Consumer Perception of quality for horticultural products and related agricultural practices

by

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ABSTRACT

CONSUMER PERCEPTION OF QUALITY FOR HORTICULTURAL PRODUCTS AND RELATED AGRICULTURAL PRACTICES

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In recent years, growing interest towards foods produced from alternative agricultural practices have been seen among consumers. This thesis is an investigation of consumer understanding and attitudes towards information regarding sustainable, organic and local foods and agricultural practices and how such information could affect consumer food product expectation and sensory acceptability. Using internet questionnaires constructed based on common definitions and popular beliefs, 172 primary grocery shoppers were surveyed regarding their perception concerning information related to these alternative agricultural practices and foods. Results obtained from statistical analyses revealed the existence of various dimensions concerning the understanding and attitudes towards these concepts. Segmentations based on their understanding and attitudes towards these concepts were also found within the sampled population. Furthermore, by utilizing the theory of assimilation and contrast, a three-part sensory study was conducted, with 49 consumers from the Niagara Peninsula, to examine the impact of information regarding production methods (organic vs. conventional) and product origins (local vs. imported) on consumer expectation and acceptability of yellow peaches. Despite of some peach samples being under-ripe, a significant positive labeling effect has been observed in hedonic rating and perceived intensity of sensory characteristics when the joint organic and local
label was presented. A similar labeling effect, however, was not observed in monetary valuation of willingness to pay.
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His Love is Immutable.
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Chapter 1: Introduction

Interest in sustainable, organic, and local agricultural products has increased dramatically over recent years, due to consumers’ growing interest in where and how food is produced, and its relationship to the local economy, environmental wellness, food safety, and personal health. Organic food sales in the U.S. have increased from $3.6 billion in 1997 to $21.1 billion in 2008 (Greene et al., 2009), and it has been reported that, despite the economic downturn, seventeen out of twenty households (86%) in the U.K. purchased organic products in 2010 (Soil Association, 2011). In Canada, consumer demand for organic and local foods is growing constantly, by at least 15 to 20% each year, with a market share of at least $1.3 billion (OMAFRA, 2011). Over 60% of Canadian consumers have purchased organic products in 2010 (OMAFRA, 2011). Canadian organic food production, however, cannot meet consumer demand, and the majority of organic food in the present market is imported from the United States and other countries (OMAFRA, 2011; Christianson & Morgan, 2007). More recently, the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) has worked closely with the Organic Council of Ontario, using the newly created Foodland Ontario Organic logo as an effort to gain consumer awareness and market share from its importing competitors, in order to support the local producers, processors and retailers of Ontario organic food (Organic Council of Ontario, 2011). Consumer interest in local food continues to grow, as indicated by the growth of alternative retail outlets for local food, such as farmers markets and community supported agriculture organizations (CSA) (e.g., Thilmany et al., 2008; Feagan et al., 2004; Lass et al., 2003). Many consumers associate the purchase and consumption of organic and/or local foods with the support of sustainable and local agricultural production systems (Darby et al., 2008; Dimitri& Greene, 2006).
With such promising prospects in the market, it is essential to understand consumers’ perceptions of the benefits and values of foods produced with these various production systems. It is also important to understand consumer decision-making behaviour when purchasing such foods produced based on these principles. Much research has investigated the motives and intentions behind the increasing interest of consumers in organic and local products, in relation to the sustainable production system worldwide (e.g., Yue & Tong, 2009; Thilmany et al., 2008; Hoogland et al., 2006). Several studies have been conducted in the U.S. and Canada to investigate consumer behaviour related to the concepts of local, organic and sustainable agricultural products, particularly from an economics perspective (e.g. Nie & Zepeda, 2011; Bellows et al., 2010; Brown, 2003). Several themes have been identified with regard to consumer attitudes and motivations for the purchase and consumption of foods produced from organic and sustainable agricultural practices, such as beliefs concerning the benefits in health, food safety, environment, and local economy (Hughner et al., 2007; Shepherd et al., 2005). Similar concerns, particularly in the aspects of the local economy and perceived environmental consequences, have also been observed with regard to consumer perception of local food (Roininen et al., 2006; Zepeda & Li, 2006). Despite the similarity exhibited in consumer attitudes towards these alternative food production methods, little comparative studies have been conducted to attempt to understand consumer perception of these practices.

Consumers often use various product and label cues to make purchase and consumption decisions. Product expectations are formed based on two categories of product factors: intrinsic and extrinsic cues (Olson & Jacoby, 1972). Intrinsic characteristics refer to product-specific attributes. Examples of intrinsic characteristics of a food product include physical and chemical properties, sensory properties, degree of freshness, and nutritional properties. Intrinsic
characteristics of a food can further be classified into two categories: the perceivable and the unperceivable. Perceivable intrinsic attributes, such as sensory and textural qualities, are those that can be experienced during food intake. Some of these qualities, however, can often be experienced through their physiological effects, such as satiety and quenching of thirst after consumption. Unperceivable intrinsic qualities are those characteristics that, even with their presence, cannot be physically experienced by consumers during actual intake. Examples of the unperceivable intrinsic characteristics include nutritional values, amount of carbohydrates, and amount of preservatives used.

Extrinsic characteristics are attributes that are closely related to, but not physically part of the product. Examples of extrinsic qualities include price, brand, availability, packaging, region of origin, and production method. These qualities are also considered as credence attributes, because the information provided by these qualities often cannot be physically experienced by consumers, yet such information often plays an important role in consumer’s decision-making process. Credence information is often indicated by product labels, and interpreted by consumers at the point of purchase or consumption, with different implications based on their beliefs and understanding. For instance, organic foods, as an alternative to foods produced by conventional agricultural practices, are considered by many consumers as a healthier choice than conventional products due to the absence of pesticides (Roininen et al., 2006). When compared with imported products, others may consider purchasing locally grown produce an action that is more socially responsible and environmentally friendly, due to their support of the local agricultural system, and a smaller production of carbon footprint with shortened transportation distances (Thilmany et al., 2008). Each of these is an example of credence information affecting consumer’s beliefs and understanding of food products.
The theory of expectation, proposed by Anderson (1973), attempts to explain how product expectations can be influenced by people’s perception of credence characteristics, and ultimately, change their product perception due to the discrepancy between expectation and product performance. A number of studies have investigated the impact of labeling information containing organic production method and region of origin on consumer perception of food. Information regarding organic production has been identified as a positive determinant in consumer perception and valuation of meat and dairy products (Napolitano et al., 2010a; Napolitano et al., 2010b). Similar findings have also been observed in a study concerning the impact of organic and fair-trade information on fresh pineapples (Poelman et al., 2008). Information regarding the region of origin has been found to have great impact on consumer perception of foods with a strong regional identity, such as is the case for dry-cured ham (Hersleth et al., 2010), wine (d’Hauteville et al., 2007), spelt (Stefani et al., 2006), and salami (Iaccarino et al., 2006). Concerning the case of fresh produce, using conjoint analysis, Campbell et al. (2010) have examined how credence attributes, such as organic and local labeling, are used by consumers as quality cues at the point of purchase. Little research to date, however, has investigated the joint effect of such information on consumer expectations and actual perception.

**Objectives**

There appears to be a lack of comparison between consumer perceptions and understanding of organic, local and sustainable agricultural practices, and the impact of such information on product expectation and sensory perception, particularly in the province of Ontario, Canada. Therefore, the research questions for the current research are as follows:
1) What is Ontario consumers’ current understanding of organic, local and sustainable agricultural practices and perception of foods produced using such practices?

2) How do consumers perceive intrinsic food characteristics with or without the impact of extrinsic information on production methods and regions of origin?

A review of current literature will be presented with regard to consumer understanding and perception of organic, local and sustainable practices, and how product information disclosure can affect a consumer’s decision-making process. This thesis will then present in the format of two manuscripts, as discussion of the above research questions. The first manuscript will provide an overview and comparison of Ontario consumers’ understanding of organic, local and sustainable agricultural practices and products. Subsequently, the second manuscript will examine the impact of information disclosure related to production methods and regions of origin on consumer expectation and acceptability, using Ontario yellow peaches. Finally, the last section will summarise the major contributions of current research to the field of sensory and consumer sciences and the horticultural industry.
Chapter 2: Literature Review

In the marketplace today, there are a number of alternatives to conventional agricultural practices, such as organic, local and sustainable food production. The first section of this literature review will outline the definitions of each of these practices, according to the current legislature, and provide an overview according to the current literature on consumer perceptions and motivations to the purchase and consumption of foods produced by these practices. The subsequent section will provide discussions on various factors impacting consumer food choices. Lastly, the final section will review how the labeling information can influence consumer expectation and perception on foods.

2.1 Organic, Local and Sustainable Agricultural Practices – Consumer perceptions and Motivations for Purchase and Consumption

2.1.1 Organic

Organic foods, according to the guidelines published by the Canadian General Standards Boards (2006), are foods from a production system that is prohibited from the use of synthetic pesticides, fertilizer, synthetic growth regulators, and processing aids. The organic production system aims to protect and conserve ecological and soil stability and rely on renewable resources in locally organized agricultural systems. With the implementation of the Canadian Organic Product Regulation of 2009 (CFIA, 2011), mandatory certifications are now required for food products labeled with organic claims. Similar standards are also seen in the United States and European Union, with equivalency established in Canada for imported products from such countries. Fresh produce accounts for the largest category of organic food sales. In the U.S., fruits and vegetables represent 38% of total organic food sales in 2010, followed by dairy and beverage categories, with 15% and 13% of total sales respectively (Organic Trade Association, 2010). Similar trend in market shares is also observed in Canada. Fruits and vegetables represent
41% of all retail sales of certified organic food products in 2006, followed by beverages (18%), and packaged and prepared food (15%) (Macey, 2007).

Much research has been conducted to examine the characteristics and attitudes of organic consumers and the common perceptions of such practice. Some consumer attitudes for the purchase and consumption of organic food may be product specific, such as those concerned about animal welfare and the use of growth hormones and antibiotics may choose to consume organic meat and dairy products (e.g., McEachern & Willock, 2004; Hill & Lynchehaun, 2002; O’Donovan & McCarthy, 2002). Much research, mostly conducted in the European Union and some in North America, has shown that organic consumers are motivated to purchase and consume organic food by considering the credence attributes particular to organic products, such as the benefits of health, food safety, environmental-friendliness, and product quality (e.g., Shepherd et al., 2005; Magnusson et al., 2003; Harper & Makatouni, 2002; Squires et al., 2001; Schifferstein & Oude Ophuis, 1998; Jolly et al., 1991). Many of such credence attributes cannot be experienced or perceived physically even after consumption. By evaluating against the perceived consequences of consuming such products as a measure of motivation, consumers use these credence attributes as quality cues in making purchase and consumption decisions (Wirth et al., 2011; Aertsens et al., 2009; Vindigni et al., 2002).

Perceived healthiness has been identified as one of the most important motivations towards the purchase and consumption of organic food products in many studies (e.g., Padel & Foster, 2005; Shepherd et al., 2005; Harper & Makatouni, 2002; Makatouni, 2002; Squires et al., 2001; Torjusen et al., 2001; Davies et al., 1995; Wilkins & Hillers, 1994; Jolly et al., 1991). Consumers use the perceived consequence of health, which is often attributed to the absence of chemicals in organic agricultural practice, as an indicator of product quality (Magnusson et al.,
Perceived benefit of health is reported to be a stronger predictor to the purchase of organic foods than environmental benefits by Magnusson et al. (2003) using a questionnaire focusing on organic milk, meat, potatoes and bread as the representative examples of organic foods. Schifferstein & Oude Ophuis (1998) provided evidence of the positive relationship between consumption of organic food and attitude towards health in their attitudinal comparison study between organic and conventional food consumers in the Netherlands. According to the study, Dutch consumers of organic foods are usually more aware of their responsibilities in maintaining personal health, and are more likely to take preventative measures, such as exercising and practicing healthier food choices. With the rise of food scares due to the recent foodborne illness outbreaks, concern for food safety, often embedded in the construct of perceived healthfulness, has become another driver for the purchase and consumption of organic products (Lockie, 2006; Schifferstein & Oude Ophuis, 1998).

Environmental-friendliness has also been an important aspect of the organic agricultural practice, with its emphasis on ecological and soil conservation and its utilization of renewable energy. Studies have found that positive perceived consequence for the environment is an important determinant for organic consumers (e.g., Thøgersen & Olander, 2006; Magnusson et al., 2003; Wandel & Bugge, 1997). The study by Lea and Worsley (2005) has shown a positive relationship between personal value of environmentalism and pro-organic beliefs among Australian consumers. Concern for the environment, however, is often not the priority on consumer’s mind. Many consumers are not willing to make the trade-off in price for the environmental benefits of organic food consumption (Torjusen et al., 2001; Wandal & Bugge, 1997). Though an ethical concern such as environmental-friendliness has a positive influence on consumer attitudes toward organic food, it is still considered rather a remote and abstract concept.
by consumers, and provides limited impact on the decision-making process (Krystallis et al., 2008).

Consumers also use product qualities, such as nutritional value and sensory characteristics, as another factors to determine their choice of food. Studies have indicated that organic consumers believe that organic products have superior nutritional values when compared to conventional food products (Hill & Lynchehaun, 2002; Jolly et al., 1991). A number of studies have also found taste to be among the most important motivators in the purchase and consumption of organic foods (McEachern & McClean, 2002; Magnusson et al., 2001; Schifferstein & Oude Ophuis, 1998). Yet the reviews provided by Bourn and Prescott (2002) and Woose et al. (1997) have delivered evidence that no consistent difference in terms of nutritional qualities and sensory characteristics between organic and conventional food products have been found. Sensory discrimination and descriptive studies have shown inconsistent results in comparison to organic and conventional products (e.g., Fillion & Arazi, 2002; Haglund et al., 1999; Johannson et al., 1999). It is worthwhile to note that it is extremely difficult to deliver a fair comparison between organic and conventional food products, particularly in fresh produce, due to the many differences in the agricultural practices, such as growing environment (e.g., soil types, use of different fertilizers and other additives, and climate conditions), crop varieties, and post-harvest practices (e.g., harvest methods, storage methods, and processing techniques).

There is an overwhelming amount of information regarding the benefits of organic foods available to consumers. Though the organic certification programs and labels provide distinctions between organic and conventional food products, the information provided by such labels could provide implications that may bear different meanings to consumer than what the labels intend to entail. While many consumers have purchased or consumed organic products in
the past, many are unfamiliar with the standards that regulate the organic food production system (Chryssochoidis, 2000). When considering animal production standards in organic farming, Harper and Makatouni (2002) have revealed from the results of focus groups that some consumers consider organic meat as an equivalent to free-range meat. When evaluating consumers’ preference for organic food production standards, consumers have shown preference for standards that require regular testing of pesticide content of the end product and labels of local origins. Neither is required by the current legislation in the U.S. and Canada (Cranfield et al., 2009). Evidence has shown that there may be a discrepancy between current organic agricultural practices and consumers’ understanding of what such label represents.

Regular shoppers of organic foods are willing to pay a premium for organic foods, as they are willing to pay extra for the additional benefits that may not be found in conventional foods. This is true even if organic foods have a shorter shelf-life, such as in the case of fruits and vegetables (Yiridoe et al., 2005). Studies using experimental economics have shown that segments of the consumer population may respond to the organic labels not only with an increase in likelihood of purchase (Campbell et al., 2010) but also with an increase in willingness to pay that is no more than 20% of the price mark-up when compared to conventional foods (Soler et al., 2002).

2.1.2 Local

The “buy local” movement supports foods produced from a relatively close proximity to the consumer and shortens the food supply chain in terms of geographic system; the concept also supports rural area development and local labour markets in hope to promote the local economy (Roininen et al., 2006). The definitions for local food are often ambiguous and inconsistent based on various government agencies as well as popular beliefs. This is also the case in the province
of Ontario, Canada. For instance, the “Foodland Ontario” program has a long history in the province of Ontario promoting the presence of Ontario food products (OMAFRA, 2010). However, the Canadian Food Inspection Agency (CFIA) has also issued a rather complicated and strict definition of local food in which the foods labeled or claimed as local must be “… advertised originating within 50km of the place where they are sold, measured directly, point to point…” with the exception of food “[being] manufactured, processed, produced, or packaged in a local government unit and sold only in local government unit…” (CFIA, 2010). As alluded in the regulation, the local government units are areas defined by the local geographic boundary, such as a metropolitan area, city, town, village, municipality or other area of local government. Any food sold in Canada with the label of “local food” needs to be compliant with such regulation; and CFIA can take enforcement action if one or more of the criteria of such regulation is not met. According to the CFIA regulation, fruits and vegetables sold with the Foodland Ontario labels do not meet the requirement for the local food claim. The U.S. government also has similar regulations regarding local food production. Indeed, in 2008, the U.S. Congress has passed the Food, Conservation, and Energy Act (U.S. Congress, 2008), which defines local foods as foods produced within 400 miles from its origin or within the state in which it is produced.

To confuse the matter further, there are also different definitions used by consumers and retailers to describe local food. The 100-mile diet has long been a popular concept used to promote the locavore movement starting from the west coast of the U.S. in the late 1990s and has spread across North America (Cloud, 2007; Time, 2006). Based on research results, Zepeda and Leviten-Reid (2004) reported that consumers often use driving distance and time as measures to define local food. One-day driving distance has frequently been used as a boundary for such
definition. Whole Foods, the leading organic and natural food retailer in the U.S., defines food as local if it is produced within seven hours of the driving distance from where it is sold in one of its retail outlets. Wal-Mart, being the largest food retailer in the U.S., defines local food by the state boundary in which any food can be deemed as local if it is from the state where it is sold (Schmitt, 2008). Many of these local food definitions and guidelines are used interchangeably by both marketers and consumers to define the local food using either traveling distance to the point of purchase or places of origin such as region, state or province where it is produced. The discrepancy in definitions of local foods can lead to confusion and misinterpretation.

When evaluating local foods, consumers often use the attribute of the distance measurement to gauge product benefits indirectly and form attitudes towards local products within. Such attitudes can focus on either the public or private interest (Thilmany et al., 2008). With regard to consumers’ private interest, the short traveling distance of local food signifies improved quality, such as freshness, taste, and nutritional values, which, alternatively, may provide health benefits (Darby et al., 2008). In respect to the public interest, the close proximity, suggesting low fuel usage and anti-corporate image, is also a motivator for consumers who are concerned with environmental wellness and local economy (Darby et al., 2008; Zepeda & Li, 2006). The work of Darby et al. (2008) also suggests that consumers who purchase local foods often have some degree of ethnocentric pride regarding product origin. They are often willing to pay more in order to compensate for the attributes of freshness and “home-pride,” yet the magnitude of premiums vary and depend on the population segments of socioeconomics. Campbell et al. (2010) have also provided similar evidence among the segment of Ontario population in response to the Foodland Ontario label with an increase in likelihood of purchase and willingness to pay.
2.1.3 Sustainable

As explained by Vermeir and Verbeke (2008), the definition of sustainability is multidimensional involving three components: economic (profit), ecological (planet) and social (people). A sustainable agricultural production system, according to Agriculture and Agri-Food Canada (2007), is a production system with the concept of promoting conservation of environment and natural resources, as well as the wellbeing of those involved with the agricultural and agri-food business. The concept of sustainable agriculture promotes a high quality supply of agricultural products while contributing to the wellness of the economics and society of all people (Agriculture and Agri-Food Canada, 2007). One can also define a sustainable agricultural system as low-input agriculture, which in realistic practice, aims to utilize internal production inputs (on-farm resources) and reduced, but not eliminated, use of external production inputs (off-farm resources) such as chemical fertilizer, insecticides and herbicides; farmers adopt this practice primarily to reduce cost, and minimize environmental impact (Parr et al., 1990). The act of buying organic or local food products may represent one or more aspects of supporting sustainable practices.

