

A Study of Young Consumers' In-Store Food Shopping
Behaviour For Developing Smart Mobile Devices

by

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A thesis submitted to
the Faculty of Graduate and Postdoctoral Affairs
in partial fulfillment of the requirements for the degree of

Master of Design

in

Industrial Design

Carleton University
Ottawa, Ontario

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ABSTRACT

The purpose of this study was to explore in-store food purchasing behaviour of young adults with particular reference to the five-stage consumer purchase decision-making process, and to explore how current mobile technologies can aid consumers' in-store food shopping experience. The researcher hypothesizes that consumers will have better food shopping experiences through customization and personalization of mobile applications to create personal value during in-store food shopping situations. A study was conducted where the researcher observed and shadowed a group of young adults to help the researcher learn about what information shoppers look for, and what their food choices are based on.

The study discovered that there are a number of influential factors that contributed to a purchase decisions that participants assessed simultaneously. Results showed that key design functions for mobile tools and applications using existing technologies such as Mobile Recommendation Agents (MRA's) can enhance the usefulness of such tools and applications in order to create more personalized food-shopping experiences and to help consumers make the most informed purchase decisions by seeking information at the point-of-purchase, thereby alleviating any post-purchase psychological tension or anxiety. The results of this research provide valuable insights and recommendations for designers to develop mobile tools and applications for food shopping situations.

Keywords: Mobile Design, Food Shopping, Consumer Behaviour

ACKNOWLEDGMENTS

I would like to thank my parents for their constant love, support, and encouragement from home. Special thanks to my father who reminded me to never give up and to always strive to succeed in whatever I do. Very special thanks to my wife Sarah for her unconditional love, endless support, patience, and encouragement throughout my study, and for being there whenever I need her.

I would like to thank my thesis advisors Dr. WonJoon Chung and Dr. Michel Rod for their dedication, support, and countless hours of guidance. Their contribution, advice and feedback played an important role in the success of this thesis. I would like to thank them for being available whenever I needed them. I also would like to thank Professor Lois Frankel for her guidance and motivation in the early weeks of my study at Carleton University.

I also would like to thank my colleague and friend Tara for her contribution as an editor for this thesis. Finally, thanks to all the participants for their time and effort in taking part in this study, and for sharing their personal food shopping experiences. Without them, this study wouldn't be possible.

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CHAPTER 1

INTRODUCTION

This study seeks to explore how current mobile technology can aid consumers' in-store food shopping with particular reference to consumers' decision-making processes. This thesis research attempts to build an understanding of consumers' in-store shopping behaviour and how the design of mobile technology tools through *Mobile Recommendation Agents* (MRAs) and *smart products* may assist consumers' access to digital information through *Dynamic Product Information* (DPI) at the point-of-purchase.

MRAs are perceived as a means for delivering product information into in-store purchase decision situations (Maass & Kowatsch, 2008). Interdisciplinary in nature, this research merges knowledge in the disciplines of design and marketing. The purpose of this interdisciplinary study is to explore the behaviour of young adults during grocery shopping. The study was conducted in order to determine how this demographic seeks information during grocery shopping, and in particular, what information they look for at the point-of-purchase. It is anticipated that the knowledge generated from this inquiry will afford new insights to inform future conceptual prototype design for designers to carry forward when developing mobile tools for the food industry. In addition, the in-depth findings and theoretical construct developed in this thesis may be enriching to the theoretical discussion for higher education practice in the area of design research including industrial design.

This research employed a multi-qualitative study methodology to illustrate the phenomenon under examination. Participants of this study included a selected group consisting of seven young adults who are independent food shoppers. There is little information as to why MRAs are not used for food shopping experiences; in addition, there is minimal qualitative research that explores the type of information that young consumers look for when faced with food shopping decisions. Hence, the study seeks to explore how the design of mobile technology tools, specifically technology embedded into mobile smartphones, might be utilized by consumers to generate a healthier, more personalized food shopping experience.

