University of Alberta

Consumer Preferences and Willingness to Pay for Certification of Eggs with Credence Attributes

by

Patrycja Ewelina Romanowska

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Examining Committee

Ellen Goddard, Rural Economy

Wiktor Adamowicz, Rural Economy

Rob Renema, Agricultural, Food and Nutritional Science

Dedication

I dedicate this thesis to my mother Elżbieta Romanowska and my grandmother, Irena Szymaniuk without whom neither I nor this thesis would have ever come to exist.

Abstract

This research examines consumer preferences for certification of select credence attributes by different certifying agents. Over two separate study periods, groups of Edmonton consumers participated in sessions comprised of three components – a "real" choice experiment, a stated preference exercise and a survey – designed to elicit willingness to pay for select credence attributes of eggs, certification of those attributes and establish attitudes and beliefs that may affect preferences. Results indicate that consumer shopping habits, overall trust levels and certain demographic characteristics influence the preference for an attribute as well as the preference for certification of that attribute. Survey respondents prefer certified to uncertified eggs and government is the preferred certifier. Pasteurized eggs gained the most from certification. Furthermore, an assessment of respondent knowledge about current certification practices indicates that certification schemes be accompanied by an adequate education campaign.

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1. INTRODUCTION

1.1 Background Information

Increasing consumer interest in food product characteristics with implications for human health, animal welfare and food safety has led to an increase in product differentiation by credence attribute. “Credence attributes are those for which consumers can assess the quality attributes neither before nor after purchase and use… Historically, as the set of products and technological processes has broadened to encompass more credence goods, consumers' awareness of and demand for quality have risen over time. As a result, quality signaling to consumers has become a major problem.” (Auriol and Schilizzi (2003) page 2).

Further to that, national outbreaks of foodborne illness such as listeriosis have fuelled the debate surrounding current food inspection regimes and the optimal method of communicating the validity of such regimes to consumers of food and agricultural products. While Canada has not experienced food safety crises as severe as countries such as the UK, the repeated occurrence of foodborne diseases has compromised the integrity of consumable agricultural products and necessitated a valuation of measures that should be taken to guarantee consumer food safety and maintain or restore consumer trust in the food supply (Eden et al., 2008; Gellnyck et al. 2006).

However, whether it is industry, government or third party certification, measures to assure consumers about food attributes are limited in their effectiveness by the degree of faith consumers have in the certifying body as well as the certification process. Recent

research has indicated that an increase in available information does not necessarily improve the decision making power of the consumer. In fact, studies that have looked at increased traceability systems and quality assurance schemes in meat products found that this increase in information had only a very limited effect on consumer trust in the safety of these products (Gellynck et al, 2006). Others have found that as the amount of food information proliferates so does the degree of consumer skepticism about food information and food assurance claims (Eden et al, 2008). These types of results indicate that the increase in the quantity of food information may actually be confounding a consumer's purchasing decisions and as such, further research into consumer perceptions of the quality of food information is necessary.

1.2 Economic Problem

A market system relies on the premise that a rational economic actor makes utility-maximizing decisions using available information. In the context of consumable agricultural products, the economic actors are utility-maximizing producers and consumers. In order to ensure optimal market outcomes, producers seek to maximize profit, a function of costs and revenues, while consumers maximize utility, a function of prices and individual preferences.

The communication of information via labeling and certification schemes is a cost borne by producers and shared by consumers that ensures a more efficient market as it allows consumers to effectively value the attributes of a product and make decisions

reflecting their preferences. However, despite or perhaps because of the abundance of available knowledge, not all sources of information are equally valued in the minds of consumers (Frewer et al. 2003). In the development and implementation of systems to provide verification of credence attributes to consumers trust is clearly a critical issue. In order to value a product correctly and thus maximize utility, consumers must trust the information they receive about a particular product attribute. Their level of trust could be affected by the way the system is designed, the source or type of the information, previous experience with quality assurances from different entities and their personal evaluation of the importance of the credence attribute.

The issue of trust in labeling has two major economic consequences. In the absence of consumer trust, the provision of information raises transaction costs without a corresponding increase in welfare by resulting in consumption decisions that do not properly reflect attribute preferences. Conversely, if distrustful consumers believe that information is being withheld by producers, they may make consumption decisions that do not reflect a product's actual characteristics.

Secondly, marketing or government food safety and health initiatives become less effective when consumers are skeptical about the information they are provided. Currently, this raises issues for marketers of functional foods as well for food and wellness policies.

1.3 Research Objectives

Recent developments in the marketplace highlight the simultaneous development of standards certified and developed by companies and by government. What is lacking is an empirical comparison of the costs and benefits; both social and private, of these two systems in the Canadian context. As such, the purpose of this study is to advance the literature regarding consumer trust in public versus private standards in the marketing of agricultural and food products with credence attributes. This research study examines the nature of consumer trust and how quality versification affects the consumer's choice decision. Concurrently, we will seek to ascertain consumer knowledge of certifying bodies and the certification process and gauge the effect of food safety awareness and attitudes towards health on the valuation of certain food attributes and certification. These objectives will be pursued through a survey mechanism coupled with two choice experiments, one that features an actual exchange of goods and money while the other is a stated preference exercise. The experiments will be eliciting consumer willingness to pay for different attributes of eggs and different bodies that could certify eggs.

The primary objectives of the research are as follow.

1. To examine how trust and quality certifications affect a consumer's choice decision and willingness to pay for credence attributes.
2. To identify the differences between using public and private certification in the marketing of agricultural and food products with credence attributes.

3. Determine the extent of consumer knowledge about the food certification process and examine how consumer attitudes towards food safety, trust in different agents and confidence in food change between two study periods.

4. To determine whether there are distinct consumer groups that share similar preferences for attributes and/or certification type.

The choice of eggs as the product was based on the rising trend in specialty eggs and the result sundry credence attributes of eggs – mostly uncertified – currently being marketed (ie. Vitamin-enhanced, omega-3). While not a primary objective, this study will also provide some market information about the value of certain egg attributes. The choice between pasteurized eggs and free-run eggs will be indicative of the values study subjects attribute to food safety versus animal welfare. Similarly, the choice between vitamin enhanced eggs and pasteurized eggs will indicate how study subjects value food safety attributes in contrast to health attributes. Of particular interest to egg marketers will be consumer willingness to pay for eggs that have undergone an in-shell pasteurization process since these eggs are not available in Canada but have recently seen an exponential growth in demand in the U.S.

1.4 Study Procedure

The study will be conducted over two distinct sessions in the following manner.

1. Data will be collected from a survey about consumer trust and food safety perception. As this survey will enhance the awareness study subjects have about food safety and certification, half of the surveys will be filled out by subjects prior to their participation in the valuation exercises outlined, while the other half will be filled out after.

2. Subjects will participate in a choice experiment where they will be endowed with a dozen large regular eggs and will be asked to make eight pairwise choices between keeping these eggs and paying a premium between $1 and $4 to trade in these eggs for eggs that have either undergone an in-shell pasteurization process or eggs that are free-run. In the second experimental session, study subjects will make these identical choices but between pasteurized eggs and vitamin-enhanced eggs. After they have filled out their payment cards, a Becker -DeGroot-Marschak (BDM) auction will be performed to determine which choice is binding. Depending on their choice in the binding option, subjects will either keep their endowment or trade in their eggs and pay the premium for the specialty eggs.

3. The stated preference experiment in the first set of study experiments will be similar to the first exercise but will be hypothetical and no exchange of eggs will take place. Subjects will again be asked to make pairwise choices between regular eggs and either in-shell pasteurized eggs or free-run eggs but this time their choice set will include certifying bodies. In the second set of experiments, study subjects will fill out a different hypothetical stated preference survey, which they will have a three-way choice between four types of eggs at two prices and an option

not to purchase. The eggs will either be uncertified or will be certified by the same agencies as in the first group of study sessions.

In terms of methodology, we will look for and discuss a possible information effect and we will examine the two exercises for differences arising from the hypothetical nature of one and the market exchange nature of the other. Another test will determine whether the willingness to pay for eggs in a hypothetical stated preference exercise is affected when subjects first do a "real" experiment that is similar. The regression results of the "real" experiment will be presented in Appendix Q, however, they will not be discussed in detail within this thesis which focuses instead on information from the other two exercises.

1.5 Thesis Structure

This thesis will structured in the following manner. This introductory chapter will be followed by a chapter in which background information is provided about the economic theory of consumer trust, current certification mechanisms and labeling practices as well as a summary of research findings in the areas of trust and food assurance schemes. In the third chapter methodology of the proposed study will be the focus. Within this chapter, the survey and experimental designs will be discussed and justified. Data structure and descriptive statistics will be presented in the fourth chapter while the fifth chapter will feature analysis of the econometric modeling followed by a conclusion.

CHAPTER 2: BACKGROUND

2.1 Introduction

This chapter will encompass a literature review focused on the different aspects of the previously outlined research problem. In order to assess the need for certification, this chapter will first focus on the theoretical justification for quality assurance schemes along with issues for consideration and proceed into a discussion of the pivotal role of trust as a link between certification mechanisms and consumer choice. The chapter will end with a description of the current Canadian regulatory framework for food in general and for eggs in particular.

2.2 Credence Attributes and Information Asymmetry

The issue of determining the consumer characteristics, beliefs and attitudes that determine the utility consumers receive from a particular product, or its specific attribute(s), is arguably the prime objective of consumer-based microeconomic theory. The idea that each consumer wishes to maximize their unobserved utility by consuming goods and services and that this utility can be indirectly observed and quantified through prices they wish to pay for certain goods relative to others forms the foundation of any consumer choice analysis. Yet, while the purchase of goods and the prices of those goods can be easily observed in the marketplace, the underlying beliefs that motivate a consumer's purchases are less obvious. This raises the issues of whether those beliefs correctly correspond with the attribute for which the consumer is paying – so whether the benefit the consumer thinks they are getting exists – and also whether the attribute itself exists. An example of the first would be a consumer purchasing low-fat yogurt with the belief that it will

make them lose weight. This would lead to a welfare loss for the consumer if they then do not lose weight because, for instance, they didn't know that low fat foods actually cause people to overeat. An example of the second issue would be someone who bought a container of yogurt because the label said the cows that produced it were not given any growth hormones. If the cows were in fact given growth hormones – something the consumer had no way of verifying – this would cause a welfare loss. In both of these cases, information asymmetry causes a situation where the benefit incurred does not correspond to the increase in utility for which the consumer was willing to pay. Although the two situations are intertwined, this analysis will focus on the second type of issue, namely the potential welfare loss – and the potential of certification regimes to correct that loss – due to information asymmetry associated with a credence attribute.

Attributes that potentially affect the utility a consumer receives from the purchase of a good have been classified by Nelson (1970) as search, experience and credence attributes. Products embody search characteristics if buyers can inspect quality before purchase through their sensory faculties. A product has experience characteristics if quality is revealed only after purchasing and credence characteristics if quality is not even revealed after purchasing. Although there is a potential for consumer welfare loss with the purchase of a product characterized by each type of attribute, this potential is greatest for the credence attribute. In products with both search and experience characteristics, the consumer is likely to find out if they did not get what they paid for and then punish the seller or the producer by no longer purchasing their products. This provides a natural disincentive for sellers who are dependent on repeat sales to mislead the consumer. However, such is not the case for a credence attribute. In fact, considering the very low probability that a consumer will find out if they got what they paid for, the possibility of marketing a credence attribute that does not exist may become appealing. Knowing this, why

would a rational consumer pay a premium for a credence attribute? The answer is simple but its implications are complex.

2.3 Credence Attributes and Trust

A rational consumer choosing to purchase something on the basis of a credence attribute – be it a production method, an animal welfare or nutritional claim or a food safety assurance – might do so for two reasons. The first is that they trust the players along the food supply chain (Mazzocchi et al. 2004; Dierks and Hanf, 2006; Rousseau et al. 1998; de Jonge et al 2008). The second is that they have a guarantee that the attribute they are paying for exists. This guarantee would most likely come from some quality assurance scheme (Gellnyck et al. 2006; Nilsson et al. 2006). These schemes are also inherently based on trust, as consumers have to have faith in a certifying body in order to believe that what they claim is true (Poppe and Kjaernes, 2003; Wales et al. 2006; Nocella et al. 2007). Whether it is industry, government or third party certification, measures to assure consumers about food attributes are limited in their effectiveness by the degree of faith consumers have in the certifying body as well as the certification process. In a study exploring how consumers think about food information, trust and assurance schemes, Eden et al. (2008) found a high degree of skepticism about quality assurance schemes and only a weak trust in certification. This resulted from survey participants expressing concerns that organizations had funding requirements or political agendas that jeopardized their judgment. Study participants were also concerned about difficulties understanding how quality assurance schemes work and thus difficulties trusting them. This highlights the importance of understanding

what institutions people trust when it comes to certification as well as what people understand about certification. Both of these issues will be addressed in this study.

2.4 Understanding Trust in the Certification Context

Certification schemes have been identified as having the potential to correct welfare loss due to information asymmetry (Aurioll and Schilizzi (2003), page 3) and their effectiveness is based largely on trust. As such, there have been many attempts to model, analyze and consequently understand the determinants of consumer trust in a quality assurance scheme and corresponding purchase decisions. It continues to be a complex task because trust is a subjective notion that can be affected by the way the system is designed, the source or type of the information, previous experience with quality assurances from different entities and personal evaluation of the importance of the credence attribute (de Jonge et al. 2008; Frewer et al. 2003; Cranfield and Magnusson, 2003; Nilsson, 2006; Ward et al. 2004). A major longitudinal study in Europe highlights the importance of cultural context to the construction of trust perceptions (Poppe and Kjærnes, 2003).

Furthermore, while certification or the communication of 'an unobservable quality level of a product to consumers through a labeling system' (Aurioll and Schilizzi (2003), page 3) can be particularly important for credence attributes, recent research has indicated that an increase in available information does not necessarily improve the decision-making power of the consumer. In a study that looked at the effect of increased traceability systems and quality assurance schemes in meat products, Gellnyck et al (2008) found that this increase in information had only

a very limited effect on consumer trust in the safety of these products. Another study has found that as the amount of food information proliferates, so does the degree of consumer skepticism about food information and food assurance claims (Eden et al. 2008). These types of results indicate that the increase in the quantity of food information may actually be confounding a consumer's purchasing decisions and as such, necessitate further research into consumer perceptions of the quality of food information.

Linking beliefs about the quality of food information to purchase decisions is also far from conclusive. Frewer et al (2003) conducted a study aiming to test the role of trust in an attitude change concerning genetically modified foods where they surveyed attitudes about GM foods before and after giving them information about the process from different sources, for which the respondents had indicated different levels of trust. They found on one hand that the direct effect of the information source was mediated by the participants' trust in that source but on the other hand, their results implied that information provision in general had little effect on changing peoples' attitudes and perceptions of information source characteristics contributed very little to attitude changes.

When looking at the specific credence attribute of food safety, de Jonge et al. (2008) developed a consumer confidence indicator as a proxy for trust in food safety and a measure for trust in specific agents – government, retailers, manufacturers and farmers – that consumers may perceive as responsible for food safety. Both of these methods are used in the survey portion of this study. The indicators identify optimism, which is based on a series of questions that gauge the extent to which consumers are satisfied about food safety, and pessimism, which indicates the level they are suspicious about food safety. The agent

trust measures were based on perceptions of competence, knowledge, honesty, openness, care and attention of these agents with respect to food safety. A standard regression model with optimism, pessimism as dependent variables and trust predictor variables revealed that optimism about food safety varies depending on who is trusted. Another interesting result from this study indicates that consumer perceptions that government is open and transparent about food safety matters may both increase the level of optimism and simultaneously reduce the level of pessimism. The competence dimensions of trust, however, have little effect on enhancing optimism and reducing pessimism.

On balance, the literature does seem to indicate that properly executed certification schemes increase consumer welfare. However, certification may come at a cost that is prohibitive to many producers, limiting their options to become certified in the absence of some government-based scheme or an industry-wide scheme where costs would be spread over a much larger group. Also, it is far from clear that consumers are willing to cover the cost of certification in the cost of their purchase. While Ward et al. (2004) found a strong preference for certification in the organic produce market, they also found that incorporating costs of certification decreased the demand for a product. This is a very interesting result as it implies that the lack of certification is not a barrier to purchase but rather that certification is an attribute for which only some people were willing to pay. This suggests that the people who were willing to pay for the attribute but not for certification sufficiently trusted the players in the food supply process whereas the people who were willing to pay the premium trusted the certifying institutions, in this case government and third party, *more* than the actors in the food supply chain. This raises an interesting question, and one beyond the bounds of this study, of whether the a need for certification only exists once the lower bound of some trust threshold for the food supply process has been breached.

2.5 Communicating Standards Through Certification

While recent developments in the Canadian marketplace highlight the simultaneous development of both public and private standards (eg. national organic versus private 'Prime Naturally™'), establishing standards for food products is not a new phenomenon. Beginning with the development of grading systems, benefits of establishing standards have been identified by Freebairn (1967) as including increased consumer satisfaction, enhanced producer returns and market efficiencies. However, the existence of many credence and process attributes combined with brand differentiation, mandatory nutritional labels and the emergence of functional foods has created a number of issues in achieving these benefits. The first question deals with consumer response to the existence of standards and the potential of these standards to change consumption patterns in response to additional information at point of sale. The second question deals with whether or not consumers care about the source of the standard – is there a different response to standards verified by government than standards verified by an industry body or even a third party verification system. Fundamentally this second question has to do with the nature of consumer trust, in general and specifically. The third question deals with consumer understanding of what certain standards imply and who sets those standards. The sheer density of information on labels and the number of potential sources that it may come from or be verified by, raises the issue of whether the potential benefit of information is being negated by a consumers' limited cognitive capacity.

In assessing these fundamental questions a number of specific issues also become relevant. For example, industry representatives have raised the issue of whether signaling

the food safety of certain products with a food safety designation might increase consumer concerns about food safety in general and food safety of the product identified as coming from a non-certified system, specifically. Kanter et al. (2008) suggest that identifying differences in production methods might 'stigmatize' a conventionally produced product. They show this effect in calculations of willingness to pay for conventionally produced milk in the presence of labeled rBST free milk in the U.S. In a food safety study, focusing on heavy metal concentration in apples, potatoes and bread, Rozan et al (2004) identify reduced willingness to pay for non-certified product when certified options are present. This type of concern can contribute to the debate about the benefits of mandating a national standard or allowing industry to develop their own standards over time. There are also questions about whether different standards – food safety as opposed to environmental, for example, generate different concerns and different potential attitudes among consumers about the appropriate verifying body.

In a large way, certification schemes are dependent on the trust consumers possess in the certifying agent. Ward et al. (2004) found a significant difference in willingness to pay for certified organic produce when the certifiers were self-certifiers (farmers, stores) or government and third party, which were perceived as far more effective. Further to this effect, Harbaugh et al. (2007) suggest that consumers might view certified labels as being indicative of either high quality or undemanding standards. They suggest that with voluntary standards or certification consumers may not be sure about whether firms will disclose compliance or lack of compliance with the standard. That uncertainty may discourage firms from wishing to use certified labels. Another study looking at attitudes towards certifiers and their effect on

trust who found that 'overall, consumer confidence in the safety of food is most strongly enhanced by trust in food manufacturers, much more than trust in the government, farmers, and retailers. This suggests that, when trust in manufacturers is compromised, this might have relatively large consequences for general consumer confidence in the safety of food' (de Jonge et al. 2008).

Certification schemes also depend on the type of attribute they are designed to verify and consumer attitudes towards that attribute. The importance a consumer attaches to a particular attribute may also be linked to a more general set of characteristics. For instance, in a study aiming to measure the willingness to pay for pesticide free certified products in Canada, Cranfield et al. (2003) found that environmental concerns are more important factors than socio-demographic factors in determining consumer preference for reduced input products. There is also a role for certification of certain attributes to change attitudes, particularly for emerging technologies. On p. 1117, Frewer et al (2003) found that when measuring the effects of information from different sources on changing consumer attitudes towards GM foods that "public attitudes towards technologies are mainly driven by trust in the institutions promoting and regulating these technologies." In a study valuating the willingness to pay for egg attributes, Goddard et al. (2007) linked a survey establishing attitudes towards health, animal welfare and adherence to 'natural foods' to consumer purchase decisions. The study found the people who were identified as health conscious were willing to pay a premium for organic, free-run and eggs from vegetarian-fed hens. It should be noted that organic is a production attribute and the health benefits of organically produced foods are by no means certain. Meanwhile, free run is considered an animal

welfare attribute while vegetarian-fed may be considered a food safety attribute after the spread of BSE was linked to feed that included diseased animal meal. Considering the people willing to pay a premium for these attributes were identified as having health conscious attitudes, the link between attribute types and consumer purchase decisions is clearly significant and by no means obvious.

The moral intensity towards an attribute is also a determinant of consumer choice and has been shown by Bennett et al. (2002) to be correlated positively with willingness to pay for public policy to address the issue. This suggests a possible government role in certifying attributes that carry a higher possibility for underlying attitudes to evoke a high degree of moral intensity (ie. animal welfare) in consumers who prefer it. However, from a regulatory point of view, governments likely see a significant difference in mandating standards, perhaps minimum quality standards (MQS), for food safety as opposed to 'choice' attributes such as animal welfare or ethical (fair trade, for example) purchase criteria, Codron et al (2005). Although information asymmetries exist in each case, externalities (health or environmental costs, for example) and liabilities differ considerably. Ronnen (1991) has identified the potential benefits of creating national minimum quality standards even in the absence of externalities. Rather than qualifying government certification in the form of MQS as the definitive standard for food safety attributes, Codron et al (2005) and Giraud-Heraud et al (2006) suggest that governments should develop an MQS level that is not too high to discourage development of retailer certification or premium private label products. To do so would decrease social welfare, which will be higher with both systems operating simultaneously. Giraud-Heraud et al (2006) suggest

that retailers may desire their own certification scheme for meat with higher food safety evaluation alongside national certification schemes established post BSE in Europe. To this effect, they argue that retailers looking for tighter supply chains would negotiate with established suppliers for a certain percentage of their supply to meet a higher than national food safety standard. This would allow them to market their products accordingly, with the 'safer' one being more expensive, and develop an optimization strategy to determine how much of each product to sell to maximize profit. In this case the costs would be distributed along the marketing chain but the retailer/processor would incur the additional cost of developing, and marketing the private standard in addition to the national standard. That the higher private standards are being developed suggests the market for food products that meet those standards confers enough benefits to retailers to warrant the cost of their implementation.

2.6 Current Canadian Certification Mechanisms

Regulations regarding food in Canada are set out in the Canadian Food and Drug Act, while the Canadian Food Inspection Agency (CFIA) is responsible for enforcing portions of that Act. While specific national government standards and certification schemes for those standards do not exist, the CFIA is largely responsible for ensuring food quality. The responsibilities of the CFIA are set out in the CFIA Act:

> 11. (1) The Agency is responsible for the administration and enforcement of the Agriculture and Agri-Food Administrative Monetary Penalties Act, Canada Agricultural

Products Act, Feeds Act, Fertilizers Act, Fish Inspection Act, Health of Animals Act, Meat Inspection Act, Plant Breeders' Rights Act, Plant Protection Act and Seeds Act.

Consumer Packaging and Labeling Act

(2) The Agency is responsible for the enforcement of the Consumer Packaging and Labeling Act as it relates to food, as that term is defined in section 2 of the Food and Drugs Act.

Food and Drugs Act

(3) The Agency is responsible for:

(a) the enforcement of the Food and Drugs Act as it relates to food, as defined in section 2 of that Act; and

(b) the administration of the provisions of the Food and Drugs Act as they relate to food, as defined in section 2 of that Act, except those provisions that relate to public health, safety or nutrition.

Role of Minister of Health

(4) The Minister of Health is responsible for establishing policies and standards relating to the safety and nutritional quality of food sold in Canada and assessing the effectiveness of the Agency's activities related to food safety.

The Canadian Food and Drug Act empowers a CFIA agent in the following manner:

A.01.026. An inspector may, for the proper administration of the Act or these

Regulations, take photographs of

(*a*) any article that is referred to in subsection 23(2) of the Act;

(*b*) any place where, on reasonable grounds, he believes any article referred to in paragraph (*a*) is manufactured, prepared, preserved, packaged or stored; and

(*c*) anything that, on reasonable grounds, he believes is used or capable of being used for the manufacture, preparation, preservation, packaging or storing of any article referred to in paragraph (*a*).

The CFIA Consumer Packaging and Labeling Act is quite stringent in what can go on labels. Nutrition labeling is mandatory and there are guidelines for what certain claims entail (eg. A food can be labeled as low-fat if it has a 30% or larger reduction in fat than its full-fat counterpart.) However, the verification of claims that appear on food labels is regulated only in a broad way by a truth in labeling provision of the CFIA's Consumer Packaging and Labeling Act:

"3.8 Appropriated or Inferred Claims

It is misleading to make a claim for a product or its use so that the merits of another article, with which it may be associated or used, are directly or indirectly appropriated to the product being promoted."
(http://www.inspection.gc.ca/english/fssa/labeti/guide/ch3e.shtml)

This has significant implications for consumer faith in food as it raises questions as to the method of certification that exists for a given claim on a particular food. The CFIA does have

processes of verifying certain claims but they differ by claim, by product and consumers may have a difficult time understanding who checks what on their labels and how.

2.7 Certification Case Study: Egg Products

To provide an example of the multi-dimensional and potentially confusing process involving the regulation of eggs and to give some background for the certification questions that are included in the survey portion of the study, standard setting and verification mechanisms for quality, nutritional and food safety claims on eggs products will now be outlined.

Quality Claims

The standards for egg quality claims, such as "Canada Grade A," are set by the federal government. The requirements pertaining to the grading of eggs are outlined specifically in Schedule 1 of **Egg Regulations** (C.R.C., c.284), a document within the larger *Canada Agricultural Products Act*. It is important to add that all regulations pertaining to eggs in the *Canada Agricultural Products Act* meet all other requirements of the *Food and Drugs Act* and the *Food and Drug Regulations*. The four grades of eggs are Canada A, Canada B, Canada C and Canada Nest Run.

The CFIA regulates shell eggs and processed egg products leaving federally inspected establishments or being imported into Canada (http://www.inspection.gc.ca/english/fssa/eggoeu/eggoeue.shtml). The CFIA verifies they

are safe, wholesome and graded according to established standards. The Agency also verifies they are labeled to avoid misleading consumers and facilitate orderly marketing. To these ends, CFIA activities include:

- registration of egg grading stations and manufacturers of prepared egg products;
- inspection and certification of domestically produced egg products, and exports;
- residue testing;
- retail inspection including enforcing label regulations at retail;
- policy and program development for food labeling and label verification; and
- verifying that food advertising complies with requirements.

Quality certification ensures that a sample of eggs from the producer has been inspected by a CFIA inspector at a registered egg grading station. It is the responsibility of the producer to send a sample (or "lot") of eggs for inspection, in order to maintain that producer's compliance level. For small producers, inspections are conducted approximately twice a year. For larger producers, this may happen up to 24 times a year (CFIA staff, 2009).

Once the sample reaches a registered egg grading station, a CFIA inspector begins the process of inspection. Firstly, the sample must be 85% free of potential defects outlined in Schedule 1, 2.1b) of Egg Regulations (C.R.C., c.284). Then, the inspector assigns a grade of A or B to the sample depending on factors including weight, shape, firmness and exterior appearance. Further, a process known as 'candling' is used to examine the interior consistency of eggs in the sample.

Eggs that do not meet the requirements for Grade A or Grade B are classified as Grade C, and may be sold for use in processed foods. The exact requirements for each grade are outlined in Schedule 2 of Egg Regulations (C.R.C., c.284).

Nutritional Claims

Standards for nutritional claims are set by the producer and must be presented to the CFIA. Eggs bearing any special nutritional claims ("specialty eggs" such as vitamin enhanced eggs that have a better nutritional profile than normal eggs) are often priced at a premium, and it is the responsibility of the CFIA to ensure that consumers are receiving the additional benefits they are paying for. The CFIA certifies these nutritional claims, based on the standards provided by producers. However, this certification is not communicated in any way on the label to consumer and does not mean routine inspections. In Alberta, there is a sampling plant that checks specialty eggs from any individual producer approximately 3 times a year. If the CFIA finds that a sample of specialty eggs meets the standards that the producer claims, the specialty eggs from that producer taken to market may be labeled as such. (CFIA staff, 2009)

Food Safety Standards

General health and safety standards for the marketing and sale of eggs are outlined in section 6.1 of **Egg Regulations** (C.R.C., c.284) in the *Canada Agricultural Products Act*. To be marketed and sold, eggs must be edible, not adulterated, not contaminated and meet all other requirements of the *Food and Drugs Act* and the *Food and Drug Regulations*. An inspector decides whether eggs meet these standards, although it is not clear exactly how.

Pasteurization

Although there are currently no producers of in-shell pasteurized eggs in Canada, following the emergence of these eggs on the U.S. market, there was legislation put in place regulating the process. For a producer to begin producing in-shell pasteurized eggs for the Canadian market, the producer must have their pasteurization process approved by Health Canada. Specifically:

Section 7(2)(h) of **Egg Regulations** (C.R.C., c.284) refers to pasteurization standards:

(h) in the case of an egg station that pasteurizes eggs, a copy of the pasteurization program for the egg station [is required], indicating

(i) the person responsible for carrying out the program, and

(ii) the process to be used to pasteurize the eggs.

Once approved, in-shell pasteurized eggs would be classified as specialty eggs and would be subject to the same frequency of inspection.

2.8 Conclusion

This chapter set out some of the theoretical foundation regarding the implications of information asymmetry on consumer welfare; the possible role of certification in correcting resulting welfare loss and the integral role of trust – whether it is in food chain actors or certifying agents – in ensuring that quality assurance schemes fulfill their purpose. In

addition to trust, the quantity of information may also have an effect on the welfare-enhancing effects of certification schemes. Consumer beliefs and attitudes towards certifying agents, information sources and broader issues such as health and the environment also have a considerable effect on the valuation of a particular attribute or the certification of that attribute.

The Canadian regulatory framework concerning food has certification measures in place to ensure truth in labeling holds, not to determine whether standards are met. This is different than a certification scheme which is focused on setting standards as well as ensuring they are met.

3. METHODOLOGY

3.1 Introduction

This study was comprised of three components to reflect the many dimensions of the research topic and the different types of information sought for the analysis. The survey component was designed to measure attitudes that have been empirically established to affect consumer choice and are believed to be relevant to this research topic (Frewer et al., 2003; Dierks et al., 2006; Glaeser et al., 2000; Nilsson et al., 2006). The "real" choice experiment was designed to simulate a market scenario where a respondent's stated willingness to pay is potentially binding through a Becker- deGroot –Marschak (BDM) auction mechanism, and is thus more likely to reflect their genuine willingness to pay for an attribute. The third component was a stated preference survey that asked consumers questions about their willingness to pay for certification of particular attributes by different agents.

In a study to measure trust, Glaeser et al. (2000) report the worth of using experiments and surveys together as arising from the following characteristics of the two: "Experiments measure preferences, behavioural propensities, and other individual attributes much more convincingly than surveys, since experiments provide direct observations of behaviour. Connecting experiments and survey, we can determine the socioeconomic correlates of hard to measure individual attributes and test validity of survey measures." As many combinations of techniques are used to collect information about how consumers make their choices, for ease of reference, Table 3.1 lists several of

the studies referred to in this thesis, their objective, their method and how data collected were modeled. The last column of this table will be referenced in the next chapter.

This chapter will focus on the methods that were used to conduct this study and collect data that will be used to further the thesis objective of examining the nature of consumer trust and the effect quality certifications have on consumer choice decisions. The overall study design, the rationale for eggs as a products choice and the three components of the study as well as the differences between the two study sessions will comprise the chapter's subsections.

Table 3.1: Methods Used to Measure Objectives Similar to This Study

Citation	**Objective**	**Method**	**Model/Data Analysis**
Cranfield, J. A., and Erik Magnusson (2003) Canadian Consumer's Willingness-To-Pay for Pesticide Free Food Products: An Ordered Probit Analysis *International Food and Agribusiness Management Review* Vol. 6 (14-30) No. 4.	To measure and model WTP for pesticide free certified products.	A contingent valuation survey was sent to households in three Canadian cities. Questions about different aspects of product asked Likert scale responses, added together to form summated scale. WTP questions were a range between two dollar values.	Ordered probit model was used to analyze results.

de Jonge, J., Van Trijp, H. C. M., Van der Lans, I. A. Renes, R. J., & Frewer, L. J. (submitted for publication). How trust in institutions and organizations builds general consumer confidence in the safety of food: A decomposition of effects.	To systematically investigate the contribution of specific actors, specific trust dimensions, and combinations between these, in enhancing general consumer confidence in food safety	Surveys administered by market research agency to Dutch shoppers. Optimism, pessimism, worry questions were asked. Ratings of trust for different agents: manufacturers, retailers, government and farmers.	Standard regression model run with optimism, pessimism as dependent variables and trust predictor variables (ie. Belief a manufacturer is perceived as competent). How do trust levels predict the level of food confidence?
de Jonge, Janneke, Hans van Trijp, Ellen Goddard , and Lynn Frewer. 2008. Consumer confidence in the safety of food in Canada and the Netherlands: The validation of a generic framework. *Food Quality and Preference* 19, no. 5: 439-51.	Consider safety of food in general, consumer confidence in general and determine whether research framework developed in the Dutch context can be applied in international context.	Cross sectional survey conducted in two countries using market research agency. Participants recruited from volunteers. Internet survey. Trust was measured using six items for each of four different actors.	Data was analyzed using structural equation modeling. Factor analysis was used.
Dierks, L. H. and C. H. Hanf (2006) Trust as a determinant of consumer behaviour in food safety crises. Selected paper at the International Association of Agricultural Economists Conference, Australia.	To determine the effect of trust on a consumer's intention to purchase.	2,725 face-to-face in-home interviews across Europe. Respondents indicated information on seven point Likert scale.	Factor analysis following Varimax rotation; SPARTA model.
Enneking, Ulrich. 2004. "Willingness-to-pay for safety improvements in the German meat sector: the case of the Q&S label." *European Review of Agricultural Economics*. 31, no. 2: 205-223.	To investigate WTP for the quality assurance scheme in the German meat sector.	Data was collected using computer-assisted surveys administered to liver sausage eaters in pedestrian and shopping areas. Chose between different prices for different brands with and without quality assurance label	Conditional logit model.

Frewer, L. J, J. Scholderer and L. Bredahl (2003) Communicating about the risks and benefits of genetically modified foods: The mediating role of trust, Risk Analysis, 23, 1117-1133.	To test the role of trust in an attitude change experiment.	1,405 respondents, half beer consumers, half yogurt consumers, were recruited in malls. Respondents got information from different sources, rated prior attitudes then rated post information attitudes.	Multi structural equation model defined by 5 simultaneous equations; 2 models: one with beer one with yogurt, then models were compared.
Glaeser, Edward L., David I. Laibson, José A. Scheinkman, and Christine L. Soutter. 2000. Measuring Trust. *Quarterly Journal of Economics* 115, no. 3: 811-46.	Measure trust and trustworthiness by conducting experiments with monetary rewards. Identify individual and situational correlates of trust. Test whether the standard attitudinal trust questions predict actual trusting behavior with real money. Primary methodological point of paper is that experiments can be integrated with survey to measure individual-level variation in traditionally hard to measure characteristics such as trust and trustworthiness.	Undergraduates (258 sample) were asked survey questions. Two weeks later, subgroup (196) plays experimental trust games. Subjects are paired and then one of them has the opportunity to send a sum of money to the recipient. The experimenter doubles each dollar that is sent. Recipient can then send back all or a portion of money back. Second experiment is an envelope drop.	Ran OLS with trust level as dependent variable and demographics as regressors. Used the trust questions from the GSS survey.
Gellnyck, Xavier, Wim Verbeke and Bert Vermeire (2006) Pathways to increase consumer trust in meat as a safe and wholesome food. *Meat Science* 74, 161-171.	Verify whether three aspects related to information - consumer interest in traceability as a response to quality concerns, information on meat labels and the role of quality assurance schemes - generate additional trust for consumers in meat safety.	Two consumer surveys (170 Belgium, 2001, 155, 2004). One with no restrictions. Respondents asked about importance of different label information cues. Assessed respondent awareness about traceability and opinions about who should possess traceability information. Respondents were shown four meat labels with different degrees of traceability information and were asked to select their preferred label.	Hierarchal cluster analysis followed by a k-mean clustering on the perception of quality of fresh meat now compared with 5 years ago. Evaluation of Likert scale questions.

Goddard, Ellen, Peter Boxall, John Paul Emunu, Curtis Boyd, Andre Asselin, and Amanada Neall. 2007. "Consumer Attitudes, Willingness to Pay and Revealed Preferences for Different Egg Production Attributes: Analysis of Canadian Egg Consumers." *Project Report #07-03*, Department of Rural Economy, University of Alberta.	To examine how consumers' perceptions of quality with regard to food safety, concern for animal welfare, health/nutrition and the environment are revealed through their purchases of various types of eggs in the market.	Two types of analysis: stated preference survey to determine consumer WTP for shell egg attributes. Revealed preference analysis of specific egg purchases by household over a period of time.	Survey tries to establish links between attitudes and purchase decisions; health locus of control used. Attitude or behaviour scales reduced by principal component analysis; conditional logit model for stated preference survey.
Gracia, A., Loureiro, M.L., Nayga, R.M., Consumers' Valuation of Nutritional Information: a choice experiment study, Food Quality and Preference (2009), doi: 10.1016/j.foodqual.2009.03.010	To assess consumers' preferences towards nutritional information available on food packages when shopping.	Choice experiments were performed with 400 food shoppers in Spain. Given the opportunity to select between two boxes of breakfast cookies carrying different attributes and a no buy option.	Random parameter model used to analyze data.
Kanter, Christopher, Kent Messer, and Harry M. Kaiser. 2008. Does Production Labeling Stigmatize Conventional Milk? Working paper. Funding provided by National Science Foundation and New York Milk Promotion Order Advisory Board.	To determine whether the move away from conventional milk is being driven by consumer bias against rBST.	Experimental economics to elicit WTP measures for milk produced by different production methods. Three-part experiment and used BDM bidding mechanism. Experimental session lasted an hour.	Two limit tobit model.
Loureiro, Maria and Wendy Umberger. 2004. "A Choice Experiment Model For Beef Attributes: What Consumer Preferences Tell Us." Selected Paper Presented at the American Agricultural Economics Association Annual Meetings Denver, Colorado, August 1-4, 2004.	To examine to which extent attitudes about food safety and meat attributes translate into WTP for labeled ribeye steaks.	Choice modeling framework which allows individuals to select between two alternative options that contain a number of attributes at different levels	Conditional multinomial logit model estimated within a maximum likelihood framework.

Rozan, Anne, Anne Stenger and Marc Willinger. 2004. "Willingness-to-pay for Food Safety: An Experimental Investigation of Quality Certification on Bidding Behaviour." *European Review of Agricultural Economics* 31 no. 4: 409-425.	To study the impact of new information about food safety on subjects' willingness-to-pay for food products including certified food products.	An experiment where participants posted bids for products commonly bought and then they were asked to submit bids for either an uncertified version of that product or a version of the product that was certified as containing below the safe allowances of heavy metal content. The binding choices were either established through a BDM auction or a Vickrey auction depending on the study sub-sample.	Probit analysis
Ward, Ruby, Lynn Hunnicutt, John Keith (2004) If You Can't Trust the Farmer, Who Can You Trust? The Effect of Certification Types on Purchases of Organic Produce. International Food and Agribusiness Management Review No. 7 (60-77) Vol. 1.	To examine the efficacy of certification as a way to increase credibility of claims about production methods and thereby increase the size of the market for organic produce.	Survey administered to a random digit dial sample of Utah residents (n=933). Primary grocery purchaser was asked questions about how five types of certification would change their purchases of organic produce. Five certifiers were farmer, retailer, state government, federal government and independent organization. 5-point Likert scale used to gauge attitudes. Tried to determine how would certification affect purchase if it added 10% to the price.	Ordered probit regression to see the effect of certification on purchases of organically grown produce. This regression is an attempt to determine if certification shifts the demand curve.

3.2 Overall Study Design

The study was designed as a three-part exercise that was estimated to take participants approximately an hour to complete. This time frame was deemed as reasonable after conducting a pilot study with participants recruited from among University of Alberta administrative staff. The first of the three components of the study was a survey designed to elicit demographics, attitudes towards a series of issues relevant to the focus of the study and in the second sessions, respondent knowledge of certification. The survey had 30 questions in the first sessions and 43 questions in the second sessions due to extra questions related to health, certification and vitamin-enhanced eggs. The second component was a "real" experiment where respondents endowed with a dozen regular eggs would submit bids to exchange those eggs for ones with a credence attribute. The choice of eggs to exchange differed between the two study sessions, with the first ones involving eggs that had a food safety and an animal welfare attribute while the second ones involved eggs with a food safety and a health attribute. The third component was a stated preference questionnaire designed to get information about respondent WTP for certification and was completely different in both sessions, with the second version being more complex and providing much more information. The differences will be detailed in the subsection on this exercise. There were two treatments in the data collection process. The first was an information treatment that entailed varying the order in which subjects received the survey. This was done in both study sessions. The other treatment was exclusive to the second session and involved varying whether subjects did the "real"

experiment. Figures 3.1 and 3.2 are flow charts that show the process of each study and will provide a visual guide to what was done and when.

