入力して下さい。（トータルが100%になるように入力して下さい。牛肉を全く消費していな

1.	ground or minced (e.g., hamburger) ひき肉やミンチ（ハンバーガーなど）	___%
2.	roasts ブロック・塊肉（ローストビーフなど）	___%
3.	steaks スライス・薄切り肉（ステーキなど）	___%
4.	sausage, brats, hotdogs, beef luncheon meats, deli meats ソーセージ、ブラートヴルスト（ドイツの焼いて食べるソーセージ）、ホットドッグ、ランチョン・ミート、デリ・	___%
5.	organ meats (e.g., liver, tongue, tripe, etc.) 内臓肉（レバー、タン、トリップなど）	___%

6. other (please list_____) ___%
その他（具体的に_____）

※その他の割合が0%の場合 → 回答欄は無記入のまま40へ
1%以上の場合 → 回答欄に具体的に回答を入力

40. Whether you have ever knowingly purchased beef produced in another country or not, what is your perceptions of the level of food safety of beef by country of origin?
40.
これまであなたが、輸入か国産かを意識して牛肉を買っていたかどうかにかかわらず、以下のような各原産地の牛肉に関する食品安全性水準を、あなたはどのように考えていますか。(SA)

Your Perceived Level of Food Safety	Very Low 1	Low 2	Moderate 3	High 4	Very High 5	No Opinion 6
あなたが考えている食品の安全性水準	安全性が非常に低い 1	安全性が低い 2	どちらともいえない 3	安全性が高い 4	安全性が非常に高い 5	わからない 6
1. Unknown Country of Origin 原産地がわからない	❒	❒	❒	❒	❒	❒
2. Australia オーストラリア	❒	❒	❒	❒	❒	❒
3. Brazil ブラジル	❒	❒	❒	❒	❒	❒
4. Canada カナダ	❒	❒	❒	❒	❒	❒
5. Japan 日本	❒	❒	❒	❒	❒	❒
6. USA アメリカ	❒	❒	❒	❒	❒	❒

※質問41～46までの質問順： 42 → 43 → 44 → 45 → 46 → 41

41. When you buy beef, how important are the following factors to you? (Please check
41. あなたが牛肉を買うとき、以下の項目はどの程度重要だと思いますか。(SA)

	Very Important 1	Somewhat Important 2	Not Important 3

	非常に重要である	やや重要である	重要でない
	1	2	3
1. Product Leanness (fat) 脂肪分の量	❒	❒	❒
2. Food borne disease 食物に起因する病気の情報	❒	❒	❒
3. Antibiotics in food 食品中の抗生物質の有無	❒	❒	❒
4. Hormones in food 食品中のホルモンの有無	❒	❒	❒
5. BSE or Mad cow disease BSE（狂牛病）検査の有無	❒	❒	❒
6. Product Nutritional Information 製品の栄養情報	❒	❒	❒
7. Price 価格	❒	❒	❒
8. Product Flavor 味わい、風味	❒	❒	❒
9. Product Tenderness 柔らかさ	❒	❒	❒
10. Product Juiciness 肉汁の量、うまみ	❒	❒	❒
11. Product Preparation Ease 準備の手軽さ、手間	❒	❒	❒
12. Product Preparation Time 準備にかかる時間	❒	❒	❒
13. Product Freshness (i.e., “Sell by Date” in U.S.; “Packaged on Date” in Canada; “Best Before” Date in Japan) 製品の鮮度、新鮮さ（賞味期	❒	❒	❒
14. Product Color 色合い、色味	❒	❒	❒
15. Product Labeled Natural 無添加表示の有無	❒	❒	❒
16. Product Labeled Organic オーガニック表示の有無	❒	❒	❒
17. Traceability of Product to Farm 生産者へのトレーサビリティの有無	❒	❒	❒
18. Country of Origin of Product 原産国	❒	❒	❒

42. Have you ever heard of traceability in the food industry 42.	Yes	No

あなたは食品業界におけるトレーサビリティ（履歴追跡）についてご存知ですか。(SA)	はい 1	いいえ 2
	❒	❒

43. Please indicate the importance of the use of traceability under each of the following circumstances. トレーサビリティとは、消費者の購入時点から原産農家まで全ルートをトレース（履歴を追跡）できるようにすることです。 43. 以下のそれぞれの場合において、トレーサビリティを利用することはどの程度重要だと思いますか。(SA)				
	Very important 非常に重要である	Somewhat important やや重要である	Somewhat unimportant あまり重要でない	Not important at all 全く重要でない
1. To withdraw products should they prove to be dangerous 危険性があるとわかった場合に、製品を回収するため	❒	❒	❒	❒
2. To offer reassurance as to the quality of products that people purchase 製品の品質について、購入者に安心感を与えるため	❒	❒	❒	❒
3. To provide information about every stage of the manufacturing process 全ての製造過程に関する情報を提供するため	❒	❒	❒	❒
4. To provide better information on product ingredients 製品の原材料に関する情報を提供するため	❒	❒	❒	❒
5. To fight counterfeiting 偽造を防ぐため	❒	❒	❒	❒
6. To offer guarantees as to sustainable development サステイナビリティ（持続可能な開発）を保証するため	❒	❒	❒	❒
7. To help people in choosing "healthy" products 消費者が“健康に良い”製品を	❒	❒	❒	❒

選ぶのに役立てるため				
8. To provide specific information for "at risk" individuals (weakened immune system, for example) 健康リスクのある人（免疫系が低下しているなど）に特別な情報を提供するため	❒	❒	❒	❒

44. Tell me which of the following phrases you consider to be important information provided on food labels? 44. 以下のそれぞれの文章について、食品表示ラベルに記載するものとしてどの程度重要だと思いますか。(SA)					
	Very important 非常に重要である	Somewhat important やや重要である	Neutral どちらともいえない	Somewhat unimportant あまり重要でない	Not important at all 全く重要でない
1. The list of ingredients that make up a product 原材料一覧	❒	❒	❒	❒	❒
2. The list of allergens アレルギー一覧	❒	❒	❒	❒	❒
3. Information about GMOs 遺伝子組み換えに関する情報	❒	❒	❒	❒	❒
4. The country of origin of a product 原産国	❒	❒	❒	❒	❒
5. Information about dietary norms (recommended daily allowances) 食事基準に関する情報（1日当たりの推奨される摂取量など）	❒	❒	❒	❒	❒
6. The name of a product's manufacturer (the brand) メーカー名（ブランド）	❒	❒	❒	❒	❒
7. The different intermediaries involved in the manufacture of a	❒	❒	❒	❒	❒

product 製品の製造に関わる様々な中間業者					
8. The path of the product through the supply chain サプライ・チェーンにおける製品の流通経路	❒	❒	❒	❒	❒

45. For you, who should guarantee the traceability of a product?
45.
あなたは、製品のトレーサビリティは誰（どこ）が保証すべきだと思いますか。(SA)

	Manufacturers メーカー 1	Government 政府 2	Consumer associations 消費者団体 3	Scientists 科学者 4	Media マスメディア 5
	❒	❒	❒	❒	❒

46. If you had a problem with a product, who would you hold responsible? More than one may apply
46. 製品に問題があった場合、誰に責任があると思いますか。(SA)

	Restaurant レストラン 1	Manufacturer メーカー 2	Government 政府 3	Retailer 小売業者 4
	❒	❒	❒	❒

47. By which of the following ways, may humans get mad cow disease? (Check all that apply)
47.
以下のそれぞれの項目の中で、人間が狂牛病にかかるおそれがあると思うものはどれですか。当てはまるものを全てお選び下さい。(MA)

1. Touching the contagious meat ❒
   狂牛病に感染している肉に触る
2. Eating beef steak ❒
   牛肉のステーキを食べる
3. Blood transfusions from people who have variant Creutzfeldt-Jakob disease ❒
   狂牛病に感染している人から輸血を受ける
4. Drinking milk ❒
   牛乳を飲む
5. Eating beef brain ❒
   牛の脳を食べる
6. None of the above ❒

どれも当てはまると思わない

48. How has your consumption of beef changed since you first heard about BSE?
48. あなたが初めてBSEについて知ってから、牛肉の消費量は変わりましたか。(SA)

Increased dramatically 非常に増えた	Increased slightly 少し増えた	Remained the same 以前と変わらな	Decreased slightly 少し減った	Decreased dramatically 非常に減った
1 ❒	2 ❒	3 ❒	4 ❒	5 ❒

※48の回答が1 or 2 or 3 だった場合 → 49をスキップして終了

4 or 5 だった場合 → 49へ

49. If you are not consuming conventional beef, what are you substituting? (Check all that apply)
49.
以下の中から、これまでの牛肉を消費しない代わりに、現在あなたが消費しているものをお選びください。当てはまるものを全てお選び下さい。(MA)

❒ 1. Seafood
魚介類
❒ 2. Pork
豚肉
❒ 3. Chicken
鶏肉
❒ 4. Lamb
ラム肉、子羊肉
❒ 5. Organic beef
無農薬の草（粗飼料）で育てられた牛の肉
❒ 6. Grass-fed beef
草（粗飼料）で育てられた牛の肉
❒ 7. Other _____
その他_____

APPENDIX C: THE NFP FROM SURVEY RESPONSES IN JAPAN

Table C. 1 Factors That Affect the Purchase of Beef- Japan 2009

When you buy beef, how important are the following factors to you?				
	Very important	**Somewhat important**	**Not Important**	**NFP**
BSE or Mad cow disease	38.56	55.82	5.62	32.94
Product Freshness (i.e., "Sell by Date" in U.S.; "Packaged on Date" in Canada; "Best Before" Date in Japan)	31.91	63.09	5.00	26.91
Country of Origin of Product	29.12	65.00	5.88	23.25
Price	23.92	68.81	7.27	16.65
Antibiotics in food	25.46	65.05	9.48	15.98
Product Flavor	22.63	70.41	6.96	15.67
Product Labeled Natural	23.81	67.89	8.30	15.52
Food borne disease	24.33	65.62	10.05	14.28
Product Color	20.31	69.95	9.74	10.57
Product Juiciness	19.74	69.85	10.41	9.33
Product Tenderness	18.45	72.01	9.54	8.92
Hormones in food	22.53	62.27	15.21	7.32
Traceability of Product to Farm	16.60	71.55	11.86	4.74
Product Labeled Organic	14.69	67.73	17.58	-2.89
Product Nutritional Information	11.80	68.81	19.38	-7.58
Product Preparation Ease	11.29	61.03	27.68	-16.39
Product Leanness (fat)	6.96	67.63	25.41	-18.45
Product Preparation Time	10.46	57.37	32.16	-21.70

Table C. 2 Importance of Traceability- Japan 2009

Please indicate the importance of the use of traceability under each of the following circumstances					
	Very important	**Somewhat important**	**Somewhat unimportant**	**Not important at all**	**NFP**
To withdraw products should they prove to be dangerous	58.97	36.70	3.92	0.41	58.56
To fight counterfeiting	52.01	41.29	5.82	0.88	51.13
To provide better information on product ingredients	40.46	52.78	5.82	0.46	40.00