This chapter begins with an overview of the background and context that frames the study. Following this is the problem statement, the statement of purpose, and accompanying research questions. Also included in this chapter is a discussion around the research approach. The chapter then concludes with a discussion of the proposed rationale and significance of this research, followed by the thesis structure.

1.1 BACKGROUND AND CONTEXT

Modern food systems are complex, and a food study is an interdisciplinary field that requires different disciplines to work together (Lang, 1998). It is clear from the research on mobile technology and prominent issues revolving around foods and health that there is a need for new innovative way that can enhance consumers' in-store food selection arising from the absence of interactive and comprehensible information. With the continuous advancement of technology, current mobile technology can help in

consumers' food shopping and decision-making processes. Young adult consumers are considered more fluent in the use of smart mobile technology, and thus the analysis of this topic focuses on this particular demographic as its target user-group. The study touches on two main fields related to in-store food shopping selection. These are: (1) Consumer Behaviour, and (2) Mobile Technology.

People's perception of food health has been shifting towards increasingly wanting simpler, fresher and healthier food choices. Food nutrition is a growing topic of concern within the public realm and in health studies. It is a warning sign related to human health deterioration. Researchers in this area have raised concerns about what is currently happening to the food supply chain (Lang & Heasman, 2004; Lipton, Edmondson, & Manchester, 1998; Nestle, 2002; Pawlick, 2006; Pollan, 2006). The United States has become a society of overabundance, meaning that the average person is eating more as food becomes more abundant and affordable, and as a result, people are becoming heavier (Pollan, 2006). As a result of food nutrition deterioration combined with unhealthy diets based on excessive consumption of fats and sugars, obesity and common illnesses has become a major health issue (Klanten, 2008). The World Health Organization predicts that by 2015, roughly 2.3 billion adults worldwide will be overweight, and more than 700 million will be obese; in other words, there will be an obesity epidemic (Klanten, 2008). In an economy of abundant food choice, the primary factors that impact selection include taste, cost, convenience, and public confusion through marketing and advertising. In 2002, nutrition ranked as the last factor for marketing a food product (Nestle, 2002). In reality, only affluent consumers have

significant food choice; middle-income consumers have rather less, and the poor have next to none (Lang & Heasman, 2004).

In an effort to understand consumers' food selection, this paper draws on consumer behaviour research, which has extensively studied the consumers' purchase decision process. Composed of five stages, this research paper focuses on the second, third, and fourth stages of the purchase decision process. These are information search, evaluation of alternatives, and the purchase decision (Crane, Kerin, Hartley, & Rudelius, 2008). Each stage is discussed in depth to understand how the integration of mobile technology can assist consumers to make better shopping decisions in in-store supermarket environments.

Mobile technology is anticipated to play a significant role in the information search stage by yielding competing brand names and suggesting criteria to use to judge the various brands (Crane et al. 2008; Newman & Lockeman, 1975). Understanding how consumers approach a purchase decision is of critical importance for interdisciplinary research when dealing with the purchase of products and services, and in this case, in-store supermarket food shopping (Crane et al. 2008). Focusing on food shopping in the in-store environment, the main method for customers to learn about health-related information about a food product is by reading the food label. Food labels are information sources that provide knowledge about food items and dietary intake (Dimara & Skuras, 2005; Jordan Lin, Lee, & Yen, 2004). The food label is directly associated with food purchase decisions that can help consumers in making food choices (Baltas,

2001; Cotugna & Vickery, 1998; Davies, 2000; Kriflik & Yeatman, 2005). If consumers understand and use the nutrition information correctly, it should assist them in maintaining a healthy diet or lifestyle. On that note, the ability to understand and use food labels is necessary for consumers to be able to make food choices to achieve a healthier diet (Cotugna & Vickery, 1998). However current food labels rarely convey comprehensive contents or the origins and nature of production. It is almost impossible for food labels to tell the full story of what ingredients are in the food or its health attributes due to the static form of the labels (Lang & Heasman, 2004). A study reported by the ministry of agriculture fisheries and food in the U.K found that nutrition information on food packaging was often difficult for consumers to understand (Rayner, Boaz, & Higginson, 2001). This demonstrates that improving the format of nutrition information on food packages would be critical to aid in consumer's food purchasing behaviour (Guthrie, Derby, & Levy, 1999).