Figure 3.1: Study Process: Sample 1

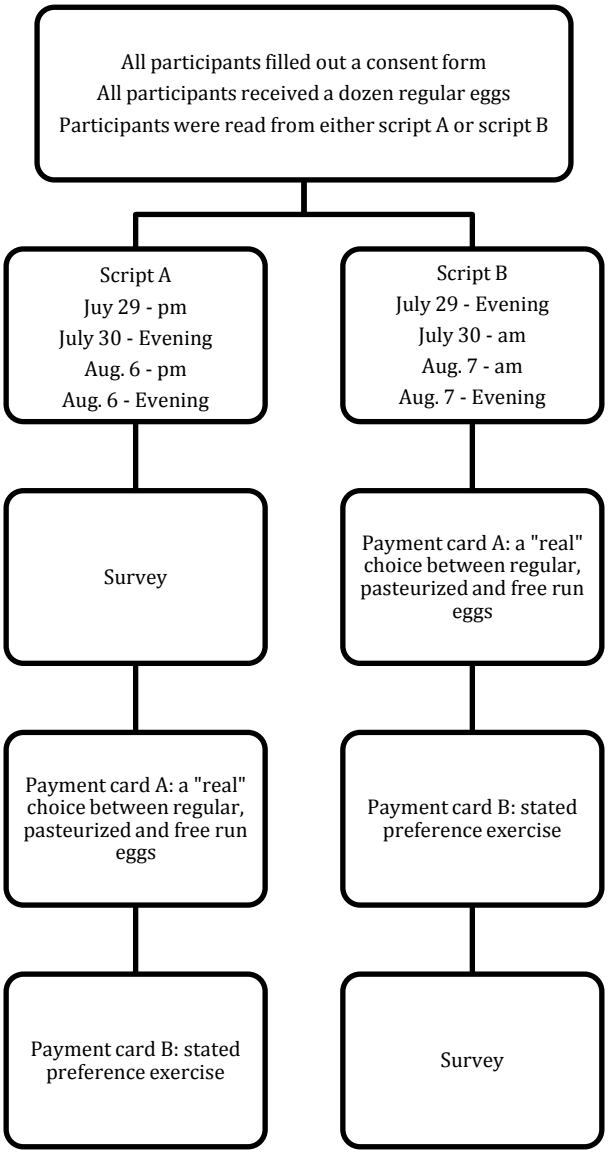
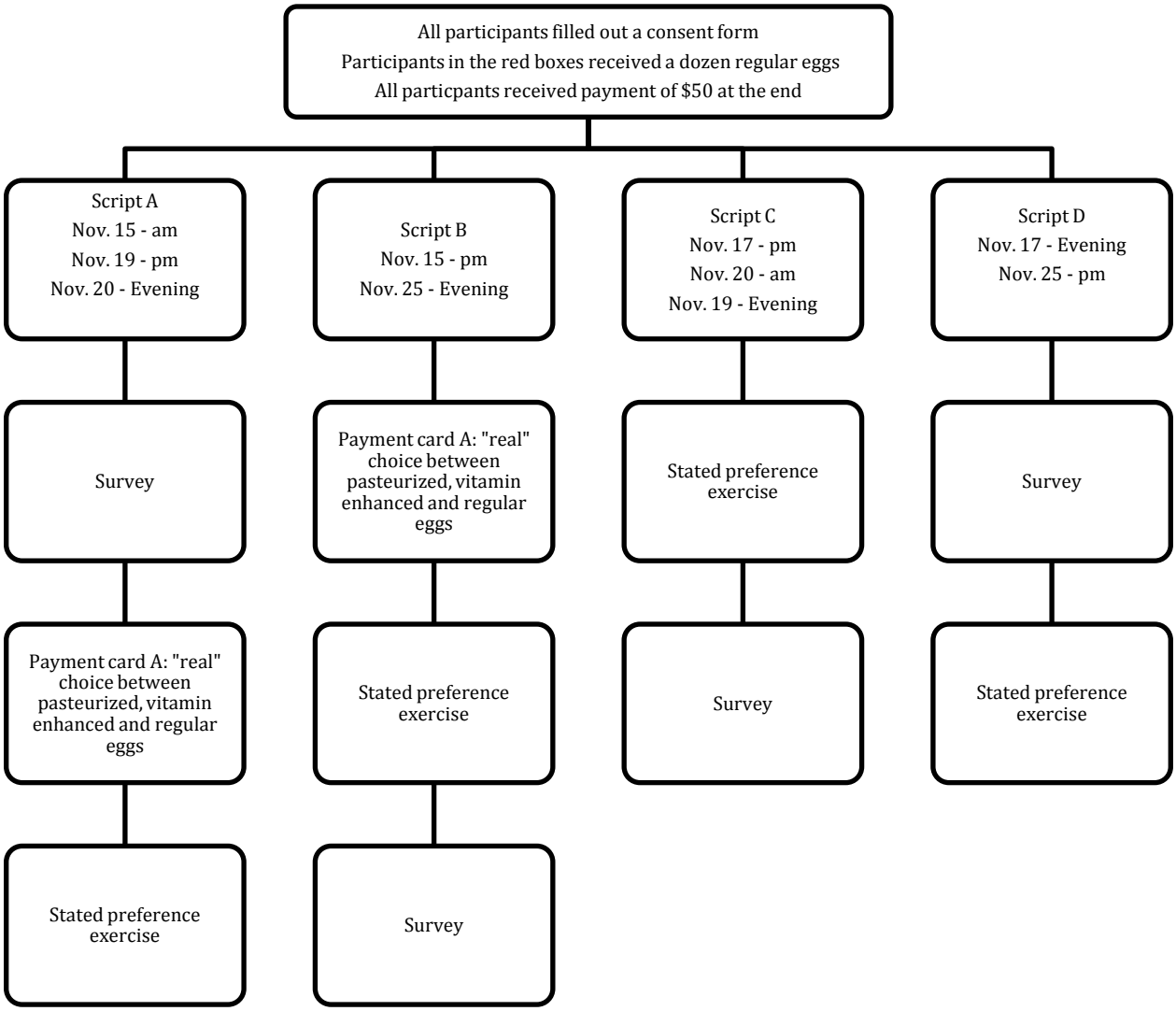


Figure 3.2: Study Process: Sample 2



3.3 The Choice of Eggs

The choice of eggs as the product for this research was based on the fact that eggs are highly differentiated by credence attribute. There is already market evidence that people are willing to pay for different credence attributes as specialty eggs are priced differently (CEMA, 2008; Goddard et al. 2007). Furthermore, the market in Canada for specialty eggs has exhibited considerable growth, as has the demand for eggs in general (CEMA, 2008). It has been observed that the demand for credence attributes such as health, as in the case of Omega-3 eggs, has also increased (Paravolidaki, 2008). These facts combined with universal consumer appeal and market versatility make eggs an appropriate product for the purposes of this particular study.

3.4 The Survey

3.4.1 Survey Framework

The purpose of the survey was to collect information that was identified in other studies as possible determinants of consumer choice. A large part of the survey was based on a similar survey developed and validated by de Jonge et al. (2007) in order to measure consumer confidence in the safety of food. That survey was developed around a conceptual framework that identified trust in regulators and actors in the food chain, consumer recall of food safety incidents and media coverage of food risks, safety perceptions of product groups and individual differences as determinants of general consumer confidence in the

safety of food (de Jonge et al., 2004). The framework conceptualizes consumer confidence as a two dimensional construct with the dimensions being optimism and pessimism. As described by de Jonge et al., (2008) p. 440: "Optimism about the safety of food indicates the extent to which consumers are satisfied about the safety of food and think that food is generally safe. Pessimism, on the other hand, indicates the extent to which consumers worry and are suspicious about the safety of food."

The links established by this survey mechanism between consumer trust in different agents and their confidence in food is particularly relevant to the questions posed in this study relating to trust in agents to certify various credence attributes, including food safety. It should also be noted that the framework used for this survey was validated in an international context through a comparative study between Dutch and Canadian consumers (de Jonge et al., 2008).

This study adapted this framework to the concept of certification of credence attributes and the survey includes questions pertaining to trust in regulators and actors in the food chain, consumer trust in institutions providing information about food safety incidents, safety perceptions of product groups, consumer understanding of certification and socio-demographic characteristics. In addition, the survey included questions about eggs, consumer practices involving eggs and other foods and consumer activism. In the second session, there were also questions about health beliefs and a set of questions about certification knowledge. Survey components will now be discussed in more detail and two versions of the survey are attached as appendices A and B.

3.4.2 Survey Components

The first set of questions was designed to elicit a general level of trust. One of the questions was aimed at determining the level of trust survey respondents possessed towards groups of people. The questions asked people to scale their trust of groups such as doctors and nurses, scientists or people in your family from 'cannot be trusted at all' to 'can be trusted a lot'. When assessing whether attitudinal trust questions predict actual trusting behaviour by combing a survey and a "real" experiment, Glaeser et al. (2000) found that specific trust questions about groups of strangers were better than general questions about trust at predicting behaviour.

The second set of questions pertained to consumer optimism, pessimism and worry. de Jonge et al. (2008) found that consumer confidence in the safety of food consisted of two dimensions: optimism and pessimism. Consumer optimism and pessimism towards food safety were elicited using 3 or 4-point Likert scale questions, which are one of the most widely used attitude scaling techniques (Weiers, 1984). A relationship was found between trust and pessimism/optimism as a higher level of trust indicated a higher degree of confidence in food (de Jonge et al. 2008). Questions in this genre also included a question about confidence in food groups like chicken, pork and different types of eggs such as brown eggs, white eggs, pasteurized and free-range eggs. The reason for the differentiation of the egg colours is that even though brown and white eggs are nutritionally equivalent, it has been found that colour affects willingness to pay, with consumers paying more for brown eggs (Goddard et al., 2007). A question was also included to determine attitudes of people towards the risk of eating eggs, since perception of new and future risks have been

found to significantly affect consumer purchasing decisions (Maruyama, 2004; Nelson, 2004).

Four sets of questions asked respondents to rate their attitudes towards different agents in the food chain. The items represented the extent to which the actor was perceived to be competent, to be honest and open, and to care for public wellbeing with respect to food safety matters (see Frewer et al., 1996; Lang & Hallman, 2005; Metlay, 1999; Poortinga & Pidgeon, 2003). Empirical findings of significant deviations in the overall trust for different actors indicate that optimism about food safety varies depending on who is trusted (de Jonge et al., 2008). This measure is in effect a proxy for trust in a given agent. The link between trust in an institution within the food chain and its effect on consumption patterns is further confirmed by Wales et al. (2006) in their analysis of how the U.K, became the country with the highest trust in food safety despite the BSE crisis. They argue that trust was established through reorganization of responsibilities for food safety, which underscores the notion that trust in the overall safety of food depends on the trust in the agency responsible for it.

The next set of questions asked respondents who is responsible for the safety of food and tried to gauge to what extent they are concerned about various controversial issues related to food such as genetically modified animal feeds and the origin of products and animals. Questions about consumer practices related to eggs, such as where they buy their eggs were included to establish a possible link between these practices and the type of certification they prefer. Consumer voice was also measured using the Likert scales in order to determine how much the consumer felt empowered to control issues surrounding

their own food. This measure is drawn from a large multi-country European study on trust in food conducted by Poppe and Kjaernes (2003). The last set of questions prior to standard demographic questions establishing gender, household position, children in house, employment and education, are questions regarding trust in the providers of information. In the previously mentioned study by Frewer et al. (2003), a connection was established between trust in an information source and the consumer choice effect of information provided by that source. In a study to examine consumer preferences for different information sources in terms of food safety, Kornelis et al. (2007) identified five distinct consumer groups that differ on the reported use of information sources and also regarding several personality characteristics and socio-demographic variables. Furthermore, their results indicate that two thirds of consumers are selective in their use of information sources.

In the second session, this same survey instrument was modified to include questions about vitamin-enhanced eggs in the egg preference and egg belief questions since vitamin-enhanced eggs were used in this study. The second survey also included two additional components: a series of questions about health attitudes and a series of questions about certification knowledge.

Attitudes towards health are measured using a health locus of control (HLC) developed by Wallston et al. (1979) to determine an individual's sense of control over their own health. The HLC scales consist of three 6-item scales which determine an individual's internal locus of control (the degree to which a person believes their behaviour affects their health) and two different external loci of control (one to assess beliefs that an

individual's health is determined by powerful other people and one that measure the extent to which one believes that health or illness is a matter of fate, luck or chance.) The item of interest for this study is the internal locus of control and the correlation that may exist between this score and an individual's propensity to purchase the health attribute of vitamin-enhanced eggs.

Questions related to certification knowledge arose from conversations researchers held with study subjects during the first study sessions. After completing their surveys and exercises, participants would often engage researchers in discussions about the tasks they had completed and about the elements they found informative or confusing. One recurrent theme was respondent confusion about current certification regimes and regulatory practices. This suggested a possibility of certification knowledge as a variable that may affect consumer willingness to pay for certification. The possibility that a consumer may hold mistaken beliefs that their food is certified in particular way and by a particular agent will distort their willingness to pay and potentially cause a welfare loss. To measure consumer knowledge of certification, a set of questions relating to who sets the standards for different attributes on the egg labels (quality, food safety, nutrition and pasteurization), who certifies those attributes and what that certification means in terms of frequency of inspection to ensure standards are met. Information against which the correctness of respondent answers was assessed was collected through interviews with CFIA staff and verified or supplemented by legislation contained in the CFIA Act as well as the Food and Drug Act.

3.5 Experimental Design: "Real" Choice Experiment

An exercise to elicit the WTP for egg attributes by themselves was conducted as an economic market-simulating experiment in order to add an additional element of reality to the study. This was possible because the research is partially based on existing products (generic, free run eggs which are sold in Canada and pasteurized eggs which are sold in the U.S.). It was not possible to run the same type of experiment for these products as certified by different bodies since not all of them exist in the Canadian market and so a hypothetical stated preference survey was used instead. As discussed in Rozan et al. (2004) the use of experimental techniques to assess consumers' WTP has several advantages over other methods, including better control over WTP elicitation and an easily replicable assessment. The second of these was useful for this study due to the two different sessions. Furthermore, the use of techniques that simulate real markets and provide subject with incentive compatible choices have been used successfully to value food safety (Rozan et al., 2004; Lusk et al., 2004), to measure trust (Glaeser et at., 2000), to value information (Gracia et al., 2009) and to value certification (Rozan et al., 2004).

The experiments in this study were conducted in a similar manner within both sessions, however, in the November sessions, free run eggs were replaced with vitamin-enhanced eggs. Also, in the November sessions only half of the sessions included the experiment. This was done to observe whether participating in a "real" experiment had any effect on consumer preference WTP expressed in the subsequent stated preference survey. Compared to WTP elicited through incentive-compatible transactions in experimental markets, the WTP elicited through hypothetical questions tends to have an upward bias

(Rozan, 2004; Neill et al., 1994). However, it is unlikely that subjects are conscious of placing a higher bid in a hypothetical situation and as such, it is interesting to test whether WTP elicited in a hypothetical exercise is affected by first having to establish a WTP for a certain product in a "real," incentive-compatible experiment. Having to first determine what they are willing to pay for a dozen eggs might make subjects more conscious of what the true value of a dozen eggs is to them and thus make their hypothetical estimations of what they would pay for those eggs with a certified credence attribute more accurate. It has been observed that making subjects conscious of their bias through cheap talk scripts has reduced that bias (Ozdemir et al., 2008) so perhaps doing a "real" experiment first might have the same effect. To establish whether there is a bias the bid amounts will be compared across the two sub-samples and if it they significantly different, it will be established whether in fact, doing an incentive-compatible experiment first reduces bid amounts in a hypothetical exercise.

The two experiments were structured as follows. Participants were endowed with a carton of 12 regular generic eggs. At the beginning of the study session, the experiment was described to them in the following manner (with the words free run exchanged for vitamin-enhanced in the November sessions and the reference to egg colour omitted):

> *"This task will be an experiment where you are issued a dozen regular large eggs. You will then be asked what you are willing to pay to trade these eggs in for a different dozen. Again, since we are trying to simulate real purchasing decisions, one of the choices you make will be binding and you will have to pay the amount indicated.*

The exercise will work like this. You will turn to Payment Card A where you will be asked to make eight choices. You may choose to keep the regular eggs and pay nothing or pay an additional amount between $1 and $4 and trade in these eggs for eggs that have undergone an in-shell pasteurization treatment to reduce the probability of salmonella, which is a food borne illness or free run eggs. Please note that while the free-run eggs are brown in colour, this does not change the nutritional value of these eggs compared to eggs, which are white. Please read the laminated information sheet prior to making your choices to make sure everyone has the same definition of the different types of eggs.

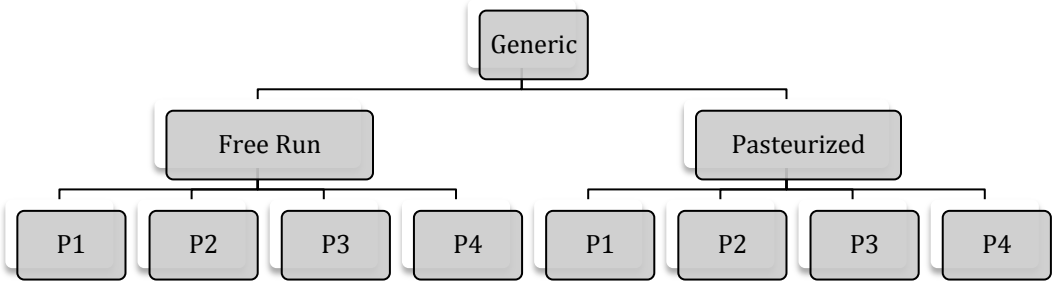
After you have made your choices, we will roll an eight-sided die to randomly determine which choice is binding. Whatever you indicated at that choice will then be taken into account when you receive your payment at the end of the session. If you indicated that you are willing to pay the amount asked at the binding level, this amount will be deducted from your $50 payout and you will be given the eggs you chose. If you indicated that you wish to keep your eggs at the binding option, you will keep the regular eggs."

The participants were then shown the other two types of eggs, which were packed in identical cartons and had identical no-brand labels differing only by the credence attribute. The labels can be viewed as Appendix H. All participants were given a sheet describing the process of egg pasteurization and vitamin enhancement, and the characteristics of the different eggs to be included in the experiment. In the first sessions, a researcher would open the cartons of the eggs that were to be traded and leave them on the table so

participants could visually inspect them. In the November sessions, it was noted after the first two sessions that people were interested in the differences in nutrition between the generic or pasteurized eggs and vitamin-enhanced eggs. For the remaining sessions, egg cartons containing the vitamin-enhanced and pasteurized eggs were put on the table so that each participant could read the nutrition label and examine the eggs. The differences in nutrition were read aloud by the researcher to participants. As consumers have the option of comparing nutrition labels in stores, this additional information treatment was not considered to be interfering with the grocery store simulation aspect of the experiment.

After being given the eggs and the information, respondents were asked to fill out a payment card, which is included as Appendix D. This payment card was designed as a set of eight randomized pairwise choices giving the option of keeping the generic eggs and paying nothing or paying either $1, $2, $3 or $4 to exchange these eggs for one of the options. The pairwise choices were developed for simplicity of the exercise, since choice complexity has been demonstrated to bias decisions. In a study combining gamble experiments and revealed preference data of investment decisions in pension plans varying by complexity, Iyengar et al. (2007) found that when faced with a large choice set, agents are reluctant to select options that they do not understand well and so excessive choice sets induce a preference for simplicity. The choices respondents faced are outlined in the figure below.

Figure 3.3 Choices in Payment Card A, Sample 1

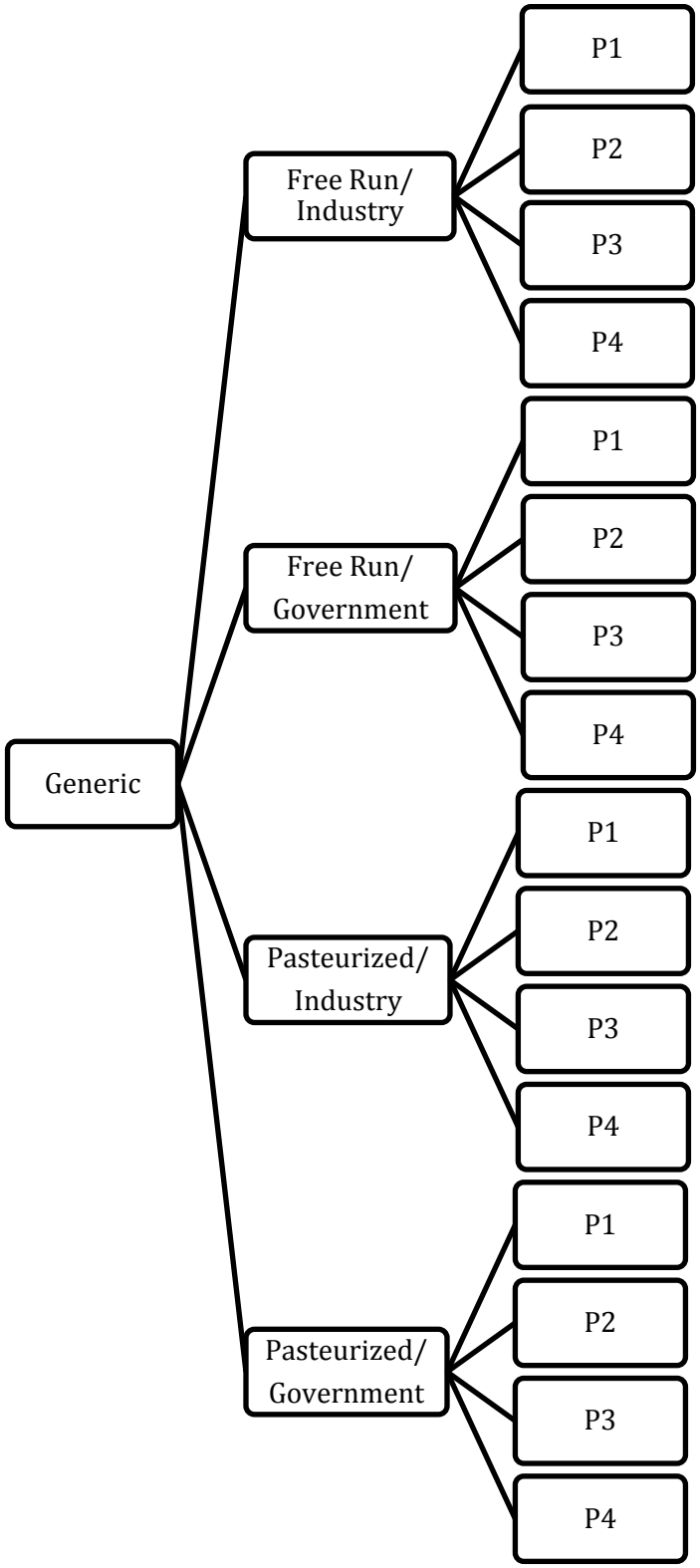


The bid values were chosen on the basis of average egg prices and premiums charged by retailers for specialty eggs in stores. The bid levels were tested in a pilot study and found to be robust, with bids submitted at every level. Once participants submitted their bids, a binding choice was established using a BDM auction mechanism. To randomly determine the binding option, an eight-sided die was cast and the number that was selected determined which one of the eight choices would be binding. If an individual responded yes to the price value on their payment card for that choice, the price was deducted from their $50 payment for participation. Kanter et al. (2008) attributed incentive compatibility and demand revealing properties to BDM auctions and they are widely believed to reduce hypothetical bias by making a survey respondent accountable for potentially any one of their stated choices (Horowitz, 2006).

3.6 Stated Preference Method

The stated preference survey was designed to determine the most crucial piece of information for this research: consumer willingness to pay for certification by different bodies. There exists considerable evidence that results obtained from a choice modeling framework compare very well with those obtained from revealed preferences (Carlsson and Marinson, 1999; Adamowicz, Louviere and Williams; Adamowicz et al., 1997; Adamowicz et al., 1998). Furthermore, in terms of stated preference methods, choice experiments based on conjoint analysis have been found to have an advantage because they present respondents with a choice between sets of attributes, allowing researchers to observe the tradeoffs between controlled choice sets (Boxall et al., 1996). This was particularly appropriate for this study where each choice set contained three variable attributes: the type of credence attribute (or no credence attribute), price and certifying agent (or no certifying agent). For the first sessions, this survey mirrored the payment card for the experiment, giving respondents pairwise choices between paying $2 for generic eggs or paying either $3, $4, $5 or $6 for either free run or pasteurized eggs certified by either farmers, industry or government. This payment card is included as Appendix D. The choices that respondents faced are outlined in the figure below.

Figure 3.4: Choices in Payment Card B, Sample 1



In the second set of sessions, the stated preference exercise was more complex, with different price ranges and a three way choice between eggs that had been certified by one of the agents (or none) at a given price and a no choice option. Participant had to make hypothetical choices between purchasing regular uncertified eggs ($2) and pasteurized, vitamin enhanced or free run eggs uncertified or certified by industry, government or farmers at three different prices, $2.20, $3.04, $3.88. Including a no choice option, as recommended by Adamowicz, Louviere and Swait has been found to produce better results in terms of the accuracy of the estimated model coefficients and predicted probabilities compared to designs without the no-choice option (Vermeulen et al., 2008). This is assumed to be because it reflects the reality that consumers always have a choice not to purchase a product.

The four types of eggs, three price levels and four types of certification yielded 117 unique combinations. From these, seven combinations were excluded because they were matches that were clearly dominated. For example, if the only difference between the two choices was the price we assumed that rational consumers would always choose the cheapest and so that combination was excluded. The combinations are all listed in Appendix K. To accommodate all the possible combinations there were 9 versions of the stated preference survey with 12 questions each. One of the versions is included as an example in Appendix G. Table 3.4 shows how many copies of each version were filled out at each session including the sum of each question answered.

Table 3.2: Number of Each Question Answered at Each Session

Version/Session	1	2	3	4	5	6	7	8	9	10	Sum of question answered across all sessions
1	2	1	2	2	3	2	1	0	3	3	20
2	2	1	2	2	3	1	2	2	2	1	20
3	2	1	3	1	1	2	1	1	2	1	18
4	2	2	2	1	1	2	1	1	1	2	19
5	2	2	2	1	1	2	1	1	1	1	19
6	2	1	2	2	1	2	1	1	2	3	23
7	2	1	2	1	2	2	2	2	3	2	26
8	1	2	2	2	2	2	2	1	1	1	24
9	1	2	1	1	0	2	2	1	1	1	21

3.6 Conclusion

This chapter details the methods used to conduct this research study and their underlying rationale. This study was conducted using a combination of experimental economics, stated preference choice experiments and a survey. This combination fit within a one-hour allotted timeframe and was observed by the researchers who conducted the experiments to generally retain participant concentration and interest. There were relatively very few unanswered questions in any portion of either study session, which was taken as a positive sign of comprehension and a testament to the usability of its design.

4: DATA COLLECTION AND SAMPLE ANALYSIS

4.1 Introduction

The aim of this chapter is to describe the data collection process and examine the demographic and attitudinal characteristics of each sample. The characteristics of both samples will be compared to census demographics and, where appropriate, to each other. Differences between groups will be analyzed for information that may shed light on the previously stated objectives of this study. The chapter will be organized in the following manner. A section detailing the data collection process will be followed by one on demographics. Graphical analysis will be concentrated on attitudes towards trust in general, confidence in different institutions and products as well as trust in different food chain agents. The chapter will conclude with a section on respondent health beliefs and knowledge of certification.

4.2 Data Collection

Data were collected over the course of two study periods. Human ethics applications were filed and approved for both sessions, as per requirements at the University of Alberta. The first study took place in July 2008 and each session comprised three parts outlined in the previous chapter. The sessions were held in the morning, afternoon and evening on July 29 and 30 and August 6 and 7. An attempt was made to recruit 100 people by telephone. Recruitment was done with the assistance of the Population Research Lab at the University

of Alberta. Specifications given to recruiters were that survey subjects were to be adults and primary household grocery shoppers. Participants were compensated $50 for their time. After accounting for no-shows and failures to properly fill out the documents, there were 68 completed surveys and payment cards for analysis. One of the information treatments concerned whether or not completing the survey heightened awareness of and willingness to pay for certification. For this treatment, half of the participants filled out the survey prior to the choice experiment and stated preference exercise and the other half completed their surveys afterwards. This was done to consider the effect of raised consciousness about food safety and trust in various elements and institutions of the food supply chain.

The second set of study sessions was held in November 2008 and also comprised three exercises. The study sessions were held in the morning, afternoon and evening on November 15, 17, 19, 20 and 25. As in the first session, half of the participants received their surveys before they completed their other exercises and the other half received their surveys afterwards. In the November session there was a second information treatment, aimed at discovering whether completing the egg purchase experiment affected willingness to pay for certification. In this session, only half of the survey participants were required to do all three exercises, the other half only did the stated preference experiment and the survey. Attempts were made to recruit 200 participants, again with the help of the Population Research Lab at the University of Alberta, and 144 surveys were collected for analysis.

4.3 Demographics

The study sample demographics were compared to Edmonton Census data from 2006. The samples were overrepresented by females, although that is likely due to the specification that respondents were to be primary household shoppers. There were also more retirees and students than in the population at large but that is to be expected in these types of exercises, as they tend to attract people who have a lower opportunity cost of time. The second study was demographically more representative and that is likely due to its larger size.

Table 4.1: Comparative Demographics of Samples 1, 2 and Edmonton Census 2006

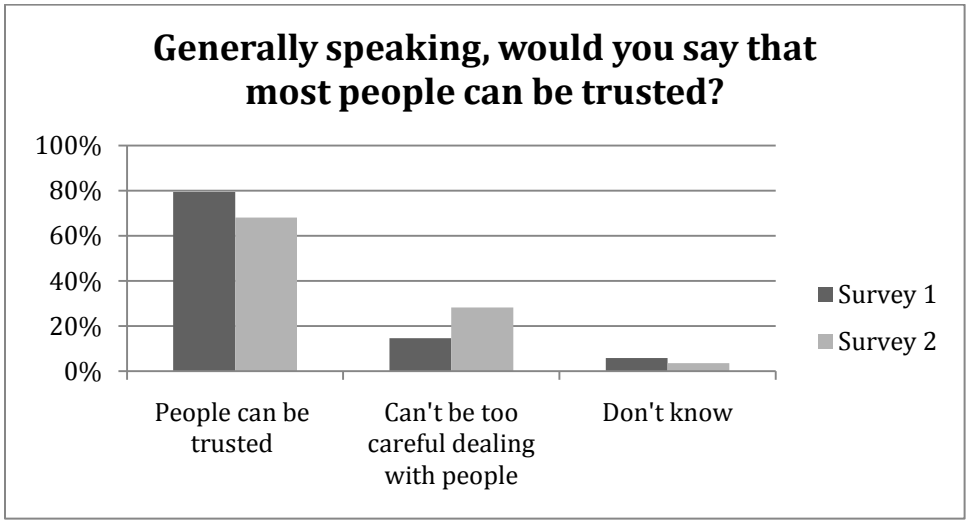
	Sample 1	**Sample 2**	**Edmonton Census 2006**
Gender			
Male	31%	33%	49.5%
Female	69%	67%	50.50%
Age	47.397	48.53	36.1
People in hhld	2.2352	2.03	2.9
Position in Household			
Head	50%	54%	
Partner	44%	39%	
Other	5%	5.60%	
Marital Status			
Single/Divorced/Widowed/Separated	31%	51%	69%

Married	69%	49%	31%
Education			
High school	15%	15%	25.80%
Total post-secondary	85%	84%	52.30%
Employment Rate	53%	57.3%	68.40%
Income	Median $50,000-$89,000	Median $50,000-$89,000	Median $63,988

4.4 Survey Attitude Analysis

Frequency distribution tables of responses to various survey questions show some attitudinal differences between the samples. The first set of respondents appeared more trusting, as 10% more said people can be trusted than in the second sample. However, a t-test indicated that these differences were not statistically significant.

Figure 4.1: Differences in General Trust



In the questions regarding what groups of people they trust most, respondents in the second sample trusted family, neighbours and doctors less than people in the first sample. While the trend was towards less trust in all groups of people, only those groups had statistically significant differences. The question posed was: 'How much do you trust each of the following groups of people?' Respondents answered using a 5-point Likert scale that ranged from 1 (cannot be trusted at all) to 5 (can be trusted a lot). The results can be seen in the following table.

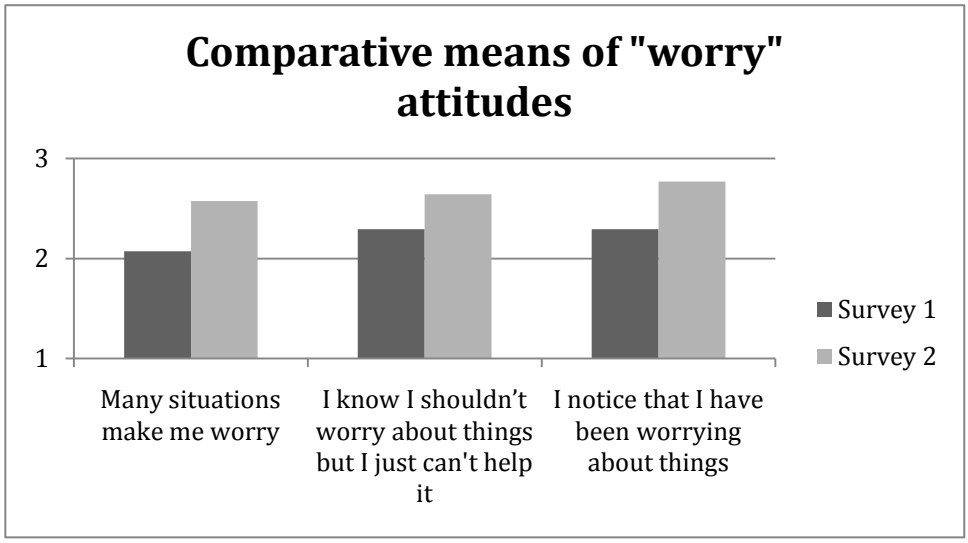
Table 4.2: Difference in Trust in Select Groups of People

	People in your family	**People in your neighbourhood**	**Doctors or nurses**
Sample 1	4.99	4.49	4.60
Sample 2	4.85	4.15	4.42
T-test of statistical significance	0.00	0.01	0.02

People in the second sample were also considerably more worried than in the first sample. The difference in all responses to the worry questions were significant at the 10% level.

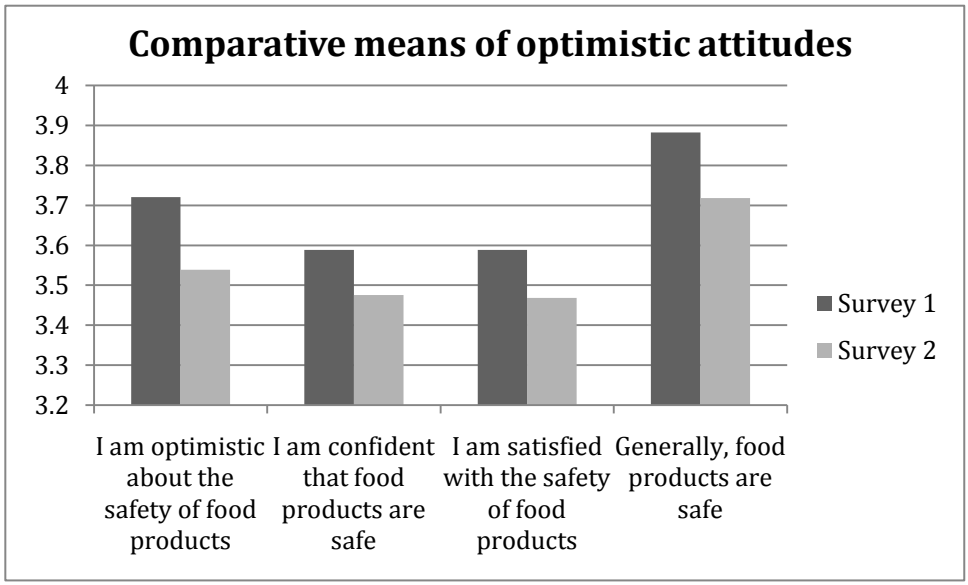
Figure 4.2: Comparative Means of "Worry" Attitudes

1= not at all typical, 3=somewhat typical, 5=very typical



de Jonge et al. (2008) found that the worry attitudes correlated highly with both optimism and pessimism, with people who worried more being less optimistic and more pessimistic about food safety. This study validated that result somewhat with the second sample appearing less optimistic about food safety and more pessimistic. While the differences in mean responses to the optimism questions are not statistically significant, they do consistently indicate a trend direction. For these questions, respondents were asked to rank their attitudes towards food safety on a Likert scale of 1 to 5 where 1 was strongly disagree, 3 was neither agree, nor disagree and 5 was strongly agree. Table 4.4 shows the difference in mean answers to the optimism questions within both samples.

Figure 4.3: Comparative Means of Optimistic Attitudes



With the same 1 to 5 scale, respondents were asked to indicate their pessimism towards food safety. Here the difference in the third component where subjects were asked if their suspicion of certain food products increased as a result of food safety incidents was highly significant, with the null hypothesis that the means of the two samples were the same rejected at the 1% level. The comparisons between the means of the two samples are illustrated in table 4.6 and provide an indication as to the difference of attitudes between the two groups.

Figure 4.4: Comparative Means of Pessimistic Attitudes

The responses to the third statement indicate that people in November were more pessimistic about certain food products as a result of food safety incidents. While the differences in responses may be due to the small sample sizes, difference in seasons or different group characteristics they may have been the result of a serious listeriosis outbreak which happened in Canada in August, 2008, between the two study periods. The outbreak was accompanied by a massive tainted deli-meat recall by Maple Leaf Foods Ltd., beginning August 17 ("12 deaths linked to listeria outbreak as China stops Maple Leaf imports." Sept. 1, 2008. Available at www.canada.com). According to Public Health Agency of Canada statistics, this outbreak involved 57 confirmed cases and resulted in 22 deaths. However, interestingly, although the outbreak concerned processed meat, the confidence in the safety of meat did not decrease any more significantly between the two study sessions than most other food products. A question in both surveys asked respondents to rate their

confidence level in several food products from 1 (no confidence) to 5 (complete confidence). The mean responses were caluculated for both samples and compared in Figure 4.6, while Figures 4.7 and 4.8 show the differences in the distribution of mean responses between the two study periods.