A limited number of studies have been published regarding the general perception of the concept of sustainable practice. Consumers generally have an inconsistent understanding of what constitutes and defines the sustainable agricultural system, although the term has been overly used in the media. The decision of supporting sustainable practice, as indicated by Verbeke et al. (2007), is a complicated issue. Such a decision is often influenced by various views and understanding regarding the environment, society and economy, in addition to other product-specific characteristics pertaining to individual interests such as taste, convenience and health benefits. Cranfield and Magnusson (2003) have investigated consumer interest in Pesticide Free
Production™, a relatively new crop management system that falls under the category of sustainable agricultural practices. They have found that health and environment concerns are important indicators for consumers who are willing to pay higher premiums for products produced using the Pesticide Free Production™ system. Consumers have also shown a strong interest in food products containing grains and oilseeds produced in the Pesticide Free Production™ system. Sustainability-related claims, however, are rarely seen in products and have only recently become apparent in the marketplace provided by third-party certification programs. Voluntary third-party certifications provided by the organizations such as California Sustainable Winegrowing Alliance, Sustainability in Practice (SIP)™ in California, Sustainable Winegrowing New Zealand (SWNZ)™, and Local Food Plus™ in Ontario, Canada, have provided labels of accreditations to wine and food products helping consumers to recognize products that are produced following the low-input agricultural guidelines. Despite the effort from the industry, generally low awareness and lack of understanding of the full scope of the definition of sustainability are still observed among consumers (Zucca et al., 2009; Verbeke et al., 2007).

With the overlapping similarity of perceived benefits and attitudes towards organic, local and sustainable agricultural practices, there has been a considerable amount of confusion observed among consumers (Henryks & Pearson, 2010; Hutchins & Greenhalgh, 1995). There appears to be a need to assess and compare consumer understanding and perceptions of such agricultural practices, yet little comparative studies have been conducted to date.

2.2 Factors Influencing Consumer Food Choices

Defining factors impacting consumer food choices could be a complicated issue as many interrelating elements can influence such action. As previously mentioned, consumers often
make food choices not only based on their personal interest and perceived benefits, but also on public interest such as ecological consequences. A model has been proposed by Shepherd (1985) in an attempt to explain the factors related to consumer food choice. As shown in Figure 2.1, factors related to consumer food choice can be classified into those related to the food, those related to the person who is making the decision, and those related to the economic and social environment in which the decision is made. People can perceive some of the physical and chemical properties of the food in their sensory experience, and other properties, such as the contents of carbohydrates and fats, can produce different physiological effects such as satiety, hunger and thirst. Indeed, as Shepherd (1985) has pointed out, it is not the perceived intensity of the physical and chemical properties that solely determine the food choice, but rather, it is the hedonic perception of such properties that will be used for determining food choice and intake. Psychological factors, such as personality, previous experience, mood and belief, also play an important role in determination of food choice and intake. Timing of such psychological factors, such as before, during and after the intake, is also essential. Furthermore, the social and economic environment where the decision and intake take place, such those pertaining to the product itself (brand, price, and availability) and those pertaining to the person (culture, religion, and demographic factors) also have an important influence on the food choice and intake. One’s attitude towards a food product is formed as a result of combining the perception of the physical and chemical attributes, psychological factors, and economic and social environment.
From a different point view, one can also categorize factors influencing consumer food choice into two groups: intrinsic and extrinsic factors (Olson & Jacoby, 1972). Intrinsic factors account for characteristics that are product–specific. Taste, appearance, nutritional value, degree of freshness, and amount of residue of preservative and pesticides are a few examples. Among the intrinsic characteristics of a food, one can also group these qualities into two categories: the perceivable and the unperceivable. The perceivable attributes include the general sensory perception such as taste, smell, texture and appearance of a food; the unperceivable attributes include (but are not limited to) nutritional value, and amount of pesticide and/or preservatives residue. The presence of unperceivable attributes often cannot be physically detected or perceived by consumers even after consumption (Giannakas, 2002). Extrinsic qualities are
defined as factors that are not physically part of, but are closely related to the product (Olson & Jacoby, 1972). Brand, price, availability, packaging, region of origin, and production method are some of examples of extrinsic qualities. The imperceptible intrinsic and extrinsic qualities often may imply other impressions that are not be necessarily present on the physical labels yet many consumers may endorse based on their personal beliefs and ideologies. Such concepts include but are not limited to the ideas of environmental-friendly, animal-welfare, benefit to local economy, and social justice. These qualities, or rather, personal values, cannot be delivered simply by looking, tasting or smelling the actual food products, yet they play an increasingly important role in the consumer decision-making process.

It is quite interesting to note that local, organic and sustainable agricultural practices simply define the farming and cultivating techniques used during production yet the name often implies many of the intrinsic characteristics such as better taste and/or higher nutritional values to consumers (Vindigni et al., 2002). Indeed, intrinsic and extrinsic factors are not mutually exclusive during consumers’ decision-making process; rather, both are present when consumers make food choices. In this decision-making process, it is necessary to understand how consumers perceive intrinsic characteristics with or without the impact of the extrinsic information, particularly in relation to sustainable, organic and local agricultural products. Specifically, information related to the importance that consumers place on intrinsic characteristics in relation to the extrinsic information is necessary to be understood.

2.3 Impact of Information on Consumer Expectation

Consumers’ perceptions and preferences are often influenced by the information related to the food products, which include the extrinsic and intrinsic characteristics as previously mentioned (e.g., Johansen et al., 2010; Kole et al., 2009; Poelman et al., 2008; Baixauli et al.,
2008; Stefani et al., 2006; Caporale & Monteleone, 2004; Johansson et al., 1999; Aaron et al., 1994). Some of the intrinsic qualities can be experienced by the actual intake, but many of these characteristics cannot be physically perceived. For food consumption, an expectation is formed based on the combination of provided product information, existing beliefs, knowledge, and past experiences. Even before the actual product intake, this expectation can often determine the result of product experience. Cardello (1994) has pointed out that the expectation can be classified into two types: sensory-based and hedonic-based expectation. The sensory-based expectation will lead consumers to believe that the product will have certain sensory characteristics which will influence the actual perception after consumption. The hedonic-based expectation is closely related to the actual degree of liking after consumption.

There are four psychological theories that attempt to explain the phenomenon of expectation, and how the discrepancy (disconfirmation) between expectation and actual product experience may impact product perception. These four psychological theories include: assimilation, contrast, generalized negativity and assimilation-contrast (Anderson 1973). The assimilation theory, stemmed from Festinger's (1957) Theory of Cognitive Dissonance, suggests that a “psychological discomfort” is experienced when people face two conflicted ideas, namely the expectation versus actual product performance. Some people will try to reduce the discomfort by minimizing the difference as they “assimilate” the actual perception towards their expectation. In comparison with the theory of assimilation, the contrast theory proposes that, due to the “psychological discomfort” created by the discrepancy, people will magnify the difference by contrasting the expectation, and provide a less favourable evaluation than expected. The theory of general negativity advises that with a discrepancy between expectation and product performance, a generalized negative hedonic rating will be constituted as a response to the
unmatched product experience, in which the rating may be less favourable than if the person has no prior expectation. Finally, the theory of assimilation-contrast proposes that people have an innate limit of product perception. When the disconfirmation between expectation and product performance falls within their limit of acceptance, consumers will assimilate the difference toward product expectation. When the disconfirmation between expectation and product performance exceeds the limit of acceptance, the consumer will magnify the contrast, resulting in product rejection.

The limit of acceptance represents an essential aspect in the decision-making process. It is illustrated and denoted by the area between the two dotted lines in the lower part of Figure 2.2, which provides a graphic description of the theory of assimilation and contrast. The upper part of Figure 2.2 provides an illustration on how the predictions are made by the assimilation theory, contrast theory and assimilation-contrast theory based on different levels of expectation and one constant level of the actual product performance. The curve line, labeled as “assimilation-contrast”, represents the various degree of the acceptance limit exhibited in different people. Based on the illustration, Schifferstein (2001) suggests that the essential aspects of the assimilation theory and contrast theory can be represented by the prediction proposed by the theory of assimilation-contrast. On the one hand, contrast effect will be seen if one’s level of acceptance is infinitely small (Contrast theory), and on the other hand, assimilation effect will be seen if one’s level of acceptance is infinitely large. Based on the assimilation-contrast curve, one’s response may steadily shift from assimilation to contrast; however, it is also possible that the person has a discrete transition point as suggested by Schifferstein (2001). In which case, the perception of the product may depend on the level of incongruence between expectation and product performance.
The impact of information can vary based on the size of the disconfirmation between expectation and product performance. Schifferstein (2001) pointed out that the impact of credence information on preferences increases as the discrepancy and ambiguity increase between expectation and actual product performance. The information impact can be either positive or negative; however, the effect is usually larger when the negative expectation is present than when the product is better than expected. When foods are consumed, one’s sensory experience is combined with the expectation from the credence information. Such expectation is then measured by the subjective hedonic evaluation as a measure of the combined impact of extrinsic and intrinsic characteristics (Lange et al., 2002; Siret & Issanchou, 2000; Lange et al.,
Discrepancy and ambiguity are often a result of the disconfirmation perceived between the expectation from the credence information and the actual sensory experience. Thus, in order to measure the impact of the extrinsic and intrinsic qualities and the importance of the sensory experience, it is suggested to measure consumer preferences for a food before and after releasing of the information. The difference between these two measures provides an assessment of the impact of such characteristics (Stefani et al., 2006; Schifferstein, 2001).

There are three measurements that can be taken after obtaining the hedonic scores. Let $B$, $E$, and $L$ be the hedonic measurements of the blind (sensory evaluation, no disclosure of information), expected (no sensory evaluation, disclosure of information), and labeled (full disclosure: sensory evaluation and labeled information), respectively. The difference between the measurements are as following (Schifferstein, 2001; Lange et al., 1999; Deliza&MacFie, 1996; Cardello, 1995):

[Equation 2.1] Degree of disconfirmation = $E - B$

[Equation 2.2] Degree of response shift = $L - B$

[Equation 2.3] Degree of incongruence measure by incomplete assimilation = $L - E$

Although we can measure the degree of response shift by obtaining the difference between the hedonic scores of the labeled and the blind conditions, the actual sensory perceptions are not always independent of the expected sensory perceptions, which are solely the measurement of the impact from the information provided. The assimilation-contrast effect can be measured by the ratio ($\alpha$) of the degrees of response shift and incongruence:

[Equation 2.4] $\alpha = (L - B) / (E - B)$
When $\alpha$ is larger than zero, an assimilation effect is observed where subjects assimilate their labeled scores to the expected. When $\alpha$ is less than zero, a contrast effect is observed where subjects, due to the discrepancy between the expected and the labeled, exaggerate the rating of the labeled in order to adjust to the unexpected stimulus. Much research has shown that when disconfirmation occurred as a result between the expected and the labeled conditions, consumers tend to assimilate toward their expectation, yet at the same time, such assimilation may be incomplete, indicating sensory perception as an essential part of the decision-making process (Lange et al., 1999; Caporale & Monteleone, 2004). Deliza and MacFie (1996) have speculated that people are more likely to assimilate toward their expectation with a negative rather than a positive disconfirmation. Experiments by Lange, et al (1999) using orange juice reveal that people tend to assimilate toward expectation with large disconfirmation between labeled and expected as predicted by the assimilation effect. Contrast effect is rarely seen in experiments even with large disconfirmation (Lange et al., 1999; d’Hauteville et al., 2007), which is contrary to the prediction of assimilation-contrast theory, where a large discrepancy between product perception and expectation can result in rejection. Cardello and Sawyer (1992) found the contrast effect in a study investigating the expectation of bitterness using pomegranate juice: the unfavourable disclosed information with an indication of perceivable bitterness manipulated subjects’ expectation on the tested sample which, as a result, had a significant higher intensity rating in the perceived degree of bitterness than in the bitterness rating perceived during the blind tasting condition was found.

Much work using the theory of expectation to date has been conducted to examine the impact of information. Studies have investigated the impact of information on the region of origin (e.g., Caporale et al., 2006; Stefani et al., 2006; d’Hauteville et al., 2007; Iaccarino et al.,
2006), on the processing methods and technologies (e.g., Caporale&Monteleone, 2004; Cardello, 2003), and on health benefit claims (Luckow&Delahunty, 2004). Works by Napolitano et al. (2010a; 2010b) have investigated the impact of organic information on meat and cheese products, and found that organic farming information has a positive impact on product expectation resulting in assimilated product perception. In both studies, organic farming information was a major determinant in product liking and willingness to pay. In a study examining the effect of organic and fair-trade information on the perception fresh pineapples (Poelman et al., 2008), subjects’ attitudes towards the labeling information (organic or fair-trade) were found to be the key in determining the effect of the information. The labeling information had a positive impact on sensory perception with those who had a positive attitude towards the labeling information, where the opposite was true with those who had a negative attitude towards the information provided. It is therefore essential to understand consumers’ attitude towards different agricultural practices in order to understand the influence of such information on product perception.

Currently, within Ontario, Canada, there has been little research completed which investigates consumers’ understanding and attitude towards organic, local and sustainable agricultural practices. Though a number of recent studies has been conducted to investigate the effect of the information on region of origin and production methods (e.g.,Napolitano et al., 2010a, Napolitano et al., 2010b, Poelman et al., 2008; d’Hauteville et al., 2007; Caporale et al., 2006; Iaccarino et al., 2006; Stefani et al., 2006), no research to date has studied the combined effect of such information disclosure. Indeed, previous research has determined the importance of credence characteristics such as organic and local in the quality determination of fresh produce at the point of purchase from a point of view of the consumer (Campbell et al., 2010),
yet little research has been done to examine how such characteristics can impact consumers’
perception during the actual sensory experience. Results from current research will not only
contribute to the current understanding of the theory of expectation in the field of sensory and
consumer sciences, but will also provide useful information to the horticulture industry as a tool
to understand how consumers differentiate the local and organic from the conventional and
imported products in the market place.
Chapter 3: Local, Organic, or Sustainable Food Production Practices: What Does It Mean to Consumers in Ontario?

ABSTRACT

In recent years, alternative agricultural practices, such as organic, local and sustainable production methods, have been popular due to consumers’ rising concerns regarding food quality and safety, as well as the impact on environment and society from the conventional agricultural system. Terms such as “organic”, “local” and “sustainable” are often perceived by consumers as being healthier and more eco-friendly, however, it is unclear how these labels affect consumer purchasing behaviour. The current study, therefore, investigates consumers’ beliefs and attitudes towards sustainable, organic and local food and agricultural practices and how such beliefs and attitudes relate to their purchase behaviour. An online survey questionnaire, which was designed based on common definitions and beliefs of organic, local and sustainable foods and agriculture practices, were administered to 172 primary household grocery shoppers in Ontario, Canada. Results obtained from exploratory factor analyses revealed similarities in consumer understanding and attitudes towards organic and local foods and production practices. When compared with organic and local foods, stronger association among statements concerning environmental and societal benefits was seen in consumer attitudes toward sustainable production systems. Perceived consequences based on personal interests and product qualities significantly impact consumer attitudes towards organic and local foods. Hierarchical cluster analysis based on the consumer questionnaire responses revealed three segments in the sampled population which can be explained by the differences observed in participants’ purchase behaviour and consumer attitudes towards organic, local and sustainable agricultural practices and products.
3.1 Introduction

The promotion of sustainability and consumption of organic and local foods has been growing rapidly worldwide. Now, more than ever, consumers are interested in learning where and how their foods are produced, and how the foods travel from production facilities to their dinner tables. Previous literature has investigated consumer purchase and consumption patterns of foods produced from sustainable, organic and local production systems, and their attitudes towards such food products (e.g., Darby et al., 2008; Vermeir& Verbeke, 2008; Vermeir& Verbeke, 2006; Zepeda & Li, 2006; Shephard et al., 2005). Consumers have become increasingly interested in foods with sustainable attributes, such as environmental-friendliness, concerns regarding the sustainability of local growers and the economy, the conservation of energy, and their relations to consumers’ daily food consumption (Vermeir& Verbeke, 2008). Large increases in the local and organic food sales has been observed in Canada as well as other countries in recent years, as consumers are attracted to various attributes of these food products; aspects such as the absence of synthetic pesticides and increased degree of freshness due to shorten traveling distance are a few examples commonly seen in the literature (e.g., Wirth et al, 2011; OMAFRA, 2011; Hughner et al, 2007).

Vermier and Verbeke (2008) proposed a multidimensional-definition of the term, sustainability, by examining the following aspects: economic (profit), ecological (planet), and social (people). This concept of sustainability strives to provide fair economic returns and prices for both producers and consumers. Ecological characteristics encompass the respect of the environment, and the conservation of natural resources. The social elements focus on taking care of the needs of society, by providing socially responsible products and practices. The sustainable agricultural system is deemed as a low-input practice, by using internal production inputs (on-
farm resources) such as crop rotation and integrated pest management, and reduced, but not
eliminated, use of external inputs (off-farm resources) such as chemical fertilizers, insecticides
and herbicides (Parr et al. 1990).

Existing research has pointed out that consumers generally have an inconsistent understanding of the constitution of sustainable agricultural practices. The food purchasing decision-making process is generally believed to be a low-involvement process as it is often habitual and repetitive (Zanoli & Naspetti, 2002). When compared to the purchasing decision of general food products, however, the decision to purchase sustainable products, or to support sustainable agricultural practices, requires much more cognitive involvement. It encompasses not only different aspects of economic, ecological and social benefits, but also basic product characteristics, such as price, convenience, health benefits and taste (Verbeke et al., 2006). The gap between behavioural patterns and positive attitudes toward sustainable products has been identified by previous research (Vermeir & Verbeke, 2008). Although an increase of organic and local food purchases has been seen widely in the marketplace, environmental concerns and sustainability are not the primary concern of consumers when purchasing such products (Wandel & Bugge, 1997). Sustainability-related claims have only been apparent in the marketplace in recent years, and a low awareness and a lack of understanding of sustainable agricultural practices are still commonly observed among consumers (Verbeke et al., 2007). The lack of knowledge and awareness, which may lead to lower cognitive involvement in decision making of food, are the primary reasons why sustainability-related attributes are not the primary purchase drivers in the process of sustainable food product selection.

According to the Canadian General Standards Board (2006), an organic agricultural system prohibits the use of synthetic pesticides, fertilizers, synthetic growth regulators and
processing aids. Previous research has indicated a strong relationship between the increased purchase of organic foods, and increasing concern for health and food safety, particularly when considering the usage of synthetic chemicals and additives in conventional foods (Aertsens et al, 2009; Schifferstein & Oude Ophuis, 1998). When compared with conventional foods, studies have found consumers associated organic foods with positive attributes, such as healthy, safe, and superior in taste and nutritional values, despite its lack of availability and high prices (e.g., Hill & Lynchechaun, 2002; Zanoli & Naspetti, 2002; Schifferstein & Oude Ophuis, 1998). Concern about the environment has also been observed in consumer perception regarding organic foods (Magnusson et al., 2003; Wandel & Bugge, 1997).

Locally grown food has gained considerable attention in recent years. Compared to the conventional food system, buying locally grown food from a relatively close proximity has been deemed an act of support for the economic and labour development of local areas, and environmentally conscious due to a shortened transportation distance (Darby et al., 2008; Roininen et al., 2006). Defining local foods, however, has been a complicated and ambiguous issue. Various definitions, in terms of distance or geographic boundaries, have been adopted by Canadian government units and food industry alike as mentioned in the literature review. Ambiguity in terms of definitions of local foods has been found upon the comparison among various guidelines, practices and common beliefs, such as the marketing strategies adopted by the Foodland Ontario program (OMAFRA, 2010), the guideline provided by Canadian federal government (CFIA, 2010), definitions used by different retailers (Schmitt, 2008), and the practice of 100-mile food diet (Time, 2006). Marketers and consumers often use these definitions interchangeably, which can lead to confusion and misinterpretations of what constitutes local food.
Distance has been a common factor that consumers use to assess local foods, and to form their opinions and attitudes. Perceived consequences from purchasing and consuming local foods have been observed in regard to both public and private interests (Thilmany et al., 2008). From a public interest perspective, concerns regarding the environment, local labour and economy, and rural development have been attributed to consumer motivation and attitudes towards local food (Berlin et al., 2009; Darby et al., 2008; Zepeda & Li, 2006). In terms of personal (private) interest, many consumers also consider the limited traveling distance of local foods a superior indication of freshness, taste, safety and nutritional quality when compared with imported food products (Berlin et al., 2009; Zepeda & Li, 2006).