Static product information does not adapt to consumer needs at all. For instance, the information on the static label does not provide price comparison and access to other consumers' actual voices about the product, which is one of the important decision-making processes for purchasing products (Maass & Kowatsch, 2008). Usually, people try to get this information online before they visit the supermarket. Researchers argue that the lack of data and information about a product can make people's food purchasing decisions much more difficult (Resatsch, Sandner, Leimeister, & Krcmar, 2008). Similarly, DPI could be a potential solution that leverages the limitations mentioned above by adapting mobile technology through MRAs and *smart* products. Combined,

they can aid consumers' access to information in in-store environments at the point-of-purchase, making food shopping easier, and better-informed, adaptable and personalized experience.

In 2011, mobile smartphones accounted for about 19% of all web traffic in the UK. In 2009, that figure was only 0.02%. The rise in mobile web browsing has been dramatic and will continue to increase as phones become faster and smarter, and more popular (Caterer & Hotelkeeper, 2011). Furthermore, the proportion of visitors booking services and buying goods is considerably higher on mobile sites than standard websites. Google statistics suggest that 88% of people looking for local information on their smart-phone follow through with action relating to that information within one day. That can be, for example, looking for a restaurant to dine and to make a booking (Caterer & Hotelkeeper, 2011).

“Right now, no one's offering an integrated shopping solution that helps consumers through the whole process: seeing a recipe on the Food Network, then generating a shopping list, finding the ingredients and how much they cost, and so on” (Lombardi, 2010). Thus, there are significant and promising opportunities for industrial designers and developers to play a role in developing mobile tools and platforms for consumers to use for their in-store shopping to enrich the food shopping experience with valuable DPI, which can be applied to a variety of retail environments including supermarkets.

With many consumers' lifestyles becoming increasingly dependent on their mobility, the value of products enabling people to work, communicate or entertain themselves in a location-free manner has risen accordingly. One of the most obvious examples of this product type is the mobile phone. Mobile devices are evolving into permanent consumer companions (Nath, Reynolds, & Want, 2006). From 1992 to 2010, the number of mobile phone users has increased from 23 million to 5.4 billion worldwide. Consequently, from 1993 to 2012, the number of Internet users grew from 10 million to 2 billion (BBC News, 2012; UNEP, 2011). In another research study, the number of global mobile users is reported as 5.3 billion (76% of the world's population) all of whom are connected to each other through mobile devices (International Telecommunication Union, 2011). Now, mobile devices are emerging as principal tools to transfer information between people.

The use and impact of MRAs in in-store shopping conditions are significant issues from both the consumers' and the retailers' perspectives (Kowatsch & Maass, 2010). Until now, little research has been conducted on the utility of MRAs for in-store purchase decision-making. In a lab experiment conducted by Maass & Kowatsch (2008), it was found that product information provided by MRAs was perceived as being better than static product information (i.e. information printed on food labels), particularly for product bundle purchases in in-store situations (Kowatsch, Maass, Filler, & Janzen, 2008; Maass & Kowatsch, 2008). Further, MRAs improve the quality of product considerations set (van der Heijden, 2006). MRAs support consumers in buying situations as it helps them to find relevant product information. With higher degrees of perceived usefulness of

the MRAs, buying intentions are increased as relevant information for purchase decisions is provided. This relation is also supported by marketing and information system research (Kamis, Koufaris, & Stern, 2008; Tellis & Gaeth, 1990). MRAs are currently emerging in various prototypical designs. In particular, retailers are testing their potential.