To provide information about every stage of the manufacturing process	40.46	51.96	7.01	0.57	39.90
To offer reassurance as to the quality of products that people purchase	39.74	53.09	6.49	0.67	39.07
To provide specific information for "at risk" individuals (weakened immune system, for example)	36.70	51.34	10.93	1.03	35.67
To help people in choosing "healthy" products	32.89	53.51	12.22	1.39	31.49
To offer guarantees as to sustainable development	28.97	53.30	16.34	1.39	27.58

Table C. 3 Perceptions of the Level of Food Safety of Beef by Country of Origin- Japan 2009

Whether you have ever knowingly purchased beef produced in another country or not, what is your perceptions of the level of food safety of beef by country of origin?							
Your Perceived Level of Food Safety	**Very Low**	**Low**	**Moderate**	**High**	**Very High**	**No Opinion**	**NFP**
Japan	0.4	1.3	18.2	47.2	30.7	2.2	76.2
Australia	1.6	6.2	41.5	40.4	7.1	3.2	39.7
Canada	3.3	12.8	58.1	17.6	1.0	7.1	2.5
Brazil	5.4	22.5	55.4	6.5	0.5	9.7	-20.8
USA	10.8	27.5	48.9	8.6	0.5	3.8	-29.3
Unknown Country	41.5	36.2	17.7	0.8	0.4	3.4	-76.5

Table C. 4 Information on Food Labels- Japan 2009

Tell me which of the following phrases you consider to be important information provided on food labels?	Very important	Somewhat important	Neutral	Somewhat unimportant	Not important at all	NFP
The list of ingredients that make up a product	48.04	41.34	9.69	0.72	0.21	88.45
The country of origin of a product	51.55	34.95	12.22	1.08	0.21	85.21
The list of allergens	44.18	38.66	14.43	2.42	0.31	80.11
Information about GMOs	37.42	41.24	17.53	3.2	0.62	74.84
The different intermediaries involved in the manufacture of a product	18.4	40.26	34.12	6.24	0.98	51.44
The path of the product through the supply chain	17.89	39.9	35.57	5.57	1.08	51.14
The name of a product's manufacturer (the brand)	17.68	39.54	33.4	8.09	1.29	47.84
Information about dietary norms (recommended daily allowances)	15.62	38.92	34.38	9.28	1.8	43.46

APPENDIX D: THE NFP FROM SURVEY RESPONSES IN CANADA

Table D. 1 Factors That Affect the Purchase of Beef- Canada 2009

When you buy beef, how important are the following factors to you?					
	Very important	**Somewhat important**	**3**	**Not Important**	**NFP**
Product Freshness (i.e., "Sell by Date" in U.S.; "Packaged on Date" in Canada; "Best Before" Date in Japan)	88.0%	11.3%	0.1%	0.6%	87.40
Product Flavor	80.8%	17.8%	0.5%	0.9%	79.90
Product Tenderness	77.3%	21.0%	0.4%	1.3%	76.00
Food borne disease	72.0%	21.5%	2.2%	4.3%	67.70
Product Juiciness	68.5%	27.7%	1.7%	2.0%	66.50
BSE or Mad cow disease	67.9%	22.6%	1.6%	7.9%	60.00
Product Color	57.2%	37.5%	1.6%	3.8%	53.40
The use of hormones in livestock production	60.0%	31.3%	1.5%	7.2%	52.80
Product Leanness (fat)	56.5%	38.7%	0.9%	4.0%	52.50
Country of Origin of Product	58.2%	34.7%	1.2%	5.9%	52.30
The use of antibiotics in livestock production	58.3%	32.9%	1.6%	7.2%	51.10
Price	48.7%	45.7%	1.9%	3.6%	45.10
Traceability of Product Back to Farm	51.0%	39.6%	2.2%	7.2%	43.80
Product Nutritional Information	48.2%	43.9%	1.2%	6.7%	41.50
Product Preparation Ease	34.6%	49.5%	4.5%	11.4%	23.20
Product Preparation Time	29.1%	53.3%	4.7%	12.9%	16.20
Product Labeled Natural	32.7%	47.1%	4.1%	16.0%	16.70
Product Labeled Organic	29.6%	43.4%	4.5%	22.4%	7.20

Table D. 2 Importance of Traceability - Canada 2009

Please indicate the importance of the use of traceability under each of the following circumstances					
	Very important	**Somewhat important**	**Somewhat unimportant**	**Not important at all**	**NFP**
To withdraw products should they prove to be dangerous	88.5%	8.8%	1.9%	0.8%	87.7
To offer reassurance as to the quality of products that people purchase	64.6%	30.3%	4.1%	1.0%	63.6
To provide specific information for "at risk" individuals (weakened immune system, for example)	61.2%	30.8%	6.6%	1.3%	59.9
To provide better information on product ingredients	58.6%	333.7%	6.5%	1.2%	57.4
To fight counterfeiting	53.6%	31.1%	12.3%	3.0%	50.6
To offer guarantees as to food being produced using environmentally sustainable production methods	52.3%	34.8%	10.0%	2.9%	49.4
To provide information about every stage of the manufacturing process	50.7%	36.1%	12.0%	1.2%	49.5
To help people in choosing "healthy" products	50.7%	37.2%	10.0%	2.1%	48.6

Table D. 3 Perceptions of the Level of Food Safety of Beef by Country of Origin- Canada 2009

Whether you have ever knowingly purchased beef produced in another country or not, what is your perceptions of the level of food safety of beef by country of origin?							
Your Perceived Level of Food Safety	**Very Low**	**Low**	**Moderate**	**High**	**Very High**	**No Opinion**	**NFP**
Canada	5.8%	4.3%	12.1%	31.7%	29.3%	6.8%	50.9
New Zealand	3.8%	6.9%	24.7%	29.2%	13.9%	21.4%	32.4
USA	5.2%	9.2%	28.1%	29.5%	15.7%	12.4%	30.8
Australia	3.6%	6.9%	27.8%	28.1%	12.0%	21.4%	29.6
Brazil	7.3%	17.2%	33.2%	12.8%	4.9%	24.6%	-6.8
Unknown Country of Origin	24.5%	22.1%	18.3%	7.0%	5.5%	22.7%	-34.1

Table D. 4 Information on Food Labels- Canada 2009

Tell me which of the following phrases you consider to be important information provided on food labels?	Very important	Somewhat important	Neutral	Somewhat unimportant	Not important at all	NFP
The list of ingredients that make up a product	83.7%	13.8%	1.0%	1.5%	0.1%	95.9
The country of origin of a product	61.0%	30.8%	1.2%	6.3%	0.7%	84.8
The list of allergens	59.1%	29.3%	2.0%	8.4%	1.2%	78.8
Information about GMOs	53.7%	34.4%	2.1%	8.4%	1.5%	78.2
The different intermediaries involved in the manufacture of a product	54.4%	32.2%	20.0%	8.6%	2.9%	75.1
The path of the product through the supply chain	44.2%	40.2%	3.1%	10.9%	1.6%	71.9
The name of a product's manufacturer (the brand)	35.9%	43.4%	3.9%	14.5%	2.3%	62.5
Information about dietary norms (recommended daily allowances)	83.7%	13.8%	1.0%	1.5%	0.1%	95.9

APPENDIX E: RESULTS OF MULTINOMIAL LOGIT MODEL FOR JAPAN 2009

Table E. 1 Multinomial model- Japan 2009

Number of observations = 26466 Log likelihood = -22235.8 Schwarz B.I.C. = 22510.8
Number of Choices = 79398

Parameter	Estimate	Standard Error	t-statistic	P-value
PR	-1.66E-03	3.11E-05	-53.3974	[.000]
JANON	1.96796	0.257234	7.65046	[.000]
USNON	1.48388	0.366147	4.05269	[.000]
CDNON	1.55204	0.346632	4.47749	[.000]
CDTR	2.08684	0.276031	7.56017	[.000]
CDAT	2.43072	0.254767	9.54095	[.000]
CDTAT	2.86482	0.244803	11.7025	[.000]
JATR	3.17856	0.25597	12.4177	[.000]
JAAT	3.17562	0.257596	12.3279	[.000]
JATAT	3.33419	0.263745	12.6417	[.000]
USTR	1.73651	0.301904	5.75187	[.000]
USAT	2.68202	0.270069	9.93089	[.000]
USTAT	2.89267	0.252657	11.449	[.000]
NA	-0.032706	0.142249	-0.229922	[.818]
AST	0.504173	0.135958	3.70831	[.000]
AGEJ	-0.012917	0.029403	-0.439329	[.660]
AGEU	-0.236116	0.043632	-5.41155	[.000]
AGEC	-0.15483	0.040806	-3.79428	[.000]
AGENA	0.026263	0.016558	1.58617	[.113]
AGEAST	0.019369	0.015876	1.21996	[.222]
AGEJATR	0.018931	0.029399	0.643957	[.520]
AGEJAAT	8.93E-03	0.029728	0.300473	[.764]
AGEJATAT	0.0158	0.030491	0.518195	[.604]
AGEUSTR	-0.081611	0.035121	-2.32369	[.020]
AGEUSAT	-0.1615	0.031354	-5.15089	[.000]
AGEUSTAT	-0.170699	0.028965	-5.89329	[.000]
AGECDTR	-0.088144	0.031945	-2.75927	[.006]
AGECDAT	-0.105429	0.02948	-3.57633	[.000]
AGECDTAT	-0.068078	0.028188	-2.41513	[.016]
GENJ	-0.508304	0.079925	-6.35978	[.000]
GENU	-0.668658	0.119305	-5.60461	[.000]
GENC	-0.734138	0.113132	-6.48922	[.000]
GENNA	-0.011299	0.045311	-0.249371	[.803]
GENAST	-0.040353	0.043412	-0.929542	[.353]
GENJATR	-0.530806	0.081237	-6.53405	[.000]
GENJAAT	-0.395965	0.081438	-4.86219	[.000]
GENJATAT	-0.377789	0.084015	-4.49668	[.000]
GENUSTR	-0.676094	0.095924	-7.04824	[.000]
GENUSAT	-0.693209	0.085192	-8.137	[.000]
GENUSTAT	-0.578233	0.079978	-7.22991	[.000]
GENCDTR	-0.531945	0.087153	-6.10359	[.000]