Figure 4.5: Confidence in the Safety of Food Groups: Samples 1, 2

1=no confidence at all; 5=complete confidence

Figure 4.6: Confidence in Certain Food Products, Sample 1

1=no confidence at all; 5=complete confidence

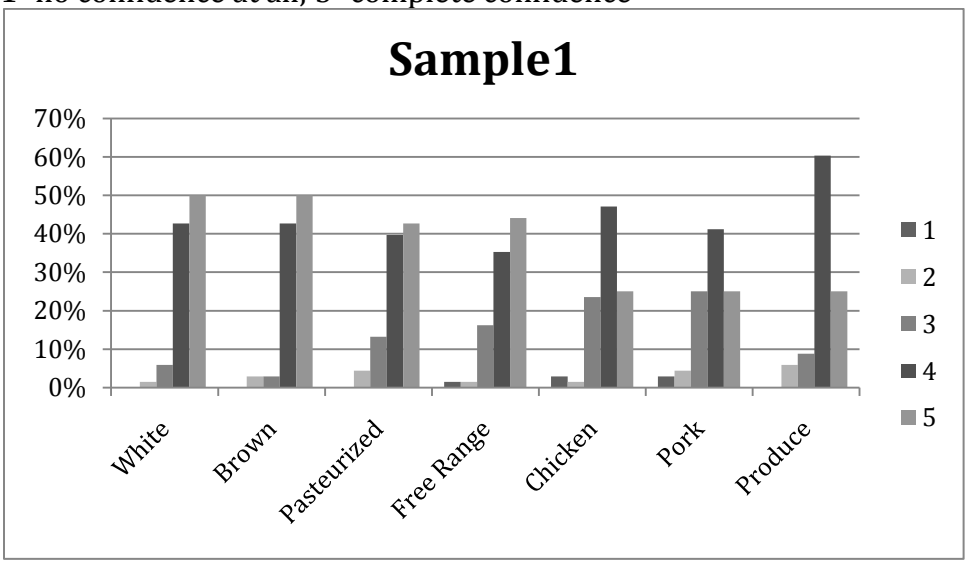
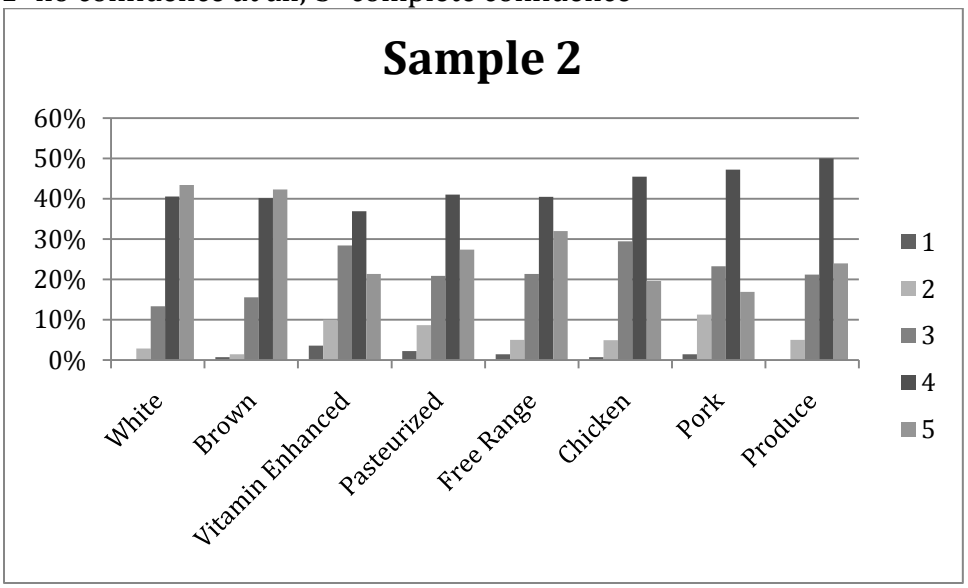


Figure 4.7: Confidence in Certain Food Products, Sample 2

1=no confidence at all; 5=complete confidence



As these figures illustrate, the largest decrease in confidence over the two periods was in pasteurized eggs. This was also the only statistically significant difference. It is also

worth noting that people in the second survey felt more exposed to risk when eating eggs and felt eating eggs was riskier than the first group. When asked to rate their perception of egg risk in the question "when eating eggs, I am exposed to …" with 1 being very little risk and 5 being a great deal of risk, the mean answer in the first survey was 1.6 while in the second it was 1.9. Also when asked to rank :For me eating eggs is …" on the same scale, the first sample had a mean answer of 1.5 while the second was 1.7. Both of these differences were statistically significant at the 10% level. This corresponds with the general trends of worry, pessimism and lower levels of trust in food that have been reported earlier in this chapter. However, the dramatically lower confidence level in pasteurized eggs is the more interesting result in terms of the questions posed by this study since pasteurized eggs are the only food product in the option set that possess a food safety credence attribute. This result may indicate that heightened awareness of food safety issues translates into a lower inclination to believe in food safety claims. Also, since the technology of in-shell pasteurization is not currently being used in Canada and many survey participants in both sessions asked questions about the process, another possibility is that people tend to be more skeptical towards a new product/process in the wake of a food safety scare. This would be consistent with a result from a study by Frewer et al. (2003) testing attitude changes towards GM foods, that "public attitudes towards emerging technologies are mainly driven by trust in the institutions promoting and regulating these technologies.'' These results indicate that it may be worthwhile to compare how attitudes of trust in institutions changed between the two study periods. To make this comparison, the next several tables will use responses from the survey to analyze who survey respondents believe is responsible for food safety in general and how that changed between the two samples.

The first two charts, and their striking and highly statistically significant results, show the distributions of respondents' answers in survey 1 (Figure 4.8) and survey 2 (Figure 4.9) to the question of who is responsible for the safety of food, with choices being farmers, government, manufacturers, retailers, the CFIA, the Consumer's Association of Canada or the consumer. The question was: 'To what extent do you think … is/are responsible for the safety of food?' Respondents could answer on a scale from 1 (not at all responsible) to 5 (completely responsible) and a 6 for I don't know for each agent.

Figure 4.8: Belief in Who is Responsible for Food Safety, Sample 1

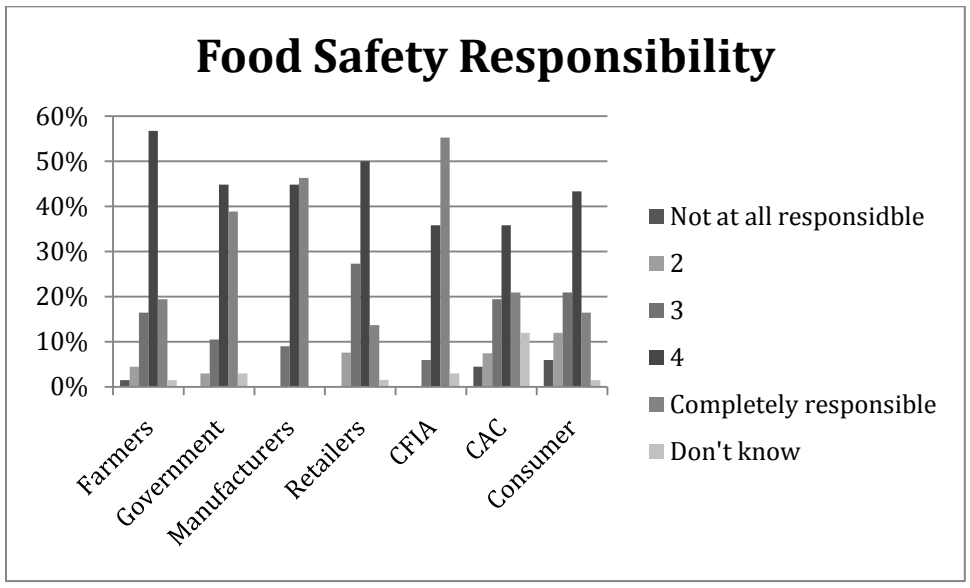
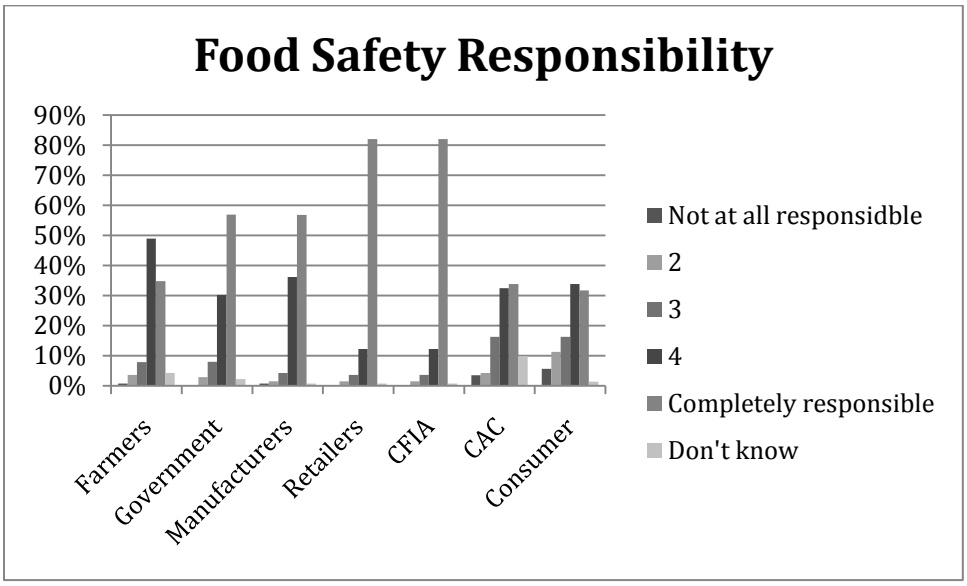


Figure 4.9: Belief in Who is Responsible for Food Safety, Sample 2



These tables show a significant difference in the beliefs of respondents for who is responsible for the safety of food. In the first survey, there was generally less certainty about who was responsible for food safety, as can be seen by the smaller variation between the number 5 "completely responsible" option and answers of 4 or even 3. The only response where there was no statistically significant difference between the two samples was for manufacturers. In the second survey respondents overwhelmingly believed that responsibility for food safety lay entirely with retailers and the CFIA. As well, people in the second survey tended to believe that government was more responsible for food safety than respondents from the first sample. Also, for most agents, a higher proportion of people believed that an agent was "completely responsible" than in the first survey. This increased certainty may be because of the information people received from the media in relation to the listeriosis crisis, linking these various agents to food safety. Their certainty that

retailers and the CFIA are responsible for food safety may have arisen from the fact that CFIA was the agency issuing directives on the listeriosis front and that retailers were the ones who were pulling contaminated products from their shelves, therefore ultimately serving as the final gatekeeper of food safety. For example, as pointed out in an August, 25 2008 CBC.ca article, CFIA had listed the specific products and UPC codes which had been recalled due to the listeriosis outbreak on their website.

4. 5 Trust in Agents and Dimensions of Trust

Using the proxy institutional trust measures of belief in the different qualities (competence, knowledge, honesty, openness, care, attention) of grocery stores, manufacturers, government and farmers, the following sets of tables will illustrate those attitudes within each study period. These indicators are important due to empirical evidence that has shown that trust vested in different actors affects confidence in food safety differently (de Jonge et al., 2008). For instance, trust in manufacturers was found to drive optimism more than does trust in any of the other agents. Furthermore, trust dimensions also matter as drivers of trust. The same study found that perceptions of care play a different role in enhancing optimism than reducing pessimism. In a study validating these trust measures on an international level, de Jonge et al. (2008) found that for Canadian consumers, the trust measures did not perform well when they included the competence dimension which is comprised of the first two questions. This indicates that

when looking for drivers of trust, perhaps it is worth looking at the first two questions separately from the other four.

In this section, tables for each agent will be compared across sessions with tables on the left representing responses from the first session and tables on the right, illustrating responses from the second session. The questions for each actor were structured in the following manner.

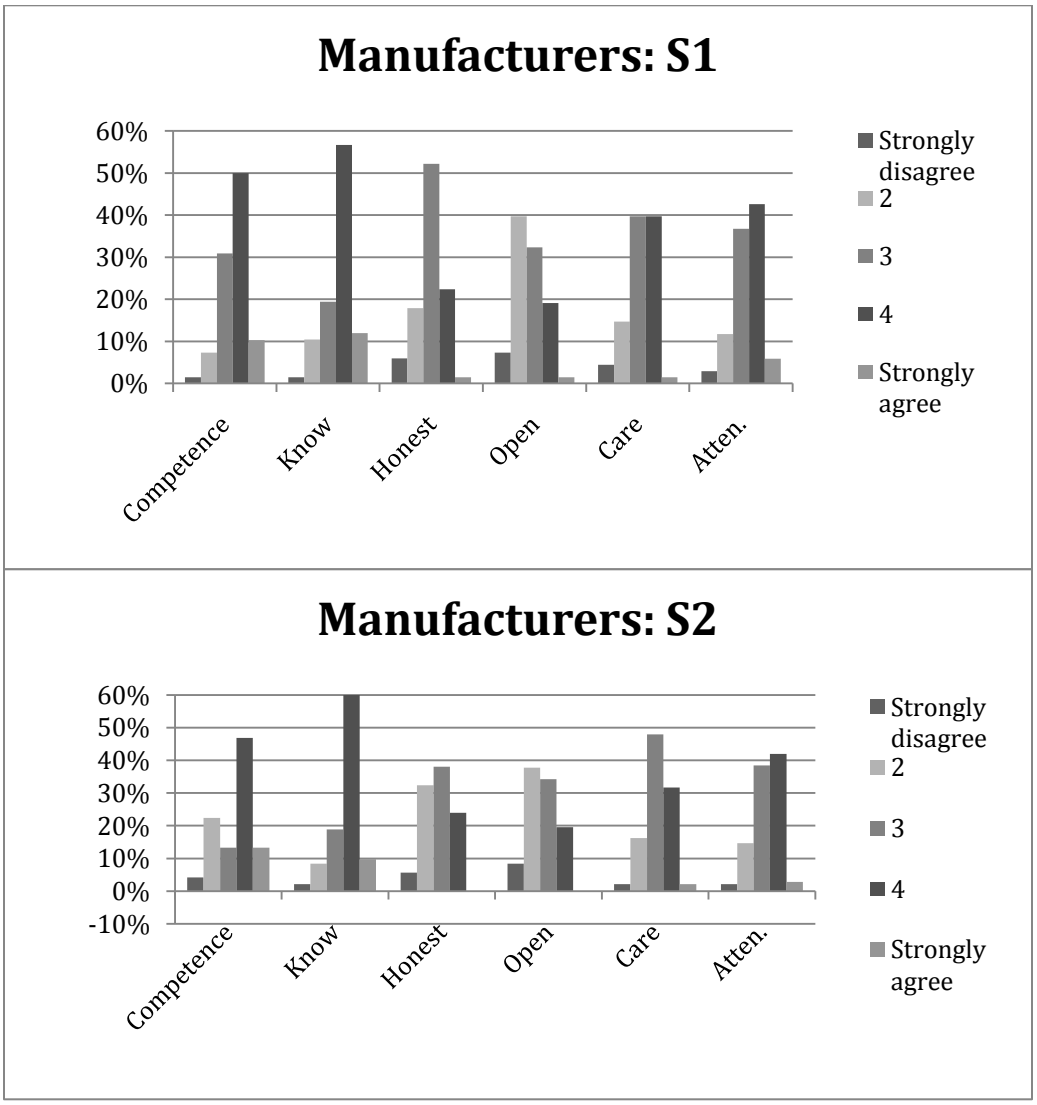
Figure 4.10: Question Format for Food Agent Confidence Questions

Below is a list of statements related to food manufacturers, retailers, government and farmers. For each, please indicate how much you agree or disagree using the scale provided.

Food manufacturers	**strongly disagree**	**disagree**	**neither agree, nor disagree**	**agree**	**strongly agree**
	1	**2**	**3**	**4**	**5**
Manufacturers have the competence to control the safety of food	❒	❒	❒	❒	❒
Manufacturers have sufficient knowledge to guarantee the safety of food products	❒	❒	❒	❒	❒
Manufacturers are honest about the safety of food	❒	❒	❒	❒	❒
Manufacturers are sufficiently open about the safety of food	❒	❒	❒	❒	❒
Manufacturers take good care of the safety of our food	❒	❒	❒	❒	❒
Manufacturers give special attention to the safety of food	❒	❒	❒	❒	❒

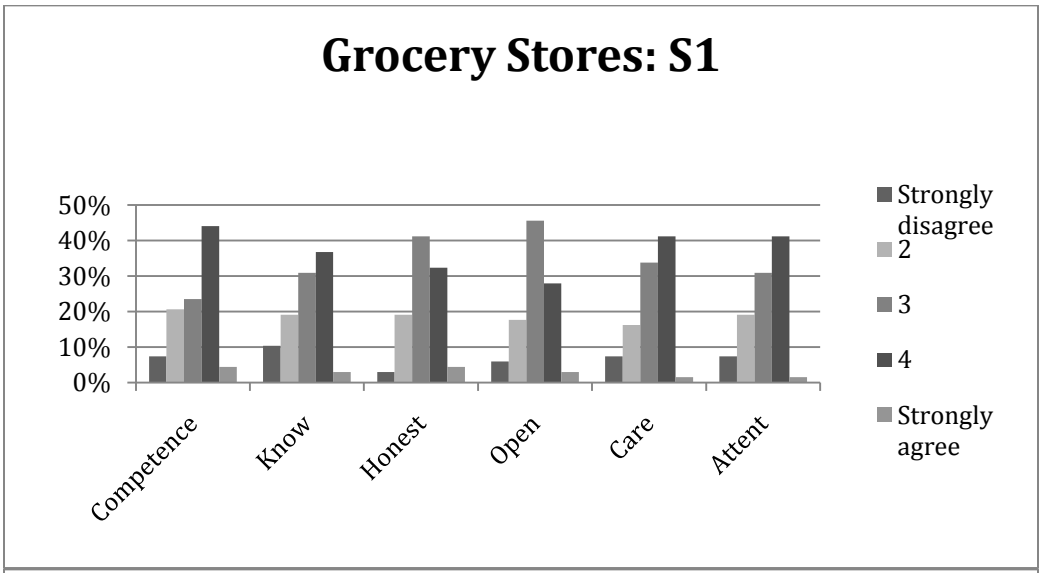
Respondents answered this set of questions for each agent. Below are the frequency distributions in percentage terms of their responses.

Figure 4.11: Belief in Food Manufacturers, Samples 1, 2



Although the differences in mean responses are not significant, the general trend seen in these frequency distribution tables is that the plurality of respondents in both samples disagreed with the statement that food manufacturers are sufficiently open about the safety of food. However, across both samples people tended to believe that food manufacturers were knowledgeable and largely competent, although it is worth noting that the proportion of people who disagreed with the statement "manufacturers have the competence to control the safety of food" went up for the second group. This is unsurprising since it was a food manufacturer that was largely associated with the listeriosis outbreak. Furthermore, in the second sample people were considerably more ambiguous about whether manufacturers cared about the safety of food but on the other hand, the number of people who disagreed that manufacturers are honest about food safety decreased as a proportion of the total answers for the second sample. This may be indicating the success of a national campaign by Maple Leaf Foods, the manufacturer associated with the contaminated meat, to inform the public about the repercussive steps they were taking.

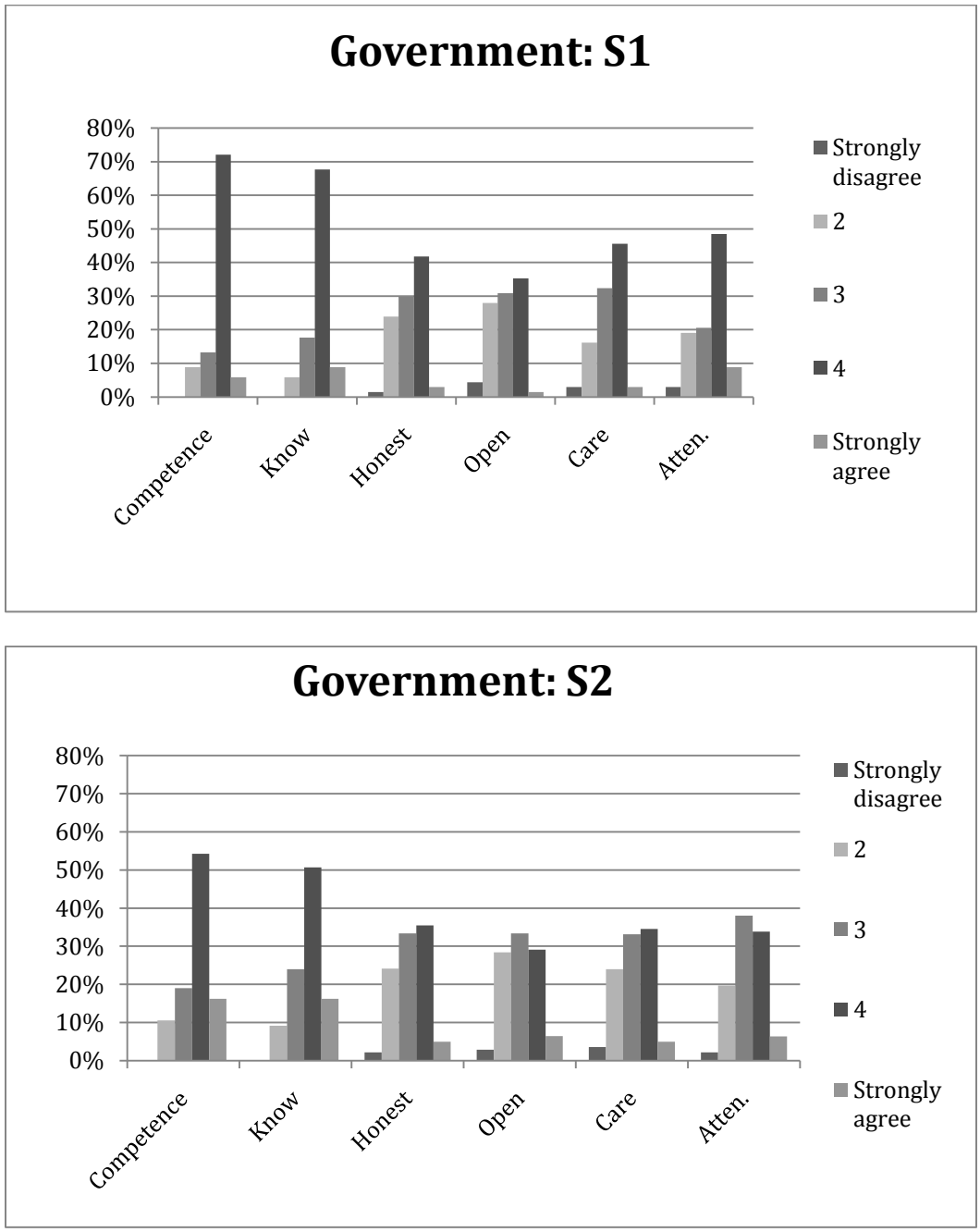
Figure 4.12: Belief in Grocery Stores, Samples 1, 2



Generally, people tend to believe that like manufacturers, grocery stores are relatively competent and knowledgeable when it comes to ensuring food safety. While the mean responses to all of the questions were not significantly different, these tables do show some changes in the distribution of the responses. The main difference in attitudes

over the two samples is that the second sample was more polarized in their opinions with a larger proportion of people saying they disagree that grocery stores are competent and knowledgeable, than those who didn't know. However, in the second sample a considerable majority of people believed grocery stores were knowledgeable. While respondents across both samples indicated that grocery stores were caring and paid attention to food safety, respondents in the second sample were less certain about their honesty and openness. Interestingly, more people in the second sample thought grocery stores were honest than those that didn't know. For both the honesty and openness questions, people in the second sample seemed more certain about whether they agreed or disagreed with statements about these characteristics. This is following the trend in the data collected from the second sample, as most comparisons so far show a higher degree of certainty with respect to attitudes.

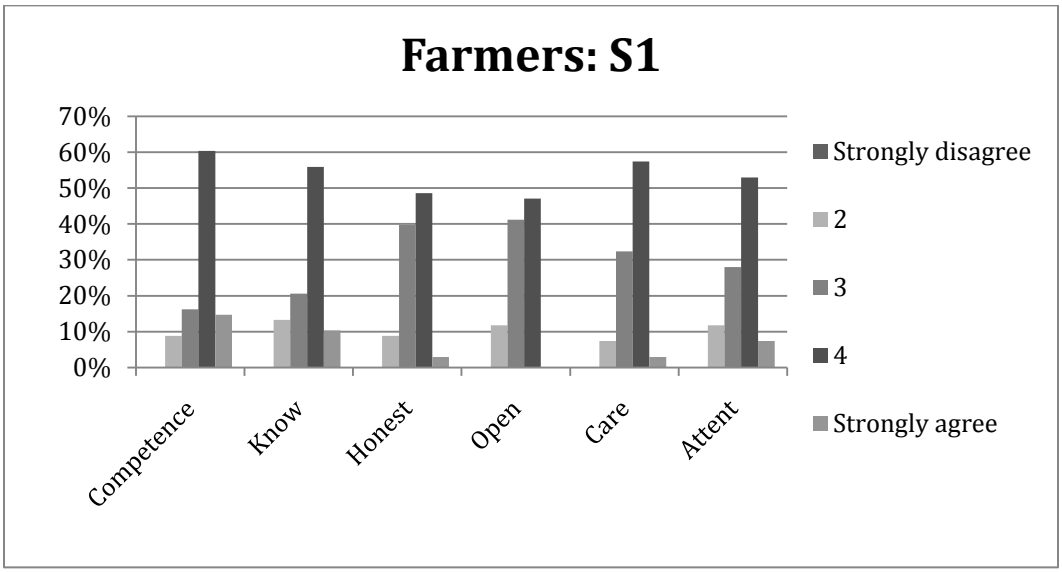
Figure 4.13: Belief in Government, Samples 1, 2

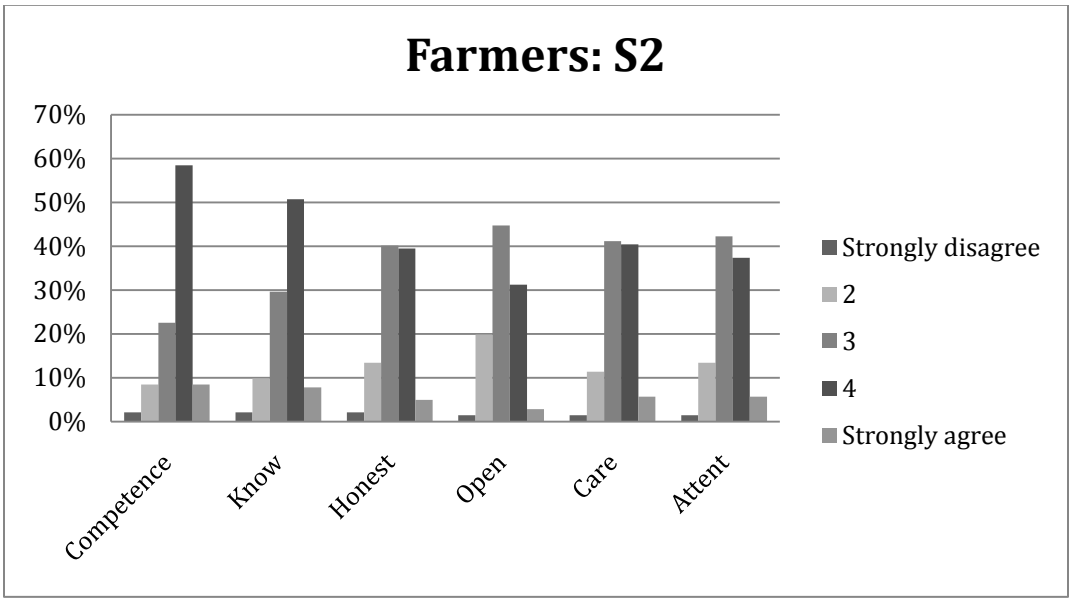


Arguably, the biggest change in the distribution of responses between the two samples was in beliefs about government's approach to food safety. While in both groups the majority of respondents agreed that government was competent and knowledgeable about food safety,

in the second sample the percentage of people who agreed with these statements dropped by around 20% with considerably more people being unsure but also more people strongly agreeing, especially in the case of competence. Beliefs about government honesty and openness remained similar but where the government really lost ground in people's minds was in terms of their caring and their attention to food safety. If these attitude shifts are any indication about how people perceived the government's handling of the listeriosis outbreak, then one possibility would be that people thought the government handled the crisis in a competent and knowledgeable way but perhaps blamed a lack of caring and attentiveness on the outbreak itself. Another possibility is that people believe that government is competent and knowledgeable but don't apply their knowledge or take care. The difference in the changes in the competence items (the first two questions) and the other trust dimensions seem to further validate the finding that these should be treated seperately.

Figure 4.14: Belief in Farmers, Samples 1, 2





Another dramatic shift in attitudes was towards farmers. This is the only shift that was dramatic enough to cause statistically significant differences in the mean responses to the latter three questions. The statistical significance of these as opposed to the

competence items continues to suggest that there are two variables within these scales. The above graphs show that while the plurality of respondents in the first sample agreed with every statement, that was only the case with two statements in the second sample. This is puzzling if it is in fact the listeriosis outbreak that is the main driver of attitude changes because farmers had little to do with the crisis. Respondent belief in farmers fell the most in terms of caring about food safety and being attentive to food safety. Also, respondents were far less certain about farmer openness in the second sample. These results are puzzling because, in general, farmers have been considered highly trusted agents.

4.6 Trust in Information Providers

The lowered trust in farmers is consistent within another survey result. Responses across the two surveys were very different to a question that asked respondents: "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'." The choice of agents was between farmers, the government, manufacturers, retailers, the Canadian Food Inspection Agency and the Consumers' Association of Canada. The following two tables compare the frequency distribution in percentage terms across the two samples.

Figure 4.15: Trust in Information Provided by Various Agents, Sample 1

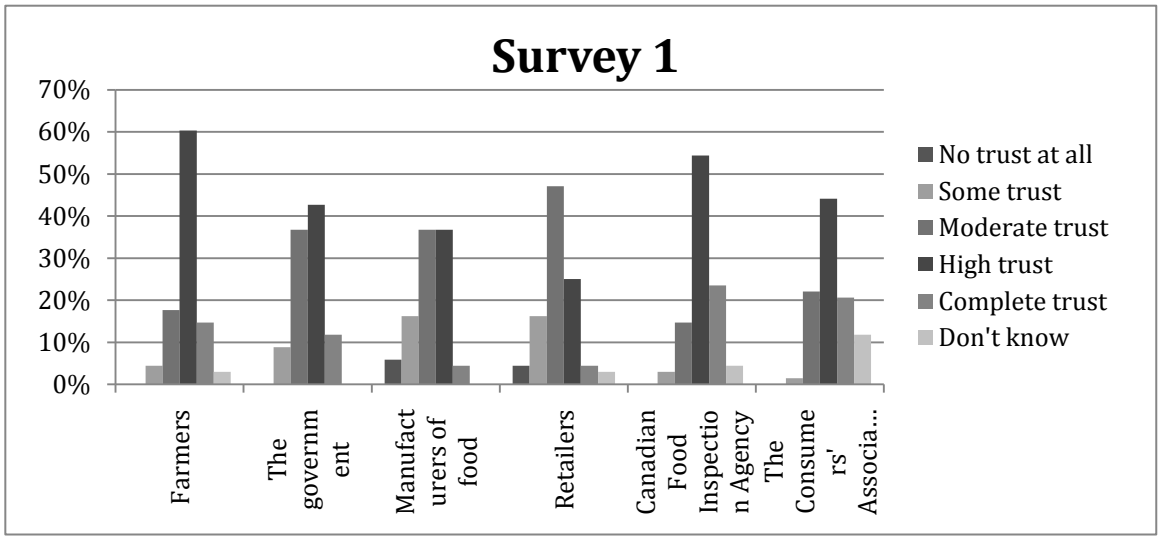
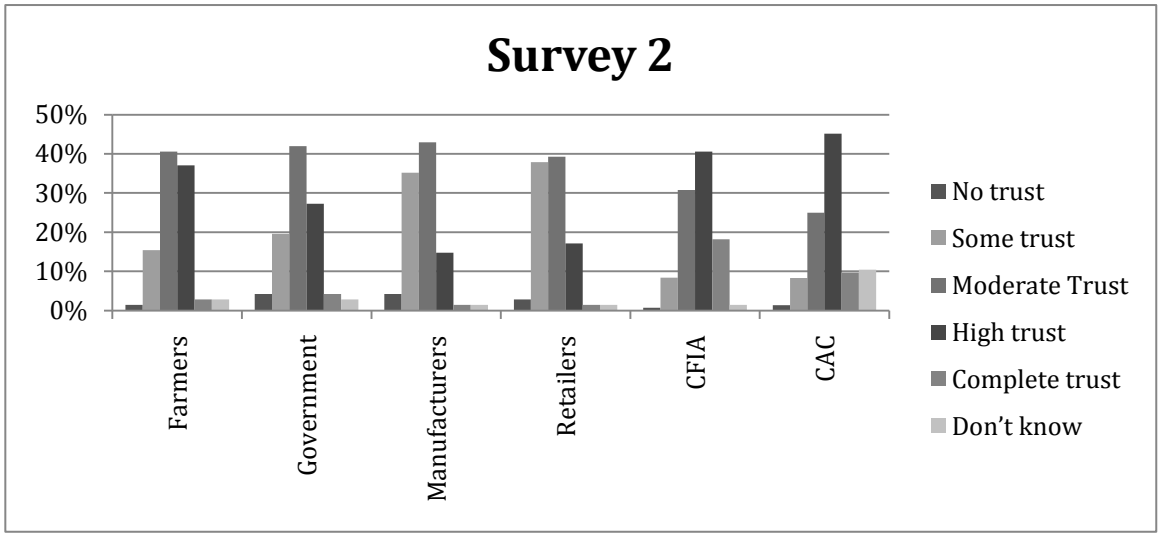


Figure 4.16: Trust in Information Provided by Various Agents, Sample 2



The trust in information from every source was different for each agent across the two samples. T-tests of the mean responses showed that for every item, the two samples

were different at statistically significant levels. What is striking in this set of responses is again, the loss of trust in farmers between the two study sessions. Whereas 60% of the respondents in the first sample had high trust in information from farmers, that proportion was almost halved within the second sample, where only 37% of people had high trust in farmers. The proportion of people that only had some trust nearly trebled between the samples from 5% to 14% and while the first sample had no respondents that claimed to have no trust in information in farmers, the second sample had a small portion of respondents make that claim.

Fewer people in the second sample had high trust in information from government and manufacturers, with both of these agents receiving a higher proportion of responses on the "moderate" and "some trust" side. While retailers were also less trusted by the second sample, the proportion of people who had moderate trust in the information they provide remained fairly similar. Since it seems unlikely that the difference in trust in farmers between the two groups is entirely due to the listeriosis outbreak, it is worth examining the two samples further for possible explanations. Consumer practices may be a factor, as a t-test of the mean responses to consumer practice questions indicated a statistically significant difference between the two surveys. The tables below show the proportion of people in each sample that never, regularly or occasionally purchase eggs at either supermarkets, grocery stores, farmer's markets or other locations.

Figure 4.17: Egg Purchasing Practices, Sample 1

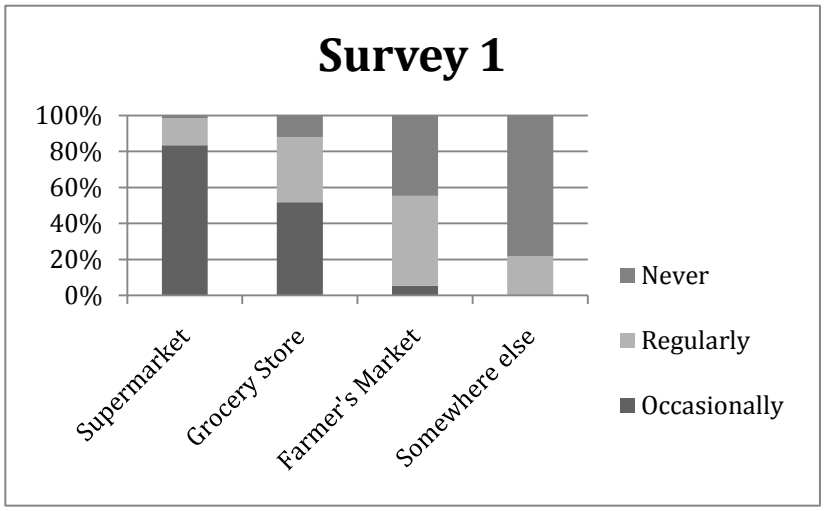
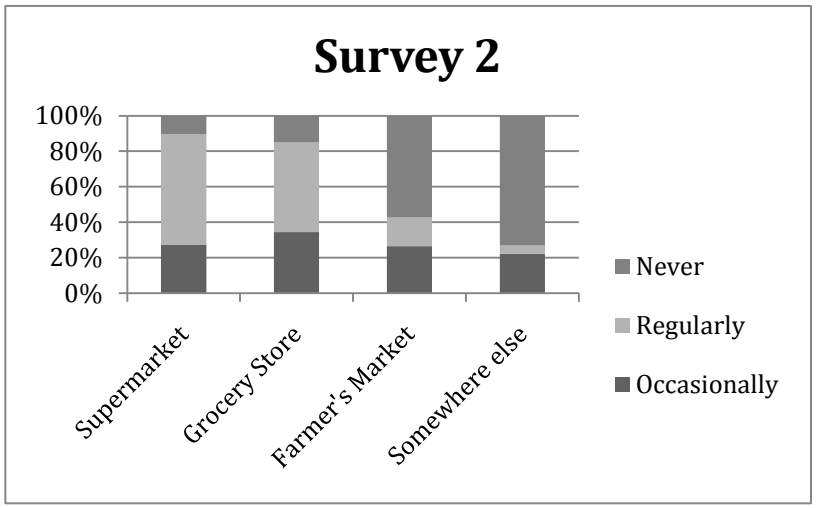


Figure 4.18: Egg Purchasing Practices, Sample 2



As can be seen by the above tables, the differences in shopping habits are considerable between the two samples. The first group was far more likely to buy their eggs at a farmer's market while the second group was more likely to buy them at a supermarket. This may be partly explained by an element of seasonality, since the first survey was completed in the summer and the second in the winter. People are more likely to shop at farmer's markets in the summer since there is considerably more choice in products during that season. Also, in Edmonton there are two farmer's markets and one only operates during the summer season. Regardless, these results suggest that there may be some connection between trust in an agent and consumer purchasing decisions. It will be interesting to test whether this carries through to the willingness to pay for certification of eggs by farmers, which will be tested for in the regression analysis of the next chapter.

4.7 Certification Knowledge

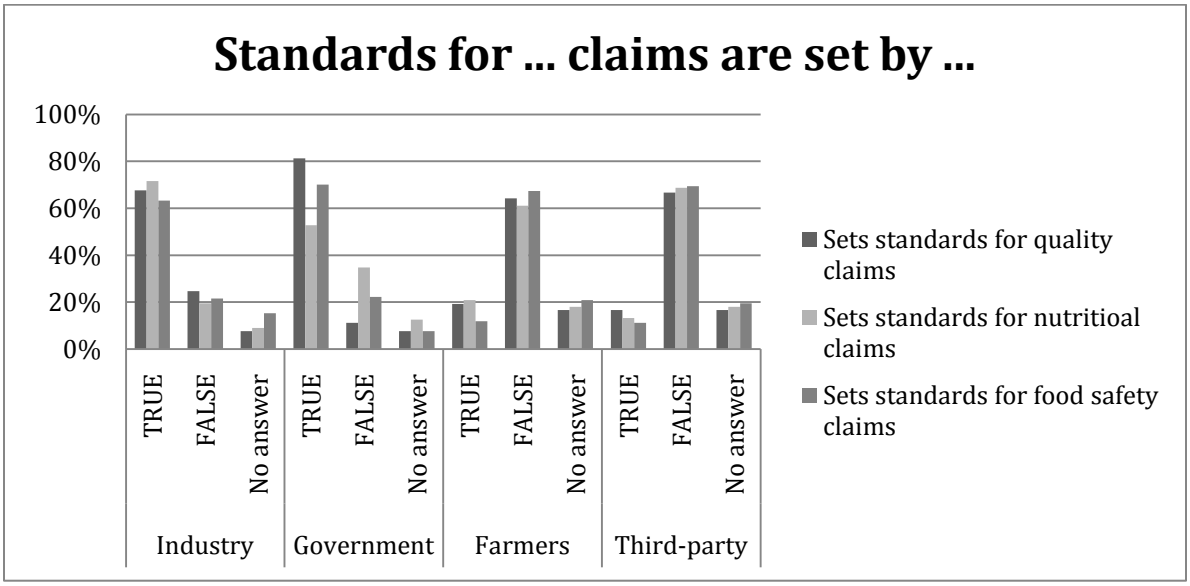
In the first study session, many study subjects seemed confused about the nature of certification, who is responsible for it and what it entails. In the second study session, respondents were given an additional 11 questions to determine their knowledge of certification as it pertains to eggs. They were asked who sets the rules for certain attribute claims, who certifies that these regulations are followed and what this certification means. They were asked this set of questions for a quality attribute, a nutritional enhancement attribute and a food safety attribute. Examples of each were given pertaining to the claims that eggs are Canada Grade A, vitamin-enhanced and pasteurized, respectively. Two

additional questions were also asked specifically pertaining to the regulation of in-shell pasteurized eggs as these are not currently being sold in Canada.

4.7.1 Certification Beliefs

The following tables show the frequency distribution of selected responses to give an idea of what respondents generally believed. The responses are calculated as a percentage of total responses that were either false or true. A 'no answer' category was included as it is believed to indicate areas that are confusing to respondents. It is worth noting that the amount of people who did not answer questions was very dependent on the category of question and the agent involved. For instance, in both standard setting and standard certifying, farmers and third-party had a higher percentage of non-responses than government and industry. This suggests that people are more confused about the nature of these agents in the quality assurance process. Of the three types of claims that were available, the highest amount of non-responses came in the category of food safety claims. This is logical as the example for food safety claims was given as "pasteurized to eliminate salmonella," which referred to a product currently not available in the Canadian market.