Similar consumer attitudes and motivations towards sustainable, organic and local food and agricultural practices have been observed throughout literature. Product-specific attributes such as taste, safety and quality have been important personal drivers for consuming and purchasing such products. Environmental and societal concerns also have great importance in consumer attitudes towards these products. Based on the similarity in consumer attitudes, one has to wonder how consumers differentiate and characterize these food products and agricultural practices. In Canada, Campbell et al. (2010) investigated the effectiveness of different organic and local logos in Canada, by assessing consumers’ purchase drivers; and Cranfield et al. (2009) studied consumers’ preferences for organic food production standards. However, research to date has yet to provide a comparative overview of consumer attitudes and understanding of products from these alternative agricultural practices. By utilizing online consumer surveys, it is the objective of the study to investigate the current state of consumers’ perception and understanding of the concepts of sustainable, organic and local food products and agricultural practices in Ontario.
3.2 Materials and Methods

3.2.1 Participants

Consumers from the province of Ontario, Canada, were recruited using a third-party consumer database (Global Market Insite, Inc.). Potential participants received invitations via email to participate in the study. To qualify, participants were required to be Ontario residents and the primary grocery shoppers of their households. From the 220 people who filled out the screening questionnaire, a total of 172 (78.18%) people qualified for and completed the survey. Table 3.1 provides detailed demographic information of the sampled subjects, and a comparison with the 2006 Census of Population for Canada. Participants for the current survey over-represented those who are 55 years of age or older, and those with postsecondary and postgraduate degrees. The current sample under-represents those between 18 and 54 years of age, and those with a secondary school level of education or below. The total number of people in the household is slightly higher than what is reported in the census. One of the reasons for the differences between the sampled population in the current study and the census data may be attributed to the qualification criteria of the study.
Table 3.1 Demographic characteristics of survey participants in comparison with 2006 Census of Population for Canada (n = 172)

<table>
<thead>
<tr>
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<th>Sample</th>
<th>2006 Census</th>
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<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
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<tr>
<td>Male</td>
<td>46.51%</td>
<td>48.77%</td>
</tr>
<tr>
<td>Female</td>
<td>53.48%</td>
<td>51.23%</td>
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<tr>
<td><strong>Age</strong></td>
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<tr>
<td>18-24 years of age</td>
<td>5.23%</td>
<td>12.94%</td>
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<tr>
<td>25-54 years of age</td>
<td>50.00%</td>
<td>61.36%</td>
</tr>
<tr>
<td>55 and older</td>
<td>44.77%</td>
<td>25.69%</td>
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<tr>
<td><strong>Household Income</strong></td>
<td></td>
<td></td>
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<tr>
<td>under $20,000</td>
<td>9.30%</td>
<td>13.91%</td>
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<tr>
<td>$20,000-49,999</td>
<td>38.95%</td>
<td>33.90%</td>
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<tr>
<td>$50,000-69,999</td>
<td>18.02%</td>
<td>19.01%</td>
</tr>
<tr>
<td>$70,000-89,999</td>
<td>16.28%</td>
<td>13.41%</td>
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<tr>
<td>$90,000 and above</td>
<td>17.44%</td>
<td>19.77%</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
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<tr>
<td>Secondary school degree or below</td>
<td>31.40%</td>
<td>63.71%</td>
</tr>
<tr>
<td>postsecondary degree</td>
<td>55.23%</td>
<td>32.81%</td>
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<tr>
<td>postgraduate degree</td>
<td>13.37%</td>
<td>3.48%</td>
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<tr>
<td><strong>Household composition</strong></td>
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<tr>
<td>number of people under 18 in the home</td>
<td>1.5</td>
<td>1.2</td>
</tr>
<tr>
<td>Total number of people in the home</td>
<td>3.6</td>
<td>2.6</td>
</tr>
</tbody>
</table>

3.2.2 Data Collection

In order to gain a better overview of consumers’ attitudes and understanding towards sustainable practice, local and organic foods, an online survey was used to solicit consumer opinions. The survey questionnaire consisted of statements in three categories: sustainability (21 items), local (23 items) and organic (19 items). Please refer to Appendix A for an example of the survey questionnaire. Statements under each category represented definitions or common attitudes and understandings associated with particular agricultural practices and food types, which were reported in the literature. Tables with the list of references consulted for choosing the
statements used in the questionnaire are included in Appendix B. Some statements are repeated under the three categories due to the similarity in perceived benefits and attitudes towards these alternative agricultural practices/food types observed among consumers. Some false statements are also used to gauge consumers’ understanding of these concepts. During completion of the survey, each of the three categories was presented to participants one at a time, in a random and balanced fashion. Additionally, statements within each category were presented one at a time, in a random order. Participants were asked to evaluate each statement individually using a 5-point Likert scale (5 = strongly agree; 3 = neither agree nor disagree; 1 = strongly disagree). Frequency of monthly purchase of organic and local foods was also obtained from the participants. In addition, demographic information was collected at the end of the survey. The survey took approximately 30 minutes to complete. Consumers completed the survey online in July 2011. All data was collected using EyeQuestion® (Logic8 B.V., The Netherlands), a consumer survey administration software. The current study was approved by the University of Guelph Research Ethics Board (REB #: 10MY030). Please refer to Appendix C for an example of participant consent form.

3.2.2 Statistical Analysis

In order to have a better understanding of consumers’ understanding and perception of organic, local and sustainable agricultural practices, an exploratory factor analysis using principal component with Oblimin rotation method and Kaiser normalization procedure was conducted for each category of the surveyed data. Prior to the factor analysis, analyses with Kaiser-Meyer-Olkin (KMO) test suggested that the factor analyses were appropriate with KMO values larger than the threshold of 0.90 for each category (KMO values equalled 0.92, 0.91 and
0.91 respectively for organic, local and sustainable) (Hair et al., 1998). Upon examining the results from the factor analysis, factors with eigenvalues greater than 1.00 were retained and included in the subsequent analyses. An individual multi-item summated scale was generated for each factor within the category using those items that have loading factors greater than 0.60. Scale reliability tests, indicated by the Cronbach’s Alpha value, were conducted to examine the internal consistency of measures for each constructed multi-item scale. Scales with Cronbach’s Alpha values greater than 0.60, which indicated an acceptable level of reliability among the items measured, were retained for subsequent analyses (Nunnally, 1967). Mean scores were obtained based on participants’ responses to the items included in the multi-item summated scales. The relative magnitude of the multi-item summated scale mean scores suggested how much participants agreed with the statements in each category on a 5-point Likert scale. Cluster analysis was performed with the multi-item scale mean scores to examine the existence of any segmentation of the sampled population. Analyses described above were conducted using SPSS (IBM® SPSS® Statistics v.19, 2011, Chicago, Illinois) and XLStat® (Addinsoft, New York, NY).

3.3 Results and Discussion

3.3.1 Results

Organic

Results from the exploratory factor analysis for the 19 surveyed items under organic are presented in Table 3.2. Three of the resulting factors had eigenvalues greater than one. The scale reliability for the first factor was above the minimum threshold (Cronbach’s Alpha = 0.93), while the scale reliability values of the other two factors were slightly over acceptable level (Cronbach’s Alpha = 0.61 and 0.69, respectively). In order to gain a better understanding of the
underlying structure of the survey data, factors were named according to the heavier loaded items within each factor. The first factor, showing the heavily loaded items concerning the benefits of consuming and purchasing organic food from the personal, environmental and societal points of view, was named “public and private benefits from buying/consuming organic.” Heavily loaded items pertaining to the negative attitudes and false beliefs of organic foods and agricultural practices, such as “hard to find”, “has a longer shelf-life”, “produced without the use of any natural chemicals/additives”, and “produced with purified water”, were found in the second factor. The factor was thus named “negative/false attitudes and beliefs.” The last factor was identified as “green consumerism”, since the highly loaded items, such as “[buying organic foods] from the local farmers’ market and farm stands” and “[organic foods] produced lower carbon footprint, were related to behaviours and attitudes towards the alternative and sustainable lifestyle. Together, the three factors explained over 56% of the data variation.

The mean scores for each factor, shown by the magnitude of the multi-item scale scores on a 5-point Likert scale, were 3.53, 2.95 and 3.72 respectively, represented consumers’ uncertainty about the definitions and beliefs regarding foods produced from organic agricultural practice.

**Local**

Results obtained from the exploratory factor analysis for the 23 surveyed items under the category of local food are presented in Table 3.3. Four factors had eigenvalues greater than one within this category. After inspecting the initial results from the factor analysis, the scale for item, “local food has longer shelf-life” was reversed in order to gain positive loading for such item in the third factor. The scale reliability of the first two factors was satisfactory (Cronbach’s Alpha = 0.90 and 0.84, respectively). However, after the scale reversion of the item pertaining to shelf-life, the third factor in the category exhibited a poor homogeneity with the
Cronbach’s Alpha value falling below the threshold of 0.60 (Cronbach’s Alpha = 0.41). This factor was, therefore, removed in the subsequent analysis due to the low scale reliability. The scale reliability for the fourth factor was again above the ideal threshold with a Cronbach’s alpha value of 0.85. Similar to the organic food category, items concerning personal and environmental benefits were heavily loaded on the in the first factor. The factor was thus identified as “public and private benefits from buying/consuming local.” The second factor, named “use of chemicals in foods”, was characterized by the association with the heavily loaded items related to the added treatments of synthetic and natural additives and chemicals. The fourth factor, identified as “local food defined by distance”, showed association with items that pertained to the distance definitions of local foods. The remaining three factors in the category of local food explained over 53% of data variation. The mean scores for the multi-item scales representing each factor were 3.51, 2.64 and 4.14 respectively. The factor “use of chemicals” was surprisingly identified by the sampled consumers as an important aspect of this category (percent data variation explained by factor = 11.26). The low magnitude of the scale mean score (2.64) reflects consumers’ disagreement toward the statements regarding the use of chemicals in local agricultural production. Although it is commonly understood that organic foods are produced without the use of any synthetic chemicals and additives (Jolly et al., 1991), the use of chemicals is not commonly emphasized in the concept of local food. Concerning the factor “local food defined by distance”, the relative magnitude of the scale mean score (mean = 4.14) indicates that distance was deemed by the surveyed consumers to be an essential part of the local food concept.

_Sustainable_

_Table 3.4_ shows results from the factor analysis on the 21 statements concerning the sustainable agricultural practice. Three factors had eigenvalues greater than one. The scale
reliability of factor one and two were above the acceptability threshold (Cronbach’s alpha = 0.92 and 0.90, respectively), which shows adequate data reliability. With the low Cronbach’s alpha value (0.47), the third factor within this category was removed due to its low data reliability. The remaining two factors still explained over 55% of the data variation. The first factor was named “ecological and environmental consumerism” due to the association with the heavy-loaded items, such as “socially responsible”, “ethical”, “eco-friendly”, “minimally packaged consumer products”, “beneficial to the local economy”, “energy-saving” and “lower production of carbon footprint”, and their relation to the concept of sustainable agricultural practice. The second factor was identified as “credence product attributes”. Many of the heavily loaded items in this factor, such as “food production without any use of synthetic chemicals/additives”, “certified organic”, “food made with all natural ingredients”, and “food production without any use of natural chemicals/additives”, were product-specific qualities. These qualities, though not physically perceivable, are often used as credence indications in consumer food choice (Olson & Jacoby, 1972). The average scores for the multi-item scales for factors “ecological and environmental consumerism” and “credence product attributes” were 3.39 and 3.01 respectively, indicating consumers’ ambivalence regarding the concept of sustainable agricultural practice when evaluated using the five-point Likert scale.
Table 3.2 Factor loadings for attitudes towards organic food and agricultural practice

<table>
<thead>
<tr>
<th>Item (Organic food ... )</th>
<th>Public and private benefits from buying/consuming organic</th>
<th>Negative/false attitudes and beliefs</th>
<th>Green consumerism</th>
</tr>
</thead>
<tbody>
<tr>
<td>tastes better</td>
<td>0.82</td>
<td>0.35</td>
<td>0.15</td>
</tr>
<tr>
<td>issafer to consume</td>
<td>0.81</td>
<td>0.34</td>
<td>0.28</td>
</tr>
<tr>
<td>isenvironmentally-friendly</td>
<td>0.81</td>
<td>0.15</td>
<td>0.56</td>
</tr>
<tr>
<td>provides health benefits</td>
<td>0.80</td>
<td>0.30</td>
<td>0.32</td>
</tr>
<tr>
<td>isa product of higher quality</td>
<td>0.79</td>
<td>0.44</td>
<td>0.35</td>
</tr>
<tr>
<td>isfresh</td>
<td>0.78</td>
<td>0.18</td>
<td>0.43</td>
</tr>
<tr>
<td>promotes social responsibility</td>
<td>0.76</td>
<td>0.20</td>
<td>0.38</td>
</tr>
<tr>
<td>ismore nutritious</td>
<td>0.75</td>
<td>0.54</td>
<td>0.18</td>
</tr>
<tr>
<td>isbeneficial to the local economy</td>
<td>0.72</td>
<td>0.30</td>
<td>0.49</td>
</tr>
<tr>
<td>iseasy to prepare</td>
<td>0.65</td>
<td>0.29</td>
<td>0.53</td>
</tr>
<tr>
<td>ishard to find</td>
<td>0.23</td>
<td>0.68</td>
<td>-0.16</td>
</tr>
<tr>
<td>has a longer shelf-life</td>
<td>0.37</td>
<td>0.67</td>
<td>0.47</td>
</tr>
<tr>
<td>isproduced without the use of any natural chemicals/additives</td>
<td>0.29</td>
<td>0.66</td>
<td>0.32</td>
</tr>
<tr>
<td>isproduced with purified water</td>
<td>0.48</td>
<td>0.60</td>
<td>0.27</td>
</tr>
<tr>
<td>issold at the local farmers market and farm stands</td>
<td>0.35</td>
<td>0.12</td>
<td>0.81</td>
</tr>
<tr>
<td>produces lower carbon footprint</td>
<td>0.53</td>
<td>0.19</td>
<td>0.65</td>
</tr>
<tr>
<td>produced without the use of any synthetic chemicals/additives</td>
<td>0.60</td>
<td>0.26</td>
<td>0.63</td>
</tr>
<tr>
<td>isexpensive</td>
<td>-0.03</td>
<td>0.02</td>
<td>-0.02</td>
</tr>
<tr>
<td>By selling organic food, farmers receive better shares of economic return</td>
<td>0.58</td>
<td>0.35</td>
<td>0.49</td>
</tr>
</tbody>
</table>

Eigenvalue | 8.20 | 1.31 | 1.17 |
Cronbach’s Alpha | 0.93 | 0.61 | 0.69 |
Percent of variation explained by factor | 43.18 | 6.88 | 6.19 |
Multi-item scale mean score (standard deviation)\(^a\) | 3.53 (0.76) | 2.95 (0.69) | 3.72 (0.74) |
KMO | 0.92 |

\(^a\) mean scores for the multi-item summated scale corresponding to how much participants agreed with the statements based a 5-point Likert scale (5 = strongly agree; 3 = neither agree nor disagree; 1 = strongly disagree)
Table 3.3 Factor loadings for attitudes towards local food and agricultural practice

<table>
<thead>
<tr>
<th>Items (Local food ...)</th>
<th>Public and private benefits from buying/consuming local</th>
<th>Use of chemicals in foods</th>
<th>Negative attitudes/beliefs</th>
<th>Local defined by distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>is a product of higher quality</td>
<td>0.83</td>
<td>0.39</td>
<td>-0.28</td>
<td>0.42</td>
</tr>
<tr>
<td>is more nutritious</td>
<td>0.80</td>
<td>0.35</td>
<td>-0.17</td>
<td>0.36</td>
</tr>
<tr>
<td>provides health benefits</td>
<td>0.79</td>
<td>0.39</td>
<td>-0.23</td>
<td>0.48</td>
</tr>
<tr>
<td>tastes better</td>
<td>0.78</td>
<td>0.24</td>
<td>-0.29</td>
<td>0.43</td>
</tr>
<tr>
<td>promotes social responsibility</td>
<td>0.76</td>
<td>0.17</td>
<td>-0.15</td>
<td>0.50</td>
</tr>
<tr>
<td>is safer to consume</td>
<td>0.72</td>
<td>0.50</td>
<td>-0.39</td>
<td>0.24</td>
</tr>
<tr>
<td>is environmentally-friendly</td>
<td>0.72</td>
<td>0.40</td>
<td>-0.13</td>
<td>0.46</td>
</tr>
<tr>
<td>is easy to prepare</td>
<td>0.66</td>
<td>0.39</td>
<td>-0.21</td>
<td>0.42</td>
</tr>
<tr>
<td>produces lower carbon footprint</td>
<td>0.63</td>
<td>0.25</td>
<td>-0.12</td>
<td>0.56</td>
</tr>
<tr>
<td>produced without the use of any synthetic chemicals/additives</td>
<td>0.41</td>
<td>0.86</td>
<td>-0.08</td>
<td>0.09</td>
</tr>
<tr>
<td>produced without the use of any natural chemicals/additives</td>
<td>0.39</td>
<td>0.85</td>
<td>-0.19</td>
<td>0.14</td>
</tr>
<tr>
<td>is certified organic</td>
<td>0.40</td>
<td>0.83</td>
<td>-0.14</td>
<td>0.17</td>
</tr>
<tr>
<td>has longer shelf-life</td>
<td>0.31</td>
<td>0.38</td>
<td>0.76</td>
<td>0.23</td>
</tr>
<tr>
<td>is expensive</td>
<td>-0.11</td>
<td>0.24</td>
<td>0.67</td>
<td>-0.01</td>
</tr>
<tr>
<td>is sold at the local farmers market and farm stands</td>
<td>0.42</td>
<td>0.01</td>
<td>-0.16</td>
<td>0.78</td>
</tr>
<tr>
<td>is produced in the region where you reside</td>
<td>0.43</td>
<td>0.14</td>
<td>-0.13</td>
<td>0.78</td>
</tr>
<tr>
<td>is produced in Ontario</td>
<td>0.38</td>
<td>0.11</td>
<td>-0.16</td>
<td>0.75</td>
</tr>
<tr>
<td>is fresh</td>
<td>0.67</td>
<td>0.14</td>
<td>-0.41</td>
<td>0.71</td>
</tr>
<tr>
<td>is beneficial to local economy</td>
<td>0.52</td>
<td>-0.03</td>
<td>-0.27</td>
<td>0.69</td>
</tr>
<tr>
<td>is produced within 50-km radius of place where it is sold</td>
<td>0.38</td>
<td>0.26</td>
<td>-0.17</td>
<td>0.68</td>
</tr>
<tr>
<td>is hard to find</td>
<td>0.10</td>
<td>0.20</td>
<td>0.01</td>
<td>-0.05</td>
</tr>
<tr>
<td>is produced within 100-mile radius of your current residence</td>
<td>0.44</td>
<td>0.03</td>
<td>-0.04</td>
<td>0.57</td>
</tr>
<tr>
<td>By selling local food, farmers receive better shares of economic return</td>
<td>0.37</td>
<td>0.17</td>
<td>-0.59</td>
<td>0.43</td>
</tr>
</tbody>
</table>

*Eigenvalue*  
8.56 2.59 1.32 1.08  
*Cronbach’s Alpha*  
0.90 0.84 0.41 0.85  
*Percent of variation explained by factor*  
37.24 11.26 5.75 4.71  
*Multi-item scale mean score (standard deviation)*\(^a\)  
3.51 (0.70) 2.64 (0.87) 3.04 (0.81) 4.14 (0.63)  
*KMO*  
0.91  
\(^a\) mean scores for the multi-item summated scale corresponding to how much participants agreed with the statements based a 5-point Likert scale (5 = strongly agree; 3 = neither agree nor disagree; 1 = strongly disagree)
Table 3.3 Factor loadings for attitudes towards sustainable products and agricultural practice