GENCDAT	-0.511495	0.080976	-6.3166	[.000]
GENCDTAT	-0.650139	0.076692	-8.47728	[.000]
KIDSJ	0.112557	0.04292	2.62248	[.009]
KIDSU	0.167524	0.063399	2.64237	[.008]
KIDSC	0.070542	0.059185	1.19188	[.233]
KIDSNA	0.022247	0.024657	0.90226	[.367]
KIDSAST	4.60E-03	0.023324	0.197073	[.844]
KIDJATR	0.112249	0.045221	2.48222	[.013]
KIDJAAT	0.017395	0.043872	0.396488	[.692]
KIDJATAT	-0.020763	0.045806	-0.453289	[.650]
KIDUSTR	0.07622	0.054195	1.40639	[.160]
KIDUSAT	0.093898	0.046134	2.03531	[.042]
KIDUSTAT	0.147861	0.043069	3.43311	[.001]
KIDCDTR	0.082767	0.047209	1.7532	[.080]
KIDCDAT	0.094018	0.043514	2.16063	[.031]
KIDCDTAT	0.103351	0.042481	2.43285	[.015]
EDUCJ	0.08076	0.028344	2.84925	[.004]
EDUCU	0.01724	0.041946	0.411009	[.681]
EDUCC	0.027319	0.039763	0.687052	[.492]
EDUCNA	0.016094	0.016122	0.998296	[.318]
EDUCAST	-0.017595	0.015438	-1.13968	[.254]
EDUJATR	0.02453	0.028884	0.849258	[.396]
EDUJAAT	0.087849	0.028805	3.04979	[.002]
EDUJATAT	0.084657	0.029939	2.82762	[.005]
EDUUSTR	0.039895	0.033793	1.18056	[.238]
EDUUSAT	0.017538	0.03014	0.58188	[.561]
EDUUSTAT	0.014603	0.028447	0.513355	[.608]
EDUCDTR	0.033405	0.031272	1.0682	[.285]
EDUCDAT	0.023021	0.028821	0.798757	[.424]
EDUCDTAT	0.063027	0.027448	2.29625	[.022]
REGION1J	-0.149081	0.128168	-1.16317	[.245]
REGION1U	-0.04099	0.190109	-0.215613	[.829]
REGION1C	-0.323148	0.19008	-1.70006	[.089]
REGION1NA	0.014876	0.072205	0.206026	[.837]
REGION1AST	0.024387	0.069557	0.350602	[.726]
REGJATR	-0.393434	0.127787	-3.07883	[.002]
REGJAAT	-0.386525	0.128773	-3.00159	[.003]
REGJATAT	-0.170208	0.129971	-1.30958	[.190]
REGUSTR	-0.034315	0.157737	-0.217549	[.828]
REGUSAT	0.036273	0.133698	0.271304	[.786]
REGUSTAT	0.01266	0.127275	0.099471	[.921]
REGCDTR	-0.133585	0.138993	-0.96109	[.337]
REGCDAT	-0.101265	0.128787	-0.786292	[.432]
REGCDTAT	0.015447	0.12245	0.126147	[.900]
TRUSTJ	0.38602	0.079834	4.83529	[.000]
TRUSTU	0.414086	0.118839	3.48443	[.000]
TRUSTC	0.445417	0.112278	3.96709	[.000]
TRUSTNA	0.027941	0.04543	0.615044	[.539]
TRUSTAST	-0.061088	0.043528	-1.4034	[.160]
TRUSTJATR	0.41382	0.081934	5.05066	[.000]

TRUSTJAAT	0.334621	0.081909	4.08528	[.000]
TRUSTJATAT	0.489868	0.084883	5.77112	[.000]
TRUSTUSTR	0.358309	0.095901	3.73624	[.000]
TRUSTUSAT	0.470499	0.085062	5.53123	[.000]
TRUSTUSTAT	0.519857	0.07986	6.50963	[.000]
TRUSTCDTR	0.397825	0.08776	4.53312	[.000]
TRUSTCDAT	0.583624	0.081177	7.1895	[.000]
TRUSTCDTAT	0.484661	0.077268	6.27249	[.000]
EATFJ	-0.996398	0.258073	-3.86091	[.000]
EATFU	-0.176313	0.384285	-0.458808	[.646]
EATFC	-0.305144	0.337008	-0.905453	[.365]
EATFNA	0.14886	0.151829	0.980444	[.327]
EATFAST	-0.404923	0.143993	-2.81211	[.005]
EATFJATR	-0.605052	0.244508	-2.47456	[.013]
EATFJAAT	-1.43243	0.2344	-6.11105	[.000]
EATFJATAT	-1.37711	0.239306	-5.75459	[.000]
EATFUSTR	-1.73475	0.449747	-3.85718	[.000]
EATFUSAT	-1.22627	0.319531	-3.83773	[.000]
EATFUSTAT	-1.01621	0.261746	-3.88242	[.000]
EATFCDTR	-1.14957	0.292331	-3.93242	[.000]
EATFCDAT	-1.36977	0.278119	-4.92513	[.000]
EATFCDTAT	-1.43371	0.270319	-5.30378	[.000]
EATMJ	-0.103288	0.224429	-0.460225	[.645]
EATMU	0.166644	0.300289	0.554946	[.579]
EATMC	-0.164849	0.288501	-0.5714	[.568]
EATMNA	-0.143201	0.124836	-1.14711	[.251]
EATMAST	0.213202	0.120019	1.7764	[.076]
EATMJATR	-0.198281	0.229977	-0.862179	[.389]
EATMJAAT	-0.601065	0.206492	-2.91084	[.004]
EATMJATAT	-1.01697	0.226197	-4.49597	[.000]
EATMUSTR	0.485506	0.238283	2.03752	[.042]
EATMUSAT	-0.215338	0.244133	-0.882055	[.378]
EATMUSTAT	-0.033622	0.240607	-0.139738	[.889]
EATMCDTR	-0.418994	0.246019	-1.7031	[.089]
EATMCDAT	-0.47526	0.220967	-2.15082	[.031]
EATMCDTAT	-0.16488	0.207439	-0.794835	[.427]
EATNJ	-0.965707	0.477309	-2.02323	[.043]
EATNU	-1.1216	0.78385	-1.43089	[.152]
EATNC	-0.54158	0.668816	-0.809759	[.418]
EATNNA	0.114372	0.278042	0.411346	[.681]
EATNAST	-0.233369	0.277164	-0.841991	[.400]
EATNJATR	-2.2145	0.482226	-4.59225	[.000]
EATNJAAT	-2.08454	0.462069	-4.51133	[.000]
EATNJATAT	-1.42473	0.456693	-3.11966	[.002]
EATNUSTR	-2.17635	1.0533	-2.06621	[.039]
EATNUSAT	-1.98281	0.66557	-2.97911	[.003]
EATNUSTAT	-1.64535	0.506292	-3.24981	[.001]
EATNCDTR	-0.565002	0.488958	-1.15552	[.248]
EATNCDAT	-1.233	0.498474	-2.47354	[.013]
EATNCDTAT	-1.85819	0.457702	-4.05982	[.000]

Table E. 2 Correlation between Education and Income- Japan 2009

Correlations

		inc	educ
inc	Pearson Correlation	1	.076**
	Sig. (2-tailed)		.000
	N	26466	26466
educ	Pearson Correlation	.076**	1
	Sig. (2-tailed)	.000	
	N	26466	26466

**. Correlation is significant at the 0.01 level (2-tailed).

Table E. 2 Results of Parameter Analysis - Japan 2009

Results of Parameter Analysis
==========

Parameter	Estimate	Standard Error	t-statistic	P-value
WTPCDTR	787.118	25.9931	30.2818	[.000]
WTPCDAT	992.840	24.0665	41.2540	[.000]
WTPCDTAT	1330.97	23.5024	56.6312	[.000]

Wald Test for the Hypothesis that the given set of Parameters are jointly zero:

CHISQ(3) = 4123.2579 ; P-value = 0.00000

Results of Parameter Analysis
==========

Parameter	Estimate	Standard Error	t-statistic	P-value
WTPUSTR	472.291	30.5182	15.4757	[.000]
WTPUSAT	800.626	25.5222	31.3698	[.000]
WTPUSTAT	1070.06	23.8135	44.9349	[.000]

Wald Test for the Hypothesis that the given set of Parameters are jointly zero:

CHISQ(3) = 2457.9343 ; P-value = 0.00000

Results of Parameter Analysis
==========

Parameter	Estimate	Standard Error	t-statistic	P-value
WTPJATR	1720.82	27.2495	63.1506	[.000]
WTPJAAT	1861.18	28.7420	64.7546	[.000]
WTPJATAT	1996.52	29.6895	67.2467	[.000]

Wald Test for the Hypothesis that the given set of Parameters are jointly zero:

CHISQ(3) = 6631.1384 ; P-value = 0.00000

Results of Parameter Analysis
==========

Parameter	Estimate	Standard Error	t-statistic	P-value
WTPUS	-16.8831	39.6244	-.426080	[.670]
WTPCD	97.8957	36.7631	2.66288	[.008]
WTPJA	1096.96	23.7449	46.1977	[.000]
WTPNA	113.462	13.6804	8.29378	[.000]
WTPAST	255.128	13.5677	18.8041	[.000]

Wald Test for the Hypothesis that the given set of Parameters are jointly zero:

CHISQ(5) = 3982.1236 ; P-value = 0.00000

APPENDIX F: DEMOGRAPHICS QUESTIONS IN JAPAN 2009

1. In which of the following age groups do you fall?
1. 以下の中から、あなたの年齢にあてはまるものをお選び下さい。(SA)

❒ 1. 15 -19
15 ~ 19歳
❒ 2. 20 -24
20 ~ 24歳
❒ 3. 25 -29
25 ~ 29歳
❒ 4. 30 -39
30 ~ 39歳
❒ 5. 40 -49
40 ~ 49歳
❒ 6. 50 -64
50 ~ 64歳
❒ 7. 65+
65歳以上

2. Please indicate your gender.
2. あなたの性別をお選び下さい。(SA)

❒ 1. Male
男性
❒ 2. Female
女性

3. How many people live in your household?
3.
以下の中から、あなたが同居しているご家族の人数（ご自身を含む）をお選び下さい。(SA)

❒ 1. 1
1人暮らし
❒ 2. 2
2人
❒ 3. 3 +
3人以上

4. How many children younger than 18 live in your house?
4.
あなたのご家庭には、同居している18歳未満のお子様が何人いらっしゃいますか。(SA)

❒ 1. No home living children < 18 years
18歳未満の子どもは同居していない
❒ 2. 1
1人
❒ 3. 2
2人
❒ 4. 3
3人
❒ 5. 4
4人
❒ 6. 5
5人
❒ 7. More than 5
6人以上

5. What is your position in the household? **ONLY ONE ANSWER POSSIBLE**
5. あなたのご家庭内の役割を次の中からお選び下さい。(SA)

❒ 1. Head of household/main income
世帯主
❒ 2. Partner of head of household
世帯主のパートナー
❒ 3. Child
子ども
❒ 4. Other family member
それ以外の家族
❒ 5. Other person (no family)
その他（家族以外）

6. What is your marital status? **ONLY ONE ANSWER POSSIBLE**
6. 失礼ですが、あなたの現在の婚姻状況をお教え下さい。(SA)

❒ 1. Married/Living together/Common Law
既婚 / 同居 / 内縁関係
❒ 2. Single
未婚
❒ 3. Divorced/Separated
離婚 / 別居
❒ 4. Widowed
死別

7. What is the highest level of education you've achieved? **ONLY ONE ANSWER POSSIBLE**
7. 失礼ですが、あなたの最終学歴をお選び下さい。(SA)

❒ 1. Elementary school
小学校

❒ 2. Junior high school
中学校
❒ 3. High school
高等学校
❒ 4. Technical/ business school
専門学校
❒ 5. Community college
短期大学
❒ 6. University
大学
❒ 7. Post graduate studies
大学院

8. Which of the following best describes your employment status? **ONLY ONE ANSWER POSSIBLE**
8. 失礼ですが、あなたの現在の雇用状況に当てはまるものをお選び下さい。(SA)

❒ 1. Employed full-time or self-employed
フルタイム勤務もしくは自営業
❒ 2. Employed part-time
パートタイム（アルバイト）勤務
❒ 3. Homemaker
主夫 / 主婦
❒ 4. Student and full-time employed
学生でフルタイム勤務
❒ 5. Student and part-time employed
学生でパートタイム（アルバイト）勤務
❒ 6. Student only
学生
❒ 7. Retired
退職
❒ 8. Unemployed
無職
❒ 9. Other
その他