Figure 4.19: Who Sets Standards



As the above figure shows, most people believe that government sets the standards for quality claims such as Canada Grade A and food safety claims such as pasteurized to eliminate salmonella while industry sets the standards for nutritional claims such as vitamin-enhanced. The fact that 65% of people said that industry sets standards for quality claims while 80% said that of government, reflect what is perhaps a flaw in the question format. The questions were asked in the following way and there was no mention of only being able to provide one answer:

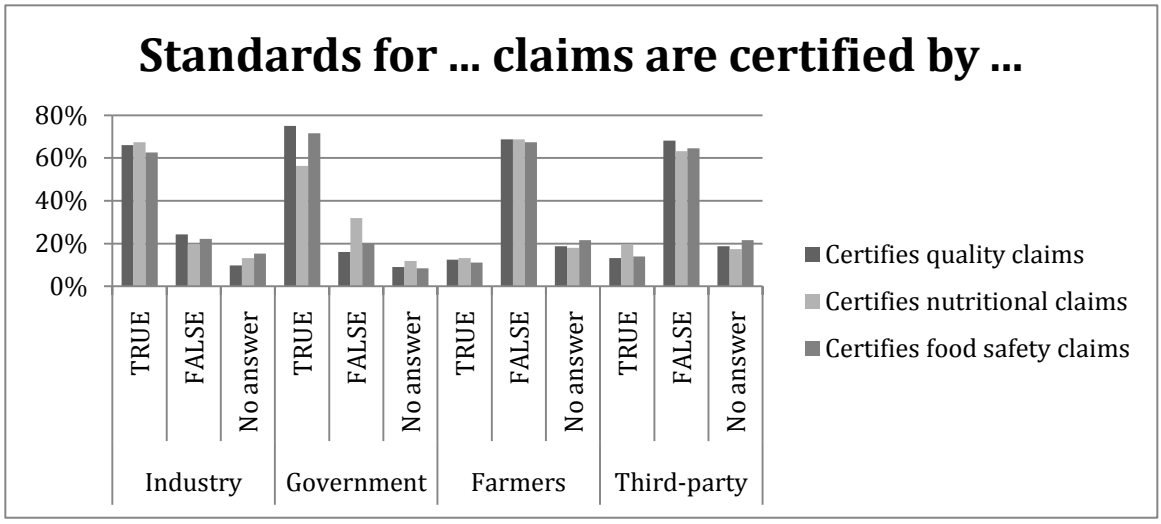
Figure 4.20: Question Sample for Certification Knowledge

Standards for egg quality claims such as Canada Grade A are set by:

	True	False
Industry		
Government		
Farmer		
Third Party		

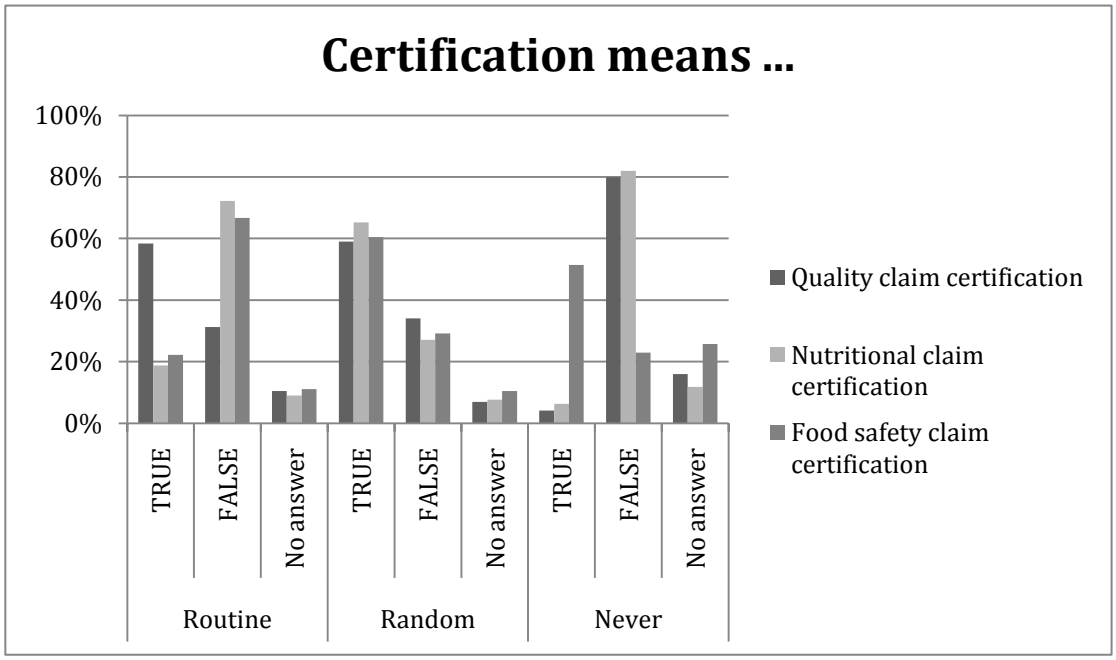
A possible correction to researchers posing such questions in the future would be to just ask respondents to indicate which one of the agents they believe is responsible for something.

Figure 4.21: Who Certifies Standards



As the above table shows, the trends from the previous response remain when it comes to certifying those standards. Most people believe that government certifies quality and safety claims while industry certifies nutritional claims. People remained quite certain that farmers and third-party did not certify any claims although it is interesting that people were more apt to believe that a third-party certifies the nutritional claims than the other two.

Figure 4. 22: What Certification Means



For this table, the question that was asked was "Quality certification by one of the above organizations means:" and true and false choices were "it routinely checks to ensure standards are met", "it randomly checks to ensure these standards are met" and "it

assumes standards are met but never checks." This question followed the question where people indicated a certifying organization for a given claim. Of all the three tables this table shows the most variance in responses and the biggest differentiation in the treatment of the credence attribute being certified. While respondents overwhelmingly believed that quality standards are checked regularly, they are quite certain that nutritional and food safety claims do not receive the same treatment. Also, half of the people believe that food safety claims are never checked – a much higher proportion than the 5% and 6% of people who believe that quality and nutritional claims, respectively, are never checked.

4.7.2. Certification Knowledge

While the previous subsection illustrates respondent beliefs, this one reveals whether those beliefs were correct. The next table shows the knowledge score that was calculated as a proportion of questions answered correctly by each respondent.

Table 4.3: Certification Knowledge Scores

	Who sets standards	**Who certifies claims**	**What certification means**	**Overall knowledge of attribute type**
Quality claims	0.75	0.75	0.59	.70
Nutritional claims	0.59	0.49	0.52	.53
Food safety	0.63	0.72	0.60	.65
Pasteurized	0.64	na	0.62	.63
Overall knowledge of process	.65	.65	.59	.63

These results verify the confusion that was communicated by respondents in the first survey as they show that only between half and two thirds of respondents understood the different elements of certification. Overall, the knowledge score for both the process and the attribute type was 0.63, indicating that on average, respondents understood approximately two thirds of the certification process for all attribute types. It is particularly noteworthy to point out that these scores likely overstate the actual knowledge of certification due to the previously described flaw with the question design. Since people often chose 'true' for more than one agent, if the agent that was actually responsible for the standard was one of their choices, it was calculated that they answered the question right. As such, if they had been forced to choose just one 'true' answer for each question, they would have likely had a lower aggregate knowledge score.

As the above table shows, there were considerable differences when it came to the understanding of certification of the types of claims that were being issued. Respondents had a better understanding of who sets standards and who certifies those standards as compared to their understanding of what that certification means. Interestingly, respondents understood the certification of quality claims such as Canada Grade A considerably more than other claims. This is logical as quality claims are the longest standing claims while nutritional enhancement claims, which received the lowest knowledge score, are fairly recent.

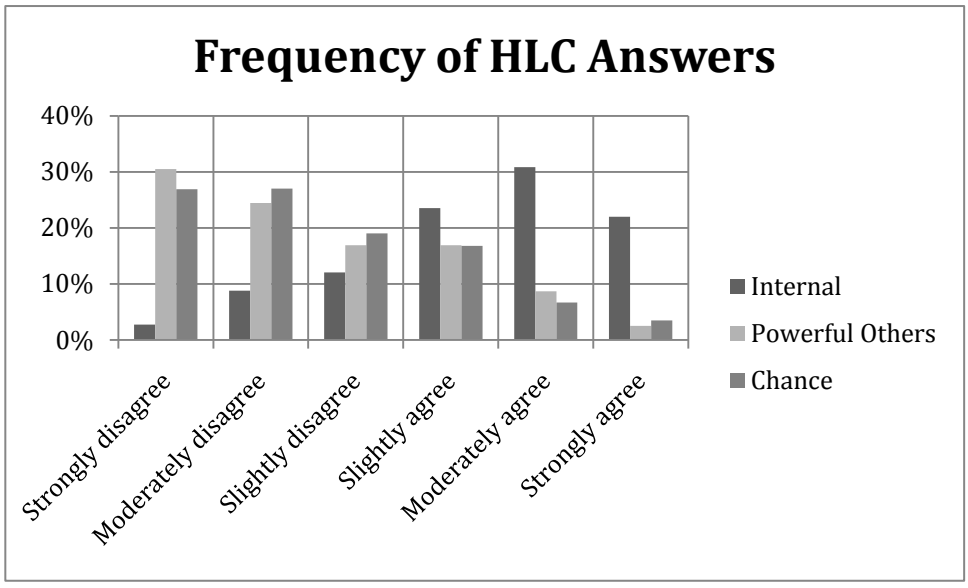
Some cross-tab analysis was performed on the certification knowledge scores and certain demographic characteristics. It is included as Appendix M. It was found that knowledge scores differed by gender and by education levels. While the average score for a

female was 0.619, for a male is was considerably higher at 0.674. Also, people with a high school education scored on average 0.57 while those with post-secondary and graduate level education got 0.65 and 0.64 respectively. The first effect is intuitive as higher education levels are generally consistent with better while the second may be partially explained by the fact that a higher percentage of men than women were educated in the survey sample.

4.8 Health Beliefs

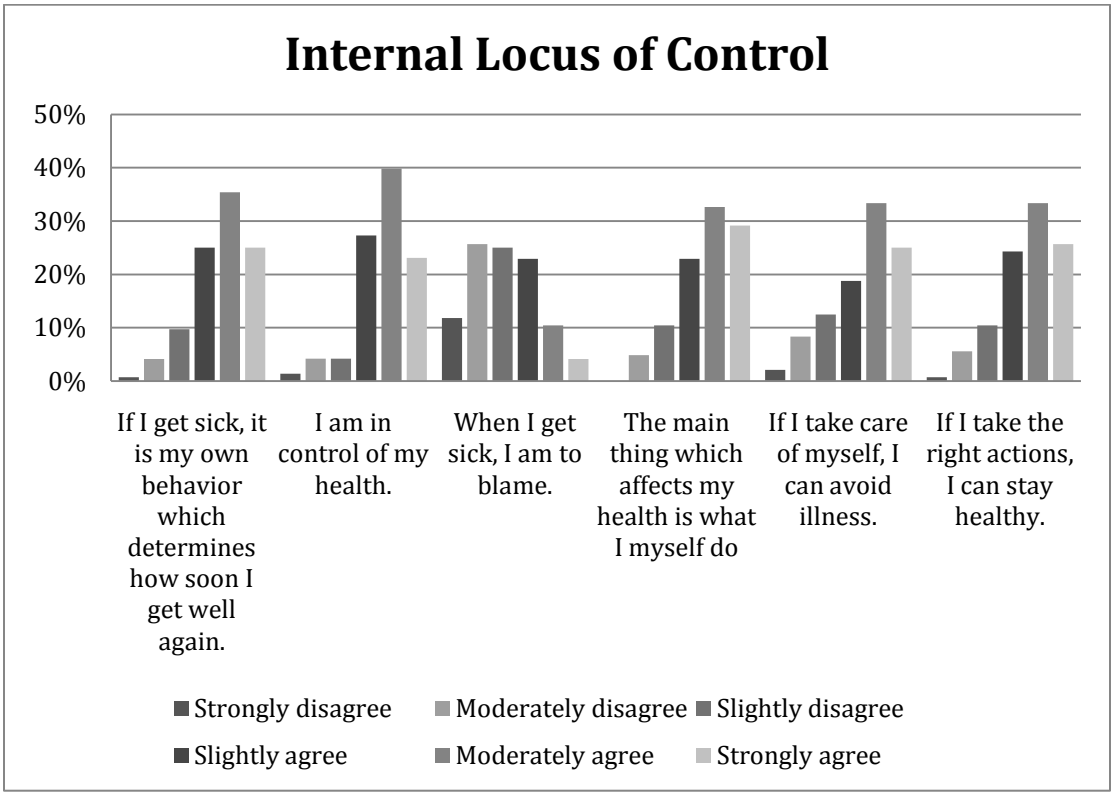
The health locus of control was designed to determine what forces people believe control their health. The 18 questions are divided into three categories each seeking to determine the extent to which people believe they control their health, others control their health or luck controls their health. The next four figures will illustrate the aggregate health beliefs of the second sample, which was the only one that did this portion of the survey.

Figure 4.23: Frequency of HLC Answers



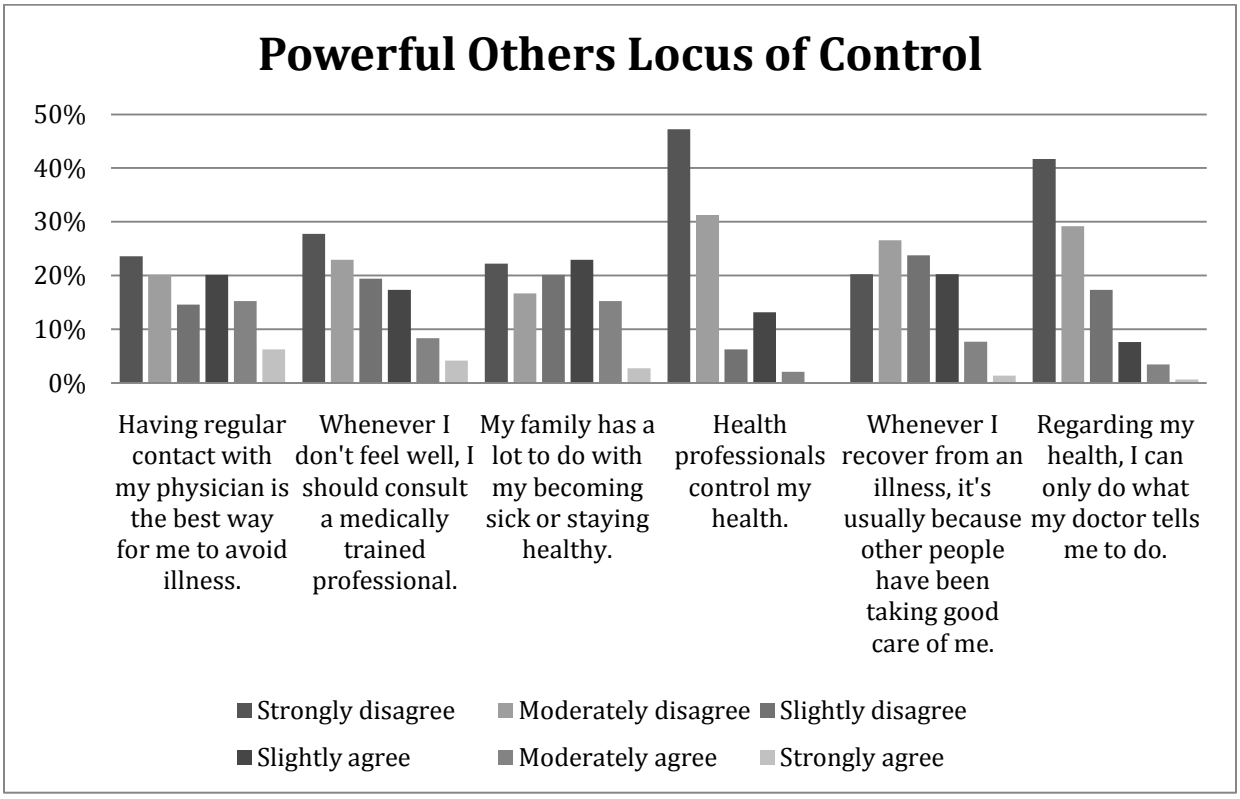
The above figure shows how many people chose which type of answer in each of the three loci of health control. It should be noted that every statement was phrased in such a way as to determine the degree to which they agreed that health was controlled internally, by others and by chance. The figure above uses the average of all six statements in each locus for each possible answer. What quickly becomes obvious is that most respondents were most likely to strongly agree, moderately agree or slightly agree with statements that affirm their own control over their health and slightly, moderately and strongly disagree with statements that affirm the role of powerful others or luck in determining their health. The next three figures will show the responses within each set of statements.

Figure 4.24: Internal Locus of Control Frequency Responses



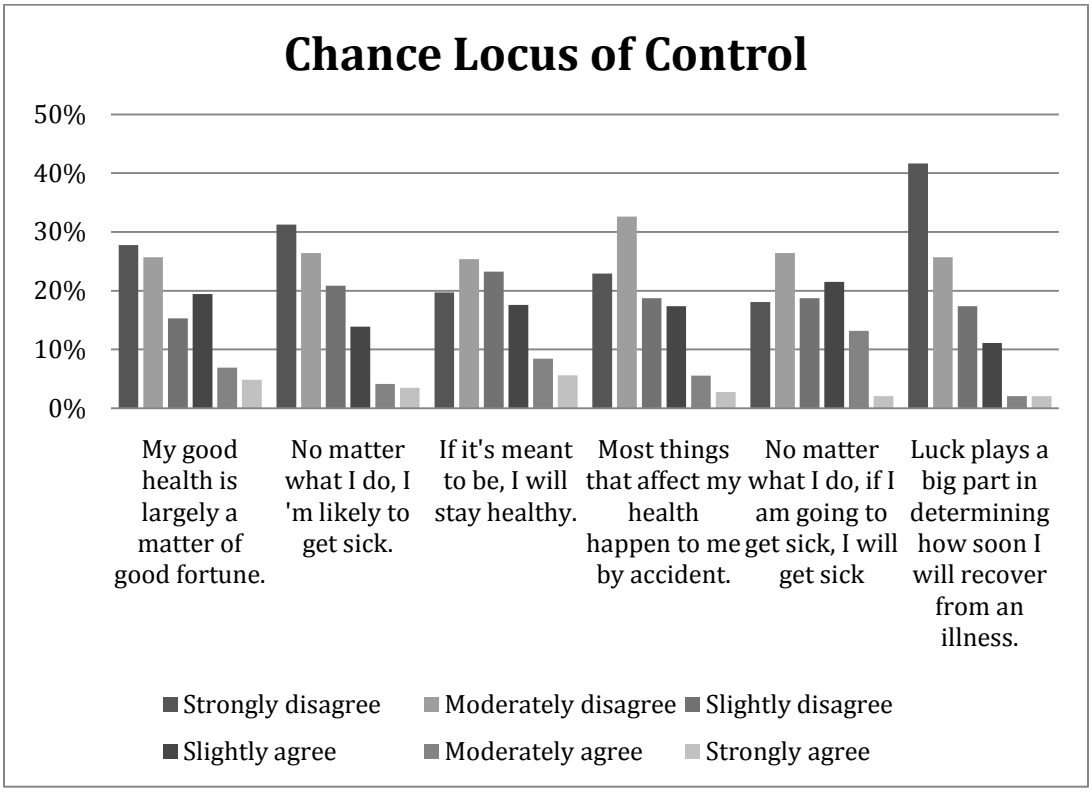
The above figure shows the number of respondents that agreed or disagreed with each statement. Respondents were most likely to strongly agree with the statement "the main thing which affects my health is what I myself do" and least likely to strongly agree with the statement "When I get sick, I am to blame." The above responses show that people are more likely to believe they can control their health but are not able to control their illness as much.

Figure 4.25: Powerful Others Locus of Control Frequency Responses



The above figure shows that there is a broad gradient of responses to most of the powerful others statements. There are only two statements with which a clear plurality of respondents strongly disagree and these have to do with the direct control of doctors and health professionals over health. The only statement where the largest block of people did not strongly disagree with was one that gave credit to other people for helping with illness recovery.

Figure 4.28: Chance Locus of Control Frequency Responses



The above figure shows that people were most ambiguous in responding to statements, which sought to establish their belief in luck as the determinant of their health. The plurality of people strongly disagreed with three of the questions and moderately disagreed with another three. People were most ambiguous when responding to the statement "No matter what I do, if I am going to get sick, I will get sick."

4.9 Conclusion

As this chapter shows, there are considerable differences between the characteristics and attitudes between the two samples. The second sample is larger and more demographically representative but is also generally less trusting and more worried. Trust in different certifying agents also seems to have declined, although the only significant differences are in the trust responses considering farmers. Respondents in the second sample are also less willing to trust in information from various agents but especially from farmers. The consumer practices in terms of egg purchases are also quite different between the two groups with the first group favouring farmer's markets while the second group favouring supermarkets. While causality between consumer purchases decisions and trust in different agents cannot be established through this analysis, a correlation certainly seems to exist. Some of the differences in attitudes and consumer behaviour between the two samples may be explained by the listeriosis food crisis that occurred between the two study dates and also the difference in seasons. However, neither of these seems sufficient to explain the decrease in trust in farmers and further analysis will have to be conducted econometrically in the next chapter.

Another important result from the graphical analysis in this chapter is the aggregate certification knowledge scores. These seem to indicate that on average people understand between half to two-thirds of the certification knowledge that is contained on a given egg label. Furthermore, the knowledge scores seem to be affected by gender and education. In terms of health beliefs, people tend to believe more strongly that they control their health as opposed to luck or "powerful" others. However, the amount of control they believe they

have over their health depends on whether the result is positive or negative. People are more likely to claim they are responsible for their good health rather than for their sickness.

5. MODEL RESULTS AND ANALYSIS

5.1 Introduction

As the apex of this thesis, this chapter contains the econometric analysis of the data from both study sessions. A multinomial logit model and a latent class model were developed to analyze the data and estimate willingness to pay. The chapter will deal with these models in separate subsections. Each model subsection will be further divided into two subsections, one for each study sample. The section on each model will begin with an account of underlying econometric theory that will be followed by the sample subsections that will include regression results and WTP estimates for certified attributes in the full sample as well as for subsamples where applicable. A comparison of the WTP estimates across both samples will also be presented for the first model.

5.2 MNL Model Theory

The objectives of the econometric analysis of this study are to construct a WTP measure for a credence attribute and for the certification of a credence attribute by a particular agent. The certification mechanisms are variable: an attribute can be certified by either a farmer, the government or industry and the credence attributes themselves are variable, with a choice of no credence attribute (generic), free run, vitamin-enhanced and pasteurized. These attributes are believed to be representative of broader classes of credence attributes namely animal welfare, health and food safety, respectively. The

methods in this research study can be classified as Attribute Based Stated Choice Methods (ABSCM) and are based on the economic and econometric theory that underpins it.

The economic theory underpinning ABSCM is random utility theory and the explanation that follows is adapted from Grafton et al. (2004). The core concept of utility theories is that individuals make utility maximizing choices in accordance to preferences that they themselves know. An individual's utility function is assumed to include a systematic or measurable component (V) and a random component (e). Since the researcher can only observe a portion of an individual's preferences, they can only attempt to explain their decisions in probabilistic terms, as the probability that an individual will choose a particular attribute or combination of attributes over. From Enneking (2004) an individual's utility function takes the form:

$$U_{in} = V_{in} + \varepsilon_{in}, \qquad (5.1)$$

where U_{in} is the overall utility of choice *i* for individual *n* and ε_{in} is the random utility component that characterizes the true utility functions which are unobservable. V_{in} is the measurable utility, assumed to be a linear function of observable variables, that may depend on individual *n* or choice *i* or both (Verbeek, 2004). It takes the following form:

$$V_{in} = ß_i * X_{in,}, \qquad (5.2)$$

where $ß_i$ represents the vector of parameters to be estimated and X is a vector of choice characteristics, respondent characteristics and possible interactions. Random utility theory posits that individual consumers choose the attribute or combination of attributes

from among alternatives that maximizes their utility. As such, if we assume there are J elements in a respondent's choice set A and if the n^{th} consumer selects choice *i*, then U_{in} is the highest utility obtainable from among the J possible choices (Loureiro and Umberger, 2004). The probability that *n* will choose *i* from J can be written as:

$$P_{in} = P\ (U_{in} > U_{an};\ a=1, 2, 3,\ldots J) = P\ (\varepsilon_{an} - \varepsilon_{in} < V_{in} - V_{an};\ a = 1, 2, \ldots J,\ a \neq j) \qquad (5.3)$$

A maximum likelihood technique is suitable to estimate the parameters in this equation and following McFadden (1974), the assumption of an independent and identically distributed type I extreme value distribution such as

$$F(\varepsilon_{in}) = e(-e^{-\varepsilon_{in}}), \qquad (5.4)$$

leads to a conditional logit model of the following form:

$$P_{in} = \exp(V_{in}) / \sum_{i}^{j} \exp(V_{jn}),\ j=1\ldots J,\ j\neq 1. \qquad (5.5)$$

In this research, as each respondent made multiple choices a multi-response model was necessary and multinomial logit regressions were developed to explain the consumer willingness to pay for the certification of an egg attributes free run, pasteurized and additionally in the second study vitamin-enhanced by government, industry or farmer relative to noncertified normal or generic eggs (in both studies) and the non-certified pasteurized, free run and vitamin enhanced eggs (in the second study). A separate multinomial logit model was estimated using TSP 5.0 for each of the study sessions. Although regression results from these two models are not directly comparable due to the difference in survey instrument, attempts were made to keep model

variables and specifications as similar as possible. This was done to enable the possible identification of some overarching trends. The models will now be discussed separately.

5.3 MNL – Model 1

5.3.1 Variables

The stated preference survey used to elicit data used in this model was a series of pairwise choices between a dozen non-certified generic eggs that cost $2 and either a dozen free run or a dozen pasteurized eggs that were either government, industry or farmer certified at prices ranging in $1 increments from $3 to $6. This resulted in 24 options and all survey respondents were given the same set of choices. For the model, the dependent variable is CHOICEB, which took on the value of 1 if a person chose some certified egg type over the generic, uncertified alternative and 0 otherwise. The binary structure of the dependent variable imposed the necessity of a maximum likelihood estimator in this case the multinomial logit.

While there were many possible variables that could have been constructed from the data, many of the attitudinal variables could not be used due to potential problems with endogeneity. Of the demographic variables age and income were used as they were quite significant. Others such as marital status, household position and number of kids in the family were tested and dropped due to statistical insignificance. A respondent's preferred shopping location seemed to be quite important both from the descriptive statistics in the previous chapter and from several preliminary regression results. In preliminary

regressions, price was interacted with all variables to test for price sensitivity but only two of these interactions were significant and were used in the final model. The variables that indicated where a person shops were reduced to two choices from three, as the options were “regularly,” “occasionally” and “never” but the variables took on a 1 if the response was “regularly” and 0 otherwise. The same thing was done for the trust variable that was constructed from the first question in the survey, which asked respondents: “Generally speaking, would you say that most people can be trusted?” Their options were “People can be trusted,” “Can’t be too careful in dealing with people” and “Don’t know.” The variable took on the value of 1 for people can be trusted and 0 otherwise. These variables were recoded so that all variables in the model would have a value between 0 and 1. The following table gives a list and a description of the variables used in the final model. Variables that are a combination of a certifying body and an attribute type are not treated as interaction terms but rather as multilevel attributes as this was how they were presented to respondents in the stated preference exercise.

Table 5.1: Variable Descriptions in Model 1

Variable	Description
CHOICEB	Choiceb=1 if product is chosen, 0 otherwise.
PRICE	Dollar price of product.
GOVFR	Multilevel attribute =1 if egg is government certified free run and 0 otherwise.
INDFR	Multilevel attribute =1 if egg is industry certified free run and 0 otherwise.
FARFR	Multilevel attribute =1 if egg is farmer certified free run and 0 otherwise.
GOVPAST	Multilevel attribute =1 if egg is government certified pasteurized and 0 otherwise.

INDPAST	Multilevel attribute =1 if egg is industry certified pasteurized and 0 otherwise.
FARPAST	Multilevel attribute =1 if egg is farmer certified pasteurized and 0 otherwise.
INFOPR	Interaction term between information treatment and price. INFO=1 if survey was given after experiment, 0 if otherwise.
AGEGF	Interaction term between AGE=age and GF=1 if government certified free run, 0 otherwise.
AGEIF	Interaction term between AGE=age and IF=1 if industry certified free run, 0 otherwise.
AGEFF	Interaction term between AGE=age and FF=1 if farmer certified free run, 0 otherwise.
AGEGP	Interaction term between AGE=age and GP=1 if government certified pasteurized, 0 otherwise.
AGEIP	Interaction term between AGE=age and IP=1 if industry certified pasteurized, 0 otherwise.
AGEFP	Interaction term between AGE=age and FP=1 if farmer certified pasteurized, 0 otherwise.
INCGF	Interaction term between INC=income and GF=1 if government certified free run, 0 otherwise.
INCIF	Interaction term between INC=income and IF=1 if industry certified free run, 0 otherwise.
INCFF	Interaction term between AGE=age and FF=1 if farmer certified free run, 0 otherwise.
INCGP	Interaction term between INC=income and GP=1 if government certified pasteurized, 0 otherwise.
INCIP	Interaction term between INC=income and IP=1 if industry certified pasteurized, 0 otherwise.
INCFP	Interaction term between INC=income and FP=1 if farmer certified pasteurized, 0 otherwise.
SUPERPR	Interaction term between shopping location, SUPER=1 if respondent shops at a supermarket regularly, 0 otherwise (includes if respondent shops at a supermarket occasionally and never).
MKTPR	Interaction term between shopping location, MKT=1 if respondent shops at a farmer's market regularly, 0 otherwise.
TRUSTGF	Interaction term between trust=1 if people can be trusted, 0 otherwise and egg attribute and certification type.
TRUSTIF	Interaction term between trust=1 if people can be trusted, 0 otherwise and egg attribute and certification type.

TRUSTFF	Interaction term between trust=1 if people can be trusted, 0 otherwise and egg attribute and certification type.
TRUSTGP	Interaction term between trust=1 if people can be trusted, 0 otherwise and egg attribute and certification type.
TRUSTIP	Interaction term between trust=1 if people can be trusted, 0 otherwise and egg attribute and certification type.
TRUSTFP	Interaction term between trust=1 if people can be trusted, 0 otherwise and egg attribute and certification type.

5.3.2 Regression Results

Results from a simple model estimated with the minimum number of explanatory variables are in the table below.

Table 5.2: MNL Constants Only Regression Results, Sample 1

Number of observations = 1632
Log likelihood = -702.116
Schwarz B.I.C. = 728.007
Number of Choices = 3264

Variable	Estimate
PRICE	-1.03781* (0.072)
GOVFR	1.20307* (0.208)
INDFR	1.05637* (0.209)
FARFR	1.25048* (0.208)
GOVPAST	0.875057* (0.210)
INDPAST	0.620493* (0.215)
FARPAST	0.497102** (0.218)

** significant at 1% level; ** significant at 5% level; Std. errors in parentheses*

The simple model shows that the coefficient PRICE is negative and significant as expected. Respondents clearly preferred free run eggs certified by any agent to generic eggs and preferences of certifying agent differ by attribute.

The next table will show the results of the MNL regression for the full model.

Table 5.3: Regression Results for Full Multinomial Logit Model, Sample 1

Dependent variable: Choice
Number of observations = 1632
Log likelihood = -633.914
Schwarz B.I.C. = 737.480
Number of Choices = 3264

Variable	Coefficient	Variable	Coefficient
PRICE	***-1.24574**** *(0.094)*	**INCGF**	-0.061825 (0.155)
GOVFR	0.910007 (0.669)	**INCIF**	-0.155167 (0.156)
INDFR	0.529174 (0.680)	**INCFF**	***-0.39031**** *(0.156)*
FARFR	***1.84065**** *(0.670)*	**INCGP**	***-0.32978**** *(0.159)*
GOVPAST	***1.13764**** *(0.667)*	**INCIP**	-0.167282 (0.167)
INDPAST	0.143451 (0.710)	**INCFP**	***-0.56104**** *(0.174)*
FARPAST	***1.78182**** *(0.687)*	**SUPERPR**	***0.590052**** *(0.087)*
INFOPR	***-0.34538**** *(0.073)*	**MKTPR**	***0.236685**** *(0.073)*
AGEGF	-0.594885 (1.03)	**TRUSTGF**	***1.27199**** *(0.456)*
AGEIF	0.872279 (1.017)	**TRUSTIF**	***1.01486**** *(0.455)*
AGEFF	-0.952369 (1.031)	**TRUSTFF**	***1.44825**** *(0.467)*
AGEGP	1.16696 (1.019)	**TRUSTGP**	0.41514 (0.436)
AGEIP	***2.84331**** *(1.059)*	**TRUSTIP**	-0.209432 (0.433)
AGEFP	0.898501 (1.083)	**TRUSTFP**	-0.046311 (0.454)

** significant at 1% level; ** significant at 5% level; Std. errors in parentheses*

5.3.3 Model Significance and Goodness of Fit

Overall model significance can be determined by comparing the log likelihood of the estimated model to the log likelihood of a base comparison model that is estimated using only alternative specific constants (Hensher, Rose, and Greene, 2005). The LL ratio test is a test to compare the LL function of the estimated full model to that of its base. The formula is:

$$-2\ (LL_{basemodel} - LL_{estimated\ model}) \sim \chi^2_{(number\ of\ new\ parameters\ estimated\ in\ full\ model)} \quad (5.6)$$

The log likelihood statistic in the base model was -839.642 while the same statistic was -633.914 for the full model. The likelihood ratio statistic is 411.456 and the χ^2 (22) is 40.289 at 0.01 so the model is significant at 1% significance.

For a linear regression model the R^2 is a summary statistic that indicates the accuracy with which the model approximates the observed data, however for a binary choice model there are several goodness of fit measures (Verbeek, 2004). The McFadden R^2, sometimes referred to as the likelihood ratio index, is the measure that is used for this analysis. As in Verbeek (2004) the formula is:

$$\text{McFadden } R^2 = 1 - (LL_{estimated\ model}/LL_{basemodel}) \quad (5.7)$$

The McFadden R^2 is 0.245. However, this pseudo R^2 statistic cannot be directly compared to an R^2 from a linear model since the two have a non-linear relationship. A visual inspection of the chart that maps out the relationship between the two R^2 measures

on page 338 of Hensher, Rose, and Greene (2005) indicates a pseudo R^2 of 0.245 is approximately equivalent to an R^2 of 0.5 in a linear model.

In this extended model, the coefficient for PRICE is still negative and highly significant, showing that the probability of choosing a particular product decreases as the price increases. The parameters are all positive and FARFR, FARPAST and GOVPAST were statistically significant at the 1% and 5% levels, respectively. Several of the interactions were significant as well.

5.3.4 Demographic Interactions

With AGEIP being positive and significant, this model predicts that older people are more likely to pay for industry certified pasteurized eggs. Income was negative and significant when interacted with farmer certified free run, government certified pasteurized and farmer certified pasteurized suggesting that people with higher incomes are less likely to choose those types of eggs.

5.3.5 Price Sensitivity Interactions

Three variables were interacted with price and all three were highly significant. The INFOPR variable measured whether doing the survey first increased the price sensitivity of respondents and since the variable took on the value of 0 if the survey was done first and 1 otherwise, its negative sign showed that it did not. This indicates that respondents who did the survey first were less likely to avoid the higher priced choices – they had a higher willingness to pay. This is something that may be of note when designing multi-part

experiments. More analysis of this phenomenon will be discussed in a subsequent section of this chapter.

The difference in magnitude of the coefficients on MKTPR (0.24) and SUPERPR (0.59) indicate that supermarket shoppers are less price sensitive than people who shop at farmer's markets. This seems counterintuitive since goods at a farmer's market are premium priced and should be interpreted with caution due to the small sample size and the small subset of that sample that shops at either location. Also, since this was done in the summer when more people shop at farmer's markets than in other seasons, summer farmer's market shoppers may have different characteristics than regular farmer's market shoppers.

5.3.6 Trust

Like the MKT variable in the preliminary regression, the TRUST variable was only significant and positive in the context of free run eggs. This result suggests that people who trust people more in general prefer free run eggs. This result is important from the perspective of survey design because it validates the use of general trust questions to help explain consumer preferences or purchasing decisions.

5.3.7 WTP

The respondent or consumer willingness to trade off attributes can be calculated as the ratio of β coefficients in a conditional logit model; if the denominator is the coefficient on price then the calculated value represents the WTP in dollar terms for the specific attribute (Enneking, 2004, page 210). In the regression estimated above, the credence attributes were interacted with

each of the explanatory variables and the interactive terms (multiplied by either their mean or actual value) were added prior to dividing by the negative of the price term.

Table 5.4: Willingness to Pay for Certification of Egg Attributes, Sample 1

	Pasteurized	Free Run
Government certified	***0.90 (.15)****	***1.16 (.14)****
Industry certified	***0.70 (.16)****	***1.05 (.14)****
Farmer certified	***0.53 (.17)*****	***1.17 (.14)****

** significant at 1% level; ** significant at 5% level; Std. errors in parentheses*

As this table shows, respondents were clearly willing to pay more for free run eggs regardless of certifying body as compared to pasteurized eggs. This is consistent with results from the "real" experiment where WTP for the free run attribute is $0.98 and not even significant for the pasteurized attribute. While the results from the "real" experiment are not discussed in this thesis as they do not contribute to the certification discussion, the full regression results are available in Appendix Q. It should be noted, that the preference ranking of the certifying bodies differs by attribute. For pasteurized eggs, government certification is preferred, followed by industry with farmer certification being the least valued. For free run eggs, both farmer and government certification are preferred and people are willing to pay $1.17 for the combination of this attribute and the certification. The difference in preference rank for farmer certification between these two attributes suggests that a preference for this type of certification depends considerably on the attribute that is being certified. On the other hand, the relatively close value of government certification across the two attributes (the difference is only $0.27 compared to $0.35 and

$0.64 for industry and farmer certification, respectively) suggests this type of certification is preferred in general and that preference is less sensitive to attribute type.

5.3.8 Information Effect

Since the information and price interaction coefficient was significant, further investigation into the information effect was deemed appropriate. The data were separated into two subsamples, one contained only respondents who had completed the survey first and the other contained only respondents who had completed the survey second. It should be noted that although the survey treatment was referred to as an "information" treatment, the survey did not contain any information that would make any attribute more valuable. However, not only was the difference between the regressions run on the subsamples significant, it was considerable. The table below shows WTP differences between the two groups in dollars and percentage change based on the group that received the survey after the stated preference exercise. The regression results for both samples are in Appendix N.

Table 5.5: WTP in Different Subsamples With Information Treatment

Parameter	Survey last	Survey first	Difference $	Difference %
Government Free Run	***1.00 (.20)****	***1.40 (.20)****	***0.40***	***40%****
Industry Free Run	***0.86 (.22)****	***1.29 (.21)****	***0.43***	***50%*****
Farmer Free Run	***1.00 (.21)****	***1.40 (.20)****	0.40	40%
Government Pasteurized	***0.90 (.20)****	***0.95 (.23)****	***0.05***	***6%******
Industry Pasteurized	***0.59 (.22)****	***0.87 (.24)****	***0.28***	***47%*****
Farmer Pasteurized	***0.43 (.25) ******	***0.55 (.27)*****	0.12	28%

** significant at 1%; ** significant at 5%; *** significant at 10%; Std. errors in parentheses. Significance levels for difference % were established through t-tests.*

What is immediately obvious is the upward direction and sheer magnitude of this effect. When people were "primed" by doing the survey first, the WTP increase was statistically significant at a 10% level of significance or more in four of the six egg types. In terms of significance, the most considerable difference was in the WTP for government certified free run eggs with and without the information treatment. What is interesting to note is that while free run eggs gained considerably in value as a result of respondents having first completed the survey, the term "free run" was never mentioned in the survey. Conversely, while farmers were mentioned in several survey questions, the WTP for farmer certification was not affected by when the survey was done. This result may have very important repercussions for researchers who are planning multi-part studies since it implies that doing a survey first, even with questions that are not directly related to attributes of a product in a stated preference exercise, may upwardly bias the WTP.

5.4 MNL - Model 2

5.4.1 Variables

The variables in this analysis were generated by interacting the choices of egg attribute and certification type with demographic and attitudinal variables. The former were derived from responses to the stated preference survey in the second study and the latter were from the survey responses in that group. In the stated preference exercise respondents chose between three combinations of fourteen different egg types: no eggs, generic uncertified and pasteurized, free

run or vitamin-enhanced with four types of certification (uncertified, government, industry and farmer). Although there are 13 egg types in this model as opposed to 6 in the first one (generic uncertified was left out as the base) all other variables are the same as in the first model.

Table 5.6: Variable Descriptions in Model 2

PR	Price ($)
	Egg Types
N	The "none" option
VN	Vitamin enhanced uncertified
VG	Vitamin enhanced government certified
VI	Vitamin enhanced industry certified
VF	Vitamin enhanced farmer certified
PN	Pasteurized uncertified
PG	Pasteurized government certified
PI	Pasteurized industry certified
PF	Pasteurized farmer certified
FN	Free run uncertified
FG	Free run government certified
FI	Free run industry certified
FF	Free run farmer certified
	Interaction Terms
INFOPR	Interaction term between information treatment and price.
INC(egg type)	Interaction term between INCOME and egg type.
AGE(egg type)	Interaction term between age and egg type.
SUPERPR	Interaction term between shopping location, SUPER=1 if respondent shops at a supermarket regularly, 0 otherwise (includes if respondent shops at a supermarket occasionally and never) and price.
MARKPR	Interaction term between shopping location which took the value of 1 if participant shopped at a farmer's market regularly and 0 otherwise, and price.
TRUST(egg type)	Interaction term between TRUST which took the value of 1 if participant believed people could generally be trusted and 0 otherwise and egg type.

5.4.2 Regression Results

As in the previous model, a simple model was first estimated.