<table>
<thead>
<tr>
<th>Items (Sustainable agricultural production means...)</th>
<th>Ecological and Environmental consumerism</th>
<th>Credence product attributes</th>
<th>Negative attitudes/beliefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>socially responsible</td>
<td>0.88</td>
<td>0.40</td>
<td>-0.25</td>
</tr>
<tr>
<td>ethical</td>
<td>0.81</td>
<td>0.34</td>
<td>-0.04</td>
</tr>
<tr>
<td>eco- or environmentally-friendly</td>
<td>0.80</td>
<td>0.51</td>
<td>-0.32</td>
</tr>
<tr>
<td>minimally packaged consumer products</td>
<td>0.77</td>
<td>0.47</td>
<td>0.07</td>
</tr>
<tr>
<td>green</td>
<td>0.76</td>
<td>0.54</td>
<td>-0.24</td>
</tr>
<tr>
<td>beneficial to local economy</td>
<td>0.73</td>
<td>0.47</td>
<td>-0.25</td>
</tr>
<tr>
<td>energy-saving and energy efficient</td>
<td>0.72</td>
<td>0.56</td>
<td>-0.23</td>
</tr>
<tr>
<td>lower production of carbon footprint</td>
<td>0.68</td>
<td>0.57</td>
<td>-0.14</td>
</tr>
<tr>
<td>locally produced</td>
<td>0.66</td>
<td>0.51</td>
<td>0.005</td>
</tr>
<tr>
<td>higher quality products</td>
<td>0.66</td>
<td>0.61</td>
<td>-0.11</td>
</tr>
<tr>
<td>food produced without any use of synthetic chemicals/additives</td>
<td>0.41</td>
<td>0.84</td>
<td>0.07</td>
</tr>
<tr>
<td>certified organic</td>
<td>0.28</td>
<td>0.83</td>
<td>-0.002</td>
</tr>
<tr>
<td>food made with all natural ingredients</td>
<td>0.30</td>
<td>0.82</td>
<td>-0.05</td>
</tr>
<tr>
<td>food produced without any use of natural chemicals/additives</td>
<td>0.35</td>
<td>0.79</td>
<td>0.12</td>
</tr>
<tr>
<td>producing products provide health benefits</td>
<td>0.59</td>
<td>0.73</td>
<td>-0.22</td>
</tr>
<tr>
<td>better taste</td>
<td>0.56</td>
<td>0.67</td>
<td>-0.12</td>
</tr>
<tr>
<td>fresh</td>
<td>0.53</td>
<td>0.66</td>
<td>-0.14</td>
</tr>
<tr>
<td>expensive</td>
<td>0.12</td>
<td>0.17</td>
<td>0.80</td>
</tr>
<tr>
<td>The term, &quot;sustainability&quot;, is a scam and I don't believe in it</td>
<td>0.38</td>
<td>0.15</td>
<td>0.75</td>
</tr>
<tr>
<td>longer shelf-life</td>
<td>0.01</td>
<td>0.33</td>
<td>-0.05</td>
</tr>
<tr>
<td>I have heard of the term, &quot;sustainability.&quot;</td>
<td>0.55</td>
<td>0.06</td>
<td>-0.15</td>
</tr>
</tbody>
</table>

Eigenvalue                                      | 9.31                                    | 2.40                        | 1.38                      |
Cronbach's Alpha                                 | 0.92                                    | 0.90                        | 0.47                      |
Percent of variation explained by factor          | 44.34                                   | 11.46                       | 6.58                      |
Multi-item scale mean score (standard deviation)  | 3.39 (0.78)                             | 3.01 (0.77)                 | 2.81 (0.81)               |
KMO                                             | 0.91                                    |

a=mean scores for the multi-item summed scale corresponding to how much participants agreed with the statements based a 5-point Likert scale (5 = strongly agree; 3 = neither agree nor disagree; 1 = strongly disagree)
3.3.2 Discussion

Similarities between organic and local categories have been observed in the presented data, indicating that study participants associate similar benefits or traits to these two production practices. For both categories, the perceived public and private consequences were found to be the dominant factor responsible for the data variation. Within the organic and local categories, perceived personal benefits concerning food safety and qualities, such as “[organic food] tastes better”, “[organic food] is safer to consume”, “[local food] is a product of higher quality”, “[local food] is more nutritious”, “[local food] provides health benefits”, and “[local food] tastes better”, yielded the strongest associations with each factor respectively. Previous research has indicated that product cues related to food quality and safety are important indicators in consumer food choice regarding organic and local agricultural practices. Results from studies by Magnusson et al. (2001), Schifferstein and Oude Ophuis (1998), and Wandel and Bugge (1997), showed that consumers viewed perceived healthiness and safety as parameters of quality for organic food products. Similar findings concerning the healthiness and safety of local food were also found in previous studies (e.g., Nie & Zepeda, 2011; Yue & Tong, 2009; Darby et al., 2008; Thilmony et al., 2008). Moreover, in both organic and local categories, attributes associated with perceived personal benefits, such as those listed above are more heavily loaded on the “public and private benefit” factor than those attributes associated with public benefits such as [organic food] / [local food] is environmentally-friendly, [organic food]/ [local food] promotes social responsibility, [organic food] is beneficial to the local economy, [local food] produces lower carbon footprint. This finding is aligned with previous research showing that consumers often put greater emphasis on attributes related to their personal interest than those related to societal or environmental concerns when evaluating food products (Hoogland et al., 2006; Grankvist & Biel, 2001).
Within the sustainable category, although the perceived public and private interests were not shown in the same component, attributes pertaining to public and societal interest included in the factor, “ecological and environmental consumerism”, explained a much larger proportion of the data variation than the factor concerning product-specific characteristics (credence product attributes). This may be an indication that the sustainable agricultural practice has a stronger emphasis on environmental and societal responsibility than the local and organic categories.

An agglomerative hierarchical cluster analysis with Ward’s method and Euclidean distance was implemented to investigate any underlying segmentation of study participants based on the resulting mean scores of the multi-item scales from each category. Three clusters are identified and details for each cluster are provided in Table 3.5. One-way ANOVA and the Newman-Keuls post-hoc procedure were used to determine any statistically significant differences among the clusters for each multi-item scale. Both Cluster_1 and Cluster_2 yielded 46.51% each of the total sampled population and Cluster_3 represented the remaining 6.98%. The one-way ANOVA and Newman-Keuls post-hoc procedure revealed significant differences among the clusters in participants’ perception of organic, local and sustainable food and agricultural practices.
Table 3.5 Profiles of consumer segments (n = 172) on dimensions of their understanding and perception of organic, local and sustainable food and agricultural practices

<table>
<thead>
<tr>
<th></th>
<th>Cluster_1 (n= 80; 46.51%)</th>
<th>Cluster_2 (n= 80; 46.51%)</th>
<th>Cluster_3 (n= 12; 6.98%)</th>
<th>Pr&gt; F</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organic</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>public and private benefits</td>
<td>3.71 b a, b</td>
<td>3.16 c</td>
<td>4.85 a</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>from buying organic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>negative/false attitudes</td>
<td>3.20 b</td>
<td>2.55 c</td>
<td>3.95 a</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>and beliefs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>green consumerism</td>
<td>3.88 b</td>
<td>3.43 c</td>
<td>4.58 a</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td><strong>Local</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>public and private benefits</td>
<td>3.61 b</td>
<td>3.23 c</td>
<td>4.75 a</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>from buying local</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>use of chemicals in foods</td>
<td>3.05 b</td>
<td>2.03 c</td>
<td>3.94 a</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>local foods defined by distance</td>
<td>4.08 b</td>
<td>4.08 b</td>
<td>4.86 a</td>
<td>0.0001</td>
</tr>
<tr>
<td><strong>Sustainability</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>green consumerism</td>
<td>3.48 b</td>
<td>3.09 c</td>
<td>4.76 a</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>product credence attributes</td>
<td>3.24 b</td>
<td>2.54 c</td>
<td>4.65 a</td>
<td>&lt; 0.0001</td>
</tr>
</tbody>
</table>

*a* mean scores for the multi-item summated scale corresponding to how much participants agreed with the statements based a 5-point Likert scale (5 = strongly agree; 3 = neither agree nor disagree; 1 = strongly disagree)

*b* means across the rows with different letters are significant different (*p* ≤ 0.05)
Participants in Cluster_1 (46.51%) can be described as consumers who are uncertain. They have shown indifferent ratings in perceived public and private benefits related to buying local and organic foods. They have also shown neutral opinions concerning the negative statements regarding the false beliefs associated with organic food and its production. Study participants in Cluster_2 represent those consumers who have shown a lack of interest in alternative agricultural practices and foods. They have not only shown uncertain ratings regarding the perceived public and private consequences of purchasing and consuming organic and local foods, but furthermore, they also disagree with statements concerning the product credence attributes associated with food produced from the sustainable agricultural practice. Both Cluster_1 and Cluster_2, however, have shown interest in and are in agreement with the distance definitions of local food, yet uncertainty about the implication of buying local products was also found in both clusters. Lastly, participants in Cluster_3 are characterized by their trust of labels. Contrary to Cluster_1 and Cluster_2, survey participants in Cluster_3 have shown significantly higher interest in the beneficial implications of buying organic and local foods. They have also shown awareness of the societal and environmental benefits of a sustainable agricultural practice. It is noteworthy that participants in Cluster_3 did not show a distinction in their ratings towards negative and false statements regarding organic foods, which is indicated by the relatively neutral mean score ([organic] negative / false attitudes and beliefs = 3.95). One may wonder if participants in this cluster are showing a lack understanding of what these agricultural practices mean.

Table 3.6 and Table 3.7 provide the descriptive demographic profiles and the average monthly purchase of organic and local food for each cluster. A chi-square analysis for demographics across clusters found no significant association between the proportions of gender
(χ² = 1.67, p = 0.43), age (χ² = 9.22, p = 0.06), levels of education received (χ² = 2.47, p = 0.64) and income (χ² = 8.44, p = 0.39) among the clusters. Chi-square analysis was also performed on the proportion of the monthly organic and local purchase among clusters. For the monthly organic food purchase, chi-square statistics has revealed there was a significant difference in proportion distribution across the clusters (χ² = 14.04, p = 0.007). There are significantly more non-organic food shoppers in Cluster_1 and Cluster_2 than in Cluster_3. Particularly, only 7% of participants in Cluster_2 have made more than three monthly purchases of organic food. This could be an indication for explaining their indifferent and uninterested attitudes towards the alternative agricultural practices. For the monthly local food purchase, there was no significant difference in proportion distribution across clusters (χ² = 3.78, p = 0.43). Overwhelming support of local food has been seen across the three clusters with the majority of the sampled population having made at least three local-food purchases per month.
Table 3.6 Demographic profile of sampled population (%) (N = 172)

<table>
<thead>
<tr>
<th></th>
<th>Cluster_1</th>
<th>Cluster_2</th>
<th>Cluster_3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>51.25%</td>
<td>41.25%</td>
<td>50.00%</td>
</tr>
<tr>
<td>Female</td>
<td>48.75%</td>
<td>58.75%</td>
<td>50.00%</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-24 years of age</td>
<td>7.50%</td>
<td>1.25%</td>
<td>16.67%</td>
</tr>
<tr>
<td>25-54 years of age</td>
<td>52.50%</td>
<td>46.25%</td>
<td>58.33%</td>
</tr>
<tr>
<td>55 and older</td>
<td>40.00%</td>
<td>52.50%</td>
<td>25.00%</td>
</tr>
<tr>
<td><strong>Household Income</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under $20,000</td>
<td>7.50%</td>
<td>10.00%</td>
<td>16.67%</td>
</tr>
<tr>
<td>$20,000-49,999</td>
<td>45.00%</td>
<td>36.25%</td>
<td>16.67%</td>
</tr>
<tr>
<td>$50,000-69,999</td>
<td>13.75%</td>
<td>21.25%</td>
<td>25.00%</td>
</tr>
<tr>
<td>$70,000-89,999</td>
<td>13.75%</td>
<td>16.25%</td>
<td>33.33%</td>
</tr>
<tr>
<td>$90,000 and above</td>
<td>20.00%</td>
<td>16.25%</td>
<td>8.33%</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary school degree or below</td>
<td>30.00%</td>
<td>33.75%</td>
<td>25.00%</td>
</tr>
<tr>
<td>Postsecondary degree</td>
<td>55.00%</td>
<td>56.25%</td>
<td>50.00%</td>
</tr>
<tr>
<td>Postgraduate degree</td>
<td>15.00%</td>
<td>10.00%</td>
<td>25.00%</td>
</tr>
<tr>
<td><strong>Household composition</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of people under 18 in the home</td>
<td>1.55</td>
<td>1.43</td>
<td>1.41</td>
</tr>
<tr>
<td>Total number of people in the home</td>
<td>3.83</td>
<td>3.74</td>
<td>3.5</td>
</tr>
</tbody>
</table>

Table 3.7 Monthly organic and local food purchase of sampled population (N=172)

<table>
<thead>
<tr>
<th></th>
<th>Cluster_1</th>
<th>Cluster_2</th>
<th>Cluster_3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organic food purchase</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>41.25%</td>
<td>56.25%</td>
<td>16.67%</td>
</tr>
<tr>
<td>1-2 times</td>
<td>38.75%</td>
<td>36.25%</td>
<td>41.67%</td>
</tr>
<tr>
<td>&gt; 3 times</td>
<td>20.00%</td>
<td>7.50%</td>
<td>41.67%</td>
</tr>
<tr>
<td><strong>Local food purchase</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>2.50%</td>
<td>6.25%</td>
<td>8.33%</td>
</tr>
<tr>
<td>1-2 times</td>
<td>41.25%</td>
<td>46.25%</td>
<td>25.00%</td>
</tr>
<tr>
<td>&gt; 3 times</td>
<td>56.25%</td>
<td>47.50%</td>
<td>66.67%</td>
</tr>
</tbody>
</table>
In conclusion, the current research provided a comparative overview of Ontario consumers’ understanding and attitudes towards sustainable, local and organic foods and agricultural practices through the utilization of an online survey. Exploratory factor analyses on each category revealed several multi-item scales, representing different dimensions of the organic, local and sustainable food and agricultural practices. Attitudes regarding both personal and public interests on perceived consequences of purchase and consumption have been identified to be important criteria in consumer perception of both local and organic foods. Consumers have granted more weight towards product attributes pertaining to personal interest, such as health benefits and product quality, than attributes concerning public benefits such as concerns regarding the environment and local economy. Sustainable agricultural production, however, have been found to have stronger association to the environmental and societal statements, when compared with perceived consequences of personal interest. Three segments of consumers have been identified based on participants’ responses to the multi-item scales representing results from the exploratory factor analysis. Various degrees of interest among clusters have been observed and provided an explanation for the differences observed in the sampled consumer’s purchase behaviour concerning organic and local foods.

Through identification of the factors concerning consumer perception of sustainable, local and organic foods and agricultural practices, policymakers, producers and retailers can have a better understanding of what contributes to consumers’ attitudes towards these alternative food production methods and products. Similar and overlapping factor dimensions have been observed among the three investigated categories, which may be an indication of consumers’ confusion over these practices. Without clear distinction being made, consumers could be misled by marketing claims concerning such alternative agricultural practices and food.
There were several limitations in the current study, which provided opportunities for future research. The consumer survey was conducted during the peak of the local food (fresh produce) season, which would likely cause biases in survey responses and overwhelming enthusiastic interest toward local food. Future research that continues to track consumers’ attitudes and interest towards alternative agricultural practices as a comparison to the existing study will be valuable. Moreover, the current research did not specify the food category in the survey questionnaire. It would also be of relevance to learn whether consumer attitudes towards these alternative agricultural practices vary by different food product categories. In order to better understand consumer behaviour with regard to alternative agricultural practices, it would also be beneficial to compare consumer attitudes towards these food production practices and respective products with their actual purchasing and consumption behaviour. Lastly, a limited number of consumers participated in the current study. It would be of great interest to examine a larger sampled population in order to substantiate the survey results.
Chapter 4: Impact of information disclosure in production methods and origins on consumer sensory acceptability and willingness to pay – a case in Ontario yellow peaches

Abstract

It is known that labeling information affects consumers’ expectations of product sensory properties and overall liking; furthermore, it also impacts consumers’ sensory experience and purchasing decision. The current study evaluates the labeling effect of production methods – organic vs. conventional, and product origins – local vs. imported on consumer perception of quality and degree of willingness to pay on yellow peaches. Forty-nine primary household grocery shoppers participated in a three-part sensory study. Four types of peaches, differing in production methods and regions of origin, were evaluated both with and without labels corresponding to production and region. Part 1) participants evaluated 4 peach samples using blind conditions by providing ratings for overall liking, sensory attributes and a monetary value (price per pound) that they were willing to pay after tasting each sample. Part 2) participants provided expected ratings on overall liking, sensory attributes and willingness to pay (price per pound) based on 4 peach labels. Part 3) participants provided ratings and willingness to pay (price per pound) based on sensory tasting combined with labeling information for the 4 peach samples. Physical and chemical analyses were conducted to monitor ripeness and other physiological conditions of peach samples for making further comparisons on consumer liking scores. Significant “negative disconfirmation”, indicating discrepancy due to high expectation and low blind liking rating, were found in all four samples. “Positive assimilation” was observed due to information disclosure between the blind condition and combined condition of sensory experience and label disclosure, particularly for products with desirable labeling elements, namely the organic peach sample produced locally. However, a similar labeling effect was not
found in consumer monetary valuation of the same product, indicating the effect of information disclosure on product sensory evaluation and monetary valuation may not be comparable.
4.1 Introduction

Purchase and consumption of organically and locally grown fruits and vegetables have become increasingly appealing to consumers in recent years. With increased concern in food quality and safety, consumer interest in food production methods and regions of origin continues to be prevalent (Tobler et al., 2011). Labels of production methods and regions of origin for food products can often affect consumers’ purchasing behaviour, particularly within the very competitive market of fresh produce. Fresh produce cannot generally be tasted at point of purchase. Produce is also often not branded or advertised in the same manner as a processed food product which is consistent in quality. Because of these factors, consumers often rely on external appearance, or credence characteristics such as labels of origin and production method certifications to form an expectation of quality (Richards, 2000). Furthermore, particularly at the point of consumption, perceivable attributes, such as taste, smell, texture, and degree of freshness, also play an important role in determination of product acceptability and possibility for repeat purchase or consumption (Harker et al., 2003).

Although previous research has investigated the impact of different credence information on consumer perception of food products (e.g., Lange et al., 1999; Schifferstein et al., 1999; Deliza & MacFie, 1996; Cardello & Sawyer, 1992), little research has investigated the effect of extrinsic attributes such as production methods and regions of origin on consumer expectation and acceptability of fresh produce. Results can be used to explore the relationship between consumers’ product expectation and sensory experience, overall liking and monetary valuation of products. The current study investigates the effect of organic and local labels on consumer expectation with regard to acceptability and willingness to pay, for Ontario-grown and imported yellow peaches.
Increased consumer interest and consumption of local and organic food products in recent years has not only led to new market opportunities but also to misunderstanding and confusion about the nature and benefits of such products (Henryks & Pearson, 2010; Hutchins & Greenhalgh, 1995). Many certification programs and labeling systems have therefore been introduced to provide authoritative distinction of organic and local products from the conventional products. In the Province of Ontario, Canada, the “Foodland Ontario” program was introduced in 1977 by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) to help consumers recognize the presence of local horticultural products (OMAFRA, 2010). The “Canada Organic” logo was introduced in 2009 to provide certification for the Canadian products that are produced according to the Canadian Organic Standards (Canada Organic Growers, 2010). The “USDA Certified Organic” logo has also been used widely in the Canadian marketplace due to the close proximity in location and the intimate trade relationship between the U.S. and Canada.

Many studies (e.g., Lange et al., 1999; Schifferstein et al., 1999; Deliza & MacFie, 1996; Cardello & Sawyer, 1992) have previously reviewed and investigated the effect of labeling information on product acceptability. The expectation and confirmation theory developed by Anderson (1973) is often utilized in these studies. The theory suggests that the uniformity between the actual sensory experience and expectation has a large influence on consumer satisfaction. This then decides the likelihood of repeated purchases and future use. Confirmation between product expectation and sensory experience produces consumer satisfaction. Disconfirmation occurs when contradiction exists between expectation and sensory experience, where the “positive disconfirmation” indicates sensory experience exceeding the expectation and the “negative disconfirmation” suggests the sensory experience falls below the expectation.
Product dissatisfaction and product rejection are often the result of negative disconfirmation. The theory predicts that disconfirmation, created by expectation, can also influence consumers’ perception of the products by the effects of assimilation and contrast. In assimilation, consumers try to minimize or assimilate the difference between expectation and the actual product experience by moving one’s perception closer toward expectation. On the contrary, the contrast phenomenon occurs when consumers try to maximize the discrepancy between product perception and expectation when the actual experience fails to match the expectation. The model of assimilation-contrast proposes that people have an innate level of acceptance for the discrepancy between product expectation and actual experience. When the difference between the product expectation and actual experience falls within the limit of the level of acceptance, one is expected to assimilate the perception toward the product expectation. However, when such difference exceeds the limit of acceptance, the contrast effect may occur. As demonstrated by the literature (Stefani et al., 2006; Lange et al., 1999; Deliza&MacFie, 1996), the contrast effect is seldom observed in an experimental setting, particularly when frequent disconfirmation is prevalent. Measurement of confirmation between expectation and actual experience is important as it can predict the strength of a particular extrinsic cue in relation to the perceived intrinsic characteristics. It is essential for producers and marketers to understand how their products are perceived as a whole from the consumers’ perspective (d’Hauteville et al., 2007).