9. What is the approximate range of your total household income? **ONLY ONE ANSWER POSSIBLE**
9. 失礼ですが、あなたのご家庭の世帯年収をお教え下さい。(SA)

❒ 1. $ 24,999 or under
250万円未満
❒ 2. Between $ 25,000 and $ 39,999
250万円以上、400万円未満
❒ 3. Between $ 40,000 and $ 64,999
400万円以上、650万円未満
❒ 4. Between $ 65,000 and $ 79,999

650万円以上、800万円未満
❒ 5. Between $ 80,000 and $ 99,999

800万円以上、1,000万円未満
❒ 6. Between $ 100,000 and $ 119,999

1,000万円以上、1,200万円未満
❒ 7. $ 120,000 or more

1,200万円以上
❒ 8. Don’t know / Refuse

わからない / 回答拒否

30. Which of the following best describes your food preferences?
30.
以下のそれぞれの文章について、あなたご自身に最も当てはまると思うものをお選び下さい。(SA)

❒ 1. I eat meat and fish

私は肉も魚も食べる
❒ 2. I eat fish but don’t eat meat

私は魚は食べるが肉は食べない
❒ 3. I do eat meat but I don’t eat fish

私は肉は食べるが魚は食べない
❒ 4. I am a vegetarian (I don’t eat either meat or fish)

私はベジタリアンである（肉も魚も食べない）

APPENDIX G: MULTINOMIAL LOGIT MODEL - CANADA 2009

Number of observations = 12945 Log likelihood = -11048.6 Schwarz B.I.C. = 11782.4 Number of Choices = 3883

Table G. 1 Multinomial model - Canada 2009

Parameter	Estimate	Error	t-statistic	P-value
PR	-0.142142	4.15E-03	-34.2463	[.000]
CDNON	1.87515	0.278843	6.72475	[.000]
USNON	0.7407	0.363051	2.04021	[.041]
AUSNON	0.836233	0.365269	2.28936	[.022]
CDTR	2.31725	0.274551	8.44011	[.000]
CDAT	2.4832	0.274194	9.05637	[.000]
CDTAT	2.5762	0.27722	9.29296	[.000]
AUSTR	1.47866	0.299166	4.9426	[.000]
AUSAT	1.48411	0.286491	5.1803	[.000]
AUSTAT	2.0385	0.269008	7.57784	[.000]
USTR	1.57011	0.29238	5.3701	[.000]
USAT	2.09221	0.281279	7.43821	[.000]
USTAT	2.02499	0.273926	7.39247	[.000]
NA	0.53248	0.15116	3.52263	[.000]
AST	0.504898	0.145719	3.46487	[.001]
AGEC	-0.023837	4.35E-03	-5.47443	[.000]
AGEU	-0.02918	5.91E-03	-4.93372	[.000]
AGEA	-0.030582	5.84E-03	-5.23835	[.000]
AGENA	-7.56E-03	2.39E-03	-3.15739	[.002]
AGEAST	2.97E-03	2.29E-03	1.29409	[.196]
AGEAUSTR	-0.026813	4.72E-03	-5.68526	[.000]
AGEAUSAT	-0.023219	4.45E-03	-5.21272	[.000]
AGEAUSTAT	-0.025604	4.27E-03	-6.00122	[.000]
AGEUSTR	-0.017378	4.56E-03	-3.80912	[.000]
AGEUSAT	-0.031565	4.41E-03	-7.15655	[.000]
AGEUSTAT	-0.018847	4.23E-03	-4.45197	[.000]
AGECDTR	-9.80E-03	4.25E-03	-2.30948	[.021]
AGECDAT	-0.013289	4.20E-03	-3.162	[.002]
AGECDTAT	-0.01112	4.28E-03	-2.5958	[.009]
GENC	0.529625	0.116391	4.55041	[.000]
GENU	0.853622	0.162298	5.25959	[.000]
GENA	0.608317	0.159244	3.82004	[.000]
GENNA	-0.154855	0.06385	-2.42529	[.015]
GENAST	0.092575	0.061773	1.49863	[.134]
GENAUSTR	0.561492	0.125271	4.48222	[.000]
GENAUSAT	0.576841	0.118311	4.87563	[.000]
GENAUSTAT	0.740117	0.112652	6.56996	[.000]
GENUSTR	0.807141	0.122944	6.56513	[.000]
GENUSAT	0.784352	0.117888	6.65335	[.000]
GENUSTAT	0.57939	0.113428	5.10801	[.000]
GENCDTR	0.382148	0.11359	3.36427	[.001]
GENCDAT	0.425018	0.113592	3.7416	[.000]

GENCDTAT	0.388626	0.114705	3.38804	[.001]
KIDSC	0.373382	0.126161	2.95956	[.003]
KIDSU	0.529412	0.167465	3.16133	[.002]
KIDSA	0.279732	0.166684	1.67822	[.093]
KIDSNA	-0.125344	0.069001	-1.81657	[.069]
KIDSAST	-0.050658	0.066772	-0.758676	[.448]
KIDAUSTR	0.348569	0.136668	2.55049	[.011]
KIDAUSAT	0.303287	0.128737	2.35586	[.018]
KIDAUSTAT	0.288575	0.122715	2.35159	[.019]
KIDUSTR	0.141389	0.133832	1.05647	[.291]
KIDUSAT	0.41198	0.126703	3.25155	[.001]
KIDUSTAT	0.039715	0.123697	0.321068	[.748]
KIDCDTR	0.070311	0.123044	0.571428	[.568]
KIDCDAT	0.238681	0.125324	1.90452	[.057]
KIDCDTAT	0.326334	0.125709	2.59596	[.009]
EDUCC	-0.120503	0.145057	-0.830732	[.406]
EDUCU	-0.187763	0.187363	-1.00213	[.316]
EDUCA	0.048503	0.199725	0.242849	[.808]
EDUCNA	0.032149	0.07822	0.411007	[.681]
EDUCAST	-0.044563	0.075867	-0.587375	[.557]
EDUAUSTR	-0.050187	0.152658	-0.328756	[.742]
EDUAUSAT	-0.014705	0.147186	-0.099905	[.920]
EDUAUSTAT	5.82E-03	0.135663	0.042884	[.966]
EDUUSTR	-0.191668	0.145974	-1.31303	[.189]
EDUUSAT	-0.367607	0.143628	-2.55944	[.010]
EDUUSTAT	0.019233	0.138926	0.138442	[.890]
EDUCDTR	0.1584	0.138558	1.14321	[.253]
EDUCDAT	-1.79E-03	0.137725	-0.012976	[.990]
EDUCDTAT	0.076466	0.140279	0.545095	[.586]
REGION1C	0.043222	0.124315	0.347678	[.728]
REGION1U	-0.062311	0.168531	-0.369728	[.712]
REGION1A	-0.035726	0.169809	-0.210388	[.833]
REGION1NA	-0.045876	0.067881	-0.675825	[.499]
REGION1AST	0.031866	0.065787	0.484378	[.628]
REGAUSTR	0.107797	0.131373	0.820545	[.412]
REGAUSAT	0.031428	0.126188	0.249056	[.803]
REGAUSTAT	0.181417	0.119341	1.52016	[.128]
REGUSTR	-0.078142	0.129635	-0.602786	[.547]
REGUSAT	0.240773	0.125116	1.9244	[.054]
REGUSTAT	0.019673	0.121751	0.161582	[.872]
REGCDTR	0.178217	0.12202	1.46056	[.144]
REGCDAT	0.111865	0.122	0.916923	[.359]
REGCDTAT	0.168767	0.121261	1.39177	[.164]
TRUSTC	0.286103	0.118666	2.41099	[.016]
TRUSTU	0.424093	0.161462	2.62658	[.009]
TRUSTA	0.179861	0.160682	1.11936	[.263]
TRUSTNA	0.079552	0.065116	1.22169	[.222]
TRUSTAST	-0.022861	0.063061	-0.362524	[.717]

TRUSTAUSTR	0.596969	0.129592	4.60651	[.000]
TRUSTAUSAT	0.481311	0.121557	3.95955	[.000]
TRUSTAUSTAT	0.246882	0.115366	2.14	[.032]
TRUSTUSTR	0.42966	0.125157	3.43297	[.001]
TRUSTUSAT	0.586093	0.12012	4.87922	[.000]
TRUSTUSTAT	0.315985	0.113942	2.7732	[.006]
TRUSTCDTR	0.278414	0.115628	2.40785	[.016]
TRUSTCDAT	0.43629	0.115687	3.7713	[.000]
TRUSTCDTAT	0.428845	0.117349	3.65446	[.000]
EATFC	-1.42085	0.385854	-3.68236	[.000]
EATFU	-3.10573	1.06467	-2.91707	[.004]
EATFA	-3.32364	1.05167	-3.16033	[.002]
EATFNA	0.439665	0.249989	1.75874	[.079]
EATFAST	-0.045037	0.242431	-0.185773	[.853]
EATFAUSTR	-3.39869	0.77537	-4.38331	[.000]
EATFAUSAT	-2.40556	0.508061	-4.73478	[.000]
EATFAUSTAT	-3.58257	0.588903	-6.08346	[.000]
EATFUSTR	-2.5461	0.548677	-4.64043	[.000]
EATFUSAT	-1.68008	0.412828	-4.06968	[.000]
EATFUSTAT	-2.60688	0.479443	-5.4373	[.000]
EATFCDTR	-1.47123	0.348995	-4.21562	[.000]
EATFCDAT	-2.91005	0.407309	-7.14457	[.000]
EATFCDTAT	-2.58151	0.367405	-7.02633	[.000]
EATMC	-0.230527	0.173099	-1.33176	[.183]
EATMU	0.075171	0.234602	0.320417	[.749]
EATMA	0.045499	0.230075	0.197759	[.843]
EATMNA	0.014851	0.096044	0.154629	[.877]
EATMAST	-0.123989	0.092378	-1.3422	[.180]
EATMAUSTR	-0.236076	0.191309	-1.234	[.217]
EATMAUSAT	0.181736	0.176895	1.02737	[.304]
EATMAUSTAT	-0.071877	0.173255	-0.414861	[.678]
EATMUSTR	0.259026	0.176976	1.46362	[.143]
EATMUSAT	-0.270173	0.178956	-1.50972	[.131]
EATMUSTAT	-5.35E-04	0.164133	-3.26E-03	[.997]
EATMCDTR	0.247799	0.174393	1.42093	[.155]
EATMCDAT	0.164432	0.173061	0.95014	[.342]
EATMCDTAT	0.170329	0.175849	0.968605	[.333]
EATNC	-3.15862	0.797424	-3.96103	[.000]
EATNU	-1.53684	0.82013	-1.8739	[.061]
EATNA	-1.91361	0.776403	-2.46471	[.014]
EATNNA	0.290525	0.322329	0.901332	[.367]
EATNAST	-0.851093	0.309543	-2.74951	[.006]
EATNAUSTR	-1.12873	0.561133	-2.01151	[.044]
EATNAUSAT	-1.96298	0.564747	-3.47586	[.001]
EATNAUSTAT	-2.43111	0.607279	-4.00328	[.000]
EATNUSTR	-1.12569	0.525183	-2.14342	[.032]
EATNUSAT	-2.20543	0.539301	-4.08943	[.000]
EATNUSTAT	-2.89867	0.790713	-3.66589	[.000]