Table 5.7: MNL Constants Only Regression Results, Sample 2

Dependent variable: CHOICEB
Number of observations = 1727
Log likelihood = -1678.70
Schwarz B.I.C. = 1730.88
Number of Choices = 5181

Variable	Coefficient	Variable	Coefficient
PR	***-0.656257**** *(0.056)*	**PG**	***0.337614**** *(0.175)*
N	***-2.63523**** *(0.215)*	**PI**	0.054671 (0.194)
VN	-0.12731 (0.181)	**PF**	0.104956 (0.180)
VG	***0.638559**** *(0.183)*	**FN**	-0.014222 (0.189)
VI	0.308447 (0.190)	**FG**	***0.639288**** *(0.182)*
VF	0.218025 (0.182)	**FI**	***0.549714**** *(0.187)*
PN	***-0.606301**** *(0.196)*	**FF**	0.158528 (0.182)

** significant at 1%; ** significant at 5%; *** significant at 10%; Std. errors in parentheses*

The N, VG, PN, PG, FG and FI coefficients are significant and price has the expected negative sign. Government certification is the only option that is significant across all the attribute types. To improve understanding of these effects, regression results from the full model are displayed in the next table. The dependent variable is choice.

Table 5.8: Regression Results for Multinomial Logit Model, Sample 2

Dependent Variable: ChoiceB
Number of observations = 1727
Log likelihood = -1637.30
Number of Choices = 5181

Variable	Estimate	Variable	Estimate
PR	***-0.629576**** *(0.067)*	**AGEVG**	-1.12213 (0.9)
N	***-2.73725**** *(0.220)*	**AGEVN**	0.381852 (0.790)
VN	0.108516 (0.571)	**AGEVI**	-1.03795 (0.954)
VG	***1.83741**** *(0.653)*	**AGEVF**	-0.851829 (0.848)
VI	0.444611 (0.680)	**AGEPN**	-0.79689 (0.939)
VF	-0.229201 (0.606)	**AGEPG**	-0.37279 (0.373)
PN	-0.515176 (0.650)	**AGEPI**	-0.050246 (0.888)
PG	0.506933 (0.550)	**AGEPF**	***-1.90761**** *(0.785)*
PI	-0.110147 (0.634)	**AGEFN**	0.321611 (0.869)
PF	0.542779 (0.548)	**AGEFG**	***-1.7201***** *(0.890)*
FN	***-1.61875**** *(0.669)*	**AGEFI**	-0.187238 (0.828)
FG	0.104292 (0.607)	**AGEFF**	-0.651984 (0.912)
FI	***-1.05966**** *(0.572)*	**SUPERPR**	0.000318 (0.04)
FF	-0.606758 (0.600)	**MARKPR**	***-0.124926**** *(0.06)*
INFOPR	***-0.09191**** *(0.041)*	**TRUSTVN**	***0.640828**** *(0.294)*
INCVG	-0.250027 (0.165)	**TRUSTVG**	0.069416 (0.313)
INCVN	***-0.332635**** *(0.149)*	**TRUSTVI**	0.117702 (0.325)
INCVI	0.126493 (0.172)	**TRUSTVF**	***0.595614**** *(0.296)*
INCVF	0.185456 (0.153)	**TRUSTPN**	0.069367 (0.326)
INCPN	0.09977 (0.168)	**TRUSTPG**	0.203962 (0.279)
INCPG	-0.04076 (0.139)	**TRUSTPI**	-0.411358 (0.310)
INCPI	0.177027 (0.167)	**TRUSTPF**	0.035509 (0.277)
INCPF	0.179562 (0.145)	**TRUSTFN**	***0.536217**** *(0.306)*
INCFN	***0.415536**** *(0.155)*	**TRUSTFG**	0.0589 (0.302)
INCFG	***0.529366**** *(0.161)*	**TRUSTFI**	0.414558 (0.297)

INCFI	***0.579295**** *(0.156)*	**TRUSTFF**	***0.571748**** *(0.314)*
INCFF	***0.273046***** *(0.166)*		

** significant at 1%; ** significant at 5%; *** significant at 10%; Std. errors in parentheses*

As in the simple model, the price coefficient is negative and strongly significant. The N constant, which represents the no eggs option, is also negative and significant indicating the negative utility of not having any eggs.

5.4.3 Model Significance and Goodness of Fit

Using equation 5.6, the LL ratio test indicates that the model is significant. The log likelihood statistic in the base model was -1753.26 while the same statistic was –1637.30 for the full model. The LL ratio statistic is 231.92 and the χ^2 (86) is 119.414 at 0.01 so the model is significant at 1% significance. As in the first model, goodness of fit was measured using the McFadden R^2 (equation 5.7). The statistic was calculated to be 0.07, which can be mapped out onto a linear R^2 as approximately 0.18.

5.4.4 Demographic Interactions

In this model, income and age were interacted with egg type. The results seem to indicate some fairly strong preference trends. People with higher income had a higher willingness to pay for free run eggs regardless of the certifier. They also tended to dislike uncertified vitamin enhanced eggs. The age and egg type interactions indicated that older people are less likely to prefer farmer certified pasteurized eggs and government certified free run eggs.

5.4.5 Price Sensitivity Interactions

As opposed to the first study, the negative and significant INFOPR variable indicated that doing the survey first increased price sensitivity (as for this regression, the info variable took on the value of 1 if people did the survey first). Results from regressions run on subsamples of the data separated according to this variable will be presented in a subsequent subsection. In addition, separate models were estimated using data subsamples separated according to who had completed the "real" experiment and who had not. These results will be presented in a subsequent section of this chapter.

As well, where a person shops had an effect on his/her sensitivity to prices. As opposed to the first study, only the MARKPR variable was significant and indicated that shopping at the farmer's market increased price sensitivity.

5.4.6 Trust

The TRUST variable seems to be more connected to the certifying agent than the attribute. TRUSTFF and TRUSTVF are both positive and significant, meaning that survey respondents who had a higher general level of trust were more likely to prefer farmer certification of free run and vitamin enhanced eggs.

5.4.7 WTP

The willingness to pay was calculated in the same manner as with the first model. Results are presented in the table below. The WTP is compared to generic eggs with no certification.

Table 5.9: Willingness to Pay for Certification of Egg Attributes, Sample 2

	Vitamin enhanced	Pasteurized	Free Run
Uncertified	-0.20 (0.26)	***-0.93 (0.30)****	-0.04 (0.27)
Government certified	***1.01 (0.28)****	***0.55 (0.26)*****	***1.02 (0.27)****
Industry certified	***0.50 (0.27)*****	0.03 (0.29)	***0.83 (0.28)****
Farmer certified	0.42 (0.27)	0.04 (0.27)	0.33 (0.27)

** significant at 1%; ** significant at 5%; *** significant at 10%; Std. errors in parentheses*

From the table above it is clear that any type of certification is preferred to no certification. It is also clear that government is the certifier of choice regardless of attribute since that is the only WTP estimate that is significant across all attributes. This is consistent with the results from the first study. Free run is the preferred attribute, followed by vitamin enhanced and then pasteurized. There was no free run option in the "real" experiment in this session but vitamin enhanced is preferred over pasteurized, with respondents willing to pay $0.86 for the first and nothing for the second. Full regression results are available in Appendix Q. WTP for farmer certification is insignificant for every attribute, indicating the lack of value that is attributed to this type of certification. The negative sign of the WTP for the uncertified attribute does indicate that none of these attributes are preferred to generic eggs and furthermore that these attributes were of negative value to consumers if they were not certified. The difference in the value of an uncertified and a certified attribute is most pronounced in the case of pasteurized eggs, which go from having a value of $-0.93 to $0.55 when they are certified by the government – a $1.48 price differential. In each case, government certification increases the value of an

attribute by over $1. What is remarkable is that farmer certification of free run eggs dropped to the third rank as the preferred alternative in the second study. This corresponds with some of the aggregate attitudinal findings discussed in the previous chapter that show a drop in the general trust level between the two studies and trust was shown to positively influence the preference for farmer certification in the second study. Also, a further loss of trust in farmers between the two studies was seen in the decrease in people who trusted information from farmers.

5.4.8 WTP Difference: Egg Experiment/No Egg Experiment

Doing the "real" egg experiment prior to completing the stated preference survey not only increased WTP in several instances but it also made WTP significant. Whereas respondent were not willing to pay an amount that was statistically significant from zero if they had not done the egg experiment first for any egg (the only significant WTP estimates were for uncertified vitamin enhanced and uncertified pasteurized, both which were negative), this changed dramatically for the people who had done the egg experiment. Results are presented in the table below and full regression results for each subsample are included Appendix P.

Table 5.10: Difference in WTP; Egg Experiment Vs. No Egg Experiment

	Did Not Do "Real" Experiment	**Did "Real" Experiment**
Egg Type	Estimate	Estimate
Vitamin Enhanced Uncertified	*-**0.56*****(0.34)*	0.36 (0.38)
Vitamin Enhanced Industry Certified	-0.06 (0.34)	***1.20**** *(0.39)*
Vitamin Enhanced Government Certified	0.35 (0.34)	***1.66**** *(0.4)*
Vitamin Enhanced Farmer Certified	-0.12 (0.33)	***1.01**** *(0.38)*
Pasteurized Uncertified	***-1.23**** *(0.4)*	-0.17 (0.4)
Pasteurized Industry Certified	-0.36 (0.39)	***0.75**** *(0.41)*
Pasteurized Government Certified	-0.22 (0.34)	***1.44**** *(0.39)*
Pasteurized Farmer Certified	-0.42 (0.34)	***0.79**** *(0.38)*
Free Run Uncertified	-0.20 (0.33)	0.27 (0.4)
Free Run Industry Certified	0.25 (0.34)	***1.79**** *(0.43)*
Free Run Government Certified	0.41 (0.33)	***1.61**** *(0.41)*
Free Run Farmer Certified	0.01 (0.34)	***0.81**** *(0.38)*

** significant at 1%; ** significant at 5%; *** significant at 10%; Std. errors in parentheses*

Overall, these results indicate that respondents who did the "real" experiment were willing to pay a lot more for all the certified eggs. However, something that must be noted when examining these results is the relatively small sample size used for this analysis. This makes it possible that there are some group-specific characteristics that are influencing the outcome. Regression results (available in Appendix K) do show that the price coefficient on the group that did not do the egg experiment is -0.78 while the one on the group that did the egg experiment has a price coefficient of -0.61, indicating the first group is more price

sensitive than the other. This could explain some of the difference in WTP between the groups. Another possible reason for the increase in WTP for the vitamin enhanced and pasteurized eggs could be that people may not be familiar with those types of eggs and that those who did the egg experiment first got to see them and read the nutritional label. Pasteurized eggs gained the most from government certification and from the egg experiment with a stunning difference of $2.77 in WTP for these eggs between the uncertified, no egg experiment version and the government certified with the egg experiment version. The free run results are difficult to explain, since free run eggs were not given as an option in the "real" experiment. A possible explanation may be that the "real" experiment increased respondent preference for specialty eggs in general.

5.4.9 WTP Difference: Survey First/Survey Last

Table 5.11: Difference in WTP; Information Vs. No Information

	Did Survey Last	**Did Survey First**
	Estimate	Estimate
Vitamin Enhanced Uncertified	-0.44 (0.37)	-0.23 (0.36)
Vitamin Enhanced Industry Certified	***0.96**** *(0.37)*	-0.11 (0.4)
Vitamin Enhanced Government Certified	***1.23**** *(0.38)*	0.63 (0.39)
Vitamin Enhanced Farmer Certified	0.33 (0.37)	0.3 (0.36)
Pasteurized Uncertified	***-0.94**** *(0.41)*	***-0.97**** *(0.41)*
Pasteurized Industry Certified	0.12 (0.4)	-0.22 (0.41)
Pasteurized Government Certified	0.53 (0.34)	***0.68*****(0.36)*
Pasteurized Farmer Certified	0.44 (0.35)	-0.39 (0.39)
Free Run Uncertified	-0.53 (0.37)	0.2 (0.37)
Free Run Industry Certified	0.47 (0.37)	***1.03**** *(0.39)*
Free Run Government Certified	***0.89**** *(0.38)*	***0.99**** *(0.38)*
Free Run Farmer Certified	0.33 (0.37)	0.15 (0.36)

** significant at 1%; ** significant at 5%; *** significant at 10%; Std. error in parentheses*

As with the first study there are significant WTP differences between the subsample that completed the survey first and last. Again, these results have to be considered in light of the sample size however it appears that those who had been first "primed" with the survey were willing to pay more for industry and government certified free run eggs, government certified pasteurized eggs and reported a higher disutility from uncertified pasteurized eggs. Interestingly, doing the survey first lowered the WTP for vitamin-enhanced eggs as the WTP for industry certified and government certified vitamin enhanced eggs became insignificant.

5.5 WTP Both Models, Full Samples

Table 5.12: WTP for Certification of Egg Attributes in Both Studies; $ with (rank)

	Pasteurized		**Free Run**		**Vitamin enhanced**
	Study 1	*Study 2*	*Study 1*	*Study 2*	*Study 2*
Uncertified		-0.93*		-0.04	-0.2
Government certified	***0.90 (1) *****	***0.55 (1)*****	***1.16 (2)*****	***1.02 (1)****	***1.02 (1)****
Industry certified	***0.70 (2)*****	0.03 (3)	***1.05 (3)*****	***0.83 (2)****	***0.50 (2)******
Farmer certified	***0.53 (3)****	0.04 (2)	***1.17 (1)****	0.33 (3)	0.42 (3)

** significant at 1%; ** significant at 5%; *** significant at 10%*

Keeping in mind that these results are not directly comparable in dollar terms because of the differences in the survey instrument, there are some trends that can be

commented on and a rank of preferences can be established and compared. In three out of the five different categories of attribute and study session, the preferences of certifier are ranked as government first, industry second and farmer third. In one case where the rank is different (pasteurized, study 2) industry and farmers are both insignificant and in another (free run, study 1) government is second in rank but only by $0.01. Industry is never the preferred certifier and farmers are only once, but they are tied with government. These results clearly indicate that consumers prefer public to private certification and that they prefer certification to no certification.

5.6 Latent Class Model Theory

While the MNL model yielded many interesting results, it did not allow for heterogeneity across the sample as it treated every two-way choice (in the first session) and three-way choice (in the second session) as one choice separate from all others and did not account for the fact that each individual made 24 of these choices in the first session and 12 in the second.

A latent class model is based on the premise that individual behaviour depends on observable attributes and on latent heterogeneity that varies by factors that are unobserved by the analyst (Greene, 2002). Because a LCM models parameter heterogeneity across individuals, this model incorporates existing discrete unobserved variables and sorts people into groups based on similar behaviour or preferences (Greene, 2007, p. N3-

20). The subsequent LCM form, as described in Greene (2008) p. N3-20, is followed in this analysis.

In an LCM, individual *i* seeks to maximize utility by choosing among *J* alternatives at choice situation *t* given that individual *i* is in class *c* where utility functions are

$U_{jit|c} = ß_c'x_{jit} + €_{jit}$ (Equation 5.8)

U_{jit} = utility of alternative *j* to individual *i* in choice situation *t*

x_{jit} = union of all attributes that appear in all utility functions. For some alternatives, $x_{jit,k}$ may be zero by construction for some attribute *k* which does not enter their utility function for alternative *J*.

$€_{jit}$ = unobserved heterogeneity for individual *i* and alternative *j* in choice situation *t*.

$ß_c$ = class specific parameter vector.

Within the class, choice probabilities are assumed to be generated by the multinomial logit model)

$Prob[yit = j|class\ c] = \exp(ß_c'x_{jit})/\sum^{J_i}_{j=1}(ß_c'x_{jit})$ (Equation 5.8)

5.7 Latent Class Model Results

A latent class model estimation based on MNL was developed for both study sessions in order to identify respondents as members of a group of consumers with a certain set of preferences as well as to determine possible drivers of these preferences. The

LCM allowed for the panel nature of the data to be incorporated in the estimation. Each study session was modeled separately using NLogit 4.0 and three model versions were developed in every case. A base model with only constants indicated the general class structure, a model with only exogenous variables was used for the analysis and to compute WTP for every class and a model with exogenous variables and some variables that may be endogenous was run for the purpose of triangulation, or to make sure that the model is consistent. The variables used in both cases were the same. The exogenous variables that were used were education, age, SHOPM (whether a person shops in a farmer's market), sex and number of children in household. The additional variables in the third model version were CONFBR, a measure of confidence in brown eggs as well as FARM and GOVT, which were composed as an average of the four components of the Likert scale questions that have been used by de Jonge et al. (2008) as proxy measures of trust in farmers and government, respectively. The choice of variables as well as the choice of two classes in the first model and three classes in the second were based on many preliminary regressions as well as model fit measures such as AIC and BIC statistics.

5.8 LCM - Model 1

5.8.1 Regression Results

The regression results for all three of the model versions for the first study will now be presented and a discussion about the characteristics of each class will follow. The

analysis of the classes and the WTP measures will be based on the results of the model with only exogenous variables.

Table 5.13: LCM Utility Parameter Results in Model with Constants Only

Dependent variable	CHOICEB
Weighting variable	None
Number of observations	1584
Iterations completed	24
Log likelihood function	-553.863

	Latent Class 1	**Latent Class 2**
Variable	Coefficient	Coefficient
FARPAST	***1.484153****(0.409)	***1.46894****(0.209)
GOVPAST	***2.11779****(0.401)	***1.835203****(0.235)
INDPAST	***1.633046****(0.402)	***1.6194****(0.209)
FARFR	***1.522435****(0.404)	***3.196303****(0.247)
GOVFR	***2.012304****(0.394)	***2.64042****(0.225)
INDFR	***1.731425****(0.394)	***2.636581****(0.251)
PRICE	***-2.26915****(0.236)	***-0.99902****(0.051)
Prob. of being in class	***0 .69****	***0.311****

** significant at 1%; ** significant at 5%; *** significant at 10%; Std. error in parentheses*

The group membership is distributed with 69% of respondents falling in the first class and 31% in the second. All of the coefficients are significant and the first group is far more price sensitive than the second.

Table 5.14: LCM Utility Parameter Results in Model with Exogenous Variables

Dependent variable	CHOICEB
Weighting variable	None
Number of observations	1584
Iterations completed	34
Log likelihood function	-551.888

	Latent Class 1	**Latent Class 2**
Variable	Coefficient	Coefficient
FARPAST	***1.460519*** (0.429)	***1.483989*** (0.216)
GOVPAST	***2.098096*** (0.410)	***1.848529*** (0.241)
INDPAST	***1.611906*** (0.415)	***1.63274*** (0.217)
FARFR	***1.526525*** (0.422)	***3.18862*** (0.255)
GOVFR	***2.015237*** (0.401)	***2.632044*** (0.238)
INDFR	***1.734296*** (0.407)	***2.629335*** (0.258)
PRICE	***-2.26343*** (0.243)	***-0.99944*** (0.054)
Prob. of being in class	***0.688***	***0.312***

All coefficients were significant at the 1% level; Std. errors in parentheses

In order to see what may possibly be driving class membership, the following table shows the likelihood of several explanatory variables to be driving membership in latent class 1 as compared to latent class 2.

Table 5.15: Demographic Coefficients in Model with Exogenous Variables

	Latent Class 1
Variable	Coefficient
Constant	1.414425 (2.16)
Education	-0.2751 (0.52)
Age	1.036677 (2.12)
Gender	0.000704 (0.00)
Supermarket	-1.17939 (1.04)
Kids	0.273084 (0.439)

The class membership in this model version is almost the same as the one with only the constants. Unfortunately, it is not apparent what is driving class membership as none of the possible explanatory variables are significant.

Table 5.16: LCM Utility Parameter Results in Multi-Variate Model

Dependent variable	CHOICEB
Weighting variable	None
Number of observations	1584
Iterations completed	38
Log likelihood function	-556.626

	Latent Class 1	**Latent Class 2**
Variable	Coefficient	Coefficient
FARPAST	***1.461469*** (0.432)	***1.484949*** (0.221)
GOVPAST	***2.098285*** (0.422)	***1.850645*** (0.246)
INDPAST	***1.611484*** (0.427)	***1.634923*** (0.225)
FARFR	***1.525699*** (0.423)	***3.18907*** (0.255)
GOVFR	***2.013001*** (0.402)	***2.635412*** (0.248)
INDFR	***1.733869*** (0.406)	***2.630583*** (0.266)
PRICE	***-2.26485*** (0.245)	***-1.00067*** (0.056)

All coefficients were significant at the 1% level; Std. errors in parentheses

Table 5.17 Demographic Coefficients in Multi-Variate Model

Latent Class 1	
Variable	Coefficient
Constant	1.347937 (2.673)
Education	-0.3087 (0.538)
Age	1.061694 (2.18)
Gender	0.000646 (0.001)
Supermarket	-1.1289 (1.073)
Brown eggs	0.09047 (0.323)
Farmvar	-1.61067 (2.526)
Govvar	1.51407 (2.562)
Kids	0.135327 (0.480)

Again, as in the previous model none of the possible explanatory variables are significant and the class memberships retain similar characteristics.

5.8.2 Model Significance and Goodness of Fit

Since only the second model version will be used for analysis and computation of WTP, the goodness of fit measures reported will be for that model. The LL ratio test performed by NLogit indicates that model significance at the 1% level and the McFadden Pseudo R^2 is reported as 0.497, which corresponds to just under 0.9 in the linear R^2.

5.8.3 WTP

The willingness to pay was calculated as the ratio of the parameter and the marginal utility of money or the price coefficient.

Table 5.18: Willingness to Pay in Latent Class Model, Sample 1 in $

	Latent Class 1	Latent Class 2
FARPAST	0.65	1.48
GOVPAST	0.93	1.85
INDPAST	0.71	1.63
FARFR	0.67	*3.19*
GOVFR	0.89	2.63
INDFR	0.77	2.63

All estimates are significant at 1% level

From the above table it is evident that one class is willing to pay considerably more for all eggs than the other. The first class has a much smaller variability in what the amount they are willing to pay for all egg types. It is noteworthy that they differentiate by certifying

agent as their rank in certifier preference is consistent across production attribute types. The second class has generally higher willingness to pay and prefer free run eggs to pasteurized eggs considerably.

5.9 Latent Class Characteristics – Model 1

5.9.1 Latent Class 1: The Price and Certifier Conscious Consumer

Respondents who belonged to this category tended to only pay between $0.65 and $0.93 for any type of eggs. They clearly prefer government certification to industry and farmer certification, which are consistently second and third in the preference rank.

5.9.2 Latent Class 2: The Free Run Lover

Respondents in this class clearly preferred free run to pasteurized and were willing to pay more than double for free run eggs in some cases. These people were also less price sensitive than people in the first group and were willing to pay considerably more for every egg type. Their preference for certifying agent depended on the attribute being certified, with farmers being the preferred certifier for free run eggs and government for pasteurized.

5.10 LCM - Model 2

5.10.1 Regression Results

As with data from the first session, data from the second session were also used to generate three versions of the LCM. A discussion about the characteristics of each class will follow the regression results. The analysis of the classes and the WTP measures will be based on the results of the model with only exogenous variables.

Table 5.19: LCM Utility Parameter Results in Model With Constants Only, Sample 2

Dependent variable	CHOICEB
Number of observations	1728
Iterations completed	79
Log likelihood function	-1379.85

	Latent Class 1	**Latent Class 2**	**Latent Class 3**
Variable	Coefficient	Coefficient	Coefficient
None	***-6.86**** (0.77)	***-2.83**** *(0.28)*	***0.76**** *(0.42)*
VN	***0.82**** (0.27)	***-0.82**** *(0.27)*	***-3.35**** *(0.83)*
VG	***1.75**** (0.3)	0.23 (0.27)	-0.39 (0.32)
VI	***1.15**** (0.27)	-0.16 (0.27)	-0.51 (0.31)
VF	***1.16**** (0.27)	-0.2 (0.24)	***-1.26**** *(0.37)*
PN	0.08 (0.27)	-0.44 (0.28)	*-31.14 (0.01)*
PG	***0.92**** *(*0.26)	***1.05**** *(0.24)*	***-2.85**** *(0.61)*
PI	***0.79**** (0.28)	***-0.37*** *(0.3)*	***-1.18**** *(0.42)*
PF	***1.13**** (0.27)	***-0.79**** *(0.24)*	***-1.15**** *(0.33)*
FN	0.31 (0.27)	***-0.85**** *(0.25)*	***1.34**** *(0.28)*
FG	***0.95**** (0.28)	-0.49 (0.3)	***2.39**** *(0.33)*
FI	***1.17**** (0.28)	***-0.64**** *(0.29)*	***1.60**** *(0.28)*
FF	***0.63**** *(0.28)*	***-1.11**** *(0.29)*	***1.08**** *(0.32)*
PRICE	***-0.88**** (0.09)	***-1.01**** *(0.08)*	***0.26**** *(0.12)*
Probability of being in class	**0.529015**	**0.279754**	**0.19123**

significant at 1%; ** significant at 5%; * significant at 10%*

Just over half the sample comprise the first group, 28% the second and 19% the third. What is common across all groups is the insignificance of the PN variable. In fact, the coefficient in the third group indicates the model hit a statistical boundary and implies that the PN option was never chosen by a respondent who belonged to this group.

Table 5.20: LCM Utility Parameter Results in Model With Exogenous Variables, Sample 2

Dependent variable	CHOICEB
Weighting variable	None
Number of observations	1728
Iterations completed	96
Log likelihood function	-1374.15

	Latent Class 1	**Latent Class 2**	**Latent Class 3**
Variable	Coefficient	Coefficient	Coefficient
None	***-7.29**** (1.04)	***-2.88**** *(0.29)*	0.52 (0.42)
VN	***0.79**** *(0.28)*	***-0.80**** *(0.3)*	***-2.47**** *(0.52)*
VG	***1.79**** *(0.32)*	0.17 (0.28)	-0.31 (0.32)
VI	***1.14**** *(0.28)*	-0.17 (0.28)	-0.4 (0.31)
VF	***1.16**** *(0.28)*	-0.2 (0.26)	***-1.14**** *(0.39)*
PN	0.07 (0.28)	-0.43 (0.28)	-30.74 (856726.29)
PG	***0.95**** *(0.27)*	***1.05**** *(0.25)*	***-3.13**** *(0.73)*
PI	***0.79**** *(0.29)*	***-0.40**** *(0.31)*	***-1.10*** *(0.44)*
PF	***1.14**** *(0.27)*	***-0.84*** *(0.26)*	-1.02 (0.33)
FN	0.3 (0.29)	***-0.89**** *(0.26)*	***1.28**** *(0.29)*
FG	***0.94**** *(0.29)*	***-0.53**** *(0.31)*	***2.35**** *(0.33)*
FI	***1.16**** *(0.29)*	***-0.67*** *(0.3)*	***1.61**** *(0.29)*
FF	***0.62*** *(0.29)*	***-1.17**** *(0.31)*	***1.08**** *(0.32)*
PRICE	***-0.87**** *(0.09)*	***-1.01**** *(0.08)*	0.17 (0.12)
Prob. of being in class	**0.524**	**0.276**	**0.2**

** significant at 1%; ** significant at 5%; *** significant at 10%; Std. errors in parentheses*

Table 5.21: Demographic Coefficients in Model with Exogenous Variables, Sample 2

	Latent Class 1	**Latent Class 2**
	Coefficient	Coefficient
Constant	3.87 (1.76)	2.12 (2.01)
Edu	-0.77 (0.8)	-0.26 (0.92)
Age	-2.11 (1.61)	-1.85 (1.85)
Shopm	**-1.69**** (0.75)	-1.01 (0.77)
Sex	0.32 (0.59)	0.66 (0.64)
Child	-0.3 (0.48)	-0.34 (0.52)

** significant at 1%; ** significant at 5%; *** significant at 10%; Std. errors in parentheses*

The class probabilities are very similar within this model version are very similar to the first version as are the directions of signs and the significance of the coefficients. Of the possible explanatory variables none were significant with the exception of shopm in the first class, which had a negative sign indicating that people in this class were less likely to shop at farmer's markets. Although this variable was insignificant for the second class, it had a negative sign there as well suggesting that members of the third latent class were those who shopped at farmer's markets.

Table 5.22: LCM Utility Parameter Results in Multi-Variate Model, Sample 2

Dependent variable	CHOICEB
Weighting variable	None
Number of observations	1728
Iterations completed	94
Log likelihood function	-1370.18

Variable	**Coefficient**	**Coefficient**	**Coefficient**
None	**-6.49*** (1.07)	***-3.65**(0.36)*	0.24 (0.35)
VN	**0.84*** (0.28)	***-0.77*** (0.33)*	-31.93 (137673D+07))
VG	**1.83*** (0.32)	0.2 (0.32)	***-0.66*** (0.29)*
VI	**1.19*** (0.29)	-0.21 (0.31)	-0.94 (0.32)
VF	**1.19*** (0.29)	-0.05 (0.31)	***-1.74**** *(0.42)*
PN	0.02 (0.3)	-0.09 (0.31)	-32.01(.145D+07)
PG	**0.85**** (0.35)	***1.21**** (0.31)	***-3.39**** *(0.79)*
PI	**0.75**** (0.3)	-0.29 (0.38)	***-1.18**** *(0.36)*
PF	**1.11*** (0.29)	***-0.80**** *(0.3)*	***-1.22**** *(0.32)*
FN	0.47 (0.3)	***-0.92**** *(0.3)*	***0.66**** *(0.25)*
FG	**1.09*** (0.32)	-0.54 (0.34)	***0.99**** *(0.28)*
FI	**1.29*** (0.31)	***-0.68***** *(0.35)*	***0.78**** *(0.25)*
FF	**0.74**** (0.32)	***-1.53**** *(0.38)*	***0.57***** *(0.28)*
PRICE	**-0.81*** (0.09)	***-1.11**** *(0.09)*	0.01 (0.1)
Probability of being in class	**0.537**	**0.226**	**0.237**

** significant at 1%; ** significant at 5%; *** significant at 10%; Std. errors in parentheses*

Table 5.23: Demographic Coefficients in Multi-Variate Model, Sample 2

	Latent Class 1	**Latent Class 2**
Variable	Coefficient	Coefficient
Constant	**5.45*** (2.5)	2.98 (3.1)
Edu	-0.94 (0.86)	-0.61 (1.09)
Age	-2.37 (1.51)	-2.4 (1.92)
Shopm	-1.18 (1.02)	-1.48 (0.94)
Sex	-0.13 (0.73)	0.43 (0.69)
Child	-0.31 (0.45)	-0.57 (0.51)
Farm	-1.4 (1.97)	2.77 (2.58)
Govt	-0.9 (1.81)	0.5 (2.22)
Confbr	0.14 (0.4)	-0.46 (0.46)

** significant at 1%; ** significant at 5%; *** significant at 10%; Std. errors in parentheses*

Within this version of the model, the class probabilities are somewhat different. The first class still contains just over 50% of the respondents however, the second and third classes are nearly equal and contain 22.6% and 23.7% of respondents. Here, the variable VN also hit a statistical boundary probably indicating that no one in the third class chose uncertified vitamin enhanced eggs even once. Unfortunately, there are no clues in the probability estimates as to what drives class membership as all of the variables are insignificant.

5.10.2 Model Significance and Goodness of Fit

Again, for only the second model version, the LL ratio test performed by NLogit indicates that the model is significant at the 1% level and the McFadden Pseudo R^2 is reported as 0.276, which corresponds to nearly 0.6 in the linear R^2.

5.10.3 WTP

The willingness to pay was calculated as the ratio of the parameter and the marginal utility of money or the price coefficient. There are no WTP estimates for the third class because the price coefficient in this class was not significant as the preferences of these consumers are not affected by price.

Table 5.24: WTP for Latent Class 1 and 2, Sample 2 in $

	LC1	**LC2**	**LC1**	**LC2**	**LC1**	**LC2**	**LC1**	**LC2**
	No Certification		Government		Industry		Farmer	
No Eggs	***-8.35****	***-2.84****	**-**		-		-	
Vitamin Enhanced	***0.91****	***-0.79****	***2.05****	0.17	***1.30****	-0.17	***1.33****	-0.2
Pasteurized	0.08	-0.43	***1.08****	***1.04****	***0.90****	***-0.39****	***1.30****	***-0.83****
Free Run	0.34	***-0.88****	***1.07****	***-0.52****	***1.33****	***-0.66****	***0.71****	***-1.15****

** significant at 1%; ** significant at 5%; *** significant at 10%*

5.11 Latent Class Characteristics

5.11.1 Latent Class 1: The Rational Tradeoff Consumer

The consumer that falls into this class gets utility from every egg type except uncertified pasteurized and uncertified free run and has a very high disutility from not getting any eggs. Consumers in this group clearly differentiate by production attribute type and by certification type, as well as the combination of the two. When production attributes are uncertified, the preference ranking goes from vitamin enhanced as most preferred to pasteurized as least preferred. The low rank of the pasteurized attribute is quite consistent with the results of the MNL model and underlines its relative undesirability. The preference ranking changes when these attributes are combined with certification. Government certification greatly increases the value of vitamin enhanced and pasteurized eggs, catapulting the latter past free run eggs. However, free run eggs are preferred above all when they are industry certified and least when they are farmer certified. Overall, consumers in this group generally prefer vitamin enhanced eggs over every other type and

while they do value farmer certification similarly to how they value industry certification, they are unlikely to be people who shop at farmer's markets.

5.11.2 Latent Class 2: The Price Conscious Consumer

The consumers in this class have the highest price sensitivity and has either no willingness to pay or a negative willingness to pay for every egg type except government certified pasteurized. This consumer distinctly dislikes free run eggs as those have a negative and significant coefficient regardless of certification type.

5.11.3 Latent Class 3: The Free Run Lover

Around 20% of respondents fall into this group, which distinctly prefers free run eggs, regardless of certification, over any other type of egg. This group also values certification as it has a high disutility associated with uncertified vitamin enhanced and pasteurized eggs. In fact, the coefficient on the PN variable suggests that no one in this group even once chose pasteurized uncertified eggs. Of the free run eggs, government certification is highest ranked and farmer the lowers. This is logical as these people are more likely that people in the other two groups to shop at farmer's markets and so all the products they buy are implicitly farmer certified. The price coefficient of this group is not significant indicating that preferences are not driven by price. This is also logical, as preferences are so strongly driven by attribute type and people might have a very inelastic demand for certain attributes.

5.12 Conclusion

Two models were constructed to analyze the data generated from the two study sessions conducted for this thesis: an MNL model and an LCM. The MNL model for the first sample was more parsimonious than the model for the second sample due to the different nature of the stated preference instrument. In this model, people preferred free run eggs to pasteurized eggs. Where they shopped and whether they received the survey before or after the stated preference exercise turned out to affect their price sensitivity. A remarkable finding from this analysis was the strength of the information effect. Separate regressions run on study subsamples found that WTP differed considerably between respondents depending on whether they had completed the survey first. In the second MNL model, regression results also showed the choice of eggs was affected by demographic characteristics and that shopping habits affected price sensitivity. The WTP estimates showed that government was the preferred certifier but that people were not willing to pay anything for farmer certification. This was consistent with some of the attitudinal results presented in the previous chapter, which showed a significant decline in confidence in farmers as compared to the first study. As in the first study, the effects of experimental procedure on stated WTP were remarkable. Whether people did the "real" egg experiment first increased their willingness to pay for eggs as did the order in which they did their survey. Taken in tandem with the results from the first study, these results underline the necessity of careful planning when choosing the sequence of multi-part study sessions.

In order to determine whether respondents belonged to a group with shared characteristics an LCM was developed and estimated with data from both sessions.

Respondents from the first sessions were categorized into two groups, one characterized by price and certification consciousness and a second by a clear preference for free run eggs and lower price sensitivity. Data from the second study were sorted into three latent classes, which also included a group that clearly preferred free run eggs to any type of eggs as well as a group that was price sensitive and one that valued all egg types and traded off between them rationally.

6. CONCLUSION

6.1 Introduction

This thesis will conclude with a chapter that will provide a summary of results assessed against the research objectives outlined in the introductory chapter. Methodological findings will be summarized and a section on study limitations and implications will be followed by some brief concluding remarks.

6.2 Summary

A look at any grocery shelf will reveal the proliferation of credence attribute claims on food products. From an economic perspective, credence attributes may be problematic because they cannot be verified by the consumer and rely on a consumer's belief in their existence. This has the potential to lower welfare in two ways: either the consumer does not believe the attribute exists and is not willing to pay for the true value of the product or the consumer believes an attribute exists when it does not and pays too much for a given product. In theory, certification mechanisms exist to avert these potential welfare losses by imposing certain standards on credence attribute claims and communicating those standards to a consumer. However, if removing moral hazard and correcting information asymmetry were as simple as an additional logo on a label, there would be no need for studies like the one that forms the basis for this thesis. Indeed, to remove welfare loss due to moral hazard, standards certifying credence attributes must be stringent enough to satisfy the consumer and in order to remove welfare loss caused by information

asymmetry they must be set and regulated by an agent that a consumer trusts and communicated to a consumer in a way they understand. In order to further the literature on correcting the second type of potential welfare loss, this thesis set out to determine the consumer's preference of certifying agent by establishing the precise value they assign to certification by various agents. The role of various attitudes, beliefs, knowledge and trust levels were also examined to provide context to these preferences. From a methodological perspective, study procedures were modified among sample subgroups to determine whether this made a difference to their stated WTP for certification. Classified according to previously stated research objectives, the findings are as follow.

Research Objective 1: To examine how trust and quality certifications affect a consumer's choice decision and willingness to pay for credence attributes.

Much of the analysis for this objective was conducted by comparing the two samples in terms of their attitudes to trust and confidence questions. Trust in general and trust in farmers in particular was lower for the second sample. Some of this may be explained by the listeriosis crisis that happened between the two studies and some may be explained by the different shopping habits of the two groups. There is also the fact that the sample sizes were small and the lower trust levels may have just been the characteristics of that particular group of people. The regression results for both studies revealed a significant correlation between trust in general and consumer preference for farmer certification. The lower value, relative to the other certifiers within that study, and lower rank, relative to the ranking structure of the first sample, of farmer certification in the WTP estimates of the second sample corresponded with these findings.

Quality certification affects a consumer's choice decision because it increases the value of the attribute that it is certifying. In the WTP estimates for the second sample, where the survey instrument was structured to enable respondents to value an uncertified version of a credence attribute, the differences in WTP between these and their certified versions were considerable. Although across both studies, government ranked first as the certifier of choice, the biggest difference in the WTP of a certified versus an uncertified attribute was for pasteurized eggs. This may indicate the need for certification of new products.

Research Objective 2: To identify the differences between using public and private certification in the marketing of agricultural and food products with credence attributes.

Respondents clearly preferred certification to no certification. They also clearly differentiated between attributes and their valuation of those attributes with some attributes becoming considerably more valuable with certain types of certification. Respondents were willing to pay the most for free run eggs regardless of certification however, the attribute of pasteurization, which was simultaneously a food safety attribute and represented a new technology that is not currently available in the Canadian market, had the most to gain from certification.

Respondents across both surveys clearly preferred government certification over any other type of certification. Government certification was the only type that was positive and statistically significant for every attribute in every study. Farmer certification was generally the least preferred and in most cases, the willingness to pay for this type of certification was not significantly different than zero, other than for free run in some cases.

Research Objective 3: Determine the level of consumer knowledge about the food certification process.

Certification knowledge scores were composed on the basis of a questionnaire that asked respondents to indicate what agent set and certified certain claims and what that certification meant. On average, people understood between half to two thirds of the different elements of certification, with considerable variability in knowledge based on the type of attribute and the certification element. Further analysis on these scores seemed to indicate that they were affected by gender and education. The knowledge scale was not used in the regression analysis because of flaws in the design of the question.

Research Objective 4: To determine whether there are distinct consumer groups that share similar preferences for attributes and/or certification type.

Results from latent class modeling indicate that there were two distinct consumer groups in the first study and three in the second. These groups include a rational, egg loving consumer, a price sensitive consumer and the free run lovers. The group that prefers free run above all other attributes and regardless of certification is common within both studies. Most people in both studies tend to belong to a group that is fairly price-sensitive, likes eggs and seems to be making rational tradeoffs between attributes and certification types.

6.3 Methodological Issues

The three components of this study raised questions allowed for the procedure for administering these components to be modified within study subsamples in order to discern

whether this affected the outcome. In the first study, the order of the survey was different for each half of the sample, with some doing the survey prior to completing their "real" and hypothetical experiments while the other have completed the survey afterwards. The second sample underwent the same treatment while also additionally being separated into a group that completed the "real" experiment and a group that did not. Analysis of the WTP estimates for the two sub-groups in the first sample revealed that WTP was significantly higher for four out of the six certification-attribute combinations in the group that had completed the survey. Perhaps even more striking was regression analysis in the second sample of the group that had participated in the "real" experiment versus the group that had not. The WTP estimates derived from the estimated regression coefficients were significantly different in 9 out of 12 of the certification-attribute combinations available. In each of these cases, the WTP was not even significant in the group that had not done the egg experiment. This may be indicate that doing a "real" experiment first may have caused people to give more thought to the actual value they attribute to eggs and their attributes. It may have put them into the mindset of an egg consumer rather than a survey respondent, which caused higher WTP. These types of differences in WTP estimates underline the need to carefully consider the procedure of administering a study.