Designers need to understand the relationship between consumer behaviour and food products during food shopping. By understanding the user experience through an interdisciplinary approach, design-led innovation in products and services can occur. The use of existing mobile technologies may offer practical solutions in the realm of food shopping. Industrial designers and user experience designers can develop tools (e.g. mobile tools and applications using smart phones) that may play a role in developing a more sustainable, informative, and personalized food-shopping experience. There is evidence that *smart products* and mobile technology can play an essential role as part of the solution.

Products are increasingly required to intelligently adapt to consumer's needs and changes in usage situations (Maass & Varshney, 2008). The future of such *smart products* will involve having considerable intelligence embedded in food products. Current approaches supporting consumers in their buying decisions, among others, are provided through web-based product recommendation (RAs) systems. Therefore, this study seeks to shed light on how the use of MRAs can play an important role in in-store environments. They allow users to generate feedback from experiences they have had with particular products and to share this with other users in the community. Moreover,

MRAs allow access to rich information in a location-free manner at the point-of-purchase. It is this issue that this study seeks to address. This research paper is a preliminary initiative that looks at young consumers' shopping behaviour using qualitative research methods. Specifically, the study explores what particular information young consumers look for when faced with food shopping decisions. It is this information that adds tangible value to the research outcomes, which is a part of understanding food selection.

1.2 PROBLEM STATEMENT

Many consumers' lifestyles are becoming increasingly dependent on their mobility. The rise of mobile technology ownership and mobile information search in a location-free manner has risen accordingly. However, despite their popularity, mobile devices are not used to support consumers' food shopping in in-store environments, specifically in product information search. Research indicates that MRAs improve the quality of the product consideration set, and supports consumers in buying situations as it helps them to find relevant product information in support of purchase decisions (van der Heijden, 2006). With the continuous shift in people's perception of food health, and increasingly wanting simpler, fresher and healthier food choices, mobile technology is anticipated to play a significant role in the information search stage (Crane et al. 2008; Newman & Lockeman, 1975), which can assist consumers in making healthier food choices. There is little information as to why MRAs are not utilized for food shopping experiences; in addition, there is minimal qualitative research that explores the type of information that young consumers look for when faced with food shopping decisions.

Hence, this study seeks to explore how the design of mobile technology tools, specifically technology embedded into mobile smartphones might be utilized by consumers to independently create a healthier, more personalized food shopping experience.

1.3 STATEMENT OF PURPOSE AND RESEARCH QUESTIONS

The purpose of this multiple-case study is to explore the behaviour of information search of young adults during in-store food shopping. This study relied on seven young adults from Ottawa and Toronto to discover their decision-making process and information seeking behaviour during grocery shopping. It is anticipated that, through a better understanding of young consumers purchase decision processes including the information search stage and the evaluation of alternative stage, more informed designs can be developed for smartphone mobile applications and tools that can aid consumer's in in-store food shopping, as well as advance academic research in the areas of marketing and design. To shed light on the problem, the following research questions are addressed:

The first set of research questions:

1. During their routine grocery-shopping visit, what information do young participants want to know about food products during the information search stage and evaluation of alternatives stage prior to food selection and purchase?
2. What information related to food is useful for consumers in their decision-making that designers can incorporate into existing and future mobile technologies?

The second set of research questions: (These questions can only be answered after answering the first set of questions).

3. How can current mobile technology support the consumer purchase decision cycle by searching for food related information in in-store food shopping situations?
4. What types of information individuals need to customize and personalize mobile devices for food shopping situations?

1.4 RESEARCH APPROACH

With the approval of Carleton University's research ethics board, this study investigated the shopping behaviour of seven participants in in-store supermarkets through an observatory shadowing study in which participants were encouraged to think aloud. In addition, these participants were asked to complete two surveys, and a selected number of participants were selected for a short interview. All the selected candidates were young independent food shoppers. This investigation represented a multiple-case study approach using qualitative research methods.