EATNCDTR	-3.05596	0.518049	-5.89898	[.000]
EATNCDAT	-2.9856	0.597538	-4.9965	[.000]
EATNCDTAT	-2.59265	0.52408	-4.94705	[.000]
ENGFRNA	0.02835	0.078783	0.359851	[.719]
ENGFRAST	0.209684	0.07636	2.746	[.006]
ENGFRAUSTR	0.207643	0.159735	1.29992	[.194]
ENGFRAUSAT	0.120446	0.143217	0.841	[.400]
ENGFRAUSTAT	-0.122941	0.141784	-0.867097	[.386]
ENGFRUSTR	0.188767	0.157051	1.20195	[.229]
ENGFRUSAT	0.131205	0.14886	0.8814	[.378]
ENGFRUSTAT	0.04888	0.136671	0.357646	[.721]
ENGFRCDTR	0.147825	0.138221	1.06948	[.285]
ENGFRCDAT	0.269406	0.140575	1.91645	[.055]
ENGFRCDTAT	0.233596	0.142429	1.64009	[.101]
ENGFRA	-0.032246	0.188405	-0.171151	[.864]
ENGFRU	-0.189452	0.205251	-0.923026	[.356]
ENGFRC	0.198573	0.144764	1.3717	[.170]

Table G. 2 Correlation between Education and Income- Canada 2009

Correlations

		income	ed
income	Pearson Correlation	1	.298**
	Sig. (2-tailed)		.000
	N	948	948
ed	Pearson Correlation	.298**	1
	Sig. (2-tailed)	.000	
	N	948	948

**. Correlation is significant at the 0.01 level (2-tailed).

Table G. 3 Results of Parameter Analysis - Canada 2009

Results of Parameter Analysis

Parameter	Estimate	Standard Error	t-statistic	P-value
WTPCDTR	17.4052	.439445	39.6073	[.000]
WTPCDAT	17.2305	.447635	38.4923	[.000]
WTPCDTAT	19.3402	.464657	41.6226	[.000]

Wald Test for the Hypothesis that the given set of Parameters are jointly zero:

CHISQ(3) = 2586.1536 ; P-value = 0.00000

Results of Parameter Analysis

==========

Parameter	Estimate	Standard Error	t-statistic	P-value
WTPUSTR	9.05658	.431829	20.9726	[.000]
WTPUSAT	9.36836	.410491	22.8223	[.000]

WTPUSTAT	11.2755	.398652	28.2840	[.000]

Wald Test for the Hypothesis that the given set of Parameters are jointly zero:

CHISQ(3) = 1199.5440 ; P-value = 0.00000

Results of Parameter Analysis
==========

Parameter	Estimate	Standard Error	t-statistic	P-value
WTPAUSTR	6.65553	.461523	14.4208	[.000]
WTPAUSAT	7.52450	.419683	17.9290	[.000]
WTPAUSTAT	10.3949	.400896	25.9292	[.000]

Wald Test for the Hypothesis that the given set of Parameters are jointly zero:

CHISQ(3) = 849.91104 ; P-value = 0.00000

Results of Parameter Analysis
==========

Parameter	Estimate	Standard Error	t-statistic	P-value
WTPUS	-.265215	.645830	-.410657	[.681]
WTPAUS	-.840154	.654249	-1.28415	[.199]
WTPCD	8.32659	.461010	18.0616	[.000]
WTPNA	.930731	.225431	4.12867	[.000]
WTPAST	4.65447	.247975	18.7699	[.000]

Wald Test for the Hypothesis that the given set of Parameters are jointly zero:

CHISQ(5) = 1140.0089 ; P-value = 0.00000

APPENDIX H: LCM - JAPAN 2009

Table H. 1 Parameters for 3 classes

Model for Choices								
		Class1	**Class2**	**Class3**	**Overall**			
R^2		0.4081	0.345	0.088	0.4942			
$R^2(0)$		0.5226	0.3575	0.7005	0.5026			
Attributes		**Class1**	**Class2**	**Class3**	**Wald**	**P-value**	**Mean**	**Studded.**
Price								
		-0.0024	-0.0014	-2.60E-03	2.85E+03	1.9e-617	-0.0021	0.0005
ast								
	0	0	0	0.00E+00	3.65E+02	9.00E-79	0	0
	1	0.4378	0.5464	0.4398			0.4727	0.0504
Japtr								
	0	0	0	0.00E+00	2.81E+03	4.0e-610	0	0
	1	5.4481	2.3579	3.37E-01			3.9406	1.8549
Japat								
	0	0	0	0.00E+00	3220.402	2.3e-698	0	0
	1	5.9175	2.6054	-3.26E-01			4.2235	2.1472
Japtat								
	0	0	0	0.00E+00	3288.615	3.5e-713	0	0
	1	6.0655	2.8991	0.3991			4.477	1.9882
Cdtr								
	0	0	0	0.00E+00	1.49E+03	1.1e-322	0	0
	1	4.1626	-0.2941	-3.0771			2.0019	2.6492
Cdat								
	0	0	0	0.00E+00	1.93E+03	1.1e-418	0	0
	1	4.6601	0.0311	-0.9639			2.6095	2.4205
Cdtat								
	0	0	0	0.00E+00	2.48E+03	5.9e-537	0	0
	1	5.356	0.5576	-1.21E+00			3.1556	2.6264
UStr								
	0	0	0	0.00E+00	1.11E+03	1.00E-239	0	0
	1	3.4975	-1.0915	-1.224			1.5518	2.2819
USat								
	0	0	0	0	1875.827	1.6e-406	0	0
	1	4.2667	-0.7782	-7.35E-01			2.1469	2.4857
UStat								
	0	0	0	0.00E+00	2123.461	2.9e-460	0	0
	1	4.9478	-0.2408	-1.34E+00			2.6508	2.7108
Japnon								
	0	0	0	0.00E+00	1624.1	6.9e-352	0	0
	1	4.4916	0.8849	-0.6378			2.8175	2.0083
Cannon								
	0	0	0	0	831.1178	7.70E-180	0	0
	1	3.0276	-2.1429	-1.82E+00			0.8835	2.5158
USnon								
	0	0	0	0.00E+00	6.17E+02	1.70E-133	0	0
	1	2.3614	-2.2153	-1.7593			0.481	2.2087

na								
	0	0	0	0.00E+00	1.16E+02	4.60E-25	0	0
	1	0.3283	0.1816	0.1511			0.2634	0.0765

Model for Classes					
Intercept	**Class1**	**Class2**	**Class3**	**Wald**	**P-value**
	0	-1.5081	3.02E-01	11.9901	0.0025

Covariates	**Class1**	**Class2**	**Class3**	**Wald**	**Pvalue**
age					
	0	0.0159	-1.70E-03	13.763	0.001
gender					
0	0	0	0.00E+00	47.2955	5.40E-11
1	0	-0.6618	-0.7457		
people					
	0	0.1118	-0.2754	7.8567	0.02
kids					
0	0	0	0	7.6462	0.022
1	0	0.3553	-1.42E-02		
educ					
0	0	0	0.00E+00	0.6579	0.72
1	0	0.0115	-0.1339		
region					
0	0	0	0	3.8292	0.15
1	0	-0.1108	-0.3179		
trust					
0	0	0	0.00E+00	23.3526	8.50E-06
1	0	-0.465	-0.562		
eatmf					
0	0	0	0.00E+00	4.3708	0.11
1	0	0.3253	-0.5906		
eatf					
0	0	0	0	9.759	0.0076
1	0	1.0644	1.5971		
eatn					
0	0	0	0	4.2547	0.12
1	0	0.6129	1.4843		

Table H. 2 Profile for 3 classes – Japan 2009

		Class1	**Class2**	**Class3**
Class Size		0.579	0.3189	0.1021
Attributes				
Price				
	0	0.6648	0.4815	0.6993
	528	0.1915	0.2297	0.1798
	865	0.0865	0.1433	0.0755
	1200	0.0393	0.0896	0.0319
	1536	0.0178	0.0559	0.0134
Mean		250.474	438.6668	219.2188

ast				
	0	0.3923	0.3667	0.3918
	1	0.6077	0.6333	0.6082
Japtr				
	0	0.0043	0.0864	0.4165
	1	0.9957	0.9136	0.5835
Japat				
	0	0.0027	0.0688	0.5809
	1	0.9973	0.9312	0.4191
Japtat				
	0	0.0023	0.0522	0.4015
	1	0.9977	0.9478	0.5985
Cdtr				
	0	0.0153	0.573	0.9559
	1	0.9847	0.427	0.0441
Cdat				
	0	0.0094	0.4922	0.7239
	1	0.9906	0.5078	0.2761
Cdtat				
	0	0.0047	0.3641	0.7695
	1	0.9953	0.6359	0.2305
UStr				
	0	0.0294	0.7487	0.7728
	1	0.9706	0.2513	0.2272
USat				
	0	0.0138	0.6853	0.676
	1	0.9862	0.3147	0.324
UStat				
	0	0.007	0.5599	0.7926
	1	0.993	0.4401	0.2074
Japnon				
	0	0.0111	0.2922	0.6543
	1	0.9889	0.7078	0.3457
Cannon				
	0	0.0462	0.895	0.8606
	1	0.9538	0.105	0.1394
USnon				
	0	0.0862	0.9016	0.8531
	1	0.9138	0.0984	0.1469
na				
	0	0.4187	0.4547	0.4623
	1	0.5813	0.5453	0.5377
Covariates				
age				
	22	0.1608	0.0989	0.1777
	27	0.1172	0.1217	0.1163
	35	0.2548	0.2495	0.2747
	45	0.2248	0.2068	0.2094
	57	0.2423	0.3231	0.2218
Mean		39.551	41.9172	38.7333

gender				
	0	0.4273	0.5936	0.6149
	1	0.5727	0.4064	0.3851
people				
	1	0.1506	0.1101	0.2359
	2	0.1882	0.2564	0.1869
	3	0.6613	0.6335	0.5772
Mean		2.5107	2.5233	2.3412
kids				
	0	0.3753	0.3122	0.3248
	1	0.6247	0.6878	0.6752
educ				
	0	0.3188	0.3466	0.3763
	1	0.6812	0.6534	0.6237
region				
	0	0.4217	0.4461	0.5221
	1	0.5783	0.5539	0.4779
trust				
	0	0.5096	0.6222	0.6647
	1	0.4904	0.3778	0.3353
eatmf				
	0	0.0491	0.0538	0.1845
	1	0.9509	0.9462	0.8155
eatf				
	0	0.9885	0.9734	0.906
	1	0.0115	0.0266	0.094
eatn				
	0	0.9958	0.9947	0.9646
	1	0.0042	0.0053	0.0354