6.4 Study Limitations and Implications

Limitations of this study included using a different instrument in the stated preference exercise across the two samples, which made the WTP estimates not directly comparable. It also made it hard to measure the effect of the listeriosis food crisis on WTP.

Another problem was with the knowledge certification questions, which were posed in such a way as to allow respondents to select several answers.

From a policy perspective, the implications of the research findings are that consumers are willing to pay for government certification of certain credence attributes. As such, the government as a certifier may be best suited to correct information asymmetry induced welfare losses. However, the value people place on certification is considerably influenced by certain characteristics. People who shop at farmer's markets, for instance, seem to be far more concerned about the presence of certain attributes than their certification. This may be because while farmers are their preferred certifiers they are already paying a premium for products at the farmer's market, that are in effect farmer certified, and the value they place on that certification is part of the price.

The confusion communicated by study participants about current certification schemes and the knowledge scores in the second sample that confirmed it indicate that certification schemes should be accompanied by some type of information campaign. The most effective way of communicating standards may be an area of future research.

The significant difference between the WTP for uncertified and certified attributes suggests demand for specialty attributes may increase in the presence of certification. This is particularly true for attributes that are unknown in the marketplace or that use new technologies. This may be of note for producers and may also indicate an area of future research as someone may find it interesting to determine whether the market penetration of new technologies is affected by certification.

Other potential areas of future research lie in the area of determining more precisely the connection between trust in farmers, general trust and confidence in the food system arising from that link. It may be that trust in the food system may be restored most quickly after a food crisis such as listeriosis by measures that increase public trust in farmers. Any further studies in this direction may be enhanced by correlating collected responses with real data looking at how much of a product consumers actually buy rather than how much they would buy hypothetically or in a laboratory setting.

The methodology of administering studies is something else that should be studied in more detail, as the ramifications for future studies could be significant. Although the results in this study that show a large difference between the WTP estimates in a group that did a "real" experiment versus a group that did not are not very robust due to the small sample size, they might point to a possible source of bias in estimates. It would be interesting to discover if larger and more diverse samples show a similar tendency to the one in this study and if they do, to discover whether doing a "real" market simulation experiment first upwardly biases estimates or whether it simply corrects a downward hypothetical bias.

6.5 Conclusion

The questions that motivated this study continue to be very relevant as a market optimum is sought for consumer increasingly exposed to choices, the existence of which can often be called into question. This thesis dealt with precisely the types of attributes that cannot be determined to exist by the purchasing consumer and whether the presence of

certification and the nature of the certifier affected the consumer's behaviour. The study carried out to this effect, showed that people clearly differentiate among credence attributes, preferring some to others regardless of any other factors. Just as clear was the finding that these attributes carry a higher value when certified, or more plainly, when consumers are more certain that they exist. The preference of certifier is determined by several things, not the least being where a person shops, how educated they are and even what attribute they value. There exist groups of consumers who have different sets of preferences with some caring only about a certain attribute while others make rational choices ranking their attribute and certification preferences and assigning values according to that rank. Regardless of group or individual characteristics, government remains the preferred certifier, indicating that public standards are preferred to private standards and that people are willing to pay for public certification programs.

REFERENCES

Adamowicz, W., R. Boxall, M. Williams, and J. Louviere. 1998. "Stated Preference Approaches for Measuring Passive Use Values: Choice Experiments and Contingent Valuation." *American Journal of Agricultural Economics* 80: 64-75.

Adamowicz, W., Swait, J., Boxall, P., Louviere, J., Williams, M. 1997. "Perceptions versus Objective Measures of Environmental Quality in Combined Revealed and Stated Preference Models of Environmental Valuation*." Environmental Economics and Managemen*t 32:65-84.

Auriol, Emmanuelle, and Steven G. M. Schilizzi. 2003. "Quality Signaling through Certification. Theory and application to agricultural seed markets." *IDEI Working Paper No. 165*, Institut d'Économie Industrielle (IDEI), Toulouse. http://idei.fr/doc/wp/2003/certif5.pdf

Bennett, R. M. ,J. Anderson, and R. J. P. Blaney. 2002. "Moral Intensity and Willingness to Pay Concerning Farm Animal Welfare Issues and the Implications for Agricultural Policy." *Journal of Agricultural and Environmental Ethics* 15(2).

Boxall, P., W. Adamowicz, Joffre Swait, Michael Williams, Jordan Louviere.1996. "A Comparison of Stated Preference Methods for Environmental Valuation." *Ecological Economics* 18: 243-253.

Canada Agricultural Products Act. http://laws.justice.gc.ca/en/C-0.4/index.html.

Canadian Food and Drugs Act. http://laws.justice.gc.ca/en/F-27/.

Carlsson, F. and P. Martinsson. 2001. "Do Hypothetical and Actual Marginal Willingness to Pay Differ in Choice Experiments?" *Journal of Environmental Economics and Management* 41:179-192.

CBC. "More listeriosis cases expected; Maple Leaf Foods expands recall." *CBC.ca* Aug. 2008. http://www.cbc.ca/canada/story/2008/08/24/health-listeria.html

CEMA Marketing Update (2008). www.canadaegg.ca.

Codron, Jean-Marie, Eric Giraud-Heraud, and Louis-Georges Soler. 2005. "Minimum quality standards, premium private labels, and European meat and fresh produce retailing." *Food Policy* 30(3): 270-283.

Cranfield, J. A., and Erik Magnisson. 2003. “Canadian Consumer's Willingness-To-Pay for Pestcide Free Food Products: An Ordered Probit Analysis.” *International Food and Agribusiness Management Review* 6 (4):14-30.

de Jonge, J., Frewer, L., Van Trijp, H., Renes, R. J., De Wit, W., & Timmers, J. 2004. “Monitoring consumer confidence in food safety: An exploratory study.” *British Food Journal* 106: 837–849.

de Jonge, J., Van Trijp, H., Renes, R. J., & Frewer, L. 2007. “Understanding consumer confidence in the safety of food: Its two-dimensional structure and determinants.” *Risk Analysis* 27: 729–740.

de Jonge, J., Van Trijp, H. C. M., Van der Lans, I. A. Renes, R. J., & Frewer, L. J. 2008. “How trust in institutions and organizations builds general consumer confidence in the safety of food: A decomposition of effects.”*Appetite* 51(2): 311-317.

de Jonge, Janneke, Hans van Trijp, Ellen Goddard , and Lynn Frewer. 2008. “Consumer confidence in the safety of food in Canada and the Netherlands: The validation of a generic framework.” *Food Quality and Preference* 19 (5): 439-51.

Dierks, L. H. and C. H. Hanf. 2006. “Trust as a determinant of consumer behaviour in food safety crises.” *Selected paper at the International Association of Agricultural Economists Conference, Australia.* Available at http://ideas.repec.org/s/ags/iaae06.html.

Eden, Sally, Christopher Bear, and Gordon Walker. 2008. “The sceptical consumer? Exploring views about food assurance.” *Food Policy* 33(6): 624-630.

Enneking, Ulrich. 2004. "Willingness-to-pay for safety improvements in the German meat sector: the case of the Q&S label." *European Review of Agricultural Economics*. 31(2): 205-223.

Erdem, Tulin, Keane, Michael P. and Sun, Baohong. 2008. “The Impact of Advertising on Consumer Price Sensitivity in Experience Goods Markets.” Quantitative Marketing and Economics 6(2): 136-176.

Freebairn, J. W. 1967. “Grading as a Market Innovation.” *Review of Marketing and Agricultural Economics* 35: 147-62.

Frewer, L. J, J. Scholderer and L. Bredahl. 2003. “Communicating about the risks and benefits of genetically modified foods: The mediating role of trust.” *Risk Analysi*s 23: 1117-1133.

Gellnyck, Xavier, Wim Verbeke and Bert Vermeire. 2006. “Pathways to increase consumer trust in meat as a safe and wholesome food.” *Meat Science* 74:161-171.

Giraud-Heraud, Eric, Lamia Rouached, and Louis-Georges Soler. 2006. “Private labels and public quality standards: How can consumer trust be restored after the mad cow crisis?” *Quantitative Marketing & Economics* 4(1): 31-55.

Glaeser, Edward L., David I. Laibson, José A. Scheinkman, and Christine L. Soutter. 2000. “Measuring Trust.” *Quarterly Journal of Economics* 115(3): 811-46.

Goddard, Ellen, Peter Boxall, John Paul Emunu, Curtis Boyd, Andre Asselin, and Amanada Neall. 2007. "Consumer Attitudes, Willingness to Pay and Revealed Preferences for Different Egg Production Attributes: Analysis of Canadian Egg Consumers." *Project Report #07-03*, Department of Rural Economy, University of Alberta.

Gracia, A., Loureiro, M.L., Nayga, R.M. 2009. “Consumers’ Valuation of Nutritional Information: a choice experiment study.” *Food Quality and Preference* 20(7): 463-471.

Grafton, R. Q., W. Adamowicz, D. Dupont, H. Nelson, R. Hill and S. Renzetti. 2004. *Economics of the Environment and Natural Resources*, Blackwell Publishers.
P. Neher (1990) *Natural resource economics* Cambridge: Cambridge University Press.

Greene, William and David Hensher. “A Latent Class Model for Discrete Choice Analysis: Contrasts with Mixed Logit.” 2002. *Working paper Institute of Transport Studies*.

Greene, William (2007). *NLOGIT Version 4.0 Reference Guide.* Econometric Software Inc.

Harbaugh, Rick, John W. Maxwell, and Beatrice Roussillon. 2006. “The Groucho Effect of Uncertain Standards.” *Working Papers 2006-09, Indiana University, Kelley School of Business, Department of Business Economics and Public Policy.*

Hensher, D.A, J.M. Rose, and W.H. Greene. *Applied Choice Analysis*. Cambridge: Cambridge University Press, 2005.

Horowitz, John. 2006. “What Do We Know About the Performance of The Becker-DeGroot-Marschak Mechanism?” *University of Maryland Working Paper.*

Iyengar, S. S., and E. Kamenica. 2006. “Choice Overload and Simplicity Seeking.” *University of Chicago Graduate School of Business Working Paper.*
http://faculty.arec.umd.edu/jhorowitz/BDM-Empirics-1.doc

Kanter, Christopher, Kent Messer, and Harry M. Kaiser. 2008. “Does Production Labeling Stigmatize Conventional Milk?” *American Journal of Agricultural Economics* 91(4): 1097-1109.

Kornelis, Marcel, Janneke de Jonge, Lynn Frewer and Hans Dagevos. 2007. "Consumer Selection of Food-Safety Information Sources." *Risk Analysis* 27(2): 327-335.

Lacanilao, Ryan. 2009. "An Experimental Investigation of the Impact of Fat Taxes: Price Effects, Food Stigma, and Information Effects on Economic Instruments to Improve Dietary Health." M.Sc. Thesis, University of Alberta.

Lang, J. T., & Hallman, W. K. 2005. "Who does the public trust? The case of genetically modified food in the United States." *Risk Analysis* 25:1241–1252.

Lipsey, Richard and Christopher Ragan. 2001. *Microecnomics.* Pearson Education Canada Inc. Toronto, Ontario.

Lobb, A. M. Mazzocchi and B. W. Traill. 2007. "Modeling risk perception and trust in food safety information within the theory of planned behaviour." *Food Quality and Preference* 18: 384-395.

Loureiro, Maria and Wendy Umberger. 2004. "A Choice Experiment Model For Beef Attributes: What Consumer Preferences Tell Us." *Selected Paper Presented at the American Agricultural Economics Association Annual Meetings Denver, Colorado, August 1-4, 2004.* http://purl.umn.edu/19931

Lusk, J.L. and D. Hudson. 2004. "Willingness-to-Pay Estimates and Their Relevance to Agribusiness Decision Making." *Review of Agricultural Economics* 26:152-169.

Maruyama, A., M. Kikuchi. "Risk-learning process in forming willingness to pay for egg safety." *Agribusiness* 20(2): 167-179.

Mazzocchi, M., A. E. Lobb, and B. W. Traill. 2004. "A strategy for measuring trust in food safety information: A literature review." *University of Florence Working Paper Series on Trust No. 18. Florence University Press.* Available at http://www.deart.unifi.it/trust/wp4_Reading.PDF.

McFadden, D. 1974. Conditional Logit Analysis of Qualitative Choice Behaviour. In R. Zarembka (ed), Frontiers in Econometrics. New York. Academic Press. 105-142.

Metlay, D. 1999. "Institutional trust and confidence: A journey into a conceptual quagmire." In G. Cvetkovich & R. E. Lo¨ fstedt (Eds.), *Social trust and the management of risk*. London: Earthscan, pp. 100–116.

Neill, H., Cummings, R., Ganderton, P., Harrison, G. and McGukin, T. 1994. "Hypothetical surveys and real economic commitments." *Land Economics* 70: 145-154.

Nelson, P. 1970. "Information and consumer behavior." *Journal of Political Economy* 78: 311-329.

Nilsson, Tomas, Ken Foster, and Jayson L. Lusk. 2006. "Marketing Opportunities for Certified Pork Chops." *Canadian Journal of Agricultural Economics/Revue Canadienne D'Agroeconomie* 54(4): 567-83.

Nocella Guiseppe, Lionel Hubbard and Riccardo Scarpa. 2007. *Working Paper, University of Waikato.*

Ozdemir, S., Johnson, F.R., Hauber, A.B. 2009. "Hypothetical Bias, Cheap Talk, and Stated Willingness to Pay for Health Care." *Journal of Health Economics*. Article in Press, Corrected Proof.

Paravolidaki, Chrysoula, 2008. "Labelling, Information Asymmetry and Functional Foods: A Case Study of Omega-3 Enriched Eggs." M.Sc.Thesis. University of Saskatchewan.

Poortinga, W., & Pidgeon, N. F. 2005. "Trust in risk regulation: Cause or consequence of the acceptability of gm food?" *Risk Analysis* 25:199–209.

Poppe Christian and Unni Kjaernes. 2003. "Trust in Food in Europe." Professional Report no 5. National Institute for Consumer Research. http://www.sifo.no

Public Health Agency of Canada. "Listeria monocytogenes outbreak." April 17, 2009. http://www.phac-aspc.gc.ca/alert-alerte/listeria/listeria_2009-eng.php

Ronnen, Uri. 1991. "Minimum quality standards, fixed costs, and the competition". *RAND Journal of Economics* 22(4): 490-504.

Rousseau, Denise, Sim B. Sitkin, Ronald S. Burt, Colin Camerer. 1998. "Not so different after all: A cross-discipline view of trust." *Academy of Management Review* 23(3): 393-404.

Rozan, Anne, Anne Stenger and Marc Willinger. 2004. "Willingness-to-pay for Food Safety: An Experimental Investigation of Quality Certification on Bidding Behaviour." *European Review of Agricultural Economics* 31(4): 409-425.

Wales, Corinne, Mark Harvey, and Alan Warde. 2006. "Recuperating from BSE: The shifting UK institutional basis for trust in food." *Appetite* 47(2): 187-95.

Wallston, Kenneth and Barbara Strudler Wallston. *Social Psychology of Health and Illness.* Eds. G. Sanders et al. Hillsdale, N.J., pp. 65-95.

Ward, Ruby A., and Lynn Hunnicutt. 2004. “If you can't trust the farmer, who can you trust? The role of certifying organizations in consumer willingness to pay for organic products.” *International Food and Agribusiness Review* 7(1): 60-77.

Verbeek, Marno. 2004. *A Guide to Modern Econometrics*. John Wiley & Sons Ltd. Chichester, England.

Vermeulen, B., Goos, P. and Vandebroek, M. 2008. Models and optimal designs for conjoint choice experiments including a no-choice option, *International Journal of Research in Marketing*, vol. 25, n. 2, 94-103.

Appendix A: Survey Instrument, Sample 1

Analytical Comparison of Public and Private Standards in Agriculture and Agri-food Markets

1. Generally speaking, would you say that most people can be trusted?		
People can be trusted	Can't be too careful in dealing with people	Don't know
❒	❒	❒

2. How much do you trust each of the following groups of people?						
	Cannot be trusted at all	**Somewhat untrustworthy**	**Slightly untrustworthy**	**Somewhat trustworthy**	**Can be trusted a lot**	**Don't know**
	1	**2**	**3**	**4**	**5**	**6**
People in your family	❒	❒	❒	❒	❒	❒
People in your neighbourhood	❒	❒	❒	❒	❒	❒
People you work or go to school with	❒	❒	❒	❒	❒	❒
Doctors or nurses	❒	❒	❒	❒	❒	❒
Scientists	❒	❒	❒	❒	❒	❒
Consumer Organizations	❒	❒	❒	❒	❒	❒
Environmental organizations	❒	❒	❒	❒	❒	❒
Media sources	❒	❒	❒	❒	❒	❒
Strangers	❒	❒	❒	❒	❒	❒

3. How often do you lend money to your friends?				
Never	**Infrequently**	**Moderately often**	**Frequently**	**Regularly**
1	**2**	**3**	**4**	**5**
❒	❒	❒	❒	❒

4. 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").					
	not at all typical		**somewhat typical**		**very typical**
	1	**2**	**3**	**4**	**5**
Many situations make me worry	❒	❒	❒	❒	❒
I know I shouldn't worry about things, but I just cannot help it	❒	❒	❒	❒	❒
I notice that I have been worrying about things	❒	❒	❒	❒	❒

5. Please indicate to what extent you agree/disagree with the following statements. Give your answer on a scale from 1 ("strongly disagree") to 5 ("strongly agree").	**strongly disagree**	**disagree**	**neither agree, nor disagree**	**agree**	**strongly agree**
	1	**2**	**3**	**4**	**5**
I am optimistic about the safety of food products	❒	❒	❒	❒	❒
I am confident that food products are safe	❒	❒	❒	❒	❒
I am satisfied with the safety of food products	❒	❒	❒	❒	❒
Generally, food products are safe	❒	❒	❒	❒	❒

6. Please indicate to what extent you agree/disagree with the following statements. Give your answer on a scale from 1 ("strongly disagree") to 5 ("strongly agree").	**strongly disagree**	**disagree**	**neither agree, nor disagree**	**agree**	**strongly agree**
	1	**2**	**3**	**4**	**5**
I worry about the safety of food	❒	❒	❒	❒	❒

I feel uncomfortable regarding the safety of food	❒	❒	❒	❒	❒
As a result of the occurrence of food safety incidents I am suspicious about certain food products	❒	❒	❒	❒	❒

7. 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").

	no confidence at all				**complete confidence**
	1	**2**	**3**	**4**	**5**
White eggs	❒	❒	❒	❒	❒
Brown eggs	❒	❒	❒	❒	❒
Free range eggs	❒	❒	❒	❒	❒
Pasteurized eggs	❒	❒	❒	❒	❒
Chicken	❒	❒	❒	❒	❒
Pork	❒	❒	❒	❒	❒
Fresh fruits and vegetables	❒	❒	❒	❒	❒

8. What do you think about eating eggs? Give your answer on a scale from 1 to 5.

	1	**2**	**3**	**4**	**5**	
When eating eggs, I am exposed to …						
very little risk	❒	❒	❒	❒	❒	a great deal of risk
I accept the risks of eating eggs						
strongly disagree	❒	❒	❒	❒	❒	strongly agree
I think eating eggs is risky						
strongly disagree	❒	❒	❒	❒	❒	strongly agree
For me, eating eggs is …						
not risky	❒	❒	❒	❒	❒	risky
For me, eating eggs is worth the risk						

strongly disagree	❒	❒	❒	❒	❒	strongly agree
I am … the risk of eating eggs						
not willing to accept	❒	❒	❒	❒	❒	willing to accept

Below is a list of statements related to food manufacturers, retailers, government and farmers. For each, please indicate how much you agree or disagree using the scale provided.

9. Food manufacturers	**strongly disagree**	**disagree**	**neither agree, nor disagree**	**agree**	**strongly agree**
	1	**2**	**3**	**4**	**5**
Manufacturers have the competence to control the safety of food	❒	❒	❒	❒	❒
Manufacturers have sufficient knowledge to guarantee the safety of food products	❒	❒	❒	❒	❒
Manufacturers are honest about the safety of food	❒	❒	❒	❒	❒
Manufacturers are sufficiently open about the safety of food	❒	❒	❒	❒	❒
Manufacturers take good care of the safety of our food	❒	❒	❒	❒	❒
Manufacturers give special attention to the safety of food	❒	❒	❒	❒	❒

10. Grocery stores	**strongly disagree**	**disagree**	**neither agree, nor disagree**	**agree**	**strongly agree**
	1	**2**	**3**	**4**	**5**
Grocery stores have the competence to control the safety of food	❒	❒	❒	❒	❒
Grocery stores have sufficient knowledge to guarantee the safety of food products	❒	❒	❒	❒	❒
Grocery stores are honest about the safety of food	❒	❒	❒	❒	❒
Grocery stores are sufficiently open about the safety of food	❒	❒	❒	❒	❒

Grocery stores take good care of the safety of our food	❒	❒	❒	❒	❒
Grocery stores give special attention to the safety of food	❒	❒	❒	❒	❒

11. Government	**strongly disagree**	**disagree**	**neither agree, nor disagree**	**agree**	**strongly agree**
	1	**2**	**3**	**4**	**5**
The *government* has the competence to control the safety of food	❒	❒	❒	❒	❒
The *government* has sufficient knowledge to guarantee the safety of food products	❒	❒	❒	❒	❒
The *government* is honest about the safety of food	❒	❒	❒	❒	❒
The *government* is sufficiently open about the safety of food	❒	❒	❒	❒	❒
The *government* takes good care of the safety of our food	❒	❒	❒	❒	❒
The *government* gives special attention to the safety of food	❒	❒	❒	❒	❒

12. Farmers	**strongly disagree**	**disagree**	**neither agree, nor disagree**	**agree**	**strongly agree**
	1	**2**	**3**	**4**	**5**
Farmers have the competence to control the safety of food	❒	❒	❒	❒	❒
Farmers have sufficient knowledge to guarantee the safety of food products	❒	❒	❒	❒	❒
Farmers are honest about the safety of food	❒	❒	❒	❒	❒
Farmers are sufficiently open about the safety of food	❒	❒	❒	❒	❒
Farmers take good care of the safety of our food	❒	❒	❒	❒	❒
Farmers give special attention to the safety of food	❒	❒	❒	❒	❒

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").

13. To what extent do you think … is/are responsible for the safety of food?	not at all responsible 1	2	3	4	completely responsible 5	don't know 6
Farmers	❒	❒	❒	❒	❒	❒
The government	❒	❒	❒	❒	❒	❒
Manufacturers of food	❒	❒	❒	❒	❒	❒
Retailers	❒	❒	❒	❒	❒	❒
Canadian Food Inspection Agency (CFIA)	❒	❒	❒	❒	❒	❒
The Consumers' Association of Canada (CAC)	❒	❒	❒	❒	❒	❒
The consumer	❒	❒	❒	❒	❒	❒

14. To what extent are you concerned about the following issues?	not at all concerned 1	Minor concerns 2	Some concerns 3	Major Concerns 4	Very concerned 5
The feed given to livestock	❒	❒	❒	❒	❒
Conditions in which food animals are raised	❒	❒	❒	❒	❒
Genetically modified animal feeds	❒	❒	❒	❒	❒
Animal diseases (e.g. Avian Flu)	❒	❒	❒	❒	❒
The origin of products/ animals	❒	❒	❒	❒	❒
Antibiotics in meat	❒	❒	❒	❒	❒

15. Consumer practices	Regularly 1	Occasionally 2	Never 3
How often do you purchase food for your own household? Is it…	❒	❒	❒
How often do you buy eggs? Is it…	❒	❒	❒
Where do you usually buy eggs?			
Supermarket	❒	❒	❒
Grocery store	❒	❒	❒
Farmers market	❒	❒	❒
Other	❒	❒	❒

16. Thinking about buying eggs, would you say that the following characteristics are unimportant, matter a bit or are important to you?	Not important at all	Somewhat unimportant	Important	Somewhat important	Very important
	1	2	3	4	5
The eggs are tasty	❒	❒	❒	❒	❒
The eggs are safe to eat	❒	❒	❒	❒	❒
The hens are raised in an environmentally friendly way	❒	❒	❒	❒	❒
The shop is easily accessible	❒	❒	❒	❒	❒
The price is low	❒	❒	❒	❒	❒

We would now like to know your own involvement with food issues

17. Have you been involved in any of the following situations during the last twelve months?	Yes	No	Don't know
	1	2	3
Complained to a retailer about food quality	❒	❒	❒
Refused to buy certain food types or brands in order to express your opinion on a political or social issue	❒	❒	❒
Bought particular foods or brands in order to encourage or support their sale	❒	❒	❒
Participated in organised consumer boycotts	❒	❒	❒
Been member of an organisation that works for the improvement of food	❒	❒	❒
Taken part in any other kind of public or political action in order to improve the food we buy(contacted a politician, signed up for a petition, supported a campaign with money, distributed leaflets, collected petitions or money, participated in demonstration etc.)	❒	❒	❒

18. For the following statements, please give your answer on a scale from 1 ("very little") to 5 ("a lot").	Very little	Little	Some	A lot	Don't know
	1	2	3	4	5
To what degree do you think that your voice as a consumer matters? Is it…	❒	❒	❒	❒	❒
To what degree are you confident that the foods bought for your household are unharmful?	❒	❒	❒	❒	❒

19. Imagine that there is a food scandal concerning chicken production in Canada. Do you think that the following persons or institutions would tell you the whole truth, part of the truth, or would hold information back?

	Whole truth	Parts of the truth	Hold information back	They would not know	I don't know
	1	2	3	4	5
Press, television, and radio	❒	❒	❒	❒	❒
The processing industry	❒	❒	❒	❒	❒
The supermarket chains	❒	❒	❒	❒	❒
Farmers	❒	❒	❒	❒	❒
Consumer organizations	❒	❒	❒	❒	❒
Politicians	❒	❒	❒	❒	❒
Public food authorities	❒	❒	❒	❒	❒
Food experts	❒	❒	❒	❒	❒
Universities and college researchers	❒	❒	❒	❒	❒

20. 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".

	no trust in information at all				**complete trust in information**	**don't know**
	1	**2**	**3**	**4**	**5**	**6**
To what extent do you trust information about the safety of food provided by …?						
Farmers	❒	❒	❒	❒	❒	❒
The government	❒	❒	❒	❒	❒	❒
Manufacturers of food	❒	❒	❒	❒	❒	❒
Retailers	❒	❒	❒	❒	❒	❒
Canadian Food Inspection Agency (CFIA)	❒	❒	❒	❒	❒	❒
The Consumers' Association of Canada (CAC)	❒	❒	❒	❒	❒	❒

The following questions are designed to tell us a little about you. This information will only be used to report comparisons among groups of people. Your identity will not be linked to your responses in any way.

21. Are you a male or female? (*Check one*)

❒ Male

❒ Female

22. What is your age? (*Enter number*) _____

23. How many people live in your household? (*Check one*)

❒ 1

❒ 2

❒ 3 or more

24. How many children younger than 18 live in your house? (*Check one*)

❒ No home living children younger than 18 years

❒ 1

❒ 2

❒ 3 or more

25. What is your position in the household? (*Check one*)

❒ Head of household/main income

❒ Partner of head of household

❒ Other family member

26. What is your marital status? (*Check one*)

❒ Married/Living together/Common Law

❒ Single

27. What is the highest level of education you've achieved? (*Check one*)

❒ Elementary school

❒ Secondary (high) school

❒ Technical/College /University

❒ Graduate studies

28. Which of the following best describes your employment status? (*Check one*)

❒ Employed full-time or self-employed

❒ Employed part-time

❒ Homemaker

- ❒ Student
- ❒ Retired
- ❒ Unemployed
- ❒ Other

29. For comparison purposes only, which one of the following best describes your annual household income level before taxes? (*Check one*)

- ❒ under $19,999
- ❒ $20,000 - $49,999
- ❒ $50,000 - $89,999
- ❒ more than $90,000

30. Please provide the first 3 digits of your home Postal code: _____

Appendix B: Survey Instrument, Sample 2

Session: Date and Time_____

Examining Consumer Food Preferences

1. Generally speaking, would you say that most people can be trusted?

People can be trusted	Can't be too careful in dealing with people	Don't know
❒	❒	❒

2. How much do you trust each of the following groups of people?

	Cannot be trusted at all	Somewhat untrustworthy	Slightly untrustworthy	Somewhat trustworthy	Can be trusted a lot	Don't know
	1	2	3	4	5	6
People in your family	❒	❒	❒	❒	❒	❒
People in your neighbourhood	❒	❒	❒	❒	❒	❒
People you work or go to school with	❒	❒	❒	❒	❒	❒
Doctors or nurses	❒	❒	❒	❒	❒	❒
Scientists	❒	❒	❒	❒	❒	❒
Consumer Organizations	❒	❒	❒	❒	❒	❒
Environmental organizations	❒	❒	❒	❒	❒	❒
Media sources	❒	❒	❒	❒	❒	❒
Strangers	❒	❒	❒	❒	❒	❒

3. How often do you lend money to your friends?

Never	Infrequently	Moderately often	Frequently	Regularly
1	2	3	4	5
❒	❒	❒	❒	❒

4. 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").

	not at all typical		somewhat typical		very typical
	1	2	3	4	5
Many situations make me worry	❒	❒	❒	❒	❒
I know I shouldn't worry about things, but I just cannot help it	❒	❒	❒	❒	❒
I notice that I have been worrying about things	❒	❒	❒	❒	❒

5. Attitudes toward food.	strongly disagree	disagree	neither agree, nor disagree	agree	strongly agree
	1	2	3	4	5
I am optimistic about the safety of food products	❒	❒	❒	❒	❒
I am confident that food products are safe	❒	❒	❒	❒	❒
I am satisfied with the safety of food products	❒	❒	❒	❒	❒
Generally, food products are safe	❒	❒	❒	❒	❒

6. Attitudes toward food.	strongly disagree	disagree	neither agree, nor disagree	agree	strongly agree
	1	2	3	4	5

I worry about the safety of food	❒	❒	❒	❒	❒
I feel uncomfortable regarding the safety of food	❒	❒	❒	❒	❒
As a result of the occurrence of food safety incidents I am suspicious about certain food	❒	❒	❒	❒	❒

7. 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").

	no confidence at all				**complete confidence**
	1	**2**	**3**	**4**	**5**
White eggs	❒	❒	❒	❒	❒
Brown eggs	❒	❒	❒	❒	❒
Vitamin enhanced eggs	❒	❒	❒	❒	❒
Pasteurized eggs	❒	❒	❒	❒	❒
Free range eggs	❒	❒	❒	❒	❒
Chicken	❒	❒	❒	❒	❒
Pork	❒	❒	❒	❒	❒
Fresh fruits and vegetables	❒	❒	❒	❒	❒

8. What do you think about eating eggs?

	1	**2**	**3**	**4**	**5**	
When eating eggs, I am exposed to …						
very little risk	❒	❒	❒	❒	❒	a great deal of risk
I accept the risks of eating eggs						
strongly disagree	❒	❒	❒	❒	❒	strongly agree
I think eating eggs is risky						
strongly disagree	❒	❒	❒	❒	❒	strongly agree
For me, eating eggs is …						
not risky	❒	❒	❒	❒	❒	risky

For me, eating eggs is worth the risk						
strongly disagree	❒	❒	❒	❒	❒	strongly agree
I am … the risk of eating eggs						
not willing to accept	❒	❒	❒	❒	❒	willing to accept

Below is a list of statements related to food manufacturers, retailers, government and farmers. For each, please indicate how much you agree or disagree using the scale provided.

9. Food manufacturers	**strongly disagree**	**disagree**	**neither agree, nor disagree**	**agree**	**strongly agree**
	1	**2**	**3**	**4**	**5**
Manufacturers have the competence to control the safety of food	❒	❒	❒	❒	❒
Manufacturers have sufficient knowledge to guarantee the safety of food products	❒	❒	❒	❒	❒
Manufacturers are honest about the safety of food	❒	❒	❒	❒	❒
Manufacturers are sufficiently open about the safety of food	❒	❒	❒	❒	❒
Manufacturers take good care of the safety of our food	❒	❒	❒	❒	❒
Manufacturers give special attention to the safety of food	❒	❒	❒	❒	❒

10. Grocery stores	**strongly disagree**	**disagree**	**neither agree, nor disagree**	**agree**	**strongly agree**
	1	**2**	**3**	**4**	**5**
Grocery stores have the competence to control the safety of food	❒	❒	❒	❒	❒
Grocery stores have sufficient knowledge to guarantee the safety of food products	❒	❒	❒	❒	❒
Grocery stores are honest about the safety of food	❒	❒	❒	❒	❒
Grocery stores are sufficiently open about the safety of food	❒	❒	❒	❒	❒

Grocery stores take good care of the safety of our food	❒	❒	❒	❒	❒
Grocery stores give special attention to the safety of food	❒	❒	❒	❒	❒

11. Government	**strongly disagree**	**disagree**	**neither agree, nor disagree**	**agree**	**strongly agree**
	1	**2**	**3**	**4**	**5**
The *government* has the competence to control the safety of food	❒	❒	❒	❒	❒
The *government* has sufficient knowledge to guarantee the safety of food products	❒	❒	❒	❒	❒
The *government* is honest about the safety of food	❒	❒	❒	❒	❒
The *government* is sufficiently open about the safety of food	❒	❒	❒	❒	❒
The *government* takes good care of the safety of our food	❒	❒	❒	❒	❒
The *government* gives special attention to the safety of food	❒	❒	❒	❒	❒

12. Farmers	**strongly disagree**	**disagree**	**neither agree, nor disagree**	**agree**	**strongly agree**
	1	**2**	**3**	**4**	**5**
Farmers have the competence to control the safety of food	❒	❒	❒	❒	❒
Farmers have sufficient knowledge to guarantee the safety of food products	❒	❒	❒	❒	❒
Farmers are honest about the safety of food	❒	❒	❒	❒	❒
Farmers are sufficiently open about the safety of food	❒	❒	❒	❒	❒
Farmers take good care of the safety of our food	❒	❒	❒	❒	❒
Farmers give special attention to the safety of food	❒	❒	❒	❒	❒

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").

13. To what extent do you think … is/are responsible for the safety of food?

	not at all responsible 1	2	3	4	completely responsible 5	don't know 6
Farmers	❒	❒	❒	❒	❒	❒
The government	❒	❒	❒	❒	❒	❒
Manufacturers of food	❒	❒	❒	❒	❒	❒
Retailers	❒	❒	❒	❒	❒	❒
Canadian Food Inspection Agency (CFIA)	❒	❒	❒	❒	❒	❒
The Consumers' Association of Canada (CAC)	❒	❒	❒	❒	❒	❒
The consumer	❒	❒	❒	❒	❒	❒

14. To what extent are you concerned about the following issues?

	not at all concerned 1	Minor concerns 2	Some concerns 3	Major Concerns 4	Very concerned 5
The feed given to livestock	❒	❒	❒	❒	❒
Conditions in which food animals are raised	❒	❒	❒	❒	❒
Genetically modified animal feeds	❒	❒	❒	❒	❒
Animal diseases (e.g. Avian Flu)	❒	❒	❒	❒	❒
The origin of products/ animals	❒	❒	❒	❒	❒
Antibiotics in meat	❒	❒	❒	❒	❒

15. Consumer practices	Occasionally 1	Regularly 2	Never 3
How often do you purchase food for your own household? Is it….	❒	❒	❒
How often do you buy eggs? Is it…	❒	❒	❒
Where do you usually buy eggs? Supermarket/Big Box	❒	❒	❒

Grocery store (neighbourhood)	❒	❒	❒
Farmers market	❒	❒	❒
Other	❒	❒	❒

16. Thinking about buying eggs, would you say that the following characteristics are unimportant, matter a bit or are important to you?

	Not important at all	**Somewhat unimportant**	**Neutral**	**Somewhat important**	**Very important**
	1	**2**	**3**	**4**	**5**
The eggs are tasty	❒	❒	❒	❒	❒
The eggs are safe to eat	❒	❒	❒	❒	❒
The hens are raised in an environmentally friendly way	❒	❒	❒	❒	❒
The shop is easily accessible	❒	❒	❒	❒	❒
The price is low	❒	❒	❒	❒	❒

We would now like to know your own involvement with food issues

17. Have you been involved in any of the following situations during the last twelve months?	**Yes**	**No**	**Don't know**
	1	**2**	**3**
Complained to a retailer about food quality	❒	❒	❒
Refused to buy certain food types or brands in order to express your opinion on a political or social issue	❒	❒	❒
Bought particular foods or brands in order to encourage or support their sale	❒	❒	❒
Participated in organised consumer boycotts	❒	❒	❒
Been member of an organisation that works for the improvement of food	❒	❒	❒
Taken part in any other kind of public or political action in order to improve the food we buy(contacted a politician, signed up for a petition, supported a campaign with money, distributed leaflets, collected petitions or money, participated in demonstration etc.)	❒	❒	❒

18. Consumer Voice	**Very little**	**Little**	**Some**	**A Lot**	**Don't know**
	1	**2**	**3**	**4**	**5**

To what degree do you think that your voice as a consumer matters? Is it…	❒	❒	❒	❒	❒
To what degree are you confident that the foods bought for your household are unharmful?	❒	❒	❒	❒	❒

19. Imagine that there is a food scandal concerning chicken production in Canada. Do you think that the following persons or institutions would tell you the whole truth, part of the truth, or would hold information back?

	Whole truth	**Parts of the truth**	**Hold information back**	**They would not know**	**I don't know**
	1	**2**	**3**	**4**	**5**
Press, television, and radio	❒	❒	❒	❒	❒
The processing industry	❒	❒	❒	❒	❒
The supermarket chains	❒	❒	❒	❒	❒
Farmers	❒	❒	❒	❒	❒
Consumer organizations	❒	❒	❒	❒	❒
Politicians	❒	❒	❒	❒	❒
Public food authorities	❒	❒	❒	❒	❒
Food experts	❒	❒	❒	❒	❒
Universities and college researchers	❒	❒	❒	❒	❒

20.	**no trust in information at all**	**some Trust**	**moderate trust**	**high trust**	**complete trust in information**	**don't know**
To what extent do you trust information about the safety of food provided by …?						
Farmers	❒	❒	❒	❒	❒	❒
The government	❒	❒	❒	❒	❒	❒
Manufacturers of food	❒	❒	❒	❒	❒	❒
Retailers	❒	❒	❒	❒	❒	❒

Canadian Food Inspection Agency (CFIA)	❒	❒	❒	❒	❒	❒
The Consumers' Association of Canada (CAC)	❒	❒	❒	❒	❒	❒

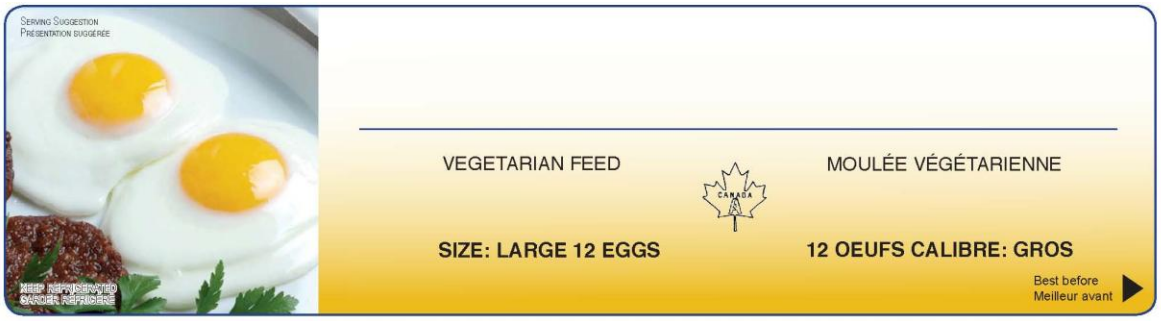
21. Each item below is a belief statement about your medical condition with which you may agree or disagree. Beside each statement is a scale which ranges from strongly disagree (1) to strongly agree (6). For each item we would like you to circle the number that represents the extent to which you agree or disagree with that statement. The more you agree with a statement, the higher will be the number you circle. Please make sure that you answer **EVERY ITEM** and that you check **ONLY ONE** box per item. This is a measure of your personal beliefs; obviously, there are no right or wrong answers.