An in-depth shadowing study was the primary method of data collection. The research process began with the researcher conducting one pilot study. The information obtained through seven individual studies subsequently formed the basis for the first phase of the methodology, which was used as the basis for the second phase of the study and the overall findings of this research. Each interviewee was identified as a young food shopper between the ages of 20 to 34 years of age using different methods of enrolment. Each individual study from beginning to end was audio recorded which later was

transcribed, in addition, some photographic images were taken. To support the findings emanating from the in-depth shadowing study, participants completed one survey prior to food shopping and another survey after food shopping to help match what the interviewee had said, in addition, some participants were selected for a short interview.

The nature of this study aimed to achieve triangulation of data through multiple research methodologies, in addition, a comprehensive review of the relevant literature and pilot tests shaped and refined the three data-collection methods used. In addition, different strategies were used, including a coding process, discovering patterns, and developing theory taking into account frequency and emotional intensity (Creswell & Plano Clark, 2011).

1.5 RATIONAL AND SIGNIFICANCE OF THE STUDY

The rationale for this study emerges from the researcher's desire to uncover needed information that encourages designers to create digital mobile tools that consumers can use whilst food shopping. These designers may be industrial designers, user experience designers, and/or developers. The increased understanding of young consumers' in-store food shopping and food selection may not only inform designers and retailers with valuable information about their food selection and information search habits, but also increase the potential for both retailers and designers to invest in tools that can enhance consumer's food shopping experience, thus, helping create a personalized and healthier food selection process through mobile technology. Understanding the consumer shopping behaviour may also motivate retailers to invest in

the infrastructure and smart technology needed, which in turn, may create store loyalty. In a larger scheme, this research is a smaller stepping-stone in bridging the gap between the ever-growing mobile technology design, and food shopping; the implications of which can be of benefit to society at large, particularly in a time where obesity and food health concerns are a major health threat in North America. Moreover, this study can contribute to the ongoing conversation in the interdisciplinary field of food design. The study also accumulates theoretical and conceptual understanding of how mobile technology can be utilized to aid food-shopping in-stores. Lastly, the study hopes to contribute to the development of professional practice through applicable recommendations that can be developed and tested in the industry.

1.6 THESIS STRUCTURE

This thesis consists of six chapters. In this first chapter, the overall research was introduced by discussing the background and context surrounding the subject of the research; illustrating the problem statement; discussing the purpose of the study followed by the research questions and propositions pertinent to this research; explaining the research approach; describing the significance of this research to the field of design, indicating the value that this thesis will have for design practice, researchers and industry, and finally, introducing some key terminologies meaningful to this thesis.

The second chapter is the literature review, which presents a selective examination of the extant literature that surrounds the topics of consumer behaviour, and mobile technology in an interdisciplinary perspective. This chapter is broken down into

two main sections. The first section addresses the topic of consumer behaviour and the purchase decision process, beginning with a definition of the five-step purchase decision model described by marketing experts such as Crane et al. (2008), followed by a comprehensive review of stages (2) information search; (3) evaluation of alternatives; and (4) purchase decision of the purchase decision process. The second section begins by looking at the expanding mobile phone industry, followed by in-depth review of *Mobile Recommendation Agents* (MRAs), *Dynamic Product Interface* (DPI) and *smart products*, and how these technologies assist consumers to access online information at the point-of-purchase in in-store environments. A particular focus is placed on the various emerging mobile technologies that increase access to product information. Furthermore, this section presents how these implications can translate into positive impacts when it comes to food products, where MRAs can play a significant role in aiding consumers to make healthier food choices, resulting in healthier food selections and healthier lifestyles.

The third chapter is dedicated to explaining the methodology employed to conduct the primary research for this thesis. It discusses the various settings in which the study took place; the sample that participated in the study; the materials that were used to conduct the study; and the procedures followed for collecting and analyzing the data.

The fourth chapter consists of the study results, which presents the qualitative findings from the investigation and the data analysis. Major themes, patterns, and insights are presented that emerged from the shadowing observation study, the two survey questionnaires, and the interviews.

These results are then interpreted and discussed in chapter five. This chapter is dedicated to understanding what the findings mean for interdisciplinary design in the area of mobile tools for the food industry. The chapter aims to connect some of the results with past research on MRAs, DPI, and *smart products*. It is here that the research questions are reviewed and clearly answered.