APPENDIX I: LCM -CANADA 2009

Table I. 1 Parameters for 2 Classes – Canada 2009

Model for Choices						
	Class1	**Class2**	**Overall**			
R^2	0.2972	0.2001	0.364			
$R^2(0)$	0.4121	0.2834	0.3713			
Attributes	**Class1**	**Class2**	**Wald**	**p-value**	**Mean**	**Std.Dev.**
Price						
	-0.1765	-0.12	1198.826	4.80E-261	-0.1535	0.0277
na						
0	0	0	18.4256	1.00E-04	0	0
1	0.1566	0.1213			0.1422	0.0173
ast						
0	0	0	511.3718	9.10E-112	0	0
1	0.7404	0.7427			0.7413	0.0011
austr						
0	0	0	718.7195	8.60E-157	0	0
1	3.0194	-1.0945			1.3437	2.0213
ausat						
0	0	0	863.8398	2.60E-188	0	0
1	3.1909	-1.0693			1.4556	2.0932
austat						
0	0	0	1114.565	9.40E-243	0	0
1	3.7874	-0.7391			1.9436	2.224
ustr						
0	0	0	763.2658	1.80E-166	0	0
1	3.3278	-0.3488			1.8302	1.8064
usat						
0	0	0	913.4264	4.50E-199	0	0
1	3.4872	-0.6702			1.7938	2.0427
ustat						
0	0	0	1014.677	4.60E-221	0	0
1	3.7226	-0.2823			2.0913	1.9678
cannon						
0	0	0	697.3109	3.80E-152	0	0
1	3.1108	-0.2972			1.7226	1.6745
Cantr						
0	0	0	1343.264	2.10E-292	0	0

1	4.2472	1.2181			3.0133	1.4883
Canat						
0	0	0	1388.723	2.80E-302	0	0
1	4.4102	0.9838			3.0145	1.6835
Cantat						
0	0	0	1509.133	2.0e-328	0	0
1	4.6339	1.3793			3.3082	1.5991
ausnon						
0	0	0	329.6381	2.60E-72	0	0
1	1.8321	-2.1282			0.219	1.9458
usnon						
0	0	0	342.4349	4.40E-75	0	0
1	1.9296	-2.1509			0.2674	2.0049
Model for Classes						
Intercept	**Class1**	**Class2**	**Wald**	**p-value**		
	0	-1.0178	4.894	0.027		
Covariates	**Class1**	**Class2**	**Wald**	**p-value**		
age						
	0	0.0306	28.1553	1.10E-07		
gender						
0	0	0	21.6838	3.20E-06		
1	0	-0.6914				
HH						
	0	-0.087	0.4706	0.49		
child						
0	0	0	0.6144	0.43		
1	0	-0.1618				
Edu						
0	0	0	0.2018	0.65		
1	0	0.0819				
region						
0	0	0	1.5304	0.22		
1	0	0.1937				
trust						
0	0	0	11.7066	0.00062		
1	0	-0.5187				
MF						
0	0	0	0.1507	0.7		
1	0	-0.0864				
F						
0	0	0	11.8061	0.00059		
1	0	2.0761				

Veg						
0	0	0	9.5567	0.002		
1	0	2.3096				

Table I. 2 Profile for 2 classes-Canada 2009

	Class1	**Class2**
Class Size	0.5927	0.4073
Attributes		
Price		
0	0.5706	0.4493
5.5	0.2161	0.2322
9	0.1165	0.1525
12.5	0.0628	0.1002
16	0.0339	0.0658
Mean	3.5651	4.9556
na		
0	0.4609	0.4697
1	0.5391	0.5303
ast		
0	0.3229	0.3224
1	0.6771	0.6776
austr		
0	0.0466	0.7492
1	0.9534	0.2508
ausat		
0	0.0395	0.7445
1	0.9605	0.2555
austat		
0	0.0222	0.6768
1	0.9778	0.3232
ustr		
0	0.0346	0.5863
1	0.9654	0.4137
usat		
0	0.0297	0.6615
1	0.9703	0.3385
ustat		
0	0.0236	0.5701
1	0.9764	0.4299
cannon		
0	0.0427	0.5738
1	0.9573	0.4262
Cantr		
0	0.0141	0.2283
1	0.9859	0.7717
Canat		
0	0.012	0.2721
1	0.988	0.7279

Cantat		
0	0.0096	0.2011
1	0.9904	0.7989
ausnon		
0	0.138	0.8936
1	0.862	0.1064
usnon		
0	0.1268	0.8958
1	0.8732	0.1042
Covariates		
age		
22	0.2299	0.1471
27	0.217	0.1607
35	0.2266	0.1934
45	0.2482	0.3485
57	0.0783	0.1502
Mean	42.489	47.502
gender		
0	0.3823	0.5548
1	0.6177	0.4452
HH		
1	0.1671	0.2101
2	0.3546	0.3983
3	0.4783	0.3917
Mean	2.3112	2.1816
child		
0	0.6687	0.7362
1	0.3313	0.2638
Edu		
0	0.2033	0.23
1	0.7967	0.77
region		
0	0.6886	0.6399
1	0.3114	0.3601
trust		
0	0.4487	0.5358
1	0.5513	0.4642
Meat/Fish		
0	0.1375	0.2065
1	0.8625	0.7935
Fish		
0	0.9923	0.9465
1	0.0077	0.0535
Non meat		
0	0.9951	0.9683
1	0.0049	0.0317

APPENDIX J: FREQUENCIES OF QUESTIONS – JAPAN 2009

Q12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	851	43.9	43.9	43.9
	2	412	21.2	21.2	65.1
	3	677	34.9	34.9	100.0
	Total	1940	100.0	100.0	

Q13_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	41	2.1	2.1	2.1
	2	366	18.9	18.9	21.0
	3	861	44.4	44.4	65.4
	4	514	26.5	26.5	91.9
	5	158	8.1	8.1	100.0
	Total	1940	100.0	100.0	

Q13_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	51	2.6	2.6	2.6
	2	440	22.7	22.7	25.3
	3	752	38.8	38.8	64.1
	4	533	27.5	27.5	91.5
	5	164	8.5	8.5	100.0
	Total	1940	100.0	100.0	

Q13_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	55	2.8	2.8	2.8
	2	430	22.2	22.2	25.0
	3	740	38.1	38.1	63.1
	4	576	29.7	29.7	92.8
	5	139	7.2	7.2	100.0
	Total	1940	100.0	100.0	

Q14_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	145	7.5	7.5	7.5
	2	738	38.0	38.0	45.5

	3	551	28.4	28.4	73.9
	4	457	23.6	23.6	97.5
	5	49	2.5	2.5	100.0
	Total	1940	100.0	100.0	

Q14_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	190	9.8	9.8	9.8
	2	910	46.9	46.9	56.7
	3	654	33.7	33.7	90.4
	4	178	9.2	9.2	99.6
	5	8	.4	.4	100.0
	Total	1940	100.0	100.0	

Q14_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	172	8.9	8.9	8.9
	2	773	39.8	39.8	48.7
	3	744	38.4	38.4	87.1
	4	235	12.1	12.1	99.2
	5	16	.8	.8	100.0
	Total	1940	100.0	100.0	

Q14_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	153	7.9	7.9	7.9
	2	667	34.4	34.4	42.3
	3	745	38.4	38.4	80.7
	4	365	18.8	18.8	99.5
	5	10	.5	.5	100.0
	Total	1940	100.0	100.0	

Q14_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	30	1.5	1.5	1.5
	2	296	15.3	15.3	16.8
	3	559	28.8	28.8	45.6
	4	922	47.5	47.5	93.1
	5	133	6.9	6.9	100.0
	Total	1940	100.0	100.0	

Q14_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	31	1.6	1.6	1.6
	2	302	15.6	15.6	17.2
	3	604	31.1	31.1	48.3
	4	864	44.5	44.5	92.8
	5	139	7.2	7.2	100.0
	Total	1940	100.0	100.0	

Q14_7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	37	1.9	1.9	1.9
	2	239	12.3	12.3	14.2
	3	560	28.9	28.9	43.1
	4	848	43.7	43.7	86.8
	5	256	13.2	13.2	100.0
	Total	1940	100.0	100.0	

Q15a_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	275	14.2	14.2	14.2
	2	779	40.2	40.2	54.3
	3	481	24.8	24.8	79.1
	4	335	17.3	17.3	96.4
	5	70	3.6	3.6	100.0
	Total	1940	100.0	100.0	

Q15a_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	257	13.2	13.2	13.2
	2	693	35.7	35.7	49.0
	3	511	26.3	26.3	75.3
	4	416	21.4	21.4	96.8
	5	63	3.2	3.2	100.0
	Total	1940	100.0	100.0	

Q15a_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	294	15.2	15.2	15.2
	2	769	39.6	39.6	54.8

	3	613	31.6	31.6	86.4
	4	246	12.7	12.7	99.1
	5	18	.9	.9	100.0
	Total	1940	100.0	100.0	

Q15a_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	336	17.3	17.3	17.3
	2	797	41.1	41.1	58.4
	3	600	30.9	30.9	89.3
	4	195	10.1	10.1	99.4
	5	12	.6	.6	100.0
	Total	1940	100.0	100.0	

Q15a_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	379	19.5	19.5	19.5
	2	872	44.9	44.9	64.5
	3	527	27.2	27.2	91.6
	4	147	7.6	7.6	99.2
	5	15	.8	.8	100.0
	Total	1940	100.0	100.0	

Q15a_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	345	17.8	17.8	17.8
	2	799	41.2	41.2	59.0
	3	611	31.5	31.5	90.5
	4	169	8.7	8.7	99.2
	5	16	.8	.8	100.0
	Total	1940	100.0	100.0	

Q15b_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	58	3.0	3.0	3.0
	2	433	22.3	22.3	25.3
	3	707	36.4	36.4	61.8
	4	675	34.8	34.8	96.5
	5	67	3.5	3.5	100.0
	Total	1940	100.0	100.0	

Q15b_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	83	4.3	4.3	4.3
	2	498	25.7	25.7	29.9
	3	746	38.5	38.5	68.4
	4	556	28.7	28.7	97.1
	5	57	2.9	2.9	100.0
	Total	1940	100.0	100.0	

Q15b_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	87	4.5	4.5	4.5
	2	534	27.5	27.5	32.0
	3	941	48.5	48.5	80.5
	4	352	18.1	18.1	98.7
	5	26	1.3	1.3	100.0
	Total	1940	100.0	100.0	

Q15b_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	126	6.5	6.5	6.5
	2	659	34.0	34.0	40.5
	3	877	45.2	45.2	85.7
	4	254	13.1	13.1	98.8
	5	24	1.2	1.2	100.0
	Total	1940	100.0	100.0	

Q15b_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	88	4.5	4.5	4.5
	2	551	28.4	28.4	32.9
	3	911	47.0	47.0	79.9
	4	364	18.8	18.8	98.7
	5	26	1.3	1.3	100.0
	Total	1940	100.0	100.0	

Q15b_6

		Frequency	Percent	Valid Percent	Cumulative Percent

Valid	1	88	4.5	4.5	4.5
	2	543	28.0	28.0	32.5
	3	935	48.2	48.2	80.7
	4	343	17.7	17.7	98.4
	5	31	1.6	1.6	100.0
	Total	1940	100.0	100.0	

Q15c_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	141	7.3	7.3	7.3
	2	751	38.7	38.7	46.0
	3	661	34.1	34.1	80.1
	4	363	18.7	18.7	98.8
	5	24	1.2	1.2	100.0
	Total	1940	100.0	100.0	

Q15c_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	165	8.5	8.5	8.5
	2	788	40.6	40.6	49.1
	3	671	34.6	34.6	83.7
	4	300	15.5	15.5	99.2
	5	16	.8	.8	100.0
	Total	1940	100.0	100.0	