	Strongly disagree 1	**Moderately disagree** 2	**Slightly disagree** 3	**Slightly agree** 4	**Moderately agree** 5	**Strongly agree** 6
If I get sick, it is my own behavior which determines how soon I get well again.	❒	❒	❒	❒	❒	❒
No matter what I do, if I am going to get sick, I will get sick	❒	❒	❒	❒	❒	❒
Having regular contact with my physician is the best way for me to avoid illness.	❒	❒	❒	❒	❒	❒
Most things that affect my health happen to me by accident.	❒	❒	❒	❒	❒	❒
Whenever I don't feel well, I should consult a medically trained professional.	❒	❒	❒	❒	❒	❒
I am in control of my health.	❒	❒	❒	❒	❒	❒
My family has a lot to do with my becoming sick or staying healthy.	❒	❒	❒	❒	❒	❒

When I get sick, I am to blame.	❒	❒	❒	❒	❒	❒
Luck plays a big part in determining how soon I will recover from an illness.	❒	❒	❒	❒	❒	❒
Health professionals control my health.	❒	❒	❒	❒	❒	❒
My good health is largely a matter of good fortune.	❒	❒	❒	❒	❒	❒
The main thing which affects my health is what I myself do	❒	❒	❒	❒	❒	❒
If I take care of myself, I can avoid illness.	❒	❒	❒	❒	❒	❒
Whenever I recover from an illness, it's usually because other people (for example, doctors, nurses, family, friends) have been taking good care of me.	❒	❒	❒	❒	❒	❒
No matter what I do, I 'm likely to get sick.	❒	❒	❒	❒	❒	❒
If it's meant to be, I will stay healthy.	❒	❒	❒	❒	❒	❒
If I take the right actions, I can stay healthy.	❒	❒	❒	❒	❒	❒
Regarding my health, I can only do what my doctor tells me to do.	❒	❒	❒	❒	❒	❒

22. Please rank the importance of the following characteristics of three different types of eggs in comparison to normal eggs.						
Statement	Strongly Agree	Agree	Neutral / No difference	Disagree	Strongly Disagree	N/A / No opinion
In comparison to normal eggs, I believe that free range eggs:						
Taste better	❒	❒	❒	❒	❒	❒
Are fresher	❒	❒	❒	❒	❒	❒
Are healthier	❒	❒	❒	❒	❒	❒
Are more natural	❒	❒	❒	❒	❒	❒
Do not contain antibiotics	❒	❒	❒	❒	❒	❒
Are safer to eat	❒	❒	❒	❒	❒	❒
Bake better	❒	❒	❒	❒	❒	❒
Statement	Strongly Agree	Agree	Neutral / No difference	Disagree	Strongly Disagree	N/A / No opinion
In comparison to normal eggs, I believe that vitamin enhanced eggs:						
Taste better	❒	❒	❒	❒	❒	❒
Are fresher	❒	❒	❒	❒	❒	❒

Are healthier	❒	❒	❒	❒	❒	❒
Are more natural	❒	❒	❒	❒	❒	❒
Do not contain antibiotics	❒	❒	❒	❒	❒	❒
Are safer to eat	❒	❒	❒	❒	❒	❒
Bake better	❒	❒	❒	❒	❒	❒
In comparison to normal eggs, I believe that pasteurized eggs:						
Taste better	❒	❒	❒	❒	❒	❒
Are fresher	❒	❒	❒	❒	❒	❒
Are healthier	❒	❒	❒	❒	❒	❒
Are more natural	❒	❒	❒	❒	❒	❒
Do not contain antibiotics	❒	❒	❒	❒	❒	❒
Are safer to eat	❒	❒	❒	❒	❒	❒
Bake better	❒	❒	❒	❒	❒	❒



23. Standards for egg quality claims such as Canada Grade A are set by:

	True	False
Industry		
Government		
Farmer		
Third Party		

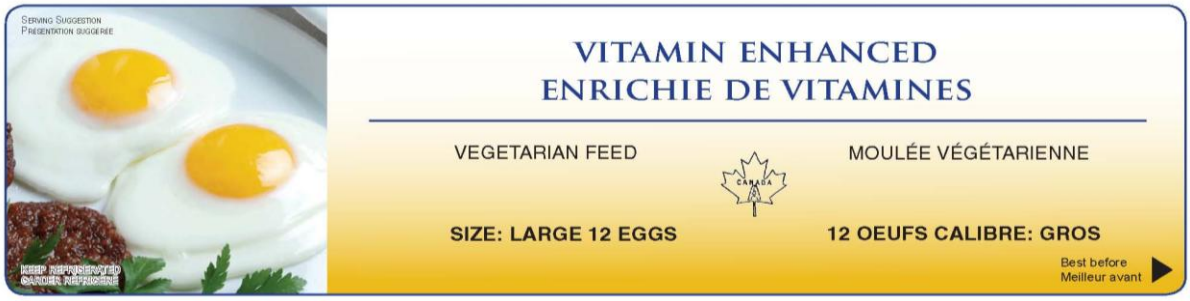
24. These quality claims (Canada Grade A) are certified by:

	True	False
Industry		
Government		
Farmer		
Third Party		

25. Quality certification by one of the above organizations means:

	True	False

It routinely checks to ensure standards are met		
It randomly checks to ensure these standards are met		
It assumes standards are met but never checks		



26. Standards for nutritional claims such as "vitamin-enhanced" are set by:

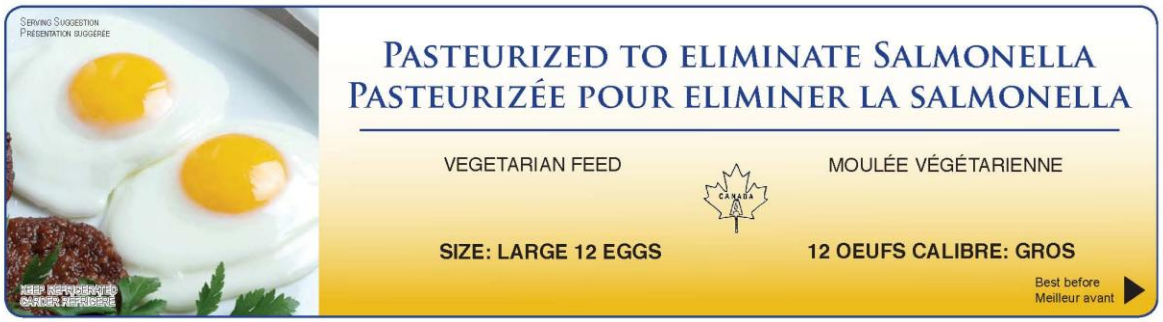
	True	False
Industry		
Government		
Farmer		
Third Party		

27. These nutritional claims (vitamin enhanced) are certified by:

	True	False
Industry		
Government		
Farmer		
Third Party		

28. In the case of nutritional enhancements, certification by one of the above organizations means:

	TRUE	FALSE
An egg out of every carton is routinely tested to ensure the nutrient claims listed on the labels are true		
An egg out of a randomly chosen carton is sporadically tested to ensure the nutrient claims on the labels are true		
An egg out of a randomly chosen carton is never tested as nutrient claims on the labels are assumed true		
An egg out of a randomly chosen carton is always tested to ensure nutrient claims on the labels are true		



29. Regulations for food safety claims such as "pasteurized to eliminate salmonella" are set by:

	True	False
Industry		
Government		
Farmer		
Third Party		

30. These food safety claims are certified by:

	True	False
Industry		

Government		
Farmer		
Third Party		

31. In the case of food safety claims, certification by one of the above organizations means:

	True	False
An egg out of every carton is routinely tested to ensure the claims listed on the labels are true		
An egg out of a randomly chosen carton is sporadically tested to ensure the claims on the labels are true		
An egg out of a randomly chosen carton is never tested as claims on the labels are assumed true		
An egg out of a randomly chosen carton is always tested to ensure claims on the labels are true		

32. The pasteurization process is regulated by

	True	False
Industry		
Government		
Farmer		
Third Party		

33. In the case of pasteurization, certification by one of the above organizations means:

	TRUE	FALSE
Producers undergo regular inspections to ensure the pasteurization process fulfils certain standards		
Producers undergo random inspections to ensure the pasteurization process fulfils certain standards		
Producers do not undergo inspections to ensure the pasteurization process fulfils certain standards		
There are no standards for pasteurization in Canada		

The following questions are designed to tell us a little about you. This information will only be used to report comparisons among groups of people. Your identity will not be linked to your responses in any way.

34. Are you a male or female? (*Check one*)

❒ Male

❒ Female

35. What is your age? (*Enter number*) _____

36. How many people live in your household? (*Check one*)

❒ 1

❒ 2

❒ 3 +

37. How many children younger than 18 live in your house? (*Check one*)

❒ No home living children < 16 years

❒ 1

❒ 2

❒ 3 or More

38. What is your position in the household? (*Check one*)

- ❒ Head of household/main income
- ❒ Partner of head of household
- ❒ Other family member

39. What is your marital status? (*Check one*)

- ❒ Married/Living together/Common Law
- ❒ Single

40. What is the highest level of education you've achieved? (*Check one*)

- ❒ Elementary school
- ❒ Secondary (high) school
- ❒ Technical/College /University
- ❒ Graduate studies

41. Which of the following best describes your employment status? (*Check one*)

- ❒ Employed full-time or self-employed
- ❒ Employed part-time
- ❒ Homemaker
- ❒ Student
- ❒ Retired
- ❒ Unemployed
- ❒ Other

42. For comparison purposes only, which one of the following best describes your annual household income level before taxes? (*Check one*)

- ❒ under $19,999
- ❒ $20,000 - $49,999
- ❒ $50,000 - $89,999
- ❒ more than $90,000

43. Please provide the first 3 digits of your home postal code: _____

APPENDIX C: Sample Script

Instructions to Participants – Sessions A

Thank you for coming. We ask that throughout the duration of this session you refrain from communicating among each other. As well, since we are trying to simulate a choice made in a grocery store environment, we will not provide any additional information during the session. You will be asked to make your choices based on information provided on the laminated information sheets and your prior knowledge.

If you have questions about the study before you participate, please ask them now. You have been given a research consent form and a research information sheet. Please read the sheet and fill out the consent form. Please indicate if you answered **no** to any of the questions by raising your hand.

We would like to ask you to participate in the following three tasks.

1. Please fill out our survey regarding your perception of food safety issues and submit it at the end of the session.

2. The second task is an experiment where you are issued a dozen regular large eggs. You will then be asked what you are willing to pay to trade these eggs in for a different dozen. Again, since we are trying to simulate real purchasing decisions, one of the choices you make will be binding and you will have to pay the amount indicated.

The exercise will work like this. You will turn to **Payment Card A** where you will be asked to make eight choices. You may choose to keep the regular eggs and pay nothing or pay an additional amount between $1 and $4 and trade in these eggs for eggs that have undergone an in-shell pasteurization treatment to reduce the probability of salmonella, which is a food borne illness or free-run eggs. Please note that while the free-run eggs are brown in colour, this

does not change the nutritional value of these eggs compared to eggs which are white. Please read the laminated information sheet prior to making your choices to make sure everyone has the same definition of the different types of eggs.

After you have made your choices, we will roll an eight-sided die to randomly determine which choice is binding. Whatever you indicated at that choice will then be taken into account when you receive your payment at the end of the session. If you indicated that you are willing to pay the amount asked at the binding level, this amount will be deducted from your $50 payout and you will be given the eggs you chose. If you indicated that you wish to keep your eggs at the binding option, you will keep the regular eggs.

3. The third task is a stated preference survey, which you will find on **Payment Card B.** Here you are asked to indicate what you would pay for eggs that have been certified by three different agencies: government, industry or farmer. This is a hypothetical experiment so you will not have to pay anything.

APPENDIX D: "Real" Experiment Payment Card, Sample 1

You have been endowed with a dozen regular eggs. You now have the option to keep these eggs or pay an additional sum of money and trade them for a dozen eggs that have been pasteurized to eliminate salmonella or a dozen free-run eggs. Please choose either Option A or Option B for each scenario. Once you submit your responses we will roll an eight sided die to determine which scenario will be binding. You will then receive the eggs you have chosen in the particular scenario and whatever sum you indicated you will be willing to pay will be deducted from your $50 stipend.

Scenario	**Option A**	**Option B**	**Circle A or B below**
1	I will keep the dozen regular eggs.	I will pay $1 and exchange a dozen regular eggs for a dozen pasteurized eggs	A B
2	I will keep the dozen regular eggs.	I will pay $1 and exchange a dozen regular eggs for a dozen free-run eggs	A B
3	I will keep the dozen regular eggs.	I will pay $3 and exchange a dozen regular eggs for a dozen pasteurized eggs	A B
4	I will keep the dozen regular eggs.	I will pay $2 and exchange a dozen regular eggs for a dozen free-run eggs	A B
5	I will keep the dozen regular eggs.	I will pay $2 and exchange a dozen regular eggs for a dozen pasteurized eggs	A B
6	I will keep the dozen regular eggs.	I will pay $4 and exchange a dozen regular eggs for a dozen pasteurized eggs	A B

7	I will keep the dozen regular eggs.	I will pay $4 and exchange a dozen regular eggs for a dozen free-run eggs	A B
8	I will keep the dozen regular eggs.	I will pay $3 and exchange a dozen regular eggs for a dozen free-run eggs	A B

APPENDIX E: "Real" Experiment Payment Card A, Sample 2

You have been endowed with a dozen pasteurized eggs. You now have the option to keep these eggs or receive an additional sum of money and trade them in for a dozen regular eggs or a dozen vitamin-enhanced eggs. Please choose either Option A or Option B for each scenario. Once you submit your responses we will roll an eight-sided die to determine which scenario will be binding. You will then receive the eggs you have chosen in the particular scenario and whatever sum you indicated you would be willing to accept will be added to your $50 stipend.

Scenario	**Option A**	**Option B**	**Circle A or B below**
1	I will keep the dozen pasteurized eggs.	I will accept $1 and exchange a dozen pasteurized eggs for a dozen regular eggs	A B
2	I will keep the dozen pasteurized eggs.	I will pay $1 and exchange a dozen pasteurized eggs for a dozen vitamin-enhanced eggs	A B
3	I will keep the dozen pasteurized eggs.	I will pay $3 and exchange a dozen pasteurized eggs for a dozen vitamin-enhanced eggs	A B
4	I will keep the dozen pasteurized eggs.	I will pay $2 and exchange a dozen pasteurized eggs for a dozen regular eggs	A B
5	I will keep the dozen pasteurized eggs.	I will pay $2 and exchange a dozen pasteurized eggs for a dozen vitamin-enhanced eggs	A B
6	I will keep the dozen pasteurized eggs.	I will pay $4 and exchange a dozen	A B

		pasteurized eggs for a dozen regular eggs	
7	I will keep the dozen pasteurized eggs.	I will pay $4 and exchange a dozen pasteurized eggs for a dozen vitamin-enhanced eggs	A B
8	I will keep the dozen pasteurized eggs.	I will pay $3 and exchange a dozen pasteurized eggs for a dozen regular eggs	A B

APPENDIX F: Stated Preference Exercise, Sample 1

Please assume you have walked into a supermarket and you wish to purchase eggs. You have the choice between uncertified regular eggs, free-range eggs certified by industry, government or a farmer and pasteurized eggs certified by industry, government or a farmer. Please consider each of the 24 scenarios below and indicate your choice for each scenario. Please circle either Option A or Option B for each scenario.

Scenario	**Option A**	**Option B**	**Circle A or B below**
1	I would buy regular eggs for $2	I would buy government certified free-run eggs for $3	A B
2	I would buy regular eggs for $2	I would buy industry certified free-run eggs for $5	A B
3	I would buy regular eggs for $2	I would buy government certified free-run eggs for $5	A B
4	I would buy regular eggs for $2	I would buy farmer certified free-run eggs for $6	A B
5	I would buy regular eggs for $2	I would buy farmer certified free-run eggs for $4	A B
6	I would buy regular eggs for $2	I would buy industry certified free-run eggs for $6	A B
7	I would buy regular eggs for $2	I would buy industry certified pasteurized eggs for $3	A B
8	I would buy regular eggs for $2	I would buy government certified pasteurized eggs for $4	A B

9	I would buy regular eggs for $2	I would buy government certified pasteurized eggs for $5	A B
10	I would buy regular eggs for $2	I would buy farmer certified pasteurized eggs for $3	A B
11	I would buy regular eggs for $2	I would buy industry certified pasteurized eggs for $5	A B
12	I would buy regular eggs for $2	I would buy farmer certified free-run eggs for $5	A B
13	I would buy regular eggs for $2	I would buy industry certified free-run eggs for $3	A B
14	I would buy regular eggs for $2	I would buy farmer certified pasteurized eggs for $4	A B
15	I would buy regular eggs for $2	I would buy farmer certified pasteurized eggs for $5	A B
16	I would buy regular eggs for $2	I would buy farmer certified pasteurized eggs for $6	A B
17	I would buy regular eggs for $2	I would buy government certified pasteurized eggs for $3	A B
18	I would buy regular eggs for $2	I would buy industry certified pasteurized eggs for $6	A B
19	I would buy regular eggs for $2	I would buy farmer certified free-run eggs for $3	A B
20	I would buy regular eggs for $2	I would buy government certified free-run eggs for $6	A B

21	I would buy regular eggs for $2	I would buy government certified pasteurized eggs for $6	A B
22	I would buy regular eggs for $2	I would buy industry certified free-run eggs for $4	A B
23	I would buy regular eggs for $2	I would buy government certified free-run eggs for $4	A B
24	I would buy regular eggs for $2	I would buy industry certified pasteurized eggs for $4	A B

Appendix G: Example Stated Preference Exercise, Sample 2,

Session Date and Time _____

Whether you currently eat eggs or not, we would appreciate you completing the following choice comparisons.

We will be considering the following types of eggs:

Vitamin Enhanced:

Vitamin-Enhanced Eggs are from hens fed a nutritionally-enhanced diet containing higher levels of certain nutrients (e.g., vitamin E, folate, vitamin B6 and vitamin B12). As a result, the eggs produced will contain higher levels of these nutrients than regular eggs. The amounts of each nutrient will vary between brands of eggs.

Free Run Eggs:

Free Run Eggs are produced by hens that are able to move about the floor of the barn and have access to nesting boxes and, quite often, perches. The nutrient content of these eggs is the same as that of regular eggs.

Pasteurized Eggs:

Pasteurized Eggs use a patented, all-natural pasteurization process to eliminate harmful Salmonella bacteria (Salmonella can contribute to food borne illness) and viruses like Avian influenza. The nutrient content of these eggs is the same as that of regular eggs.

Generic Eggs:

Generic eggs are produced using traditional methods. Generic eggs are an excellent source of high quality protein plus they provide many vitamins and minerals, including Vitamin B12, riboflavin, Vitamin D, folacin and iron. Eggs are one of nature's most nutrient dense foods. Canada's Food Guide to Healthy Eating identifies a serving of one to two eggs as part of a healthy eating pattern. These eggs are not engineered to offer extra benefits to the consumer.

(Survey 1)

1. During a typical shopping trip to the grocery store when you purchase eggs, if the following options were the only ones available, which option would you purchase?

Option A	Option B	Option C
Canada Grade A large.		I would purchase neither of these types of egg
Free Run eggs: Hens able to move on the barn floor, have access to nesting boxes	Pasteurized eggs: processed to remove harmful bacteria and viruses	
Certified by industry	Certified by industry	
$3.88 per dozen	$2.20 per dozen	

☐Option A **☐ Option B** **☐Option C**

2. During a typical shopping trip to the grocery store when you purchase eggs, if the following options were the only ones available, which option would you purchase?

Option A	Option B	Option C
Canada Grade A Large		I would purchase neither of these types of egg
Pasteurized eggs: processed to remove harmful bacteria and viruses	Pasteurized eggs: processed to remove harmful bacteria and viruses	
Certified by government	Certified by farm organization	
$3.88 per dozen	$3.04 per dozen	

☐Option A **☐ Option B** **☐Option C**

3. During a typical shopping trip to the grocery store when you purchase eggs, if the following options were the only ones available, which option would you purchase?

Option A	Option B	Option C
Canada Grade A Large		I would purchase neither of these types of egg
Pasteurized eggs: processed to remove harmful bacteria and viruses	Generic Eggs: Traditional production methods .	
Certified by government		
$3.04 per dozen	$3.88 per dozen	

□Option A **□ Option B** **□Option C**

4. During a typical shopping trip to the grocery store when you purchase eggs, if the following options were the only ones available, which option would you purchase?

Option A	Option B	Option C
Canada Grade A large.		I would purchase neither of these types of egg
Pasteurized eggs: processed to remove harmful bacteria and viruses.	Vitamin-enhanced eggs: hens fed a nutritionally enhanced diet	
$3.04 per dozen	$3.04 per dozen	

□Option A **□ Option B** **□Option C**

5. During a typical shopping trip to the grocery store when you purchase eggs, if the following options were the only ones available, which option would you purchase?

Option A	Option B	Option C
Canada Grade A large.		I would purchase neither of these types of egg
Pasteurized eggs: processed to remove harmful bacteria and viruses	Vitamin-enhanced eggs: hens fed a nutritionally enhanced diet	
Certified by government	Certified by industry	
$2.20 per dozen	$3.04 per dozen	

☐**Option A** ☐ **Option B** ☐**Option C**

6. During a typical shopping trip to the grocery store when you purchase eggs, if the following options were the only ones available, which option would you purchase?

Option A	Option B	Option C
Canada Grade A large.		I would purchase neither of these types of egg
Vitamin-enhanced eggs: hens fed a nutritionally enhanced diet	Pasteurized eggs: processed to remove harmful bacteria and viruses	
Certified by Industry	Certified by government	
$3.04 per dozen	$3.04 per dozen	

☐**Option A** ☐ **Option B** ☐**Option C**

7. During a typical shopping trip to the grocery store when you purchase eggs, if the following options were the only ones available, which option would you purchase?

Option A	Option B	Option C
Canada Grade A large.		I would purchase neither of these types of egg
Vitamin-enhanced eggs: hens fed a nutritionally enhanced diet	Free Run eggs: Hens able to move on the barn floor, have access to nesting boxes.	
$3.04 per dozen	$3.04 per dozen	

☐**Option A** ☐ **Option B** ☐**Option C**

8. During a typical shopping trip to the grocery store when you purchase eggs, if the following options were the only ones available, which option would you purchase?

Option A	Option B	Option C
Canada Grade A large.		I would purchase neither of these types of egg
Free Run eggs: Hens able to move on the barn floor, have access to nesting boxes.	Vitamin-enhanced eggs: hens fed a nutritionally enhanced diet	
$3.04 per dozen	$2.20 per dozen	

☐**Option A** ☐ **Option B** ☐**Option C**

9. During a typical shopping trip to the grocery store when you purchase eggs, if the following options were the only ones available, which option would you purchase?

Option A	Option B	Option C
Canada Grade A large.		I would purchase neither of these types of egg
Vitamin-enhanced eggs: hens fed a nutritionally enhanced diet	Vitamin-enhanced eggs: hens fed a nutritionally enhanced diet	
Certified by government	Certified by farm organization	
$2.20 per dozen	$3.04 per dozen	

☐**Option A** ☐ **Option B** ☐**Option C**

10. During a typical shopping trip to the grocery store when you purchase eggs, if the following options were the only ones available, which option would you purchase?

Option A	Option B	Option C
Canada Grade A large.		I would purchase neither of these types of egg
Vitamin-enhanced eggs: hens fed a nutritionally enhanced diet	Free Run eggs: Hens able to move on the barn floor, have access to nesting boxes.	
Certified by farm organization		
$2.20 per dozen	$3.88 per dozen	

☐**Option A** ☐ **Option B** ☐**Option C**

11. During a typical shopping trip to the grocery store when you purchase eggs, if the following options were the only ones available, which option would you purchase?

Option A	Option B	Option C
Canada Grade A large.		
Free Run eggs: Hens able to move on the barn floor, have access to nesting boxes.	Vitamin-enhanced eggs: hens fed a nutritionally enhanced diet	I would purchase neither of these types of egg
Certified by government	Certified by farm organization	
$2.20 per dozen	$2.20 per dozen	

☐**Option A** ☐ **Option B** ☐**Option C**

12. During a typical shopping trip to the grocery store when you purchase eggs, if the following options were the only ones available, which option would you purchase?

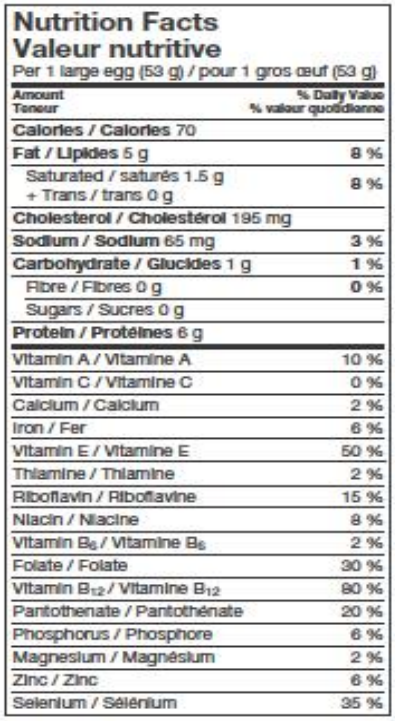
Option A	Option B	Option C
Canada Grade A large.		
Free Run eggs: Hens able to move on the barn floor, have access to nesting boxes.	Free Run eggs: Hens able to move on the barn floor, have access to nesting boxes.	I would purchase neither of these types of egg
	Certified by industry	
$2.20 per dozen	$3.88 per dozen	

☐**Option A** ☐ **Option B** ☐**Option C**

Appendix H: Egg Carton Label Examples

KEEP REFRIGERATED
GARDER REFRIGERE

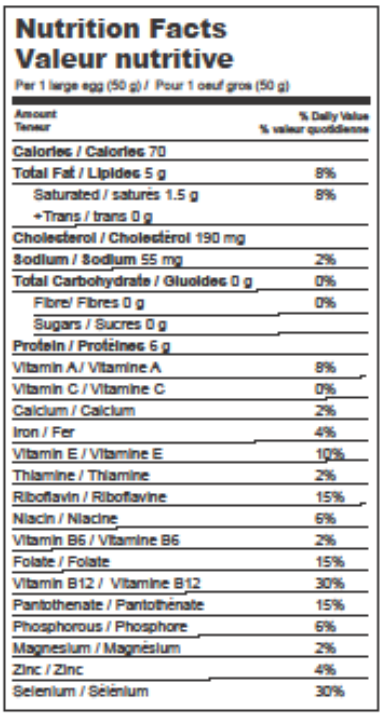
Vitamin Enhanced Egg Label



Nutrition Facts
Valeur nutritive
Per 1 large egg (53 g) / pour 1 gros œuf (53 g)

Amount / Teneur	% Daily Value / % valeur quotidienne
Calories / Calories 70	
Fat / Lipides 5 g	**8** %
Saturated / saturés 1.5 g + Trans / trans 0 g	**8** %
Cholesterol / Cholestérol 195 mg	
Sodium / Sodium 65 mg	**3** %
Carbohydrate / Glucides 1 g	**1** %
Fibre / Fibres 0 g	**0** %
Sugars / Sucres 0 g	
Protein / Protéines 6 g	
Vitamin A / Vitamine A	10 %
Vitamin C / Vitamine C	0 %
Calcium / Calcium	2 %
Iron / Fer	6 %
Vitamin E / Vitamine E	50 %
Thiamine / Thiamine	2 %
Riboflavin / Riboflavine	15 %
Niacin / Niacine	8 %
Vitamin B_6 / Vitamine B_6	2 %
Folate / Folate	30 %
Vitamin B_{12} / Vitamine B_{12}	80 %
Pantothenate / Pantothénate	20 %
Phosphorus / Phosphore	6 %
Magnesium / Magnésium	2 %
Zinc / Zinc	6 %
Selenium / Sélénium	35 %

Regular Nutrition Label



Nutrition Facts
Valeur nutritive

Per 1 large egg (50 g) / Pour 1 oeuf gros (50 g)

Amount / Teneur	% Daily Value / % valeur quotidienne
Calories / Calories 70	
Total Fat / Lipides 5 g	8%
Saturated / saturés 1.5 g	8%
+Trans / trans 0 g	
Cholesterol / Cholestérol 190 mg	
Sodium / Sodium 55 mg	2%
Total Carbohydrate / Glucides 0 g	0%
Fibre/ Fibres 0 g	0%
Sugars / Sucres 0 g	
Protein / Protéines 6 g	
Vitamin A/ Vitamine A	8%
Vitamin C / Vitamine C	0%
Calcium / Calcium	2%
Iron / Fer	4%
Vitamin E / Vitamine E	10%
Thiamine / Thiamine	2%
Riboflavin / Riboflavine	15%
Niacin / Niacine	6%
Vitamin B6 / Vitamine B6	2%
Folate / Folate	15%
Vitamin B12 / Vitamine B12	30%
Pantothenate / Pantothénate	15%
Phosphorous / Phosphore	6%
Magnesium / Magnésium	2%
Zinc / Zinc	4%
Selenium / Sélénium	30%

Appendix I: Experimental Design for Stated Preference Exercise, Sample 2

There are four types of eggs – Generic (G), Free Run (FR), Vitamin Enhanced (VE), Pasteurized (P)

There are three price levels - $2.20 (P1), $3.04 (P2), $3.88 (P3)

There are 4 types of certification – No certification (NC), Government certification (GC), industry certification (IC), farm certification (FC)

Types of information per egg:

GP1GC	GP1IC	GP1FC	GP1NC
GP2GC	GP2IC	GP2FC	GP2NC
GP3GC	GP3IC	GP3FC	GP3NC
FRP1GC	FRP1IC	FRP1FC	FRP1NC
FRP2GC	FRP2IC	FRP2FC	FRP2NC
FRP3GC	FRP3IC	FRP3FC	FRP3NC
VEP1GC	VEP1IC	VEP1FC	VEP1NC
VEP2GC	VEP2IC	VEP2FC	VEP2NC
VEP3GC	VEP3IC	VEP3FC	VEP3NC
PP1GC	PP1IC	PP1FC	PP1NC
PP2GC	PP2IC	PP2FC	PP2NC
PP3GC	PP3IC	PP3FC	PP3NC

Egg Combinations:

GP1GC-GP1IC	GP1IC-GP1FC	GP1FC-GP1NC	GP1NC-GP2GC
GP1GC-GP1FC	GP1IC-GP1NC	GP1FC-GP2GC	GP1NC-GP2IC
GP1GC-GP1NC	GP1IC-GP2GC	GP1FC-GP2IC	GP1NC-GP2FC
GP1GC-GP2GC	GP1IC-GP2IC	GP1FC-GP2FC	GP1NC- GP2NC
GP1GC-GP2IC	GP1IC-GP2FC	GP1FC- GP2NC	GP1NC-GP3GC

GP1GC-GP2FC	GP1IC- GP2NC	GP1FC-GP3GC	GP1NC-GP3IC
GP1GC- GP2NC	GP1IC-GP3GC	GP1FC-GP3IC	GP1NC-GP3FC
GP1GC-GP3GC	GP1IC-GP3IC	GP1FC-GP3FC	GP1NC- GP3NC
GP1GC-GP3IC	GP1IC-GP3FC	GP1FC- GP3NC	GP1NC-FRP1GC
GP1GC-GP3FC	GP1IC- GP3NC	GP1FC-FRP1GC	GP1NC-FRP1IC
GP1GC- GP3NC	GP1IC-FRP1GC	GP1FC-FRP1IC	GP1NC-FRP1FC
GP1GC-FRP1GC	GP1IC-FRP1IC	GP1FC-FRP1FC	GP1NC-FRP1NC
GP1GC-FRP1IC	GP1IC-FRP1FC	GP1FC-FRP1NC	GP1NC-FRP2GC
GP1GC-FRP1FC	GP1IC-FRP1NC	GP1FC-FRP2GC	GP1NC-FRP2IC
GP1GC-FRP1NC	GP1IC-FRP2GC	GP1FC-FRP2IC	GP1NC-FRP2FC
GP1GC-FRP2GC	GP1IC-FRP2IC	GP1FC-FRP2FC	GP1NC- FRP2NC
GP1GC-FRP2IC	GP1IC-FRP2FC	GP1FC- FRP2NC	GP1NC-FRP3GC
GP1GC-FRP2FC	GP1IC- FRP2NC	GP1FC-FRP3GC	GP1NC-FRP3IC
GP1GC- FRP2NC	GP1IC-FRP3GC	GP1FC-FRP3IC	GP1NC-FRP3FC
GP1GC-FRP3GC	GP1IC-FRP3IC	GP1FC-FRP3FC	GP1NC- FRP3NC
GP1GC-FRP3IC	GP1IC-FRP3FC	GP1FC- FRP3NC	GP1NC-VEP1GC
GP1GC-FRP3FC	GP1IC- FRP3NC	GP1FC-VEP1GC	GP1NC-VEP1IC
GP1GC- FRP3NC	GP1IC-VEP1GC	GP1FC-VEP1IC	GP1NC-VEP1FC
GP1GC-VEP1GC	GP1IC-VEP1IC	GP1FC-VEP1FC	GP1NC-VEP1NC
GP1GC-VEP1IC	GP1IC-VEP1FC	GP1FC-VEP1NC	GP1NC-VEP2GC
GP1GC-VEP1FC	GP1IC-VEP1NC	GP1FC-VEP2GC	GP1NC-VEP2IC
GP1GC-VEP1NC	GP1IC-VEP2GC	GP1FC-VEP2IC	GP1NC-VEP2FC
GP1GC-VEP2GC	GP1IC-VEP2IC	GP1FC-VEP2FC	GP1NC- VEP2NC
GP1GC-VEP2IC	GP1IC-VEP2FC	GP1FC- VEP2NC	GP1NC-VEP3GC
GP1GC-VEP2FC	GP1IC- VEP2NC	GP1FC-VEP3GC	GP1NC-VEP3IC
GP1GC- VEP2NC	GP1IC-VEP3GC	GP1FC-VEP3IC	GP1NC-VEP3FC
GP1GC-VEP3GC	GP1IC-VEP3IC	GP1FC-VEP3FC	GP1NC- VEP3NC
GP1GC-VEP3IC	GP1IC-VEP3FC	GP1FC- VEP3NC	GP1NC-PP1GC

GP1GC-VEP3FC	GP1IC- VEP3NC	GP1FC-PP1GC	GP1NC-PP1IC
GP1GC- VEP3NC	GP1IC-PP1GC	GP1FC-PP1IC	GP1NC-PP1FC
GP1GC-PP1GC	GP1IC-PP1IC	GP1FC-PP1FC	GP1NC-PP1NC
GP1GC-PP1IC	GP1IC-PP1FC	GP1FC-PP1NC	GP1NC-PP2GC
GP1GC-PP1FC	GP1IC-PP1NC	GP1FC-PP2GC	GP1NC-PP2IC
GP1GC-PP1NC	GP1IC-PP2GC	GP1FC-PP2IC	GP1NC-PP2FC
GP1GC-PP2GC	GP1IC-PP2IC	GP1FC-PP2FC	GP1NC- PP2NC
GP1GC-PP2IC	GP1IC-PP2FC	GP1FC- PP2NC	GP1NC-PP3GC
GP1GC-PP2FC	GP1IC- PP2NC	GP1FC-PP3GC	GP1NC-PP3IC
GP1GC- PP2NC	GP1IC-PP3GC	GP1FC-PP3IC	GP1NC-PP3FC
GP1GC-PP3GC	GP1IC-PP3IC	GP1FC-PP3FC	GP1NC- PP3NC
GP1GC-PP3IC	GP1IC-PP3FC	GP1FC- PP3NC	
GP1GC-PP3FC	GP1IC- PP3NC		
GP1GC- PP3NC			

Appendix J: Regression and WTP Results for No Information and Information Subsamples

Regression results: No information

Parameter	Estimate	Std. Error	t-statistic	P-value
PRICE	-1.41983	0.142313	-9.97679	[.000]
GOVFR	4.25135	1.30185	3.26562	[.001]
INDFR	3.17553	1.47728	2.14958	[.032]
FARFR	6.62287	1.31594	5.0328	[.000]
GOVPAST	6.06813	1.23322	4.92055	[.000]
INDPAST	4.28746	1.30918	3.27492	[.001]
FARPAST	6.75821	1.36618	4.9468	[.000]
AGEGF	-0.04433	0.018472	-2.40011	[.016]
AGEIF	-0.03079	0.017847	-1.72512	[.085]
AGEFF	-0.06579	0.019316	-3.40582	[.001]
AGEGP	-0.03405	0.017555	-1.93935	[.052]
AGEIP	-8.64E-03	0.018045	-0.47876	[.632]
AGEFP	-0.05471	0.022009	-2.48595	[.013]
INCGF	0.197113	0.249008	0.791592	[.429]
INCIF	0.105184	0.253514	0.414905	[.678]
INCFF	-0.40505	0.25755	-1.57272	[.116]
INCGP	-0.41048	0.256605	-1.59964	[.110]
INCIP	-0.08387	0.280983	-0.29849	[.765]
INCFP	-0.49639	0.292946	-1.69448	[.090]
SUPERPR	0.194083	0.073349	2.64604	[.008]
MKTPR	-0.09553	0.059189	-1.61402	[.107]
TRUSTGF	2.03185	0.873003	2.32742	[.020]
TRUSTIF	2.60752	1.11381	2.34108	[.019]
TRUSTFF	2.5019	0.901579	2.77502	[.006]
TRUSTGP	1.12419	0.775435	1.44976	[.147]
TRUSTIP	0.101021	0.776253	0.130139	[.896]

TRUSTFP	0.977623	0.907358	1.07744	[.281]

WTP: No Information

Parameter	Estimate	Std. Error	t-statistic	P-value
WTPGOVFR	1.00525	0.198744	5.05803	[.000]
WTPINDFR	0.860161	0.221038	3.89146	[.000]
WTPFARFR	1.00506	0.207875	4.83491	[.000]
WTPGOVPAST	0.901713	0.200008	4.50839	[.000]
WTPINDPAST	0.588804	0.214625	2.74341	[.006]
WTPFARPAST	0.432522	0.253016	1.70947	[.087]

Regression results: Information

Parameter	Estimate	Std. Error	t-statistic	P-value
PRICE	-1.22511	0.112861	-10.855	[.000]
GOVFR	2.94306	0.944603	3.11566	[.002]
INDFR	2.77285	0.934163	2.96827	[.003]
FARFR	3.19541	0.932683	3.42604	[.001]
GOVPAST	2.11999	0.988391	2.14489	[.032]
INDPAST	1.3794	1.03989	1.32649	[.185]
FARPAST	2.25038	1.04851	2.14626	[.032]
AGEGF	0.011479	0.013169	0.87167	[.383]
AGEIF	0.025462	0.013051	1.95086	[.051]
AGEFF	0.016428	0.013023	1.26149	[.207]
AGEGP	0.035879	0.013929	2.57581	[.010]
AGEIP	0.048597	0.014577	3.33381	[.001]
AGEFP	0.040885	0.015161	2.69675	[.007]
INCGF	-0.18806	0.210201	-0.89465	[.371]
INCIF	-0.19333	0.209602	-0.92238	[.356]
INCFF	-0.30352	0.20983	-1.4465	[.148]

INCGP	-0.23742	0.223788	-1.0609	[.289]
INCIP	-0.19533	0.229954	-0.84944	[.396]
INCFP	-0.58996	0.253985	-2.3228	[.020]
SUPERPR	0.4052	0.071748	5.64752	[.000]
MKTPR	0.206483	0.056973	3.62422	[.000]
TRUSTGF	0.987053	0.574286	1.71875	[.086]
TRUSTIF	0.211463	0.546102	0.387223	[.699]
TRUSTFF	0.747719	0.561677	1.33123	[.183]
TRUSTGP	0.07632	0.582778	0.130958	[.896]
TRUSTIP	0.016537	0.600468	0.027541	[.978]
TRUSTFP	0.200663	0.654693	0.306499	[.759]

WTP: Information

Parameter	Estimate	Std. Error	t-statistic	P-value
WTPGF	1.39587	0.204113	6.83872	[.000]
WTPIF	1.28777	0.206271	6.24314	[.000]
WTPFF	1.40124	0.203413	6.88866	[.000]
WTPGP	0.952049	0.22658	4.20182	[.000]
WTPIP	0.873355	0.236673	3.69013	[.000]
WTPFP	0.545942	0.268465	2.03357	[.042]

Appendix K: Regression and WTP Results for No Information and Information Subsamples

Regression results: No eggs

Parameter	Estimate	Std. Error	t-statistic
PR	-0.78263	0.089837	-8.71162
N	-3.51903	0.340504	-10.3348
VN	0.449777	1.20078	0.374571
VG	0.582587	1.22995	0.473666
VI	2.54207	1.31843	1.9281
VF	2.12045	1.33284	1.59092
PN	1.13514	1.42323	0.797579
PG	1.76004	1.16859	1.50613
PI	4.19578	1.45441	2.88486
PF	3.0948	1.19969	2.57966
FN	0.748754	1.23356	0.606985
FG	-0.07736	1.2304	-0.06287
FI	1.45717	1.32898	1.09646
FF	2.14222	1.302	1.64532
INCVG	-0.14614	0.286942	-0.50929
INCVN	-0.45441	0.234667	-1.93641
INCVI	-0.31565	0.304088	-1.03803
INCVF	0.228626	0.238606	0.958172
INCPN	0.234444	0.266346	0.880224
INCPG	-0.35559	0.245868	-1.44628
INCPI	0.132679	0.257674	0.514911
INCPF	-0.16369	0.249521	-0.65603
INCFN	0.173921	0.2439	0.713084
INCFG	0.242241	0.266151	0.910163
INCFI	0.173569	0.252161	0.688326
INCFF	-0.35163	0.294055	-1.19579