Finally, conclusions of this research study are made in the last chapter. This part presents key findings of the study including a discussion regarding the major contributions to the field of design and marketing. This chapter also includes a discussion revolving around the limitations of this study and suggestions for future research initiatives. These suggestions will allow researchers to improve our understanding of how mobile technology might enable healthier food choices through better information search in in-store environments.

CHAPTER 2

LITERATURE REVIEW

Modern food systems are complex, and a food study is an interdisciplinary field requiring different disciplines to work together (Lang, 1998). A large amount of research has focused on different aspects of food related issues such as nutrition related to health, food and culture, food economics, food and the environment, and political impact. This chapter illustrates how current mobile technology can aid in consumers' food shopping and decision-making processes; food choice. Young adult consumers are considered more fluent in the use of smart mobile technology, and thus the analysis of this topic focuses on this particular demographic as its target user-group.

This chapter is broken into two main sections related to in-store food shopping selection. These are: (1) Consumer Behaviour, and (2) Mobile Technology. This chapter attempts to build a fair understanding of consumers' in-store shopping behaviour with a focus on stages two and three of the marketing purchase decision-process which are: information search and evaluation of alternatives, and how the design of mobile technology through MRAs, assist consumers' access to digital information through DPI at the point-of-purchase.

2.1 CONSUMER BEHAVIOUR

The disciplines of psychology, sociology and marketing have extensively studied consumer behaviour to understand when, why, how and where people purchase products and services in an attempt to understand the buyer's decision-making process. Marketing scholars have developed several models of the consumer buying process, the most prominent being proposed by (Engel, Blackwell, & Kollat, 1978), (Howard & Sheth, 1969), and (Nicosia, 1966). Although these models vary in their detail, there are five stages that consistently occur in marketing studies. The models are most relevant to complicated decision-making in which significant amounts of risk are involved.

The model consists of the five stages a consumer goes through when making a purchase for a particular good or service. It is essential for this thesis to display this model as it helps in understanding the purchasing process a consumer goes through. The focus of this paper is mainly on the second, third, and fourth stages of the purchase decision-process, respective to the overall research topic, which are (2) information search; (3) evaluation of alternatives; and (4) purchase decision. The paper will discuss each stage in-depth to lay down a foundation for the last section of this paper, which discusses how the integration of mobile technology can assist consumers in making a better shopping decision in in-store supermarkets.

2.1.1 Defining Consumer Behaviour

As previously defined, consumer behaviour consist of “the actions that a person takes in purchasing and using products and services, including the mental and social

processes that precede and follow these actions” (Crane et al. 2008, p. 116). Compliant in marketing studies, the purchase decision-process, which are the stages a buyer goes through when making choices about which products and services to buy, is composed of five stages: (1) problem recognition, (2) information search, (3) evaluation of alternatives, (4) purchase decision, and (5) post-purchase behaviour (Crane et al. 2008; V. W. Mitchell & Boustani, 1994) as seen in (Figure 1) below.

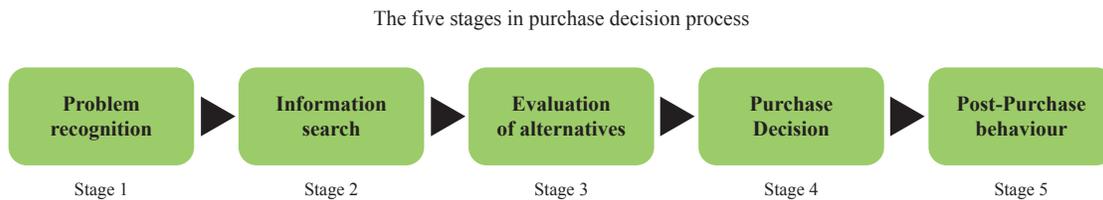


Figure 1 – The Purchase Decision-Process in Marketing. Adapted from (Crane et al. 2008)