Q15c_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	187	9.6	9.6	9.6
	2	813	41.9	41.9	51.5
	3	747	38.5	38.5	90.1
	4	183	9.4	9.4	99.5
	5	10	.5	.5	100.0
	Total	1940	100.0	100.0	

Q15c_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	212	10.9	10.9	10.9
	2	856	44.1	44.1	55.1
	3	713	36.8	36.8	91.8
	4	148	7.6	7.6	99.4
	5	11	.6	.6	100.0

Q15c_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	212	10.9	10.9	10.9
	2	856	44.1	44.1	55.1
	3	713	36.8	36.8	91.8
	4	148	7.6	7.6	99.4
	5	11	.6	.6	100.0
	Total	1940	100.0	100.0	

Q15c_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	177	9.1	9.1	9.1
	2	829	42.7	42.7	51.9
	3	738	38.0	38.0	89.9
	4	188	9.7	9.7	99.6
	5	8	.4	.4	100.0
	Total	1940	100.0	100.0	

Q15c_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	191	9.8	9.8	9.8
	2	801	41.3	41.3	51.1
	3	751	38.7	38.7	89.8
	4	189	9.7	9.7	99.6
	5	8	.4	.4	100.0
	Total	1940	100.0	100.0	

Q15d_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	61	3.1	3.1	3.1
	2	361	18.6	18.6	21.8
	3	625	32.2	32.2	54.0
	4	792	40.8	40.8	94.8
	5	101	5.2	5.2	100.0
	Total	1940	100.0	100.0	

Q15d_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	53	2.7	2.7	2.7
	2	351	18.1	18.1	20.8

	3	634	32.7	32.7	53.5
	4	805	41.5	41.5	95.0
	5	97	5.0	5.0	100.0
	Total	1940	100.0	100.0	

Q15d_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	129	6.6	6.6	6.6
	2	617	31.8	31.8	38.5
	3	908	46.8	46.8	85.3
	4	267	13.8	13.8	99.0
	5	19	1.0	1.0	100.0
	Total	1940	100.0	100.0	

Q15d_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	151	7.8	7.8	7.8
	2	768	39.6	39.6	47.4
	3	780	40.2	40.2	87.6
	4	227	11.7	11.7	99.3
	5	14	.7	.7	100.0
	Total	1940	100.0	100.0	

Q15d_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	109	5.6	5.6	5.6
	2	612	31.5	31.5	37.2
	3	845	43.6	43.6	80.7
	4	360	18.6	18.6	99.3
	5	14	.7	.7	100.0
	Total	1940	100.0	100.0	

Q15d_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	113	5.8	5.8	5.8
	2	582	30.0	30.0	35.8
	3	868	44.7	44.7	80.6
	4	352	18.1	18.1	98.7
	5	25	1.3	1.3	100.0
	Total	1940	100.0	100.0	

Q16_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	207	10.7	10.7	10.7
	2	667	34.4	34.4	45.1
	3	694	35.8	35.8	80.8
	4	293	15.1	15.1	95.9
	5	79	4.1	4.1	100.0
	Total	1940	100.0	100.0	

Q16_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	180	9.3	9.3	9.3
	2	624	32.2	32.2	41.4
	3	701	36.1	36.1	77.6
	4	352	18.1	18.1	95.7
	5	83	4.3	4.3	100.0
	Total	1940	100.0	100.0	

Q16_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	115	5.9	5.9	5.9
	2	469	24.2	24.2	30.1
	3	636	32.8	32.8	62.9
	4	494	25.5	25.5	88.4
	5	226	11.6	11.6	100.0
	Total	1940	100.0	100.0	

Q16_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	74	3.8	3.8	3.8
	2	304	15.7	15.7	19.5
	3	640	33.0	33.0	52.5
	4	600	30.9	30.9	83.4
	5	322	16.6	16.6	100.0
	Total	1940	100.0	100.0	

Q16_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	48	2.5	2.5	2.5
	2	242	12.5	12.5	14.9

	3	595	30.7	30.7	45.6
	4	593	30.6	30.6	76.2
	5	462	23.8	23.8	100.0
	Total	1940	100.0	100.0	

Q16_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	71	3.7	3.7	3.7
	2	305	15.7	15.7	19.4
	3	609	31.4	31.4	50.8
	4	618	31.9	31.9	82.6
	5	337	17.4	17.4	100.0
	Total	1940	100.0	100.0	

Q16_7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	93	4.8	4.8	4.8
	2	428	22.1	22.1	26.9
	3	646	33.3	33.3	60.2
	4	521	26.9	26.9	87.0
	5	252	13.0	13.0	100.0
	Total	1940	100.0	100.0	

Q16_8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	76	3.9	3.9	3.9
	2	349	18.0	18.0	21.9
	3	680	35.1	35.1	57.0
	4	534	27.5	27.5	84.5
	5	301	15.5	15.5	100.0
	Total	1940	100.0	100.0	

Q17_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	9	.5	.5	.5
	2	42	2.2	2.2	2.6
	3	328	16.9	16.9	19.5
	4	1149	59.2	59.2	78.8
	5	412	21.2	21.2	100.0
	Total	1940	100.0	100.0	

Q17_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	8	.4	.4	.4
	2	31	1.6	1.6	2.0
	3	208	10.7	10.7	12.7
	4	755	38.9	38.9	51.6
	5	938	48.4	48.4	100.0
	Total	1940	100.0	100.0	

Q17_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	6	.3	.3	.3
	2	25	1.3	1.3	1.6
	3	145	7.5	7.5	9.1
	4	726	37.4	37.4	46.5
	5	1038	53.5	53.5	100.0
	Total	1940	100.0	100.0	

Q17_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	9	.5	.5	.5
	2	45	2.3	2.3	2.8
	3	394	20.3	20.3	23.1
	4	1041	53.7	53.7	76.8
	5	451	23.2	23.2	100.0
	Total	1940	100.0	100.0	

Q17_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	28	1.4	1.4	1.4
	2	76	3.9	3.9	5.4
	3	640	33.0	33.0	38.4
	4	813	41.9	41.9	80.3
	5	383	19.7	19.7	100.0
	Total	1940	100.0	100.0	

Q17_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	80	4.1	4.1	4.1
	2	227	11.7	11.7	15.8

	3	764	39.4	39.4	55.2
	4	738	38.0	38.0	93.2
	5	131	6.8	6.8	100.0
	Total	1940	100.0	100.0	

Q18_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	26	1.3	1.3	1.3
	2	203	10.5	10.5	11.8
	3	1043	53.8	53.8	65.6
	4	624	32.2	32.2	97.7
	5	44	2.3	2.3	100.0
	Total	1940	100.0	100.0	

Q18_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	216	11.1	11.1	11.1
	2	586	30.2	30.2	41.3
	3	852	43.9	43.9	85.3
	4	270	13.9	13.9	99.2
	5	16	.8	.8	100.0
	Total	1940	100.0	100.0	

Q18_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	112	5.8	5.8	5.8
	2	499	25.7	25.7	31.5
	3	964	49.7	49.7	81.2
	4	346	17.8	17.8	99.0
	5	19	1.0	1.0	100.0
	Total	1940	100.0	100.0	

Q18_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	96	4.9	4.9	4.9
	2	503	25.9	25.9	30.9
	3	1066	54.9	54.9	85.8
	4	262	13.5	13.5	99.3
	5	13	.7	.7	100.0
	Total	1940	100.0	100.0	

Q18_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	91	4.7	4.7	4.7
	2	298	15.4	15.4	20.1
	3	1145	59.0	59.0	79.1
	4	382	19.7	19.7	98.8
	5	24	1.2	1.2	100.0
	Total	1940	100.0	100.0	

Q19_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	13	.7	.7	.7
	2	172	8.9	8.9	9.5
	3	569	29.3	29.3	38.9
	4	1056	54.4	54.4	93.3
	5	130	6.7	6.7	100.0
	Total	1940	100.0	100.0	

Q19_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	9	.5	.5	.5
	2	143	7.4	7.4	7.8
	3	519	26.8	26.8	34.6
	4	1107	57.1	57.1	91.6
	5	162	8.4	8.4	100.0
	Total	1940	100.0	100.0	

Q19_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	100	5.2	5.2	5.2
	2	735	37.9	37.9	43.0
	3	865	44.6	44.6	87.6
	4	224	11.5	11.5	99.2
	5	16	.8	.8	100.0
	Total	1940	100.0	100.0	

Q19_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	102	5.3	5.3	5.3
	2	782	40.3	40.3	45.6
	3	810	41.8	41.8	87.3

	4	240	12.4	12.4	99.7
	5	6	.3	.3	100.0
	Total	1940	100.0	100.0	

Q19_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	125	6.4	6.4	6.4
	2	721	37.2	37.2	43.6
	3	812	41.9	41.9	85.5
	4	263	13.6	13.6	99.0
	5	19	1.0	1.0	100.0
	Total	1940	100.0	100.0	

Q19_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	131	6.8	6.8	6.8
	2	831	42.8	42.8	49.6
	3	801	41.3	41.3	90.9
	4	169	8.7	8.7	99.6
	5	8	.4	.4	100.0
	Total	1940	100.0	100.0	

APPENDIX K: FREQUENCIES OF QUESTIONS - CANADA 2009

q16_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	2	.2	.2	.2
	1	93	9.8	9.8	10.0
	2	198	20.9	20.9	30.9
	3	399	42.1	42.1	73.0
	4	157	16.6	16.6	89.6
	5	99	10.4	10.4	100.0
	Total	948	100.0	100.0	

q16_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	10	1.1	1.1	1.1
	1	80	8.4	8.4	9.5
	2	176	18.6	18.6	28.1
	3	344	36.3	36.3	64.3
	4	219	23.1	23.1	87.4
	5	119	12.6	12.6	100.0
	Total	948	100.0	100.0	

q16_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	4	.4	.4	.4
	1	109	11.5	11.5	11.9
	2	139	14.7	14.7	26.6
	3	247	26.1	26.1	52.6
	4	254	26.8	26.8	79.4
	5	195	20.6	20.6	100.0
	Total	948	100.0	100.0	

q16_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	3	.3	.3	.3
	1	33	3.5	3.5	3.8
	2	179	18.9	18.9	22.7
	3	306	32.3	32.3	55.0
	4	269	28.4	28.4	83.3
	5	158	16.7	16.7	100.0
	Total	948	100.0	100.0	

q16_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	3	.3	.3	.3
	1	118	12.4	12.4	12.8
	2	201	21.2	21.2	34.0
	3	287	30.3	30.3	64.2
	4	208	21.9	21.9	86.2
	5	131	13.8	13.8	100.0
	Total	948	100.0	100.0	

q16_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	4	.4	.4	.4
	1	82	8.6	8.6	9.1
	2	188	19.8	19.8	28.9
	3	329	34.7	34.7	63.6
	4	230	24.3	24.3	87.9
	5	115	12.1	12.1	100.0
	Total	948	100.0	100.0	

q16_7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	5	.5	.5	.5
	1	60	6.3	6.3	6.9
	2	161	17.0	17.0	23.8
	3	240	25.3	25.3	49.2
	4	271	28.6	28.6	77.7
	5	211	22.3	22.3	100.0
	Total	948	100.0	100.0	