The objective of the present study is to evaluate the effect of labeling information of organic production method and local origin on the consumer liking and sensory preference of yellow peaches in comparison to products that are imported and produced conventionally. Prices of Ontario yellow peaches, as a major commodity of tender fruit production in the Niagara Peninsula (Ontario, Canada), have declined in recent years due to the competition with imported
products. Labels of “locally produced” and “organic” have hence been established and created an
added value to the product with a price premium that consumers may be willing to pay. It is the
goal of the study to investigate the labeling effect of organic and local claims on consumer
expectation and perception of actual sensory quality. The hypothesis is that the local and organic
information will be able to provide quality-added and value-added cues and have a significant
positive impact on overall liking, sensory evaluation and monetary valuation.

4.2 Materials and Methods

4.2.1 Participants

A sample of 49 consumers from the Niagara Peninsula (13 males and 36 females) were
recruited to participate in the experiment. The experiment was advertised on the internet and in
the local newspaper aiming to recruit people to participate in a research study surveying qualities
of peaches. To qualify, participants could not declare any food allergies and indicated that they
were the primary grocery shoppers for their households. The screening was made through an
online questionnaire sent to the interested participants. All participants were compensated with
$10 CAD and one pound of peaches equivalent of $2-3.00 CAD. Details of the subjects’
demographic information are presented in Table 4.1.
Table 4.1: Demographic profile of study participants (N = 49)

<table>
<thead>
<tr>
<th>Gender</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>26.53%</td>
</tr>
<tr>
<td>Female</td>
<td>73.47%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>19-29 years of age</td>
<td>4.08%</td>
</tr>
<tr>
<td>30-39 years of age</td>
<td>12.24%</td>
</tr>
<tr>
<td>40-49 years of age</td>
<td>20.41%</td>
</tr>
<tr>
<td>50-59 years of age</td>
<td>34.69%</td>
</tr>
<tr>
<td>&gt; 60 years of age</td>
<td>28.57%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Education</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary school degree or below</td>
<td>26.53%</td>
</tr>
<tr>
<td>Postsecondary degree</td>
<td>48.98%</td>
</tr>
<tr>
<td>Postgraduate degree</td>
<td>24.49%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Employment</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Employed full-time</td>
<td>20.41%</td>
</tr>
<tr>
<td>Employed part-time</td>
<td>24.49%</td>
</tr>
<tr>
<td>Not employed</td>
<td>8.16%</td>
</tr>
<tr>
<td>Homemaker</td>
<td>4.08%</td>
</tr>
<tr>
<td>Student</td>
<td>2.04%</td>
</tr>
<tr>
<td>Retired</td>
<td>36.73%</td>
</tr>
<tr>
<td>Preferred not to answer</td>
<td>4.08%</td>
</tr>
</tbody>
</table>

4.2.2 Products

Four types of yellow peaches (*Prunus persica* L. Batsch) were used in the experiment. For the local peaches, two different kinds of Ontario yellow peaches were used: mixed varieties of free-stone and “Vollie”, a yellow peach variety that was recently bred in Ontario. For the imported samples, one conventional variety and one organic variety of California-grown yellow peaches were used. The peach samples were labeled as following: “local non-organic” (free-stone), “local organic” (“Vollie”), “imported non-organic” (California non-organic), and “imported organic” (California organic). The Ontario peaches were obtained from the primary fruit co-operative in the Niagara Peninsula (Vineland Growers Co-operative, Ltd., Jordan, ON).
and the imported peaches were obtained from local grocery stores and fruit and vegetable wholesalers at the Ontario Food Terminal.

To ensure the proximal equal ripeness for the sake of experimental uniformity, all peaches were stored in 4 °C storage room and removed from the storage room 4 hours prior to the sensory evaluation sessions. Chemical and physical analysis such as °Brix, firmness, temperature and acidity (pH and titratable acidity) were measured to assess ripeness.

A piece of quartered peachesample was served individually on disposable plastic plates labeled with random 3-digit codes at room temperature (21 ± 1 °C).

4.2.3 Experimental Design

The experiment consisted of three parts and is similar to the protocol proposed by Lange et al. (1999) and Stefani et al. (2006) to evaluate the impact of labeling information on acceptability. Due to the nature of fresh peaches, the experiment was conducted in one session in order to minimize inconsistencies in ripeness. In order to observe and explain possible shifts in overall liking and perceived intensity of measured sensory attributes due to labeling information, sensory evaluation was conducted in three consecutive sessions (within one day) in the following order: blind, expected and informed. For each session, participants were asked to provide ratings of four peach samples using a 15-point category scale for overall liking (anchored from dislike extremely to like extremely), and 7-point category scales for perceived intensity of sweetness (anchored from weak to strong), juiciness (anchored from dry to juicy), firmness (anchored from soft to firm) and peach flavour (anchored from weak to strong). Participants were also asked to provide a monetary value of the amount they were willing to pay for a pound of the evaluated products in Canadian Dollars. Four peach samples were presented individually in each session in
a randomized and balanced order. First, in the blind session, participants were presented with samples without any labels provided. Next, in the expected session, identical pictures of peaches with different labels were presented to the participants. In the informed session, in addition to the identical pictures of peaches with different labels, corresponding peach samples were also served to the participants. Participants in all three sessions were asked to provide ratings in overall liking, perceived intensities of different sensory attributes and monetary amount of willingness to pay as described above for each sample. An example of the sensory evaluation questionnaire can be found in Appendix D. Demographic profiles and information regarding study participants’ shopping habits of fresh produce were collected during the break between the expected and informed sessions and at the end of the sensory evaluation, respectively. The experiment was conducted in the sensory evaluation laboratory of the Vineland Research and Innovation Centre, which is equipped with 10 computerized booths, over a period of 2-weeks between August 24 and September 2, 2010. All data were collecting using EyeQuestion® (Logic8 B.V., The Netherlands). The current study was approved by the University of Guelph Research Ethics Board (REB #: 10MY030). Please refer to Appendix E for an example of participant consent form.

4.2.4 Data Analysis

Scores collected for each sensory attribute (sweetness, firmness, juiciness, and intensity of peach flavour), overall liking and willingness to pay of peach samples were analyzed using a 3-way analysis of variance (ANOVA) model described as followed. Since the firmness scale was anchored to the increasing order of firmness (i.e., 1 = soft, 7 =firm), these ratings were reversed to become comparable with all the other attribute ratings. In order to account for the panel nature
of data, as more than one evaluation was assessed by the same subjects on different samples under different conditions of information disclosure, a repeated measurement procedure was adopted. Since the study participants were believed to be pooled from a large population randomly, the participant factor was considered as random in the three-way ANOVA with mixed model. The following model was used for all attributes measured:

\[(\text{response rating of measured attribute}) = \text{user} + \text{product} + \text{condition} + \text{user*product} + \text{user*condition} + \text{product*condition} + \text{error}\]

where user represented the participants and conditions represented the different sessions of sensory evaluation (blind, expected and informed). The Newman-Keuls procedure was used for post-hoc pairwise comparison of products and condition mean scores \((p \leq 0.05)\). Further product-specific analyses were also conducted using ANOVA to examine the difference between conditions for each product category. All data analyses were conducted using XLStat® (Addinsoft, New York, NY).

4.2.5 Chemical and Physical Analyses

Various chemical and physical analyses were conducted on the peach samples to determine the degree of ripeness following the protocol described by Robertson and Meredith (1988). Four varieties of peach samples were sourced weekly during the two-week experiment. Three samples were taken at random from each variety, and two repeated measurements were taken from each sample for the analyses. Chemical and physical analyses were conducted weekly upon completion of the sensory evaluation. Firmness was measured in grams on opposite cheeks of the peach sample after the removal of a small area of skin on each cheek using the texture analyzer (TA.XTPlus, Stable Micro Systems, UK) with a round-tip cylindrical probe of 5/16” in both diameter and penetration depth. Peach samples were peeled and juiced in preparation for
chemical analyses. Percent soluble Solids, indicated as °Brix, was determined using a digital refractometer (Model PR-101α, Atago, Japan) for measurement of sweetness. Acidity was measured using a digital pH meter (Accumet AB15, Fisher Scientific, US). Titratable acidity as percent malic acid was measured on 10ml of extracted sample diluted with distilled water by titration to pH 8.1 with 0.1N NaOH. Results from each analysis were analyzed using ANOVA with the following model with Newman-Keuls post-hoc pair-wise mean comparison test (p ≤ 0.05):

Instrumental measurement = product + week+ replicate + product*week + product*replicate + week*replicate + error

4.3 Results and Discussion

Results concerning consumer’s shopping habits of local and organic fresh produce were tallied and are shown in Table 4.2 and 4.3. The majority (95.92%) of the study participants have purchased local fruits and vegetables, on average, at least three times a month. These local fruit and vegetable purchases were often made at the local farmers market and/or farm stands (81.63%). On the other hand, only 28.57% of the study participants have made at least three monthly purchases of organic fruits and vegetables. Many of the organic fruit and vegetable purchases were made in chain supermarkets (32.65%) and local farmers markets and/or farm stands (44.90%). As the current study was conducted during peak season for local produce, this may have contributed to the frequent purchase of local fruits and vegetables.
Table 4.2: Percentage of average monthly fresh produce purchases (N = 49)

<table>
<thead>
<tr>
<th>Times per month</th>
<th>Organic fresh produce</th>
<th>Local fresh produce</th>
<th>Fresh produce that is neither organic nor local</th>
</tr>
</thead>
<tbody>
<tr>
<td>I do not purchase such product</td>
<td>38.78%</td>
<td>0.00%</td>
<td>4.08%</td>
</tr>
<tr>
<td>1 to 2 times</td>
<td>32.65%</td>
<td>4.08%</td>
<td>36.73%</td>
</tr>
<tr>
<td>≥ 3 times</td>
<td>28.57%</td>
<td>95.92%</td>
<td>59.18%</td>
</tr>
</tbody>
</table>

Table 4.3: Percentage of the most frequently used retail outlets selection for fresh produce

<table>
<thead>
<tr>
<th>Retail outlets</th>
<th>Organic fresh produce</th>
<th>Local fresh produce</th>
<th>Fresh produce that is neither organic nor local</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass-merchandiser</td>
<td>14.29%</td>
<td>14.29%</td>
<td>24.49%</td>
</tr>
<tr>
<td>Chained supermarket</td>
<td>32.65%</td>
<td>51.02%</td>
<td>69.39%</td>
</tr>
<tr>
<td>Discount chained supermarket</td>
<td>20.41%</td>
<td>40.82%</td>
<td>55.10%</td>
</tr>
<tr>
<td>Natural and organic food specialties retailers</td>
<td>2.04%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Local farmers markets/farm stands</td>
<td>44.90%</td>
<td>81.63%</td>
<td>63.27%</td>
</tr>
<tr>
<td>Community shared agricultural program (CSA)</td>
<td>2.04%</td>
<td>4.08%</td>
<td>2.04%</td>
</tr>
<tr>
<td>Other</td>
<td>10.20%</td>
<td>4.08%</td>
<td>4.08%</td>
</tr>
<tr>
<td>I don’t purchase such products</td>
<td>30.61%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

*a participants were allowed to select up to three options*
Computed results of the three-part sensory evaluation from three-way ANOVA with interactions are shown in Table 4.4. Results showed significant effects due to user, product and condition of information disclosure for all evaluated attributes. The presence of a significant effect seen in user validated the assumption regarding the diversity of the subject population as the subjects were pooled from a large randomly selected population. Furthermore, for most of the measured attributes, the interactions between product*condition and user*condition also were found to be significant, indicating that both product and user were dependent upon the effect of information disclosure from the three-part sensory evaluation. Interestingly, a significant effect of product*user was only observed for the willingness to pay model ($p = 0.0001$) indicating various individuals may weight products differently with regard to monetary values. Results from Newman-Keuls procedure for products and conditions of information disclosure are presented in Table 4.5 and 4.6. Across all conditions, local organic and local non-organic have received significantly higher ratings in overall liking and perceived intensities of peach flavour, sweetness, and juiciness. Across all products, significant differences between expected and other conditions have been observed.

With significant interactions between product*condition and user*condition indicating dependent relationships between product, condition and user; further attribute- and product-specific ANOVA was necessary to evaluate the difference among the blind, expected and labeled information disclosure conditions. The attribute- and product-specific analysis revealed differences in the information disclosure conditions for some samples: Figures 4.1-6 present the averaged hedonic results, ratings of individual sensory attributes and willingness-to-pay for each sample under three information disclosure conditions. Significant increases from the blind to the labeled conditions were observed in local organic (LO) for overall liking ($p=0.012$), intensity of
peach flavour ($p=0.028$), sweetness ($p=0.002$), and juiciness ($p=0.02$). A significant increase in perceived firmness from the blind to the labeled condition was also observed in imported organic (IO), and a significant decrease was observed for imported non-organic (INO) ($p \leq 0.0001$ and $p<0.0001$ respectively). Based on these results, we can determine that the labeling factors have some effect on peach acceptability of products with more favourable labels of local and organic; such an effect is most obvious when the two labeling factors are combined.

As previously indicated, many participants in the current study are frequent shoppers of local fruits and vegetables. It is inevitable that many of these frequent local food shoppers may also be biased toward locally labeled peach samples. Such bias (neighbourhood) effect could possibly be essential in contributing to the higher product acceptability of local products, particularly for the expected and labeled conditions. It was thus hypothesized, in the current study, that higher hedonic and acceptability ratings would be observed when the local labels were presented (expected and labeled conditions), particularly when compared with the blind condition. However, findings in the current study do not support such a hypothesis. When compared among conditions, significantly higher ratings in overall liking, intensity of peach flavour, sweetness and juiciness in labeled condition of the LO products was not seen in LNO (Figure 4.1-3, 4.5), signifying only the organic logo has the probable positive effect in hedonic and sensory attribute ratings. However, such positive labeling effect from the organic label was not observed in imported products. For the imported organic (IO) and imported non-organic (INO) samples, there was no significant difference observed among conditions in hedonic and perceived sensory ratings except in ratings of firmness (Figure 4.1-5).
Table 4.4: 3-way ANOVA model of hedonic and perceived sensory attributes evaluation (n = 49)

<table>
<thead>
<tr>
<th>Source</th>
<th>Type</th>
<th>DF</th>
<th>F</th>
<th>Pr&gt;F</th>
<th>Source</th>
<th>Type</th>
<th>DF</th>
<th>F</th>
<th>Pr&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>product</td>
<td>Fixed</td>
<td>3</td>
<td>29.67</td>
<td>&lt; 0.0001</td>
<td>Peach Flavour</td>
<td>Fixed</td>
<td>38.69</td>
<td>&lt; 0.0001</td>
<td>19.87</td>
</tr>
<tr>
<td></td>
<td>Random</td>
<td>48</td>
<td>4.60</td>
<td>&lt; 0.0001</td>
<td>Sweetness</td>
<td>Fixed</td>
<td>3.97</td>
<td>&lt; 0.0001</td>
<td>3.54</td>
</tr>
<tr>
<td>condition</td>
<td>Fixed</td>
<td>2</td>
<td>22.51</td>
<td>&lt; 0.0001</td>
<td>Firmness</td>
<td>Fixed</td>
<td>4.11</td>
<td>0.009</td>
<td>3.42</td>
</tr>
<tr>
<td>product*user</td>
<td>Random</td>
<td>144</td>
<td>0.99</td>
<td>0.523</td>
<td>Juiciness</td>
<td>Fixed</td>
<td>27.06</td>
<td>&lt; 0.0001</td>
<td>6.07</td>
</tr>
<tr>
<td>product*condition</td>
<td>Fixed</td>
<td>6</td>
<td>3.07</td>
<td>0.006</td>
<td>WTP</td>
<td>Fixed</td>
<td>12.40</td>
<td>&lt; 0.0001</td>
<td>21.00</td>
</tr>
<tr>
<td>user*condition</td>
<td>Random</td>
<td>96</td>
<td>1.25</td>
<td>0.082</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.5: Newman-Keuls "post-hoc" procedure: results of product mean scores comparison (n = 49)

<table>
<thead>
<tr>
<th>Category</th>
<th>Overall Liking</th>
<th>Peach Flavour</th>
<th>Sweetness</th>
<th>Firmness</th>
<th>Juiciness</th>
<th>WTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>LO</td>
<td>7.94 a</td>
<td>4.14 a</td>
<td>3.76 a</td>
<td>5.58 a</td>
<td>3.78 b</td>
<td>1.41 ab</td>
</tr>
<tr>
<td>LNO</td>
<td>9.04 a</td>
<td>4.74 a</td>
<td>4.12 a</td>
<td>5.33 a</td>
<td>4.39 a</td>
<td>1.54 a</td>
</tr>
<tr>
<td>IO</td>
<td>5.89 b</td>
<td>3.02 b</td>
<td>2.98 b</td>
<td>5.18 a</td>
<td>3.08 c</td>
<td>1.16 bc</td>
</tr>
<tr>
<td>INO</td>
<td>6.05 b</td>
<td>3.05 b</td>
<td>2.94 b</td>
<td>5.05 a</td>
<td>3.13 c</td>
<td>1.06 c</td>
</tr>
</tbody>
</table>

Table 4.6: Newman-Keuls “post-hoc” procedure: results of condition mean scores comparison (n=49)

<table>
<thead>
<tr>
<th>Category</th>
<th>Overall Liking</th>
<th>Peach Flavour</th>
<th>Sweetness</th>
<th>Firmness</th>
<th>Juiciness</th>
<th>WTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected</td>
<td>8.56 a</td>
<td>4.57 a</td>
<td>4.44 a</td>
<td>4.745 a</td>
<td>4.27 a</td>
<td>1.58 a</td>
</tr>
<tr>
<td>Labeled</td>
<td>6.65 b</td>
<td>3.39 b</td>
<td>3.11 b</td>
<td>5.383 a</td>
<td>3.30 b</td>
<td>1.16 b</td>
</tr>
<tr>
<td>Blind</td>
<td>6.49 b</td>
<td>3.25 b</td>
<td>2.79 b</td>
<td>5.740 a</td>
<td>3.21 b</td>
<td>1.17 b</td>
</tr>
</tbody>
</table>

Notes:
- "LO" means Local non-organic; "LNO" means Local organic; "IO" means Imported non-organic; "INO" means Imported organic.
- Different letters indicate significant differences at p < 0.05.
- WTP stands for willingness to pay.
Figure 4.1: Comparison of overall liking rating (13-pt scale) between samples under three information disclosure conditions (n=49)

\[ a \] statistical significance notation: 0 ‘***’, 0.001 ‘**’, 0.01 ‘*’

\[ b \] LO: Local Organic; LNO: Local Non-Organic; IO: Imported Organic; INO: Imported Non-Organic

Figure 4.2: Comparison of perceived intensity of peach flavour (7-pt scale) between samples under three information disclosure conditions (n=49)

\[ a \] statistical significance notation: 0 ‘***’, 0.001 ‘**’, 0.01 ‘*’

\[ b \] LO: Local Organic; LNO: Local Non-Organic; IO: Imported Organic; INO: Imported Non-Organic
Figure 4.3: Comparison of perceived sweetness (7-pt scale) between samples under three information disclosure conditions (n=49)

a statistical significance notation: 0 ‘***’, 0.001 ‘**’, 0.01 ‘*’

b LO: Local Organic; LNO: Local Non-Organic; IO: Imported Organic; INO: Imported Non-Organic

Figure 4.4: Comparison of perceived firmness (7-pt scale) between samples under three information disclosure conditions (n=49)

a statistical significance notation: 0 ‘***’, 0.001 ‘**’, 0.01 ‘*’

b LO: Local Organic; LNO: Local Non-Organic; IO: Imported Organic; INO: Imported Non-Organic
Figure 4.5: Comparison of perceived juiciness (7-pt scale) between samples under three information disclosure conditions (n=49)

- LO: Local Organic; LNO: Local Non-Organic; IO: Imported Organic; INO: Imported Non-Organic

![Juiciness Graph]