2.1.2 Affects on Consumers’ Retail Shopping Experience

The overall consumer shopping experience is affected by a number of store-related factors which include ambience (temperature, scent, music, lighting) (Baker, 1986), service quality within the store (Aylott & Mitchell, 1998), store image (M. Levy & Weitz, 2001), and the consumers’ situational factors such as crowding, time and budget (Donovan & Rossiter, 1982). All these factors may lead to consumer dissatisfaction mainly through the form of increased level of stress for the supermarket shopper (Aylott & Mitchell, 1998). Retailers should concentrate on enhancing the end-to-end shopping experience and aim to win customer loyalty by inventing innovative ways of satisfying customer needs since traditional levers of price, location and selection alone are not enough. Although these elements are still important, they are no longer sufficient in order to achieve competitive differentiation (Roussos, Gershman, & Kourouthanassis, 2004).

The mentioned factors of food shopping environments apply (e.g. supermarkets), therefore, retailers and marketers need to engage and innovate to make a consumer's food shopping trip as least stressful as possible. The use of mobile technology could thus enhance the shopping experience by satisfying the consumer's desire for a less stressful environment.

2.1.3 Information Search: Stage Two of The Consumer Decision-Process

In purchasing, one is engaged in problem solving for which information and facts are required for understanding the purchase decision-process to assist consumers in meeting their information needs (Newman & Lockeman, 1975). Product information, prominently visible on printed labels, influences product purchase decisions. The pre-purchase information search stage, the second stage in consumer purchase decision-process, is a critical phase that simplifies purchasing decision criteria for the consumer by yielding competing brand names and suggesting criteria to use to judge the various brands, in addition to developing consumer value perceptions (Crane et al. 2008).

2.1.3.1 Active Search And Passive Search

There are two types of searches when the consumer decides to search and collect information. The search may either be (1) active or (2) passive. In a passive search, the consumer may start with an internal search by a memory scan of previous experiences with a product or brand (Alba & Hutchinson, 2000). This is applicable for frequently

purchased products, such as toothpaste; this may be enough for someone to buy a product.

In an active search, the consumer obtains data from various information sources, which can be categorized as personal (i.e. family and friends, neighbours, etc.); commercial (i.e. advertising, packaging, sales representatives, etc.); public (i.e. media sources, consumer organizations); and experiential (i.e. testing, examining, and using the product) (Cox, 1967). In this case, information search is necessary when past experience or knowledge is insufficient, and the risk of making a wrong purchase decision is high (Moorthy, Ratchford, & Talukdar, 1997; Urbany, Dickson, & Wilkie, 1989). The most common primary sources for external information a consumer seeks are (1) personal sources, such as family and friends; (2) public sources, such as product-rating companies, consumer reports, and TV programs; and (3) marketer sources, such as information from the seller including advertisements, company website, and point-of-purchase display stores (Crane et al. 2008).

The information that a consumer seeks prior to the purchase decision is of great value, but at the same time, the more sources used, the greater the amount of data and the greater the likelihood of conflicting reports being received, which may result in confusion due to information overload. Furthermore, information acquisition may alert consumers to risks and pitfalls within the product that they had previously been unaware of. This is

an important consideration for user experience (UX) designers or industrial designers because creating information limitations for certain products may have a positive impact on consumers when shopping in stores.

2.1.3.2 Information Search Risk Reduction

There are two types of uncertainty: information uncertainty (uncertainty regarding information about alternatives) and choice uncertainty (uncertainty about which option to choose). Choice uncertainty appears to increase the need for information search while information uncertainty has a weaker, negative effect (Urbany et al. 1989). Pre-purchase risk reduction essentially focuses on increasing the amount of certainty that a satisfactory product will be purchased as well as reducing the negative consequences should the purchase be unsatisfactory (V. W. Mitchell & Boustani, 1994). Thus, information search retains positive implications in the purchasing decision-process. And having the necessary information on demand through mobile devices at the point-of-purchase in in-store situations (e.g., supermarkets) can support these benefits.