EDCVN	-0.03946	0.384832	-0.10255
EDCVG	0.013801	0.382445	0.036086
EDCVI	-0.81507	0.368061	-2.21449
EDCVF	-1.12787	0.399515	-2.8231
EDCPN	-0.79476	0.419515	-1.89448
EDCPG	-0.36698	0.369874	-0.99218
EDCPI	-1.38055	0.42559	-3.24384
EDCPF	-1.05664	0.364822	-2.89631
EDCFN	-0.70425	0.384062	-1.83368
EDCFG	-0.29304	0.34075	-0.85998
EDCFI	-0.72583	0.398437	-1.82169
EDCFF	-0.55456	0.372597	-1.48837
GROCVN	-0.14435	0.414896	-0.34791
SUPERVG	0.562336	0.44441	1.26536
SUPERVI	0.343324	0.469371	0.731456
SUPERVF	-0.06873	0.427109	-0.16092
SUPERPN	-0.04474	0.453391	-0.09867
SUPERPG	-0.17241	0.408222	-0.42234
SUPERPI	-0.36975	0.475107	-0.77824
SUPERPF	-0.02972	0.399312	-0.07444
SUPERFN	0.638712	0.409839	1.55845
SUPERFG	0.948884	0.433514	2.18882
SUPERFI	0.501403	0.465734	1.07659
SUPERFF	0.168627	0.433627	0.388876
MARKVG	-0.88867	0.769425	-1.15497
MARKVN	-0.6725	0.62344	-1.07868
MARKVI	1.29194	1.03688	1.24599
MARKVF	-1.21641	0.649086	-1.87403
MARKPN	-1.58927	0.898909	-1.768

MARKPG	-0.01104	0.648639	-0.01702
MARKPI	-2.65486	0.818299	-3.24436
MARKPF	-0.73658	0.753362	-0.97772
MARKFN	-0.4289	0.624385	-0.68692
MARKFG	-0.2203	0.831906	-0.26482
MARKFI	1.5869	0.801631	1.97959
MARKFF	-2.19921	1.29964	-1.69217
TRUSTVN	0.699544	0.423268	1.65272
TRUSTVG	0.011315	0.468221	0.024167
TRUSTVI	0.342463	0.500569	0.684146
TRUSTVF	0.997267	0.43688	2.28271
TRUSTPN	-0.16722	0.473114	-0.35345
TRUSTPG	0.647169	0.441537	1.46572
TRUSTPI	-0.29562	0.496326	-0.59561
TRUSTPF	0.402717	0.426281	0.944722
TRUSTFN	0.507177	0.419972	1.20765
TRUSTFG	0.338578	0.464399	0.729067
TRUSTFI	-0.02054	0.491718	-0.04178
TRUSTFF	0.77386	0.478039	1.61882
HEALTHVN	-0.51244	0.744882	-0.68794
HEALTHVG	1.00594	0.797183	1.26187
HEALTHVI	-2.14978	0.856098	-2.51113
HEALTHVF	-0.24011	0.707749	-0.33926
HEALTHPN	0.544517	0.788723	0.690378
HEALTHPG	1.68307	0.737987	2.28062
HEALTHPI	-0.07133	0.933306	-0.07643
HEALTHPF	0.226152	0.777613	0.290828
HEALTHFN	-0.54098	0.763412	-0.70863
HEALTHFG	-0.58059	0.725171	-0.80062

HEALTHFI	0.251833	0.826158	0.304824
HEALTHFF	-0.08508	0.632939	-0.13442

WTP results: No eggs

Parameter	Estimate	Std. Error		t-statistic
WTPVN	-0.67648	0.356958	-1.89511	[.058]
WTPVI	0.079432	0.374794	0.211936	[.832]
WTPVG	0.295111	0.362135	0.814919	[.415]
WTPVF	-0.1064	0.357158	-0.2979	[.766]
WTPPN	-1.23472	0.395401	-3.1227	[.002]
WTPPI	-0.24182	0.388742	-0.62205	[.534]
WTPPG	-0.24296	0.340109	-0.71437	[.475]
WTPPF	-0.46074	0.354379	-1.30014	[.194]
WTPFN	-0.29859	0.359131	-0.83143	[.406]
WTPFI	0.162043	0.37191	0.435706	[.663]
WTPFG	0.514231	0.356408	1.44282	[.149]
WTPFF	-0.17213	0.400998	-0.42926	[.668]

Regression results: Eggs

Parameter	Estimate	Std. Error	t-statistic	P-value
PR	-0.61337	0.083195	-7.3726	[.000]
N	-1.89461	0.313968	-6.03439	[.000]
VN	3.4778	1.35903	2.55902	[.010]
VG	1.89262	1.19123	1.58881	[.112]
VI	1.50219	1.71344	0.87671	[.381]
VF	5.35615	1.71589	3.1215	[.002]
PN	-0.03221	1.18628	-0.02715	[.978]
PG	1.88288	1.37485	1.36952	[.171]
PI	3.93713	1.85337	2.12431	[.034]

PF	2.75656	1.50876	1.82704	[.068]
FN	-2.28462	1.51149	-1.5115	[.131]
FG	-3.97067	1.79954	-2.20649	[.027]
FI	-2.21997	1.66133	-1.33626	[.181]
FF	-4.96275	1.69863	-2.92163	[.003]
INCVG	-0.61389	0.235571	-2.60597	[.009]
INCVN	-0.38519	0.222184	-1.73365	[.083]
INCVI	0.280625	0.245821	1.14159	[.254]
INCVF	0.263699	0.24411	1.08025	[.280]
INCPN	0.205498	0.17648	1.16442	[.244]
INCPG	0.042626	0.11135	0.382814	[.702]
INCPI	0.683349	0.260143	2.62682	[.009]
INCPF	0.443027	0.200371	2.21103	[.027]
INCFN	0.633357	0.239539	2.64407	[.008]
INCFG	0.370758	0.213483	1.73671	[.082]
INCFI	1.08987	0.238041	4.57852	[.000]
INCFF	0.400259	0.237066	1.68838	[.091]
EDCVN	-0.76358	0.410797	-1.85877	[.063]
EDCVG	0.260119	0.34625	0.751247	[.453]
EDCVI	-0.42466	0.52829	-0.80383	[.421]
EDCVF	-1.70955	0.512955	-3.33275	[.001]
EDCPN	-0.25178	0.328426	-0.76662	[.443]
EDCPG	-0.19925	0.397982	-0.50064	[.617]
EDCPI	-1.49308	0.537247	-2.77914	[.005]
EDCPF	-0.85898	0.47245	-1.81813	[.069]
EDCFN	0.323016	0.459822	0.702479	[.482]
EDCFG	1.25706	0.554073	2.26877	[.023]
EDCFI	4.52E-03	0.476051	9.50E-03	[.992]
EDCFF	1.33981	0.504707	2.65462	[.008]

GROCVN	-0.18469	0.400368	-0.46131	[.645]
GROCVG	0.930717	0.410988	2.26459	[.024]
GROCVI	0.419213	0.465187	0.901171	[.367]
GROCVF	0.571049	0.345029	1.65508	[.098]
GROCPN	0.442942	0.40586	1.09136	[.275]
GROCPG	3.15E-03	0.354359	8.90E-03	[.993]
GROCPI	-0.16211	0.478858	-0.33853	[.735]
GROCPF	-0.72943	0.433018	-1.68452	[.092]
GROCFN	-0.28877	0.416106	-0.69399	[.488]
GROCFG	0.601989	0.448751	1.34148	[.180]
GROCFI	0.640256	0.368625	1.73688	[.082]
GROCFF	0.750855	0.459384	1.63448	[.102]
MARKVG	-0.96267	0.54416	-1.76909	[.077]
MARKVN	-0.19021	0.480038	-0.39624	[.692]
MARKVI	-0.902	0.632906	-1.42518	[.154]
MARKVF	-0.65025	0.581052	-1.11909	[.263]
MARKPN	-0.56558	0.634238	-0.89175	[.373]
MARKPG	-2.07066	0.540852	-3.82851	[.000]
MARKPI	-1.77832	1.02278	-1.73871	[.082]
MARKPF	-3.74165	1.10823	-3.37623	[.001]
MARKFN	0.608673	0.467307	1.30251	[.193]
MARKFG	0.998975	0.626727	1.59395	[.111]
MARKFI	-1.01558	0.659738	-1.53937	[.124]
MARKFF	0.507617	0.536636	0.945924	[.344]
TRUSTVN	0.603522	0.442263	1.36462	[.172]
TRUSTVG	0.263713	0.468653	0.562706	[.574]
TRUSTVI	0.101881	0.511721	0.199094	[.842]
TRUSTVF	0.287406	0.466122	0.616589	[.538]
TRUSTPN	0.422671	0.472995	0.893606	[.372]

TRUSTPG	0.203247	0.428606	0.474205	[.635]
TRUSTPI	-0.56259	0.478008	-1.17695	[.239]
TRUSTPF	0.141974	0.425288	0.33383	[.739]
TRUSTFN	0.27701	0.477473	0.580158	[.562]
TRUSTFG	0.127886	0.469738	0.27225	[.785]
TRUSTFI	0.850523	0.457419	1.8594	[.063]
TRUSTFF	0.332568	0.467185	0.711856	[.477]
HEALTHVN	1.22578	0.718598	1.70579	[.088]
HEALTHVG	1.03942	0.833769	1.24666	[.213]
HEALTHVI	0.871749	0.802093	1.08684	[.277]
HEALTHVF	3.12961	0.827899	3.78018	[.000]
HEALTHPN	1.06382	0.651348	1.63326	[.102]
HEALTHPG	0.761748	0.639325	1.19149	[.233]
HEALTHPI	0.06955	0.853066	0.08153	[.935]
HEALTHPF	0.856279	0.773589	1.10689	[.268]
HEALTHFN	0.841674	0.63911	1.31695	[.188]
HEALTHFG	-0.31897	0.786586	-0.40552	[.685]
HEALTHFI	-1.02502	0.666699	-1.53745	[.124]
HEALTHFF	0.287114	0.779372	0.368391	[.713]

WTP results: Eggs

Parameter	**Estimate**	**Std. Error**	**t-statistic**	**P-value**
WTPVN	0.542143	0.458844	1.18154	[.237]
WTPVI	1.41916	0.482148	2.94341	[.003]
WTPVG	2.32543	0.518003	4.48923	[.000]
WTPVF	1.21426	0.476607	2.54772	[.011]
WTPPN	-0.10174	0.477696	-0.21298	[.831]
WTPPI	0.490871	0.557855	0.879926	[.379]
WTPPG	1.61672	0.471815	3.4266	[.001]

WTPPF	0.20795	0.562077	0.369968	[.711]
WTPFN	0.503346	0.478115	1.05277	[.292]
WTPFI	2.0769	0.533794	3.89083	[.000]
WTPFG	2.19181	0.531596	4.12307	[.000]
WTPFF	1.131	0.472499	2.39365	[.017]

Appendix L: Cross-Tab Data of Knowledge Score and Education

	Education Level			
Knowledge Score	2	3	4	Grand Total
0-0.3	3	14	4	21
0.3-0.5	6	8	1	15
0.5-0.7	9	43	6	58
0.7-0.9	4	36	9	49

Appendix M: Cross-Tab Data of Knowledge Score and Gender

	Gender		
Knowledge Score	1	2	Grand Total
0-0.3	5	34	39
0.3-0.5	4	22	26
0.5-0.7	20	76	96
0.7-0.9	18	62	80

Appendix N: Regression Results for Information and No Information Subsamples, Sample 1

Without Information Treatment - Survey Last

Dependent variable: CHOICEB
Number of observations = 824
Log likelihood =-265.205
Schwarz B.I.C. = 355.846
Number of Choices = 1648

Parameter	Estimate	Std. Error	t-statistic	P-value
PRICE	-1.41983	0.142313	-9.97679	[.000]
GOVFR	4.25135	1.30185	3.26562	[.001]
INDFR	3.17553	1.47728	2.14958	[.032]
FARFR	6.62287	1.31594	5.0328	[.000]
GOVPAST	6.06813	1.23322	4.92055	[.000]
INDPAST	4.28746	1.30918	3.27492	[.001]
FARPAST	6.75821	1.36618	4.9468	[.000]
AGEGF	-0.044334	0.018472	-2.40011	[.016]
AGEIF	-0.030788	0.017847	-1.72512	[.085]
AGEFF	-0.065785	0.019316	-3.40582	[.001]
AGEGP	-0.034045	0.017555	-1.93935	[.052]
AGEIP	-8.64E-03	0.018045	-0.478758	[.632]
AGEFP	-0.054714	0.022009	-2.48595	[.013]
INCGF	0.197113	0.249008	0.791592	[.429]
INCIF	0.105184	0.253514	0.414905	[.678]
INCFF	-0.405054	0.25755	-1.57272	[.116]
INCGP	-0.410478	0.256605	-1.59964	[.110]
INCIP	-0.08387	0.280983	-0.298487	[.765]
INCFP	-0.496392	0.292946	-1.69448	[.090]
SUPERPR	0.194083	0.073349	2.64604	[.008]
MKTPR	-0.095533	0.059189	-1.61402	[.107]
TRUSTGF	2.03185	0.873003	2.32742	[.020]
TRUSTIF	2.60752	1.11381	2.34108	[.019]

TRUSTFF	2.5019	0.901579	2.77502	[.006]
TRUSTGP	1.12419	0.775435	1.44976	[.147]
TRUSTIP	0.101021	0.776253	0.130139	[.896]
TRUSTFP	0.977623	0.907358	1.07744	[.281]

With Information Treatment - Survey First
Dependent variable: CHOICEB
Number of observations = 792
Log likelihood =-340.955
Schwarz B.I.C. = 431.062
Number of Choices = 1548

Parameter	Estimate	Std. Error	t-statistic	P-value
PRICE	-1.22511	0.112861	-10.855	[.000]
GOVFR	2.94306	0.944603	3.11566	[.002]
INDFR	2.77285	0.934163	2.96827	[.003]
FARFR	3.19541	0.932683	3.42604	[.001]
GOVPAST	2.11999	0.988391	2.14489	[.032]
INDPAST	1.3794	1.03989	1.32649	[.185]
FARPAST	2.25038	1.04851	2.14626	[.032]
AGEGF	0.011479	0.013169	0.87167	[.383]
AGEIF	0.025462	0.013051	1.95086	[.051]
AGEFF	0.016428	0.013023	1.26149	[.207]
AGEGP	0.035879	0.013929	2.57581	[.010]
AGEIP	0.048597	0.014577	3.33381	[.001]
AGEFP	0.040885	0.015161	2.69675	[.007]
INCGF	-0.188057	0.210201	-0.894653	[.371]
INCIF	-0.193332	0.209602	-0.92238	[.356]
INCFF	-0.303519	0.20983	-1.4465	[.148]
INCGP	-0.237416	0.223788	-1.0609	[.289]
INCIP	-0.195332	0.229954	-0.849438	[.396]
INCFP	-0.589956	0.253985	-2.3228	[.020]

SUPERPR	0.4052	0.071748	5.64752	[.000]
MKTPR	0.206483	0.056973	3.62422	[.000]
TRUSTGF	0.987053	0.574286	1.71875	[.086]
TRUSTIF	0.211463	0.546102	0.387223	[.699]
TRUSTFF	0.747719	0.561677	1.33123	[.183]
TRUSTGP	0.07632	0.582778	0.130958	[.896]
TRUSTIP	0.016537	0.600468	0.027541	[.978]
TRUSTFP	0.200663	0.654693	0.306499	[.759]

Appendix O: Regression Results for Information and No Information Subsamples, Session 2

Without Information Treatment – Survey Last

Number of observations = 911
Log likelihood = -817.141
Schwarz B.I.C. = 994.319
Number of Choices = 2733

Parameter	Estimate	Std. Error	t-statistic	P-value
PR	-0.782655	0.09159	-8.54517	[.000]
N	-2.97018	0.321285	-9.24468	[.000]
VN	0.12365	0.781418	0.158237	[.874]
VG	2.56179	0.936836	2.73451	[.006]
VI	1.76771	0.950522	1.85972	[.063]
VF	0.333539	0.938604	0.355356	[.722]
PN	-1.03806	0.972407	-1.06752	[.286]
PG	-0.112839	0.743043	-0.151861	[.879]
PI	-0.571501	0.875441	-0.652815	[.514]
PF	0.014409	0.71997	0.020014	[.984]
FN	-1.02173	0.915514	-1.11602	[.264]
FG	0.873742	0.880076	0.992803	[.321]
FI	-1.67604	0.77593	-2.16004	[.031]
FF	-1.26665	0.926267	-1.36748	[.171]
AGEVG	-0.025025	0.012619	-1.98307	[.047]
AGEVN	7.51E-03	0.010792	0.695956	[.486]
AGEVI	-0.015519	0.012723	-1.21975	[.223]
AGEVF	-5.26E-03	0.012106	-0.434428	[.664]
AGEPN	3.24E-03	0.01264	0.256568	[.798]
AGEPG	6.56E-03	0.010534	0.622609	[.534]
AGEPI	8.95E-03	0.012215	0.73246	[.464]
AGEPF	-0.017832	0.010324	-1.7272	[.084]

AGEFN	-4.83E-03	0.011722	-0.411841	[.680]
AGEFG	-0.013815	0.01232	-1.12131	[.262]
AGEFI	9.56E-03	0.011203	0.853548	[.393]
AGEFF	9.00E-05	0.012266	7.34E-03	[.994]
INCVG	-0.429818	0.253517	-1.69542	[.090]
INCVN	-0.827281	0.246163	-3.3607	[.001]
INCVI	-0.151777	0.239353	-0.634115	[.526]
INCVF	-0.463567	0.246794	-1.87835	[.060]
INCPN	0.066224	0.247467	0.267609	[.789]
INCPG	-0.217015	0.204078	-1.06339	[.288]
INCPI	-5.42E-04	0.2608	-2.08E-03	[.998]
INCPF	0.181255	0.211099	0.858624	[.391]
INCFN	0.153494	0.223955	0.685381	[.493]
INCFG	0.355105	0.24269	1.46321	[.143]
INCFI	0.515611	0.234452	2.19922	[.028]
INCFF	0.3461	0.252681	1.36971	[.171]
SUPERPR	0.090644	0.061344	1.47763	[.140]
MARKPR	-0.052801	0.09776	-0.540112	[.589]
TRUSTVN	1.94418	0.468072	4.15359	[.000]
TRUSTVG	1.05418	0.446312	2.36198	[.018]
TRUSTVI	0.110993	0.443779	0.250109	[.803]
TRUSTVF	1.90283	0.485448	3.91973	[.000]
TRUSTPN	0.198539	0.473255	0.419518	[.675]
TRUSTPG	1.04562	0.396042	2.64016	[.008]
TRUSTPI	0.379257	0.468025	0.810336	[.418]
TRUSTPF	1.18646	0.38056	3.11768	[.002]
TRUSTFN	0.969576	0.430035	2.25465	[.024]
TRUSTFG	-0.53659	0.475246	-1.12908	[.259]
TRUSTFI	0.624271	0.440741	1.41641	[.157]

TRUSTFF	0.905499	0.45405	1.99427	[.046]

With Information Treatment – Survey First

Dependent variable: CHOICEB
Number of observations = 816
Log likelihood = -755.001
Schwarz B.I.C. = 929.316
Number of Choices = 2448

Parameter	Estimate	Std. Error	t-statistic	P-value
PR	-0.662121	0.093684	-7.06759	[.000]
N	-2.707	0.318184	-8.50768	[.000]
VN	1.24768	0.873416	1.42851	[.153]
VG	2.1621	1.0138	2.13267	[.033]
VI	-0.196353	1.13208	-0.173445	[.862]
VF	0.31758	0.835722	0.380007	[.704]
PN	0.41516	0.891748	0.465557	[.642]
PG	2.75372	0.945665	2.91194	[.004]
PI	1.08719	1.00129	1.08578	[.278]
PF	1.92878	0.989425	1.9494	[.051]
FN	-2.37854	1.10409	-2.1543	[.031]
FG	-0.405033	0.88542	-0.457448	[.647]
FI	0.161556	0.902685	0.178973	[.858]
FF	0.128297	0.841249	0.152508	[.879]
AGEVG	-0.022652	0.015361	-1.47462	[.140]
AGEVN	-0.022782	0.012906	-1.76516	[.078]
AGEVI	-0.021987	0.018011	-1.22077	[.222]
AGEVF	-0.040809	0.014307	-2.85242	[.004]
AGEPN	-0.031318	0.015863	-1.97423	[.048]
AGEPG	-0.039095	0.013601	-2.87443	[.004]

AGEPI	-0.030208	0.015057	-2.00629	[.045]
AGEPF	-0.044288	0.01414	-3.13219	[.002]
AGEFN	0.015395	0.015496	0.993426	[.321]
AGEFG	-0.022999	0.015176	-1.51553	[.130]
AGEFI	-0.023813	0.013814	-1.72387	[.085]
AGEFF	-0.019866	0.01519	-1.30782	[.191]
INCVG	0.027223	0.235945	0.11538	[.908]
INCVN	0.03283	0.210226	0.156165	[.876]
INCVI	0.461235	0.274185	1.6822	[.093]
INCVF	0.79405	0.235661	3.36946	[.001]
INCPN	0.237117	0.247648	0.957474	[.338]
INCPG	0.094642	0.214999	0.440199	[.660]
INCPI	0.432535	0.257489	1.67982	[.093]
INCPF	0.337519	0.236998	1.42414	[.154]
INCFN	0.538297	0.223953	2.40362	[.016]
INCFG	0.717838	0.241787	2.96888	[.003]
INCFI	0.634405	0.233508	2.71684	[.007]
INCFF	0.283258	0.235787	1.20133	[.230]
SUPERPR	-0.033062	0.062528	-0.528757	[.597]
MARKPR	-0.104846	0.080315	-1.30543	[.192]
TRUSTVN	-0.740857	0.444886	-1.66527	[.096]
TRUSTVG	-1.27844	0.532191	-2.40221	[.016]
TRUSTVI	-0.116095	0.558716	-0.207788	[.835]
TRUSTVF	-0.66166	0.434201	-1.52386	[.128]
TRUSTPN	-0.356708	0.476013	-0.749368	[.454]
TRUSTPG	-1.26383	0.461559	-2.73819	[.006]
TRUSTPI	-1.5853	0.487048	-3.25491	[.001]
TRUSTPF	-1.6591	0.476546	-3.48151	[.000]
TRUSTFN	0.433827	0.497855	0.871392	[.384]

TRUSTFG	0.457819	0.456736	1.00237	[.316]
TRUSTFI	0.030725	0.451478	0.068054	[.946]
TRUSTFF	0.145877	0.479143	0.304455	[.761]

Appendix P: Regression Result of Egg Experiment and No Egg Experiment Subsamples, Session 2

With Egg Experiment

Dependent variable: CHOICEB
Number of observations = 888
Log likelihood = -820.091
Schwarz B.I.C. = 999.9
Number of Choices = 2664

Parameter	Estimate	Error	t-statistic	P-value
PR	-0.537416	0.087764	-6.12341	[.000]
N	-2.02137	0.297755	-6.78872	[.000]
VN	1.11599	0.707443	1.57749	[.115]
VG	3.45808	0.826174	4.18566	[.000]
VI	0.892394	0.852849	1.04637	[.295]
VF	1.10782	0.764737	1.44863	[.147]
PN	0.367313	0.787593	0.466374	[.641]
PG	1.47759	0.595655	2.48062	[.013]
PI	-0.168844	0.807391	-0.209123	[.834]
PF	1.4737	0.68333	2.15665	[.031]
FN	-1.49598	0.870853	-1.71783	[.086]
FG	0.947736	0.77852	1.21736	[.223]
FI	-0.854734	0.726973	-1.17574	[.240]
FF	-0.311606	0.791945	-0.393469	[.694]
AGEVG	-0.037399	0.012363	-3.02509	[.002]
AGEVN	-0.012867	0.012008	-1.0715	[.284]
AGEVI	-0.027183	0.013726	-1.98049	[.048]
AGEVF	-0.031223	0.011683	-2.67249	[.008]
AGEPN	-0.04519	0.015134	-2.98593	[.003]
AGEPG	-0.013606	0.010744	-1.26638	[.205]
AGEPI	-0.015979	0.013944	-1.14589	[.252]
AGEPF	-0.058456	0.014009	-4.17268	[.000]
AGEFN	-0.015516	0.013278	-1.1686	[.243]
AGEFG	-0.036395	0.013982	-2.60304	[.009]
AGEFI	-0.021937	0.013441	-1.63215	[.103]
AGEFF	-0.029008	0.013513	-2.14671	[.032]
INCVG	-0.282996	0.229995	-1.23044	[.219]
INCVN	-0.293623	0.231949	-1.2659	[.206]
INCVI	0.493376	0.23774	2.07527	[.038]
INCVF	0.342336	0.239098	1.43178	[.152]
INCPN	0.544197	0.232123	2.34443	[.019]
INCPG	0.141337	0.118218	1.19556	[.232]
INCPI	0.702106	0.258144	2.71983	[.007]
INCPF	0.678643	0.197608	3.43429	[.001]
INCFN	0.821675	0.238104	3.4509	[.001]
INCFG	0.71831	0.217823	3.29768	[.001]
INCFI	1.12912	0.2468	4.57505	[.000]
INCFF	0.834505	0.235401	3.54503	[.000]

INFOPR	-0.161332	0.058369	-2.76402	[.006]
SUPERPR	0.035884	0.025834	1.38903	[.165]
MARKPR	-0.046009	0.037405	-1.23004	[.219]
TRUSTVN	0.618291	0.437617	1.41286	[.158]
TRUSTVG	-0.015504	0.459298	-0.033755	[.973]
TRUSTVI	-0.17641	0.461338	-0.382388	[.702]
TRUSTVF	0.118091	0.416153	0.283768	[.777]
TRUSTPN	0.100818	0.455678	0.221248	[.825]
TRUSTPG	-0.346914	0.404373	-0.857905	[.391]
TRUSTPI	-0.538866	0.428696	-1.25699	[.209]
TRUSTPF	-0.199242	0.395339	-0.503978	[.614]
TRUSTFN	0.476942	0.46445	1.0269	[.304]
TRUSTFG	-0.074581	0.417624	-0.178584	[.858]
TRUSTFI	0.391851	0.41197	0.951164	[.342]
TRUSTFF	0.072382	0.428725	0.16883	[.866]

Without Egg Experiment

Dependent variable: CHOICEB
Number of observations = 839
Log likelihood = -780.748
Schwarz B.I.C. = 959.152
Number of Choices = 2517

Parameter	Estimate	Error	t-statistic	P-value
PR	-0.70858	0.100309	-7.06396	[.000]
N	-3.36251	0.322322	-10.4322	[.000]
VN	-0.699948	1.08707	-0.643883	[.520]
VG	-0.846578	1.15583	-0.732439	[.464]
VI	-0.619428	1.21405	-0.510218	[.610]
VF	-2.34482	1.13291	-2.06973	[.038]
PN	-1.83282	1.1814	-1.5514	[.121]
PG	-0.794008	1.15969	-0.684674	[.494]
PI	-0.058639	1.22547	-0.04785	[.962]
PF	-0.645202	1.09458	-0.589454	[.556]
FN	-1.70662	1.12857	-1.51221	[.130]
FG	-0.739864	1.09037	-0.678544	[.497]
FI	-1.29165	1.19433	-1.08148	[.279]
FF	-0.441714	1.17976	-0.374411	[.708]
AGEVG	0.024381	0.014323	1.70228	[.089]
AGEVN	0.01685	0.012996	1.29654	[.195]
AGEVI	0.016788	0.01497	1.12147	[.262]
AGEVF	0.023415	0.01416	1.6536	[.098]
AGEPN	0.01449	0.014336	1.01074	[.312]
AGEPG	0.021559	0.013674	1.57664	[.115]
AGEPI	9.85E-03	0.0148	0.665445	[.506]
AGEPF	0.015772	0.012838	1.2285	[.219]
AGEFN	0.017284	0.013264	1.30311	[.193]

AGEFG	1.58E-03	0.013391	0.117849	[.906]
AGEFI	0.012565	0.014074	0.892808	[.372]
AGEFF	0.017719	0.015133	1.17088	[.242]
INCVG	-0.150887	0.258538	-0.583616	[.559]
INCVN	-0.402751	0.216648	-1.85901	[.063]
INCVI	-0.285292	0.268977	-1.06066	[.289]
INCVF	0.069785	0.224325	0.311088	[.756]
INCPN	0.032585	0.250378	0.130142	[.896]
INCPG	-0.408746	0.231886	-1.7627	[.078]
INCPI	-0.20906	0.240638	-0.868776	[.385]
INCPF	-0.354277	0.238768	-1.48377	[.138]
INCFN	0.051822	0.224264	0.231076	[.817]
INCFG	0.282232	0.253193	1.11469	[.265]
INCFI	0.172444	0.233225	0.739387	[.460]
INCFF	-0.443737	0.274499	-1.61653	[.106]
INFOPR	1.83E-03	0.067071	0.027359	[.978]
SUPERPR	-0.07078	0.066724	-1.06079	[.289]
MARKPR	-0.033389	0.103938	-0.32124	[.748]
TRUSTVN	0.648407	0.417766	1.55208	[.121]
TRUSTVG	0.312721	0.451307	0.692923	[.488]
TRUSTVI	0.659844	0.463535	1.42351	[.155]
TRUSTVF	1.16919	0.437143	2.67461	[.007]
TRUSTPN	0.055439	0.47327	0.117141	[.907]
TRUSTPG	0.839716	0.408285	2.05669	[.040]
TRUSTPI	-0.301365	0.492797	-0.61154	[.541]
TRUSTPF	0.628938	0.417792	1.50539	[.132]
TRUSTFN	0.681235	0.417224	1.63278	[.103]
TRUSTFG	0.320911	0.460604	0.696717	[.486]
TRUSTFI	0.499963	0.460882	1.0848	[.278]
TRUSTFF	1.04329	0.473264	2.20446	[.027]

Appendix Q: Regression Results and WTP for Payment Cards A, Samples 1, 2

A. Regression Results – November Data Collection Payment Card A

A. i) Regression Full Sample

Dependent variable: CHOICEA

Number of observations = 558
Log likelihood = -220.180
Schwarz B.I.C. = 299.235
Number of Choices = 1116

Parameter	Estimate	Std. Error	t-statistic	P-value
PRICEPREM	-0.93167	0.123824	-7.52416	[.000]
PAST	4.46425	1.9205	2.32452	[.020]
VITAMIN	2.73765	1.63404	1.67539	[.094]
PASTINFO	-1.55349	0.425386	-3.65195	[.000]
VTINFO	-1.80458	0.408749	-4.41488	[.000]
PASTGEND	0.531194	0.429086	1.23797	[.216]
VTGEND	-0.389847	0.391477	-0.995837	[.319]
PASTAGE	-0.034721	0.013128	-2.64477	[.008]
VTAGE	6.73E-03	0.011944	0.563864	[.573]
PASTMARI	-1.16406	0.44446	-2.61905	[.009]
VTMARI	-0.964745	0.407948	-2.36487	[.018]
PASTKIDS	-0.22686	0.30434	-0.745418	[.456]
VTKIDS	0.375084	0.267825	1.40048	[.161]
PASTEDUC	-0.42203	0.453618	-0.930364	[.352]
VTEDUC	-0.086191	0.402716	-0.214025	[.831]
PASTINC	0.364218	0.216922	1.67903	[.093]
VTINC	-0.033945	0.223899	-0.151609	[.879]
PASTHLTH	0.025122	0.020965	1.19827	[.231]
VTHLTH	-0.020031	0.018866	-1.06171	[.288]
PASTTRUST	-0.063202	0.448206	-0.141012	[.888]
VTTRUST	0.405477	0.409277	0.990716	[.322]
PASTSTOR	-0.411235	0.39031	-1.05361	[.292]
VTSTOR	1.42394	0.354357	4.01836	[.000]
PASTMARK	0.332935	0.471301	0.706417	[.480]
VTMARK	-0.711819	0.51947	-1.37028	[.171]

A. ii) Regression: Subsample Who Did Survey After Experiment

Dependent variable: CHOICEA

Number of observations = 232
Log likelihood = -80.9481
Schwarz B.I.C. = 143.586
Number of Choices = 464

Parameter	Estimate	Std. Error	t-statistic	P-value
PRICEPREM	-1.26206	0.220995	-5.71083	[.000]
PAST	8.08785	3.35467	2.41092	[.016]
VITAMIN	15.0871	4.9202	3.06637	[.002]
PASTGEND	0.258872	0.850248	0.304466	[.761]
VTGEND	-5.19792	1.56151	-3.32878	[.001]
PASTAGE	-0.08556	0.023118	-3.70105	[.000]
VTAGE	0.069531	0.026663	2.60781	[.009]
PASTMARI	-2.15466	0.785873	-2.74174	[.006]
VTMARI	-6.91376	1.534	-4.50702	[.000]
PASTKIDS	-0.917754	0.463033	-1.98205	[.047]
VTKIDS	0.791762	0.475225	1.66608	[.096]
PASTEDUC	0.233505	0.791711	0.294936	[.768]
VTEDUC	1.59448	0.925442	1.72294	[.085]
PASTINC	0.507422	0.380848	1.33235	[.183]
VTINC	-1.14437	0.498802	-2.29423	[.022]
PASTHLTH	0.046313	0.031165	1.48603	[.137]
VTHLTH	-0.021137	0.033954	-0.622516	[.534]
PASTTRUST	-1.15593	0.691075	-1.67266	[.094]
VTTRUST	-0.707865	0.877723	-0.806478	[.420]
PASTSTOR	-0.234748	0.649236	-0.361575	[.718]
VTSTOR	5.75547	1.34566	4.27704	[.000]
PASTMARK	1.6632	0.79662	2.08782	[.037]
VTMARK	-5.24314	1.65439	-3.16924	[.002]

A. iii) Regression: Sample Who Did Survey Before Experiment

Dependent variable: CHOICEA
Number of observations = 326
Log likelihood = -103.731
Schwarz B.I.C. = 170.280
Number of Choices = 652

Parameter	Estimate	Std. Error	t-statistic	P-value
PRICEPREM	-1.04773	0.198696	-5.27301	[.000]
PAST	-0.134156	2.76574	-0.048506	[.961]
VITAMIN	-0.506225	2.08854	-0.242383	[.808]
PASTGEND	0.856552	0.686477	1.24775	[.212]
VTGEND	-0.435928	0.552759	-0.78864	[.430]
PASTAGE	-2.16E-03	0.019706	-0.109488	[.913]
VTAGE	-7.35E-03	0.018821	-0.390553	[.696]
PASTMARI	-0.199237	0.681737	-0.292249	[.770]
VTMARI	0.775158	0.570123	1.35963	[.174]
PASTKIDS	0.113192	0.534557	0.21175	[.832]
VTKIDS	0.563842	0.432739	1.30296	[.193]
PASTEDUC	-0.722785	0.743942	-0.971561	[.331]

VTEDUC	-0.517471	0.573175	-0.902816	[.367]
PASTINC	0.201918	0.324576	0.622098	[.534]
VTINC	0.152232	0.308237	0.493879	[.621]
PASTHLTH	-8.67E-03	0.040429	-0.214351	[.830]
VTHLTH	-0.052191	0.036103	-1.4456	[.148]
PASTTRUST	1.19537	0.989758	1.20774	[.227]
VTTRUST	1.32044	0.795245	1.66042	[.097]
PASTSTOR	-0.625107	0.649192	-0.962899	[.336]
VTSTOR	0.789389	0.51795	1.52407	[.127]
PASTMARK	-0.971087	0.916299	-1.05979	[.289]
VTMARK	-1.32797	1.15183	-1.15292	[.249]

B. Regression Results: July Data Collection Payment Card A

B. i) Regression Full Sample

Dependent variable: CHOICEA
Number of observations = 528
Log likelihood = -216.081
Schwarz B.I.C. = 288.176
Number of Choices = 1056

Parameter	Estimate	Std. Error	t-statistic	P-value
PRICEPREM	-0.978067	0.126386	-7.73872	[.000]
PAST	-0.238955	1.38561	-0.172454	[.863]
FREERUN	2.97184	1.22703	2.42197	[.015]
PASTINFO	-0.439068	0.377977	-1.16163	[.245]
FRINFO	-0.537151	0.347631	-1.54518	[.122]
PASTGEND	0.500567	0.433201	1.15551	[.248]
FRGEND	0.366429	0.393885	0.930294	[.352]
PASTAGE	-0.013604	0.013272	-1.02503	[.305]
FRAGE	-0.046097	0.012951	-3.55935	[.000]
PASTPEOP	-0.206563	0.442035	-0.467301	[.640]
FRPEOP	-0.794502	0.404511	-1.96411	[.050]
PASTKIDS	-0.318557	0.336999	-0.945276	[.345]
FRKIDS	0.292874	0.304754	0.961019	[.337]
PASTEDUC	-0.029344	0.302961	-0.096857	[.923]
FREDUC	0.135361	0.268864	0.503454	[.615]
PASTINC	0.625528	0.229473	2.72594	[.006]
FRINC	0.279106	0.198871	1.40346	[.160]
PASTTRUST	0.803893	0.504661	1.59294	[.111]
FRTRUST	1.7197	0.511881	3.35958	[.001]
PASTSUPER	-0.610659	0.482659	-1.2652	[.206]
FRSUPER	-0.83461	0.457364	-1.82483	[.068]
PASTMARK	0.528794	0.954086	0.554241	[.579]
FRMARK	-0.022263	0.877798	-0.025362	[.980]

B. ii) Regression: Sample Who Did Survey Before Experiment

Dependent variable: CHOICEA
Number of observations=248
Log likelihood=-99.7564
Schwarz B.I.C.=157.647
Number of Choices=496

Parameter	Estimate	Std. Error	t-statistic	P-value
PRICEPREM	-0.947817	0.181842	-5.21231	[.000]
PAST	-5.46	2.13509	-2.55727	[.011]
FREERUN	4.22579	1.59823	2.64404	[.008]
PASTGEND	-1.18096	0.615159	-1.91977	[.055]
FRGEND	0.340154	0.55118	0.617137	[.537]
PASTAGE	0.040235	0.02421	1.66189	[.097]
FRAGE	-0.044735	0.020332	-2.20021	[.028]
PASTPEOP	0.857947	0.740265	1.15897	[.246]
FRPEOP	-1.03891	0.593735	-1.74979	[.080]
PASTKIDS	-1.04062	0.85953	-1.21068	[.226]
FRKIDS	-0.14016	0.658953	-0.212701	[.832]
PASTEDUC	0.283973	0.520529	0.545547	[.585]
FREDUC	-0.20884	0.403946	-0.517001	[.605]
PASTINC	0.650222	0.412971	1.5745	[.115]
FRINC	0.151498	0.28559	0.530473	[.596]
PASTTRUST	2.04539	1.04812	1.95148	[.051]
FRTRUST	2.32435	0.739039	3.1451	[.002]
PASTSUPER	-1.30485	1.04342	-1.25056	[.211]
FRSUPER	-0.511074	0.831105	-0.614933	[.539]
PASTMARK	2.71633	2.48572	1.09277	[.274]
FRMARK	0.377075	2.04269	0.184597	[.854]

B. iii) Regression: Sample Who Did Survey After Experiment

Dependent variable: CHOICEA
Number of observations=280
Log likelihood=-94.3768
Schwarz B.I.C.=153.542
Number of Choices=560

Parameter	Estimate	Std. Error	t-statistic
PRICEPREM	-1.2325	0.207753	-5.93256
PAST	4.40913	2.73539	1.61189
FREERUN	-0.656861	2.35802	-0.278565
PASTGEND	2.08966	0.967976	2.15879
FRGEND	0.749536	0.709219	1.05685
PASTAGE	-0.047217	0.021592	-2.18673
FRAGE	-0.070216	0.023299	-3.01369
PASTPEOP	-1.52567	0.829203	-1.83993
FRPEOP	0.302255	0.722076	0.418591
PASTKIDS	-0.124288	0.486328	-0.255565
FRKIDS	-0.048112	0.444617	-0.108209

PASTEDUC	-0.642926	0.530777	-1.21129
FREDUC	0.526278	0.436717	1.20508
PASTINC	1.075	0.394515	2.72485
FRINC	0.31851	0.304873	1.04473
PASTTRUST	-0.341548	0.736835	-0.463533
FRTRUST	2.05477	0.81935	2.50781
PASTSUPER	-0.525058	0.673905	-0.779128
FRSUPER	-0.32064	0.72689	-0.441112
PASTMARK	0.821307	1.21469	0.676146
FRMARK	1.03386	1.15796	0.892836

Table AQ.1 Willingness to Pay for Production Attribute – Payment Card A

$/doz eggs (P values in brackets)

	WTP – Entire Sample	**WTP- Sample Survey First**	**WTP- Sample Survey Last**
	July Sample		
Pasteurized	.43 (.102)	.13 (.80)	.33 (.36)
Free Run	1.05 (.000)	1.24 (.000)	.98 (.000)
	November Sample		
Pasteurized	.33 (.26)	-.13 (.77)	1.33 (.000)
Vitamin Enhanced	.86 (.000)	.44 (.21)	1.39 (.000)

Source: Calculated from collected data