Figure 4.6: Comparison of willingness to pay (WTP) between samples under three information disclosure conditions (n=49)

- LO: Local Organic; LNO: Local Non-Organic; IO: Imported Organic; INO: Imported Non-Organic

![WTP Graph]
Despite the neighbourhood bias, a probable reason for the generally moderate to low ratings seen in all evaluations could also be attributed to the degree of ripeness of the peach samples. Tables 4.7 provides the 3-way ANOVA results on the sample ripeness determined by chemical and physical analyses. In the current study, due to the difficulty of controlling the ripening process of products from imported and local origins, the degree of ripeness was not yet at the level that was deemed acceptable by consumers to consume, particularly when compared with previous research (Génard&Bruchou, 1992). Previous research (Crisosto et al., 2005; Robertson & Meredith, 1988) has pointed out that, as peach samples reach maturity, an increase in percent soluble solids and a decrease in percent malic acid are generally observed. The ratio between percent soluble solids in °Brix and percent malic acid (°Brix:gMA) was thus calculated to further gauge the degree of ripeness of the peach samples (Crisosto et al., 2005). As indicated in Table 4.7, significant statistical differences were observed among samples in percent soluble solids (°Brix), pH, percent malic acid (gMA) and °Brix:gMA ratio across four samples. Table 4.8 provides results from the Newman-Keuls post-hoc procedure comparing means of the measured chemical and physical attributes. Significant differences in °Brix:gMA ratio were found among samples. In particular, when compared with other peach samples, imported organic (IO) peaches had a significant higher degree of °Brix:gMA ratio due to its lower degree of percent malic acid. The high malic acid content and °Brix:gMA ratio may be contributing to the resulting low consumer liking, as observed in the hedonic product comparisons from the post-hoc procedure (Table 4.5). The results also confirmed the finding from previous research that consumer liking was strongly associated with the percent soluble solids concentration in which moderate liking is yielded when the percent soluble solids concentration was measured between 10 and 11 °Brix (Crisosto et al., 2005; Crisosto&Crisosto, 2005).
Table 4.7: 3-way ANOVA model of results from physical and chemical analyses

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>Pressure&lt;sup&gt;a&lt;/sup&gt;</th>
<th>°Brix&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Temp&lt;sup&gt;c&lt;/sup&gt;</th>
<th>pH</th>
<th>gMA&lt;sup&gt;d&lt;/sup&gt;</th>
<th>Brix:gMA&lt;sup&gt;e&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>F</td>
<td>Pr&lt;sup&gt;f&lt;/sup&gt; F</td>
<td>F</td>
<td>Pr&lt;sup&gt;f&lt;/sup&gt; F</td>
<td>F</td>
<td>Pr&lt;sup&gt;f&lt;/sup&gt; F</td>
</tr>
<tr>
<td>product</td>
<td>3</td>
<td>1.40</td>
<td>0.33</td>
<td>9.38</td>
<td>0.01</td>
<td>0.26</td>
<td>0.85</td>
</tr>
<tr>
<td>week</td>
<td>1</td>
<td>5.20</td>
<td>0.06</td>
<td>8.07</td>
<td>0.03</td>
<td>0.27</td>
<td>0.61</td>
</tr>
<tr>
<td>rep&lt;sup&gt;f&lt;/sup&gt;</td>
<td>2</td>
<td>0.84</td>
<td>0.47</td>
<td>1.98</td>
<td>0.21</td>
<td>0.17</td>
<td>0.84</td>
</tr>
<tr>
<td>product*week</td>
<td>3</td>
<td>1.34</td>
<td>0.34</td>
<td>4.23</td>
<td>0.06</td>
<td>0.08</td>
<td>0.96</td>
</tr>
<tr>
<td>product*rep</td>
<td>6</td>
<td>1.58</td>
<td>0.29</td>
<td>0.93</td>
<td>0.53</td>
<td>0.43</td>
<td>0.83</td>
</tr>
<tr>
<td>week*rep</td>
<td>2</td>
<td>1.12</td>
<td>0.38</td>
<td>3.03</td>
<td>0.12</td>
<td>0.23</td>
<td>0.79</td>
</tr>
</tbody>
</table>

<sup>a</sup> firmness in grams; <sup>b</sup>sweetness by soluble solids in °Brix; <sup>c</sup> temperature at time of analyses; <sup>d</sup> titratable acidity by % malic acid; <sup>e</sup> ratio between soluble solids in °Brix and % malic acid; <sup>f</sup> replicate

Table 4.8: Newman-Keuls “post-hoc” procedure for physical and chemical analyses results

<table>
<thead>
<tr>
<th>Category</th>
<th>Pressure&lt;sup&gt;a&lt;/sup&gt;</th>
<th>°Brix&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Temp&lt;sup&gt;c&lt;/sup&gt;</th>
<th>pH</th>
<th>gMA&lt;sup&gt;d&lt;/sup&gt;</th>
<th>Brix:gMA&lt;sup&gt;e&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Pr&lt;sup&gt;f&lt;/sup&gt; F</td>
<td>F</td>
<td>Pr&lt;sup&gt;f&lt;/sup&gt; F</td>
<td>F</td>
<td>Pr&lt;sup&gt;f&lt;/sup&gt; F</td>
</tr>
<tr>
<td>LO&lt;sup&gt;f&lt;/sup&gt;</td>
<td>3965.71  a&lt;sup&gt;j&lt;/sup&gt;</td>
<td>10.38 a</td>
<td>5.62 a</td>
<td>3.53 a</td>
<td>0.72 b</td>
<td>14.42 b</td>
</tr>
<tr>
<td>LNO&lt;sup&gt;g&lt;/sup&gt;</td>
<td>2673.88  a</td>
<td>11.49 a</td>
<td>7.43 a</td>
<td>3.36 a</td>
<td>0.85 a</td>
<td>13.74 b</td>
</tr>
<tr>
<td>IO&lt;sup&gt;h&lt;/sup&gt;</td>
<td>3483.21  a</td>
<td>9.46 a</td>
<td>7.38 a</td>
<td>4.22 a</td>
<td>0.32 d</td>
<td>41.93 a</td>
</tr>
<tr>
<td>INO&lt;sup&gt;i&lt;/sup&gt;</td>
<td>3786.74  a</td>
<td>10.06 a</td>
<td>6.13 a</td>
<td>3.90 a</td>
<td>0.43 c</td>
<td>23.64 b</td>
</tr>
</tbody>
</table>

<sup>a</sup> firmness in grams; <sup>b</sup>sweetness by soluble solids in °Brix; <sup>c</sup> temperature at time of analyses; <sup>d</sup> titratable acidity by % malic acid; <sup>e</sup> ratio between soluble solids in °Brix and % malic acid; <sup>f</sup> Local organic; <sup>g</sup> Local non-organic; <sup>h</sup> Imported organic; <sup>i</sup> Imported non-organic; <sup>j</sup> means within a column with different letters are significant different (p ≤ 0.05)
With the resulting comparison between data obtained from hedonic evaluation and chemical/physical analyses, further investigation was necessary to estimate the impact of information disclosure and sensory evaluation on the product expectation measured in liking and monetary valuation. The effects of information and sensory perception were measured by calculating the differences between conditions of information disclosure. Table 4.9 provides the calculated results for the difference between expected and blind (E-B), labeled and blind (L-B), and labeled and expected (L-E) for the overall liking scores and ratings in the perceived intensity of sensory attributes of the tested peach samples. The calculated differences were compared with zero as the theoretic mean in the paired t-test to determine any statistical significance ($p < 0.05$). Disconfirmation was observed when a difference in the sensory perception (blind) and expectation (expected) occurred. “Negative disconfirmations” were observed in the imported non-organic (INO), imported organic (IO), and local organic (LO) samples for the overall liking scores and most of perceived intensity of sensory attributes evaluated, suggesting that consumers had a much higher expectation of these peach samples than they actually perceived. This observation can be the result of the undesirable ripening state and existing familiarity with the peach products, as previously discussed. Interestingly, “positive disconfirmation” was found for the imported non-organic (INO) samples for the perceived intensity of peach flavour, suggesting low expectation for imported products do occur particularly when the local products are available concurrently.
Table 4.9: Effect of expectation based on sensory evaluation and willingness to pay

<table>
<thead>
<tr>
<th></th>
<th>Overall Liking</th>
<th>Peach Flavour</th>
<th>Sweetness</th>
<th>Firmness</th>
<th>Juiciness</th>
<th>Willingness to Pay</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>E-B&lt;sup&gt;a&lt;/sup&gt;</td>
<td>L-B&lt;sup&gt;b&lt;/sup&gt;</td>
<td>L-E&lt;sup&gt;c&lt;/sup&gt;</td>
<td>E-B</td>
<td>L-B</td>
<td>L-E</td>
</tr>
<tr>
<td><strong>LO&lt;sup&gt;d&lt;/sup&gt;</strong></td>
<td>3.12</td>
<td>1.67</td>
<td>-1.45</td>
<td>1.35</td>
<td>0.73</td>
<td>-0.61</td>
</tr>
<tr>
<td><strong>P-value</strong></td>
<td>&lt;0.0001</td>
<td>0.01</td>
<td>0.04</td>
<td>0</td>
<td>0.05</td>
<td>0.05</td>
</tr>
<tr>
<td><strong>Sig&lt;sup&gt;e&lt;/sup&gt;</strong></td>
<td>Dis (-)&lt;sup&gt;i&lt;/sup&gt;</td>
<td>Ass (+)&lt;sup&gt;j&lt;/sup&gt;</td>
<td>Incomp&lt;sup&gt;k&lt;/sup&gt;</td>
<td>Dis (-)</td>
<td>Ass (+)</td>
<td>Incomp</td>
</tr>
<tr>
<td><strong>LNO&lt;sup&gt;f&lt;/sup&gt;</strong></td>
<td>0.53</td>
<td>-0.69</td>
<td>0.39</td>
<td>0.02</td>
<td>1.12</td>
<td>-0.02</td>
</tr>
<tr>
<td><strong>P-value</strong></td>
<td>0.37</td>
<td>0.32</td>
<td>0.15</td>
<td>0.95</td>
<td>&lt;0.0001</td>
<td>0.95</td>
</tr>
<tr>
<td><strong>Sig&lt;sup&gt;g&lt;/sup&gt;</strong></td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>Dis (-)</td>
</tr>
<tr>
<td><strong>IO&lt;sup&gt;h&lt;/sup&gt;</strong></td>
<td>3.16</td>
<td>0.27</td>
<td>1.9</td>
<td>-0.18</td>
<td>1.86</td>
<td>0.22</td>
</tr>
<tr>
<td><strong>P-value</strong></td>
<td>&lt;0.0001</td>
<td>0.69</td>
<td>&lt;0.0001</td>
<td>0.47</td>
<td>&lt;0.0001</td>
<td>0.42</td>
</tr>
<tr>
<td><strong>Sig&lt;sup&gt;i&lt;/sup&gt;</strong></td>
<td>Dis (-)</td>
<td>NS</td>
<td>Dis (-)</td>
<td>NS</td>
<td>Dis (-)</td>
<td>NS</td>
</tr>
<tr>
<td><strong>INO&lt;sup&gt;j&lt;/sup&gt;</strong></td>
<td>1.45</td>
<td>-0.61</td>
<td>-0.33</td>
<td>1.56</td>
<td>1.63</td>
<td>0.1</td>
</tr>
<tr>
<td><strong>P-value</strong></td>
<td>0.02</td>
<td>0.32</td>
<td>&lt;0.0001</td>
<td>0.94</td>
<td>&lt;0.0001</td>
<td>0.66</td>
</tr>
<tr>
<td><strong>Sig&lt;sup&gt;k&lt;/sup&gt;</strong></td>
<td>Dis (-)</td>
<td>NS</td>
<td>Dis (+)</td>
<td>NS</td>
<td>Dis (-)</td>
<td>NS</td>
</tr>
</tbody>
</table>

<sup>a</sup> Expected – Blind; <sup>b</sup> Labeled – Blind; <sup>c</sup> Labeled – Expected; <sup>d</sup> Local Organic; <sup>e</sup> Statistical significance; <sup>f</sup> Local Non-Organic; <sup>g</sup> Imported Organic; <sup>h</sup> Imported Non-Organic; <sup>i</sup> Negative disconfirmation; <sup>j</sup> Positive assimilation; <sup>k</sup> Incomplete assimilation; NS: Not statistically significant (for [L-E], the calculation was not performed if the prior [L-B] or [E-B] result in the same row was indicated “not statistically significant”).
Calculated differences between the full information disclosure coupled with product testing (labeled) and the blind product testing (blind) reveals the effect of information disclosure on liking and perception. In the case of information effect, as previously mentioned in Equation [2.4], two patterns could occur: \((L - B) / (E - B) > 0\) which signifies an assimilation effect or \((L - B) / (E - B) < 0\) which reveals a contrast effect. A positive assimilation effect was mostly found in local organic (LO) samples, particularly for the perceived ratings of overall liking, perceived intensity of peach flavour, sweetness, and juiciness \((\alpha = 0.54, 0.55, 0.49, \text{ and } 0.46, \text{ respectively})\). The positive assimilation effect observed in the current study supports the hypothesis for the positive shift in hedonic and perceived attributes rating being attributed to the information effect. The combination of two favourable pieces of information, local and organic, provides reinforcement for the sample ratings and sensory perception. Similar to previous research, the contrast phenomenon was not observed in the current study, even with a large degree of negative disconfirmation being observed (Deliza&MacFie, 1996; Lange, et al, 1999). This is contrary to Anderson's (1973) prediction of the assimilation-contrast theory, which suggests that the presence of contrast from large negative disconfirmation can bring forth product rejection. Furthermore, our results do not provide any further evidence for the assumption of the theory that there is a strong association between assimilation and negative disconfirmation.

As proposed by d’Hauteville et al. (2007) and Lange et al. (1998), the ratio between \((L-B)\) and \((E-B)\) provides valuable information for determining the effect of assimilation explained by the degree of disconfirmation describing the contribution of information disclosure and sensory perception on the hedonic rating and willingness to pay. There are three patterns possible listed below with the proposed linear regression model \((L-B) = \alpha + \beta(E-B) + \varepsilon:\)
1) $0 < \beta < 0.5$

2) $0.5 < \beta < 1$

3) $\beta = 0.5$

When $\beta$ is larger than 0 and approaching 0.5 as indicated in pattern 1), there is a limited effect from the information disclosure, and the hedonic rating and willingness to pay are predominantly contributed by the sensory experience. When $\beta$ lies between 0.5 and 1, the hedonic rating and willingness are heavily influenced by the effect of information disclosure. Finally, if result 3) is obtained, which indicated $\beta$ equals to 0.5, the perceived hedonic rating and willingness to pay are equally affected by the sensory experience and information disclosure.

Table 4.10 provides the linear regression results indicating the contribution of sensory experience and information disclosure on perceived hedonic rating and willingness to pay for the four peach samples tested. The results reveal some inconsistencies between overall liking and willingness to pay. In overall liking, the dominant labeling effect was found in local non-organic (LNO) samples ($\beta = 0.69$) and the significant effect from sensory experience was found in local organic (LO) samples ($\beta = 0.41$). For both imported organic (IO) and imported non-organic (INO) samples, the sensory perception and labels were close to equilibrium in contributing to the overall rating ($\beta = 0.47, \beta = 0.51$, respectively). This result is rather surprising, as one might suspect that the significant difference in chemical analyses found in IO would strengthen the impact of sensory experience, while the current data suggests otherwise. Different patterns were observed for willingness to pay: a strong label influence was found in both LO ($\beta = 0.64$) and INO ($\beta = 0.78$) and a strong sensory impact was found in IO ($\beta = 0.22$), which coincide with the findings from chemical analyses. Inconsistencies, observed in the contribution of sensory perception and information disclosure between overall liking and willingness to pay provide
evidence that the hedonic measure and monetary valuation are not directly comparable. This finding provides an indication that the sample liking score does not necessarily translate into consumers’ product monetary valuation. Furthermore, other factors may have contributed to consumers’ formation of expectation other than the evaluated intrinsic and extrinsic attributes. Results from the current study are supported by earlier research, in which consumers have a higher expectation based on the external information provided by labels alone. The actual sensory evaluation of the samples is distant from the high expectation (Lange et al., 1999; Stefani et al., 2006).
Table 4.10: Contribution ratio from effect of information disclosure and perceived sensory experience on overall liking and willingness to pay

| Source | Value | Standard error | t     | Pr>|t| | R^2 | Value | Standard error | t     | Pr>|t| | R^2 |
|--------|-------|----------------|-------|--------|-------|-------|----------------|--------|--------|-------|-------|
| LO^a   | Intercept | 0.37 | 0.65 | 0.57 | 0.567 | 0.21 | -0.13 | 0.12 | -1.06 | 0.293 | 0.45 |
|        | β     | 0.41 | 0.11 | 3.53 | 0.001 |       | 0.64 | 0.10 | 6.21 | <0.0001 |
| LNO^b  | Intercept | -1.06 | 0.56 | -1.87 | 0.067 | 0.35 | -0.14 | 0.10 | -1.36 | 0.179 | 0.26 |
|        | β     | 0.69 | 0.13 | 5.05 | <0.0001 |       | 0.49 | 0.12 | 4.07 | 0.0001 |
| IO^c   | Intercept | -1.23 | 0.77 | -1.59 | 0.117 | 0.17 | -0.24 | 0.09 | -2.75 | 0.008 | 0.15 |
|        | β     | 0.47 | 0.15 | 3.14 | 0.003 |       | 0.22 | 0.07 | 2.91 | 0.005 |
| INO^d  | Intercept | -1.35 | 0.56 | -2.41 | 0.020 | 0.26 | -0.35 | 0.11 | -3.01 | 0.004 | 0.45 |
|        | β     | 0.51 | 0.12 | 4.09 | 0.0001 |       | 0.78 | 0.12 | 6.30 | <0.0001 |
In conclusion, the current study provides empirical evidence indicating that consumer expectations from the labeled information of production methods and regions of origin vary with different rating criteria. Despite the nature of under-ripeness found in some peach samples, positive significant labeling effects were seen in the hedonic scores and ratings of perceived intensity of other sensory attributes with the presence of the local and organic label. A similar finding, however, was not observed in the degree of willingness to pay. Further linear regression analysis also provides support for such observation, with inconsistent contributions from the sensory evaluation and labeling effect on the expected rating of overall liking and monetary valuation of willingness to pay.

The current study has several limitations, and provides opportunities for further research in expectations and the impact of extrinsic label information. A probable neighbourhood effect was exhibited in the current study, as demonstrated by survey results of the participants’ fruits and vegetables purchasing habits. Participants are likely to support locally produced products and thus have a higher expectation and more knowledge about the samples which could potentially produce bias during the evaluation. Our results indicate a strong preference for local products, particularly when such products are paired with organic labels. This result provides additional support for the previous research in which the synergistic effect of “local origin and organic production” on consumer purchase intent is observed in fresh produce (Campbell et al., 2010). Our results support the marketing strategy and the installation of the newly introduced “Foodland Ontario Organic” label by the Organic Council of Ontario (2011). Such a label may likely be used by consumers as a product differentiation from products that are imported and organically produced. For future research opportunities, it would be interesting, as pointed out in previous studies, to measure the change of expectation over time, particularly with the probable
neighbourhood effect in mind (Lange et al., 1999; Deliza&MacFie, 1996). The current study was conducted, with a limited product supply of peaches, over the span of two weeks due to the short duration of the peach season in 2010. The short experimental period also resulted in recruitment of a limited number of participants. It would be preferable to increase the number of participants for future studies, in order to substantiate the experimental results. Furthermore, it would have also been preferable to separate the three-part sensory evaluation into two separate sessions, in order to avoid carry-over bias and expectation formed from seeing the labels twice in one experimental setting. The separation of sessions can also prevent experimental fatigue from large sample consumption. However, as with most of sensory experiments conducted with fresh produce, the current study is constrained to a single setting due to the biological variability inherent to fresh peach samples and the need to provide samples consistent with a controlled ripening setting.
Chapter 5: Conclusions

Information about food production methods and origins have become ever more relevant as consumers continue to develop interest in learning where and how their food is produced and its relationship to personal health, food safety, environment and society. Credence product information such as sustainable, organic and local are often interpreted by consumers differently based on their beliefs and understanding of such agricultural practices. Interpretation based on differences in attitudes and understanding of labeling information concerning these credence product attributes can also influence the constitution of product expectation and consumption experience.