q16_8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	4	.4	.4	.4
	1	75	7.9	7.9	8.3
	2	134	14.1	14.1	22.5
	3	226	23.8	23.8	46.3
	4	256	27.0	27.0	73.3
	5	253	26.7	26.7	100.0
	Total	948	100.0	100.0	

q17_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	2	.2	.2	.2
	1	6	.6	.6	.8
	2	35	3.7	3.7	4.5
	3	262	27.6	27.6	32.2
	4	520	54.9	54.9	87.0
	5	123	13.0	13.0	100.0
	Total	948	100.0	100.0	

q17_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	5	.5	.5	.5
	1	9	.9	.9	1.5
	2	22	2.3	2.3	3.8
	3	155	16.4	16.4	20.1
	4	508	53.6	53.6	73.7
	5	249	26.3	26.3	100.0
	Total	948	100.0	100.0	

q17_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	6	.6	.6	.6
	1	6	.6	.6	1.3
	2	7	.7	.7	2.0
	3	65	6.9	6.9	8.9
	4	573	60.4	60.4	69.3
	5	291	30.7	30.7	100.0
	Total	948	100.0	100.0	

q17_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	7	.7	.7	.7
	1	12	1.3	1.3	2.0
	2	79	8.3	8.3	10.3
	3	359	37.9	37.9	48.2
	4	395	41.7	41.7	89.9
	5	96	10.1	10.1	100.0
	Total	948	100.0	100.0	

q17_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	2	.2	.2	.2
	1	62	6.5	6.5	6.8
	2	120	12.7	12.7	19.4
	3	312	32.9	32.9	52.3
	4	333	35.1	35.1	87.4
	5	119	12.6	12.6	100.0
	Total	948	100.0	100.0	

q17_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	2	.2	.2	.2
	1	85	9.0	9.0	9.2
	2	178	18.8	18.8	28.0
	3	347	36.6	36.6	64.6
	4	266	28.1	28.1	92.6
	5	70	7.4	7.4	100.0
	Total	948	100.0	100.0	

q18_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	2	.2	.2	.2
	1	20	2.1	2.1	2.3
	2	226	23.8	23.8	26.2
	3	380	40.1	40.1	66.2
	4	278	29.3	29.3	95.6
	5	42	4.4	4.4	100.0
	Total	948	100.0	100.0	

q18_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	7	.7	.7	.7
	1	78	8.2	8.2	9.0
	2	241	25.4	25.4	34.4
	3	322	34.0	34.0	68.4
	4	262	27.6	27.6	96.0
	5	38	4.0	4.0	100.0
	Total	948	100.0	100.0	

q18_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	4	.4	.4	.4
	1	100	10.5	10.5	11.0
	2	336	35.4	35.4	46.4
	3	306	32.3	32.3	78.7
	4	179	18.9	18.9	97.6
	5	23	2.4	2.4	100.0
	Total	948	100.0	100.0	

q18_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	5	.5	.5	.5
	1	71	7.5	7.5	8.0
	2	368	38.8	38.8	46.8
	3	346	36.5	36.5	83.3
	4	141	14.9	14.9	98.2
	5	17	1.8	1.8	100.0
	Total	948	100.0	100.0	

q18_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	3	.3	.3	.3
	1	26	2.7	2.7	3.1
	2	185	19.5	19.5	22.6
	3	365	38.5	38.5	61.1
	4	293	30.9	30.9	92.0
	5	76	8.0	8.0	100.0
	Total	948	100.0	100.0	

q19_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	1	.1	.1	.1
	1	56	5.9	5.9	6.0
	2	195	20.6	20.6	26.6
	3	214	22.6	22.6	49.2
	4	294	31.0	31.0	80.2
	5	188	19.8	19.8	100.0
	Total	948	100.0	100.0	

q19_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	2	.2	.2	.2
	1	33	3.5	3.5	3.7
	2	164	17.3	17.3	21.0
	3	227	23.9	23.9	44.9
	4	305	32.2	32.2	77.1
	5	217	22.9	22.9	100.0
	Total	948	100.0	100.0	

q19_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	5	.5	.5	.5
	1	73	7.7	7.7	8.2
	2	200	21.1	21.1	29.3
	3	217	22.9	22.9	52.2
	4	305	32.2	32.2	84.4
	5	148	15.6	15.6	100.0
	Total	948	100.0	100.0	

q19_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	4	.4	.4	.4
	1	82	8.6	8.6	9.1
	2	222	23.4	23.4	32.5
	3	234	24.7	24.7	57.2
	4	319	33.6	33.6	90.8
	5	87	9.2	9.2	100.0
	Total	948	100.0	100.0	

q19_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	4	.4	.4	.4
	1	35	3.7	3.7	4.1
	2	123	13.0	13.0	17.1
	3	220	23.2	23.2	40.3
	4	420	44.3	44.3	84.6
	5	146	15.4	15.4	100.0
	Total	948	100.0	100.0	

q19_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	6	.6	.6	.6
	1	53	5.6	5.6	6.2
	2	249	26.3	26.3	32.5
	3	344	36.3	36.3	68.8
	4	274	28.9	28.9	97.7
	5	22	2.3	2.3	100.0
	Total	948	100.0	100.0	

q20

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	43	4.5	4.5	4.5
	1	642	67.7	67.7	72.3
	2	263	27.7	27.7	100.0
	Total	948	100.0	100.0	

q28_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	6	.6	.6	.6
	1	28	3.0	3.0	3.6
	2	193	20.4	20.4	23.9
	3	292	30.8	30.8	54.7
	4	342	36.1	36.1	90.8
	5	87	9.2	9.2	100.0
	Total	948	100.0	100.0	

q28_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	5	.5	.5	.5
	1	11	1.2	1.2	1.7
	2	42	4.4	4.4	6.1
	3	229	24.2	24.2	30.3
	4	489	51.6	51.6	81.9
	5	172	18.1	18.1	100.0
	Total	948	100.0	100.0	

q28_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	3	.3	.3	.3
	1	317	33.4	33.4	33.8

	2	321	33.9	33.9	67.6
	3	210	22.2	22.2	89.8
	4	83	8.8	8.8	98.5
	5	14	1.5	1.5	100.0
	Total	948	100.0	100.0	

q29

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	5	.5	.5	.5
	1	8	.8	.8	1.4
	2	53	5.6	5.6	7.0
	3	75	7.9	7.9	14.9
	4	261	27.5	27.5	42.4
	5	546	57.6	57.6	100.0
	Total	948	100.0	100.0	

q30

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	4	.4	.4	.4
	1	184	19.4	19.4	19.8
	2	240	25.3	25.3	45.1
	3	357	37.7	37.7	82.8
	4	144	15.2	15.2	98.0
	5	19	2.0	2.0	100.0
	Total	948	100.0	100.0	

q31

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	790	83.3	83.3	83.3
	2	25	2.6	2.6	86.0
	3	118	12.4	12.4	98.4
	4	15	1.6	1.6	100.0
	Total	948	100.0	100.0	

q32_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	4	.4	.4	.4
	1	44	4.6	4.6	5.1
	2	189	19.9	19.9	25.0
	3	284	30.0	30.0	55.0
	4	393	41.5	41.5	96.4

	5	34	3.6	3.6	100.0
	Total	948	100.0	100.0	

q32_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	3	.3	.3	.3
	1	9	.9	.9	1.3
	2	52	5.5	5.5	6.8
	3	241	25.4	25.4	32.2
	4	389	41.0	41.0	73.2
	5	254	26.8	26.8	100.0
	Total	948	100.0	100.0	

q32_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	5	.5	.5	.5
	1	61	6.4	6.4	7.0
	2	171	18.0	18.0	25.0
	3	310	32.7	32.7	57.7
	4	318	33.5	33.5	91.2
	5	83	8.8	8.8	100.0
	Total	948	100.0	100.0	

q32_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	7	.7	.7	.7
	1	236	24.9	24.9	25.6
	2	477	50.3	50.3	75.9
	3	148	15.6	15.6	91.6
	4	50	5.3	5.3	96.8
	5	30	3.2	3.2	100.0
	Total	948	100.0	100.0	

q32_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	5	.5	.5	.5
	1	22	2.3	2.3	2.8
	2	113	11.9	11.9	14.8
	3	320	33.8	33.8	48.5
	4	449	47.4	47.4	95.9
	5	39	4.1	4.1	100.0

q32_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	5	.5	.5	.5
	1	22	2.3	2.3	2.8
	2	113	11.9	11.9	14.8
	3	320	33.8	33.8	48.5
	4	449	47.4	47.4	95.9
	5	39	4.1	4.1	100.0
	Total	948	100.0	100.0	

q32_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	4	.4	.4	.4
	1	110	11.6	11.6	12.0
	2	197	20.8	20.8	32.8
	3	302	31.9	31.9	64.7
	4	260	27.4	27.4	92.1
	5	75	7.9	7.9	100.0
	Total	948	100.0	100.0	

q32_7a

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	12	1.3	1.3	1.3
	1	93	9.8	9.8	11.1
	2	204	21.5	21.5	32.6
	3	308	32.5	32.5	65.1
	4	280	29.5	29.5	94.6
	5	51	5.4	5.4	100.0
	Total	948	100.0	100.0	

q32_7b

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	13	1.4	1.4	1.4
	1	74	7.8	7.8	9.2
	2	156	16.5	16.5	25.6
	3	258	27.2	27.2	52.8
	4	311	32.8	32.8	85.7
	5	136	14.3	14.3	100.0
	Total	948	100.0	100.0	

q32_7c

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	12	1.3	1.3	1.3
	1	40	4.2	4.2	5.5
	2	83	8.8	8.8	14.2
	3	204	21.5	21.5	35.8
	4	464	48.9	48.9	84.7
	5	145	15.3	15.3	100.0
	Total	948	100.0	100.0	

q33

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	4	.4	.4	.4
	1	47	5.0	5.0	5.4
	2	296	31.2	31.2	36.6
	3	601	63.4	63.4	100.0
	Total	948	100.0	100.0	

q34

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	11	1.2	1.2	1.2
	1	733	77.3	77.3	78.5
	2	124	13.1	13.1	91.6
	3	17	1.8	1.8	93.4
	4	14	1.5	1.5	94.8
	5	49	5.2	5.2	100.0
	Total	948	100.0	100.0	

q35_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	14	1.5	1.5	1.5
	1	16	1.7	1.7	3.2
	2	90	9.5	9.5	12.7
	3	828	87.3	87.3	100.0
	Total	948	100.0	100.0	

q35_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	14	1.5	1.5	1.5
	1	50	5.3	5.3	6.8
	2	285	30.1	30.1	36.8

	3	599	63.2	63.2	100.0
	Total	948	100.0	100.0	

q35_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	13	1.4	1.4	1.4
	1	17	1.8	1.8	3.2
	2	89	9.4	9.4	12.6
	3	829	87.4	87.4	100.0
	Total	948	100.0	100.0	

q35_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	14	1.5	1.5	1.5
	1	96	10.1	10.1	11.6
	2	460	48.5	48.5	60.1
	3	378	39.9	39.9	100.0
	Total	948	100.0	100.0	

q35_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1	16	1.7	1.7	1.7
	1	132	13.9	13.9	15.6
	2	390	41.1	41.1	56.8
	3	410	43.2	43.2	100.0
	Total	948	100.0	100.0	