The current study was set out to investigate the current state of consumer understanding and attitudes towards the information regarding sustainable, organic and local foods and production practices. In addition, using yellow peaches as an example, the current research studied how such credence information concerning alternative agricultural practice presented as product labels could influence consumers’ product preference and acceptability.

Sustainable, Local and Organic, what does it mean to consumers?

The first study has examined consumer perception and understanding of sustainable, organic and local foods and agricultural practices in Ontario. Strong association among items concerning perceived personal and public interests have been observed when study participants evaluated statements regarding organic and local foods. When compared with personal (private) interest, such as taste, safety and food quality, public interest such as environmental and societal concerns had less of a contribution to consumer perception of organic and local foods. Furthermore, there was little difference between consumer attitudes toward local and organic
aside from an association with distance-related statements concerning local foods. Consumer attitudes toward sustainable agricultural practices showed a strong association with statements regarding environmental and societal benefits, demonstrating a closer alignment with the sustainable production system with public, rather than personal interests.

Three segments were found within the sampled population depicting study participants’ differences in perception and attitudes for locally grown food, organic and sustainable agricultural practices. The existence of these groupings confirmed that these practices and foods were understood differently among the study participants. These differences were related to the distinctions found in participants’ purchasing behaviours towards products produced from these production methods. There was a significant higher proportion of frequent organic food shoppers found in the cluster in which participants had a higher degree of interest toward alternative agricultural practices and foods. Overall, the study has shown the existence of different understanding and attitudes towards these concepts regarding alternative agricultural production systems and products.

**Impact of local and organic information on Consumer Acceptability**

Using yellow peaches, the second study has investigated the labeling effect of production methods and regions of origins on consumer sensory acceptability and degree of willingness to pay. Significant positive labeling effect have been observed in hedonic scores and perceived intensity of sensory characteristics when organic and local labels were presented conjointly. Product liking and sensory acceptability had significantly increased with the presence of such conjoint label. A similar effect from labeling information, however, was not observed in
monetary valuation of willingness to pay, indicating that such positive labeling effect may not be comparable between hedonic sensory measurement and monetary valuation.

**Research Implications**

Our study has shown that although the concepts of sustainable, organic and local foods and agricultural practices may be unclear to consumers, their expectation and acceptability are still altered positively with the presence of such labels. With the inconsistency between understanding and reaction towards such credence information concerning production methods and regions of origin, consumers can often misinterpret and be misled due to various degree of understanding of such information. With such confusion, it is not surprising to find that the positive attitude toward organic and local labeling does not translate into positive monetary valuation towards these products. It is thus important for the marketers, producers and retailers alike to provide appropriate information and relevant educational materials in order for consumers to gain a better understanding of the benefits of these alternative agricultural practices. Such educational information and campaigns need to be tailored towards different groups of consumers, as various degrees of interest and understanding towards alternative agricultural practices are revealed based on the heterogeneous segmentations of the population.

**Suggested future research to continue**

In the current study, the survey of consumer attitudes and understanding of alternative agricultural practices and sensory evaluation of the impact of such credence product information were conducted separately with different groups of study participants. In order to further understand consumer behaviour, it would be of benefit for future research to use only one group
of participants for both studies in order to investigate and link how consumer attitudes and understanding towards these alternative agricultural production concepts can affect their sensory liking and acceptability of food products produced from such production systems. Furthermore, it would also be of interest to track and compare the results from the proposed study with consumer’s actual purchasing and consumption behaviour. In addition, due to the biological heterogeneity of fresh peach samples and the need to provide samples with a controlled ripening condition, the current study is limited with some samples being under-ripe. Future investigation would be of great benefit to study how to monitor sample ripeness, in terms of quality control of fresh produce, particularly when paired with sensory evaluation and consumer study.
REFERENCES CITED


Appendix A- Consumer survey on sustainable, organic and local foods and agricultural practices – Sample Questionnaire

Please evaluate the following statements and use the scale provided.

I. Sustainable agricultural production

1. I have heard of the term, “sustainability.”
   a. Strongly disagree
   b. Disagree somewhat
   c. Neither disagree nor agree
   d. Agree somewhat
   e. Strongly agree

2. Sustainable agricultural production means eco- or environmentally-friendly.
   a. Strongly disagree
   b. Disagree somewhat
   c. Neither disagree nor agree
   d. Agree somewhat
   e. Strongly agree

3. Sustainable agricultural production means socially responsible.
   a. Strongly disagree
   b. Disagree somewhat
   c. Neither disagree nor agree
   d. Agree somewhat
   e. Strongly agree

4. Sustainable agricultural production means beneficial to local economy.
   a. Strongly disagree
   b. Disagree somewhat
   c. Neither disagree nor agree
   d. Agree somewhat
   e. Strongly agree

5. Sustainable agricultural production means energy-saving and energy-efficient.
   a. Strongly disagree
   b. Disagree somewhat
   c. Neither disagree nor agree
   d. Agree somewhat
   e. Strongly agree

   a. Strongly disagree
   b. Disagree somewhat
   c. Neither disagree nor agree
7. Sustainable agricultural production means lower carbon footprint.
   a. Strongly disagree
   b. Disagree somewhat
   c. Neither disagree nor agree
   d. Agree somewhat
   e. Strongly agree

8. Sustainable agricultural product means longer shelf-life.
   a. Strongly disagree
   b. Disagree somewhat
   c. Neither disagree nor agree
   d. Agree somewhat
   e. Strongly agree

   a. Strongly disagree
   b. Disagree somewhat
   c. Neither disagree nor agree
   d. Agree somewhat
   e. Strongly agree

10. Sustainable agricultural production means food produced without any use of natural chemicals or additives.
    a. Strongly disagree
    b. Disagree somewhat
    c. Neither disagree nor agree
    d. Agree somewhat
    e. Strongly agree

11. Sustainable agricultural production means food produced without any use of synthetic chemicals or additives.
    a. Strongly disagree
    b. Disagree somewhat
    c. Neither disagree nor agree
    d. Agree somewhat
    e. Strongly agree

12. Sustainable agricultural product means higher quality products.
    a. Strongly disagree
    b. Disagree somewhat
    c. Neither disagree nor agree
    d. Agree somewhat
    e. Strongly agree
13. Sustainable agricultural production means green.
  a. Strongly disagree
  b. Disagree somewhat
  c. Neither disagree nor agree
  d. Agree somewhat
  e. Strongly agree

  a. Strongly disagree
  b. Disagree somewhat
  c. Neither disagree nor agree
  d. Agree somewhat
  e. Strongly agree

15. Sustainable agricultural products provide health benefits.
  a. Strongly disagree
  b. Disagree somewhat
  c. Neither disagree nor agree
  d. Agree somewhat
  e. Strongly agree

16. Sustainable agricultural production means food made with all natural ingredients.
  a. Strongly disagree
  b. Disagree somewhat
  c. Neither disagree nor agree
  d. Agree somewhat
  e. Strongly agree

17. Sustainable agricultural production means expensive.
  a. Strongly disagree
  b. Disagree somewhat
  c. Neither disagree nor agree
  d. Agree somewhat
  e. Strongly agree

  a. Strongly disagree
  b. Disagree somewhat
  c. Neither disagree nor agree
  d. Agree somewhat
  e. Strongly agree

19. Sustainable product has a better taste.
  a. Strongly disagree
  b. Disagree somewhat
c. Neither disagree nor agree
d. Agree somewhat
e. Strongly agree

20. Sustainable agricultural production means ethical.
   a. Strongly disagree
   b. Disagree somewhat
c. Neither disagree nor agree
d. Agree somewhat
e. Strongly agree

21. The term, “sustainability” is a scam and I don’t believe in it.
   a. Strongly disagree
   b. Disagree somewhat
c. Neither disagree nor agree
d. Agree somewhat
e. Strongly agree

II. Organic Food

1. Organic food is sold at the local farmers market and farm stands.
   a. Strongly disagree
   b. Disagree somewhat
c. Neither disagree nor agree
d. Agree somewhat
e. Strongly agree

2. Organic food is beneficial to the local economy.
   a. Strongly disagree
   b. Disagree somewhat
c. Neither disagree nor agree
d. Agree somewhat
e. Strongly agree

3. Organic food is fresh.
   a. Strongly disagree
   b. Disagree somewhat
c. Neither disagree nor agree
d. Agree somewhat
e. Strongly agree

4. Organic food is a product of higher quality.
   a. Strongly disagree
   b. Disagree somewhat
c. Neither disagree nor agree
d. Agree somewhat  
e. Strongly agree

5. Organic food is produced without the use of any natural chemicals or additives.  
a. Strongly disagree  
b. Disagree somewhat  
c. Neither disagree nor agree  
d. Agree somewhat  
e. Strongly agree

6. Organic food is produced without the use of any synthetic chemicals or additives.  
a. Strongly disagree  
b. Disagree somewhat  
c. Neither disagree nor agree  
d. Agree somewhat  
e. Strongly agree

7. Organic food promotes socially responsibility.  
a. Strongly disagree  
b. Disagree somewhat  
c. Neither disagree nor agree  
d. Agree somewhat  
e. Strongly agree

8. Organic food is safer to consume.  
a. Strongly disagree  
b. Disagree somewhat  
c. Neither disagree nor agree  
d. Agree somewhat  
e. Strongly agree

9. Organic food has a longer shelf-life.  
a. Strongly disagree  
b. Disagree somewhat  
c. Neither disagree nor agree  
d. Agree somewhat  
e. Strongly agree

10. Organic food is expensive.  
a. Strongly disagree  
b. Disagree somewhat  
c. Neither disagree nor agree  
d. Agree somewhat  
e. Strongly agree
11. Organic food is hard to find.
   a. Strongly disagree
   b. Disagree somewhat
   c. Neither disagree nor agree
   d. Agree somewhat
   e. Strongly agree

12. Organic food tastes better.
   a. Strongly disagree
   b. Disagree somewhat
   c. Neither disagree nor agree
   d. Agree somewhat
   e. Strongly agree

13. Organic food is easy to prepare.
   a. Strongly disagree
   b. Disagree somewhat
   c. Neither disagree nor agree
   d. Agree somewhat
   e. Strongly agree

   a. Strongly disagree
   b. Disagree somewhat
   c. Neither disagree nor agree
   d. Agree somewhat
   e. Strongly agree

15. Organic food is produced with purified water.
   a. Strongly disagree
   b. Disagree somewhat
   c. Neither disagree nor agree
   d. Agree somewhat
   e. Strongly agree

16. Organic food provides health benefits.
   a. Strongly disagree
   b. Disagree somewhat
   c. Neither disagree nor agree
   d. Agree somewhat
   e. Strongly agree

17. Organic food is more nutritious.
   a. Strongly disagree
   b. Disagree somewhat
   c. Neither disagree nor agree
d. Agree somewhat  
e. Strongly agree  

18. By selling organic food, farmers receive better shares of economic return.  
a. Strongly disagree  
b. Disagree somewhat  
c. Neither disagree nor agree  
d. Agree somewhat  
e. Strongly agree  

a. Strongly disagree  
b. Disagree somewhat  
c. Neither disagree nor agree  
d. Agree somewhat  
e. Strongly agree  

III. Local Food  

1. Local food is produced in the region where you reside.  
a. Strongly disagree  
b. Disagree somewhat  
c. Neither disagree nor agree  
d. Agree somewhat  
e. Strongly agree  

2. Local food is produced in Ontario.  
a. Strongly disagree  
b. Disagree somewhat  
c. Neither disagree nor agree  
d. Agree somewhat  
e. Strongly agree  

3. Local food is sold at the local farmers market and farm stands.  
a. Strongly disagree  
b. Disagree somewhat  
c. Neither disagree nor agree  
d. Agree somewhat  
e. Strongly agree  

4. Local food is beneficial to the local economy.  
a. Strongly disagree  
b. Disagree somewhat  
c. Neither disagree nor agree  
d. Agree somewhat  
e. Strongly agree
5. Local food is fresh.
   a. Strongly disagree
   b. Disagree somewhat
   c. Neither disagree nor agree
   d. Agree somewhat
   e. Strongly agree

6. Local food is produced within 50-km radius of place where it is sold.
   a. Strongly disagree
   b. Disagree somewhat
   c. Neither disagree nor agree
   d. Agree somewhat
   e. Strongly agree

7. Local food is produced within the 100-mi radius of your current residence.
   a. Strongly disagree
   b. Disagree somewhat
   c. Neither disagree nor agree
   d. Agree somewhat
   e. Strongly agree

8. Local food is produced without the use of any natural chemicals or additives.
   a. Strongly disagree
   b. Disagree somewhat
   c. Neither disagree nor agree
   d. Agree somewhat
   e. Strongly agree

9. Local food is produced without the use of any synthetic chemicals or additives.
   a. Strongly disagree
   b. Disagree somewhat
   c. Neither disagree nor agree
   d. Agree somewhat
   e. Strongly agree

10. Local food is a product of higher quality.
    a. Strongly disagree
    b. Disagree somewhat
    c. Neither disagree nor agree
    d. Agree somewhat
    e. Strongly agree

11. Local food promotes socially responsibility.
    a. Strongly disagree
    b. Disagree somewhat
    c. Neither disagree nor agree
d. Agree somewhat
e. Strongly agree

12. Local food is safer to consume.
a. Strongly disagree
b. Disagree somewhat
c. Neither disagree nor agree
d. Agree somewhat
e. Strongly agree

13. Local food has a longer shelf-life.
a. Strongly disagree
b. Disagree somewhat
c. Neither disagree nor agree
d. Agree somewhat
e. Strongly agree

14. Local food is expensive.
a. Strongly disagree
b. Disagree somewhat
c. Neither disagree nor agree
d. Agree somewhat
e. Strongly agree

15. Local food is certified organic.
a. Strongly disagree
b. Disagree somewhat
c. Neither disagree nor agree
d. Agree somewhat
e. Strongly agree

16. Local food is hard to find.
a. Strongly disagree
b. Disagree somewhat
c. Neither disagree nor agree
d. Agree somewhat
e. Strongly agree

17. Local food tastes better.
a. Strongly disagree
b. Disagree somewhat
c. Neither disagree nor agree
d. Agree somewhat
e. Strongly agree
18. Local food is easy to prepare.
   a. Strongly disagree
   b. Disagree somewhat
   c. Neither disagree nor agree
   d. Agree somewhat
   e. Strongly agree

19. Local food is environmentally-friendly.
   a. Strongly disagree
   b. Disagree somewhat
   c. Neither disagree nor agree
   d. Agree somewhat
   e. Strongly agree

20. Local food is more nutritious.
   a. Strongly disagree
   b. Disagree somewhat
   c. Neither disagree nor agree
   d. Agree somewhat
   e. Strongly agree

21. Local food provides health benefits.
   a. Strongly disagree
   b. Disagree somewhat
   c. Neither disagree nor agree
   d. Agree somewhat
   e. Strongly agree

22. By selling local foods, farmers receive better shares of economic return.
   a. Strongly disagree
   b. Disagree somewhat
   c. Neither disagree nor agree
   d. Agree somewhat
   e. Strongly agree

23. Local food produces lower carbon-footprint.
   a. Strongly disagree
   b. Disagree somewhat
   c. Neither disagree nor agree
   d. Agree somewhat
   e. Strongly agree
Appendix B- Organic, Local and Sustainable Statements Used in Survey Questionnaire with Corresponding Cited References

Table B-1: Statements related to organic food and agricultural practice with references in which statements have been quoted

<table>
<thead>
<tr>
<th>Organic food ...</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>is sold at the local farmers market and farm stands</td>
<td>Schneider &amp; Francis, 2005; La Trobe, 2003</td>
</tr>
<tr>
<td>is beneficial to the local economy</td>
<td>Fotopoulos &amp; Krystallis, 2002</td>
</tr>
<tr>
<td>is fresh</td>
<td>Wandel &amp; Bugge, 1996</td>
</tr>
<tr>
<td>is a product of higher quality</td>
<td>Hill &amp; Lynchenaun, 2002</td>
</tr>
<tr>
<td>is produced without the use of any natural chemicals/additives</td>
<td>False statement (Use of pesticides: Parr et al., 1990)</td>
</tr>
<tr>
<td>is produced without the use of any synthetic chemicals/additives</td>
<td>Mäkiniemi et al., 2011; CFIA, 2010; Wilkins &amp; Hellers, 1994; Jolly et al., 1991</td>
</tr>
<tr>
<td>promotes social responsibility</td>
<td>Grunert &amp; Juhl, 1995</td>
</tr>
<tr>
<td>is safer to consume</td>
<td>Soler et al., 2002; Schifferstein &amp; Oude Ophuis, 1998; Wandel &amp; Bugge, 1996;</td>
</tr>
<tr>
<td>has a longer shelf-life</td>
<td>False statement (shorter shelf-life: Ness et al., 2010; Shepherd et al., 2005)</td>
</tr>
<tr>
<td>is expensive</td>
<td>Mäkiniemi et al., 2011; Shepherd et al., 2005; Zanoli &amp; Naspetti, 2002; Magnusson et al., 2001; Sparks &amp; Shepherd, 1992</td>
</tr>
<tr>
<td>is hard to find</td>
<td>Zanoli &amp; Naspetti, 2002; Sparks &amp; Shepherd, 1992</td>
</tr>
<tr>
<td>tastes better</td>
<td>Mäkiniemi et al., 2011; Magnusson et al., 2001; Schifferstein &amp; Oude Ophuis, 1998; Wandel &amp; Bugge, 1996; Sparks &amp; Shepherd, 1992</td>
</tr>
<tr>
<td>is easy to prepare</td>
<td>Hjelmar, 2010; Vermeir &amp; Verbeke, 2006;</td>
</tr>
<tr>
<td>is environmentally-friendly</td>
<td>Lea &amp; Worsley, 2005; Shepherd et al., 2005; Soler et al., 2002; Squires et al., 2001; Wandel &amp; Bugge, 1996; Grunert &amp; Juhl, 1995; Sparks &amp; Shepherd, 1992</td>
</tr>
<tr>
<td>is produced with purified water</td>
<td>False statement</td>
</tr>
<tr>
<td>provides health benefits</td>
<td>Mäkiniemi et al., 2011; Shepherd et al., 2005; Magnusson et al., 2003; Wandel &amp; Bugge, 1996; Sparks &amp; Shepherd, 1992; Jolly et al., 1991</td>
</tr>
<tr>
<td>is more nutritious</td>
<td>Mäkiniemi et al., 2011; Hill &amp; Lynchenaun, 2002; Jolly et al., 1991</td>
</tr>
<tr>
<td>By selling organic food, farmers receive better shares of economic return</td>
<td>Vermeir &amp; Verbeke, 2006; Reheul et al., 2001</td>
</tr>
<tr>
<td>produces lower carbon footprint</td>
<td>Vermeir &amp; Verbeke, 2006</td>
</tr>
</tbody>
</table>
Table B-2: Statements related to local food and agricultural practice with references in which statements have been quoted

<table>
<thead>
<tr>
<th>Local food ...</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>is produced in the region where you reside</td>
<td>CFIA, 2010</td>
</tr>
<tr>
<td>is produced in Ontario</td>
<td>OMAFRA, 2010</td>
</tr>
<tr>
<td>is sold at the local farmers market and farm stands</td>
<td>Zepeda &amp; Li, 2006; Schneider &amp; Francis, 2005</td>
</tr>
<tr>
<td>is beneficial to local economy</td>
<td>Roininen et al., 2006; Schneider &amp; Francis, 2005; Brown, 2003</td>
</tr>
<tr>
<td>is fresh</td>
<td>Roininen et al., 2006; Brown, 2003; La Trobe, 2001</td>
</tr>
<tr>
<td>is produced within 50-km radius of place where it is sold</td>
<td>CFIA, 2010</td>
</tr>
<tr>
<td>is produced within 100-mile radius of your current residence</td>
<td>(100-mile diet, see Time, 2006)</td>
</tr>
<tr>
<td>is produced without the use of any natural chemicals/additives</td>
<td>False statement (use of pesticides: Thilmany et al., 2008)</td>
</tr>
<tr>
<td>is produced without the use of any synthetic chemicals/additives</td>
<td>False statement (use of pesticides: Thilmany et al., 2008)</td>
</tr>
<tr>
<td>is a product of higher quality</td>
<td>Chambers et al., 2007; Schneider &amp; Francis, 2005; Zepeda &amp; Li, 2006; Brown, 2003; La Trobe, 2001</td>
</tr>
<tr>
<td>promotes social responsibility</td>
<td>Seyfang, 2006</td>
</tr>
<tr>
<td>is safer to consume</td>
<td>Roininen et al., 2006</td>
</tr>
<tr>
<td>has longer shelf-life</td>
<td>False statement (Shelf-life: Torjusen et al., 2001)</td>
</tr>
<tr>
<td>is expensive</td>
<td>Roininen et al., 2006; Zepeda &amp; Li, 2006; Brown, 2003</td>
</tr>
<tr>
<td>is certified organic</td>
<td>Seyfang, 2006; Zepeda &amp; Li, 2006; Schneider &amp; Francis, 2005; La Trobe, 2001</td>
</tr>
<tr>
<td>is hard to find</td>
<td>Hardesty, 2008</td>
</tr>
<tr>
<td>tastes better</td>
<td>Chambers et al., 2007; Schneider &amp; Francis, 2005</td>
</tr>
<tr>
<td>is easy to prepare</td>
<td>Vermeir &amp; Verbeke, 2006; Brown, 2003</td>
</tr>
<tr>
<td>is environmentally-friendly</td>
<td>Thilmany et al., 2008; Roininen et al., 2006; Schneider &amp; Francis, 2005; Seyfang, 2006; Zepeda &amp; Li, 2006; Lea &amp; Worsley, 2005</td>
</tr>
<tr>
<td>is more nutritious</td>
<td>Zepeda &amp; Li, 2006; Brown, 2003</td>
</tr>
<tr>
<td>provides health benefits</td>
<td>Roininen et al., 2006; Zepeda &amp; Li, 2006</td>
</tr>
<tr>
<td>By selling local food, farmers receive better shares of economic return</td>
<td>Thilmany et al., 2008; Roininen et al., 2006; Schneider &amp; Francis, 2005; Zepeda &amp; Li, 2006</td>
</tr>
<tr>
<td>produces lower carbon footprint</td>
<td>Schneider &amp; Francis, 2005; Seyfang, 2006; Zepeda &amp; Li, 2006</td>
</tr>
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<td>Sustainable agricultural production means ...</td>
<td>References</td>
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<td>----------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
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<tr>
<td>I have heard of the term, “sustainability.”</td>
<td>Grankvist&amp; Biel, 2001</td>
</tr>
<tr>
<td>eco- or environmentally-friendly</td>
<td>Mäkiniemi et al., 2011; Vermeir&amp;Verbeke, 2006; Roberts, 1996; Grunert&amp;Juhl, 1995</td>
</tr>
<tr>
<td>socially responsible</td>
<td>Mäkiniemi et al., 2011; Vermeir&amp;Verbeke, 2006; Grunert&amp;Juhl, 1995</td>
</tr>
<tr>
<td>beneficial to local economy</td>
<td>Vermeir&amp;Verbeke, 2006</td>
</tr>
<tr>
<td>energy-saving and energy efficient</td>
<td>Vermeir&amp;Verbeke, 2006; Sparks &amp; Shepherd, 1992</td>
</tr>
<tr>
<td>locally produced</td>
<td>Rooinen et al., 2006</td>
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<tr>
<td>lower production of carbon footprint</td>
<td>Vermeir&amp;Verbeke, 2006;</td>
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<tr>
<td>longer shelf-life</td>
<td>False statement</td>
</tr>
<tr>
<td>fresh</td>
<td>Seyfang, 2006</td>
</tr>
<tr>
<td>food produced without any use of natural chemicals/additives</td>
<td>False statement (Use of pesticides: Parr et al., 1990)</td>
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<tr>
<td>food produced without any use of synthetic chemicals/additives</td>
<td>Agricultural and Agri-Food Canada, 2007; Parr et al., 1990</td>
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<td>green</td>
<td>Roberts, 1996; Sparks &amp; Shepherd, 1992</td>
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<td>higher quality products</td>
<td>Grankvist&amp; Biel, 2001</td>
</tr>
<tr>
<td>minimally packaged consumer products</td>
<td>Vermeir&amp;Verbeke, 2006; Roberts, 1996</td>
</tr>
<tr>
<td>products provide health benefits</td>
<td>Mäkiniemi et al., 2011</td>
</tr>
<tr>
<td>food made with all natural ingredients</td>
<td>Mäkiniemi et al., 2011</td>
</tr>
<tr>
<td>expensive</td>
<td>Mäkiniemi et al., 2011; Grankvist&amp; Biel, 2001</td>
</tr>
<tr>
<td>certified organic</td>
<td>Mäkiniemi et al., 2011</td>
</tr>
<tr>
<td>better taste</td>
<td>Mäkiniemi et al., 2011; Grankvist&amp; Biel, 2001</td>
</tr>
<tr>
<td>ethical</td>
<td>Mäkiniemi et al., 2011; Vermeir&amp;Verbeke, 2006;</td>
</tr>
<tr>
<td>The term, “sustainability”, is a scam and I don't believe in it</td>
<td>False statement</td>
</tr>
</tbody>
</table>
Welcome to Consumer Questionnaire

Consumer Perception of Fruit Quality

You are asked to participate in a research study conducted by Dr. Liliane Zoungrana (Post Doctoral Fellow), Jenny Wu (MSc candidate), Dr. Lisa Duizer (co-supervisor) and Dr. Isabelle Lesschaeve (co-supervisor) from the Department of Food Science at the University of Guelph and Vineland Research and Innovation Centre.

This study is being funded by the OMAFRA New Directions & Alternative Renewable Fuels Research Program.

If you have any questions or concerns about the research, please feel free to contact Dr. Lisa Duizer: Faculty member in the Department of Food Science, Phone: 519-824-4120 ext 53410, or Dr. Liliane Zoungrana: Post Doctoral Fellow, Consumer Insights and Product Innovation, Vineland Research and Innovation Centre, Phone: 905-562-0320 ext 748.

PURPOSE OF THE STUDY

The purpose of this research is to understand consumer perception of fruit quality through utilization of consumer survey.

PROCEDURES

The whole study will last about 30 minutes. If you agree to participate in this study you would be involved in the following:

I. Completion of the questionnaire:

You will be filling out a questionnaire regarding your opinion on horticultural practices and beliefs. This questionnaire will take approximately 30 minutes to complete.

If you would like to find out more about the study, we would be more than happy to provide you with the information after the study is completed.

POTENTIAL RISKS AND DISCOMFORTS

There is no potential risks or discomforts associated with this study.

POTENTIAL BENEFITS TO PARTICIPANTS AND/OR TO SOCIETY
Information collected by this study will help us to have a better understanding of consumer perception of food qualities. Your opinion will be valued and translated into products that not only meet your demands as a consumer but will also help the Canadian horticulture industry grow and prosper.

PAYMENT FOR PARTICIPATION

You will receive 40 Marketpoints for participating in the study.

CONFIDENTIALITY

Every effort will be made to ensure confidentiality of any identifying information that is obtained in connection with this study. All data collected during the research portion of this study will be treated as confidential.

All data will be stored on a password-protected computer and/or in a locked cabinet. This can only be accessed by the students and co-investigators involved in the experiment. The data will be subject to statistical analysis. Personal demographic data will only be used for the purpose of statistical analysis.

PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you agree to be in this study, you may withdraw at any time without consequences of any kind. You may exercise the option of removing your data from the study. The investigator may withdraw you from this research if circumstances arise that warrant doing so.

RIGHTS OF RESEARCH PARTICIPANTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. This study has been reviewed and received ethics clearance through the University of Guelph Research Ethics Board. If you have questions regarding your rights as a research participant, contact:

Research Ethics Coordinator
University of Guelph
437 University Centre
Guelph, ON N1G 2W1
Telephone: (519) 824-4120, ext. 56606
E-mail: sauld@uoguelph.ca
Fax: (519) 821-5236
CONSENT FOR RESEARCH PARTICIPATION

I have read the information provided for the study “Consumer Perception of Fruit Quality. All questions have been answered to my satisfaction. I may withdraw at any time without penalty. I am 18 years of age or older.

Do you agree to with the terms described above and willing to participate in the study?  
______ YES  ______ NO
Appendix D – Impact of Information Disclosure in Production Methods and Origins on Consumer Sensory Acceptability and Willingness to Pay – Sample Sensory Evaluation Questionnaire

Blind Condition

Sample #_________________

Please taste the sample.

How much do you like/dislike the sample overall?

Dislike
Neither Like nor Dislike
Like
Extremely

I think the PEACH FLAVOUR of this sample is ________________.

weak

strong

I think the SWEETNESS of this sample is ________________.

weak

strong

I think the FIRMNESS (TEXTURE) of this sample is ________________.

soft

firm

I think the JUICINESS of this sample is ________________.

dry

juicy
Please give a price of how much you are willing to pay for 1 lb of this sample. There are approximately 3-4 peaches in 1 lb.

CAD $ ____________________/lb

Please provide some comments about this sample and the reason for the price you are willing to pay for this sample:
Expected Condition A (Imported Organic)

Sample #_________________

Based on the information above, how much do you think you will like/dislike the sample overall?

Dislike  Extremely  Neither Like nor Dislike  Like  Extremely

I think the PEACH FLAVOUR of this sample is going to be ____________________.

weak  strong
I think the **SWEETNESS** of this sample is going to be ____________________.

- [ ] weak
- [ ] strong

I think the **FIRMNESS (TEXTURE)** of this sample is going to be ____________________.

- [ ] soft
- [ ] firm

I think the **JUICINESS** of this sample is going to be ____________________.

- [ ] dry
- [ ] juicy

Please give a price of how much you are willing to pay for 1 lb of this sample. There are approximately 3-4 peaches in 1 lb.

CAD $ _________________ /lb

Please provide some comments about this sample and the reason for the price you are willing to pay for this sample:
Expected Condition B (Imported Non-Organic)

Sample #_________________

Based on the information above, how much do you think you will you like/dislike the sample overall?

Dislike Extremely
Neither Like nor Dislike
Like Extremely

I think the PEACH FLAVOUR of this sample is going to be _________________.

weak strong
I think the **SWEETNESS** of this sample is going to be ________________.

- [ ] weak
- [ ] strong

I think the **FIRMNESS (TEXTURE)** of this sample is going to be ________________.

- [ ] soft
- [ ] firm

I think the **JUICINESS** of this sample is going to be ________________.

- [ ] dry
- [ ] juicy

Please give a price of how much you are willing to pay for 1 lb of this sample. There are approximately 3-4 peaches in 1 lb.

**CAD $ ___________________/lb**

Please provide some comments about this sample and the reason for the price you are willing to pay for this sample:
Expected Condition C (Local Organic)

Sample #_________________

Based on the information above, how much do you think you will like/dislike the sample overall?

Dislike Extremely Neither Like nor Dislike Like Extremely

I think the PEACH FLAVOUR of this sample is going to be _________________.

weak strong
I think the **SWEETNESS** of this sample is going to be ________________.

- [ ] weak  
- [ ] strong

I think the **FIRMNESS (TEXTURE)** of this sample is going to be ________________.

- [ ] soft  
- [ ] firm

I think the **JUICINESS** of this sample is going to be ________________.

- [ ] dry  
- [ ] juicy

Please give a price of how much you are willing to pay for 1 lb of this sample. There are approximately 3-4 peaches in 1 lb.

CAD $ ________________/lb

Please provide some comments about this sample and the reason for the price you are willing to pay for this sample:
**Expected Condition D (Local Non-Organic)**

Sample #_________________

Based on the information above, how much do you think you will like/dislike the sample overall?

Dislike | Neither Like nor Dislike | Like
---|---|---
Extremely | | Extremely

I think the **PEACH FLAVOUR** of this sample is going to be ________________.

weak | strong
I think the **SWEETNESS** of this sample is going to be ________________.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
weak                      strong

I think the **FIRMNESS (TEXTURE)** of this sample is going to be ________________.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
soft                      firm

I think the **JUICINESS** of this sample is going to be ________________.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
dry                        juicy

Please give a price of how much you are willing to pay for 1 lb of this sample. There are approximately 3-4 peaches in 1 lb.

CAD $ ____________________/lb

Please provide some comments about this sample and the reason for the price you are willing to pay for this sample:
Labeled Condition A (Imported Organic)

Sample #_________________

Please taste the sample and evaluate the information provided.

Based on the information above and your overall experience of the sample, how much do you like/dislike the sample overall?

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Dislike
Extremely

Neither Like nor
Dislike

Like
Extremely

I think the PEACH FLAVOUR of this sample is ________________.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

weak

strong

115
I think the **SWEETNESS** of this sample is _________________.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ weak  ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ strong

I think the **FIRMNESS (TEXTURE)** of this sample is _________________.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ soft  ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ firm

I think the **JUICINESS** of this sample is _________________.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ dry  ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ juicy

Please give a price of how much you are willing to pay for 1 lb of this sample. There are approximately 3-4 peaches in 1 lb.

CAD $ ____________________/lb

Please provide some comments about this sample and the reason for the price you are willing to pay for this sample:
Labeled Condition B (Imported Non_Organic)

Sample #_________________

Please taste the sample and evaluate the information provided.

Based on the information above and your overall experience of the sample, how much do you like/dislike the sample overall?

Dislike
Extremely

Neither Like nor Dislike

Like
Extremely

I think the PEACH FLAVOUR of this sample is _________________.

weak

strong
I think the **SWEETNESS** of this sample is ________________.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
weak                      strong

I think the **FIRMNESS (TEXTURE)** of this sample is ________________.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
soft                      firm

I think the **JUICINESS** of this sample is ________________.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
dry                        juicy

Please give a price of how much you are willing to pay for 1 lb of this sample. There are approximately 3-4 peaches in 1 lb.

CAD $ _________________/lb

Please provide some comments about this sample and the reason for the price you are willing to pay for this sample:
Labeled Condition C (Local Organic)

Sample #_________________

Please taste the sample and evaluate the information provided.

I think the **PEACH FLAVOUR** of this sample is ________________.

- [ ] weak
- [ ] strong

Based on the information above and your overall experience of the sample, how much do you like/dislike the sample overall?

- [ ] Dislike
- [ ] Extremely
- [ ] Neither Like nor Dislike
- [ ] Like
- [ ] Extremely
I think the **SWEETNESS** of this sample is ____________________.

- [ ] weak
- [ ] strong

I think the **FIRMNESS (TEXTURE)** of this sample is ____________________.

- [ ] soft
- [ ] firm

I think the **JUICINESS** of this sample is ____________________.

- [ ] dry
- [ ] juicy

Please give a price of how much you are willing to pay for 1 lb of this sample. There are approximately 3-4 peaches in 1 lb.

CAD $ _______________ /lb

Please provide some comments about this sample and the reason for the price you are willing to pay for this sample:
Labeled Condition D (Local Non_Organic)

Sample #_________________

Please taste the sample and evaluate the information provided.

Based on the information above and your overall experience of the sample, how much do you like/dislike the sample overall?

□□□□□□□□□□□□□□□□□□□□□□□□□□
Dislike
Extremely

Neither Like nor
Dislike

Like
Extremely

I think the PEACH FLAVOUR of this sample is ________________.

□□□□□□□□□□□□□□□□□□□□□□□□□□
weak
strong
I think the **SWEETNESS** of this sample is ________________.

- □ weak
- □ □ □ □ □ □ strong

I think the **FIRMNESS (TEXTURE)** of this sample is ________________.

- □ soft
- □ □ □ □ □ □ firm

I think the **JUICINESS** of this sample is ________________.

- □ dry
- □ □ □ □ □ □ juicy

Please give a price of how much you are willing to pay for 1 lb of this sample. There are approximately 3-4 peaches in 1 lb.

CAD $ ________________ /lb

Please provide some comments about this sample and the reason for the price you are willing to pay for this sample:
CONSENT TO PARTICIPATE IN RESEARCH

Consumer Perception of Fruit Quality

You are asked to participate in a research study conducted by Jenny Wu, Lisa Duizer (co-supervisor) and Isabelle Lesschaeve (co-supervisor) from the Department of Food Science at the University of Guelph and Vineland Research and Innovation Centre.

We are looking for participants who are primary household grocery shopper, frequent buyers of fresh agricultural products, and interested in participating in a sensory taste test on a tender fruit product. This master thesis is being funded by the OMAFRA New Directions & Alternative Renewable Fuels Research Program.

If you have any questions or concerns about the research, please feel free to contact Lisa Duizer: Faculty member in the Department of Food Science, Phone: 519-824-4120 ext 53410, or Isabelle Lesschaeve: Research Director, Consumer Insights and Product Innovation, Vineland Research and Innovation Centre, Phone: 905-562-0320 ext 769.

PURPOSE OF THE STUDY

The purpose of this research is to understand consumer perception of fruit quality through utilization of sensory evaluation.

PROCEDURES

The whole experiment will last approximate 2 hours. If you volunteer to participate in this study after the completion of the online pre-screening questionnaire, we would ask you to do the following things:

i. Sample Evaluation:

Once you arrive at the experiment site, you will be given an identification number, which you will be using throughout the experiment. The experiment moderator will explain the procedure involved in the experiment.

- There are five parts to this experiment.
  1. You will be given some fruit samples to taste. For each sample, you will be asked to taste the sample, rate how much you like the sample,
and provide a price in Canadian dollar value of how much you are willing to pay for 1 lb of the sample.

2. You will be given some information regarding some samples. For each sample, you will be asked to review the information, rate how much you think you will like the samples based on the information provided, and provide a price in Canadian dollar value of how much you are willing to pay for 1 lb of the sample.

3. You will be asked to fill out Exit Questionnaire 1 in order for us to understand you better as a consumer.

4. You will be given some samples together with relevant sample information. For each sample, you will be asked to taste the samples, review the information, rate how much you like the samples based on tasting and the information provided, and provide a price in Canadian dollar value of how much you are willing to pay for 1 lb of the sample.

5. You will be asked to fill out Exit Questionnaire 2 regarding your knowledge on fruits and vegetables.

We will reimburse you $10 per hour and 1 pound of peaches of your choice for participating in the experiment. The experiment will last for approximately 2 hours. If you would like to find out more about the samples you see and/or taste today, we would be more than happy to provide you with the information after the study is completed.

POTENTIAL RISKS AND DISCOMFORTS

You will be tasting fruits purchased from local supermarkets, local growers and/or co-ops.

If you know that any of these products/ingredients cause you discomfort or you are allergic to them please do not take part on the study.

POTENTIAL BENEFITS TO PARTICIPANTS AND/OR TO SOCIETY

Information collected by this study will help us to have a better understanding the consumer perception of food qualities and in relation to consumer sensory experience and willingness to pay.

PAYMENT FOR PARTICIPATION

You will receive $10 per hour for your time participating in this study. Payments will be made at the end of the experiment. You will also receive 1 pound of peaches of your choice.

CONFIDENTIALITY

Every effort will be made to ensure confidentiality of any identifying information.
that is obtained in connection with this study. All data collected during the research portion of this study will be treated as confidential.

All data will be stored on a password-protected computer and/or in a locked cabinet. The data will be subject to statistical analysis. Personal demographic data will only be used for the purpose of statistical analysis. Personal contact information and identification data will be stored for one year in a separate secured place not attaching to any information with the participants’ identification number (provided during experiment). There will be a master list linking your personal identification information and experimental data storing in a password-protected computer. This can only be accessed by the students and co-investigators involved in the experiment.

PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may exercise the option of removing your data from the study. You may also refuse to answer any questions you don’t want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise that warrant doing so.

RIGHTS OF RESEARCH PARTICIPANTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. This study has been reviewed and received ethics clearance through the University of Guelph Research Ethics Board. If you have questions regarding your rights as a research participant, contact:

Research Ethics Coordinator
University of Guelph
437 University Centre
Guelph, ON  N1G 2W1

Telephone: (519) 824-4120, ext. 56606
E-mail: sauld@uoguelph.ca
Fax: (519) 821-5236
SIGNATURE OF RESEARCH PARTICIPANT

I have filled in the screening questionnaire for allergies and I have read the ingredient listing for the products that I will be trying. I am not allergic or sensitive to any of the listed items.

I have read the information provided for the study “Consumer Perception of Fruit Quality” as described herein.

My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

______________________________________
Name of Participant (please print)

______________________________________
Signature of Participant Date

SIGNATURE OF WITNESS

______________________________________
Name of Witness (please print)

______________________________________
Signature of Witness Date