2.1.4 Evaluation of Alternatives: Stage Three of The Consumer Decision-Process

The criteria a consumer considers when evaluating products to purchase are called evaluation criteria. These are factors that present both the (1) objective attributes of a brand (such as the picture quality of a camera) and the (2) subjective attributes (such as brand image) that are then used to compare different products and brands (Hawkins, Mothersbaugh, & Best, 2007). This stage is fundamentally concerned with how the consumer chooses between alternative products and brands, an important factor to study

in order to understand consumer behaviour when they are faced with the purchase of products and services. Moreover, from a demographics standpoint, young consumers are more likely to examine a wide range of choices when making purchasing decisions. For example, they tend to seek out and value extensive information throughout their shopping experiences (Kress, Ozawa & Schmid, 2000).

2.1.4.1 A Mode To Decrease Uncertainty

The first source of uncertainty is which criteria or attributes consumers should use to judge products. The consumer may also be unsure about how important the possession of each attribute is (e.g. organic yogurt vs. low-fat yogurt). Cox has suggested that each information cue, such as an attribute, has a predictive value, which is defined as how well the attribute will predict the future performance of the product (1967). The consumer, however, can never be sure about the usefulness of these predictive values (Cox, 1967). Depending on the complexity of the offering, overall risk perception should continue to fall during the evaluation period, but may rise slightly just before the decision is taken, as last minute indecision causes an increase in uncertainty (V. W. Mitchell & Boustani, 1994).

2.1.5 Purchase Decision: Stage Four of The Consumer Decision-Process

According to Crane et al. “learning refers to those behaviours that result from repeated experience and thinking” (2008, p. 124). Much consumer behaviour is learned over time (Crane et al. 2008). Consumers learn which sources are best to use for information about products and services, which evaluative criteria to use when assessing

alternatives, and, more generally, how to make purchase decisions. Understanding how consumers approach a purchase decision is a critical knowledge for interdisciplinary studies when dealing with the purchase of products and services, and in this case, in-store supermarket food shopping. Understanding consumer purchase decision allows designers to develop tools, platforms and applications informed by the targeted consumer's usability and likability. Thus, understanding what information consumers' value during a food related purchase item is of value to this thesis.

During the purchase decision stage, a buyer has two remaining choices: (1) from whom and where to buy, and (2) when to buy. Often, a purchase decision involves a simultaneous evaluation of both product attributes and seller characteristics (Crane et al. 2008) According to Hoyer & MacInnis (2004) and Mowen & Minor (1998), consumers often do not engage in all parts of the five-stage purchase decision-process, depending on the personal, social, and economic importance of the purchase to the customer. Thus, this part of the process is dependent upon the level of involvement for the consumer, which is defined as the personal, social, and economic significance of the purchase to the consumer. Instead, consumers skip or minimize one or more stages (Hoyer & MacInnis, 2004; Mowen & Minor, 1998).

2.1.5.1 Purchase Level of Involvement

When studying consumer behaviour related to food shopping in-store, it is important to make distinctions between the levels of involvement a consumer goes

through when choosing a food product. This section examines existing theories and research in the area of purchase involvement.

Product class involvement is defined as the overall consumer's involvement with specific attributes of a product. In this case, food is the product category. Product involvement is divided into two conditions: (1) high-involvement purchases and (2) low-involvement purchases. High-involvement purchase occasions typically have at least one of three characteristics: (1) expensiveness; (2) serious personal consequences; and (3) reflects one's image. For those occasions, consumers engage in an extensive information search and consider many product attributes and brands. Low-involvement purchases such as soap and toothpaste require "virtually no consumer participation" (Crane et al. 2008, p. 118).

On the other hand, low-involvement purchases are also referred to as a routine problem solving. For product purchases such as table salt and milk, consumers recognize a problem, make a decision, and spend little effort seeking external information and evaluating alternatives (Crane et al. 2008). The purchase process for such items is virtually a habit and illustrates low-involvement decision-making. Routine problem solving is typically the case for low-priced, frequently purchased products (Crane et al. 2008, p. 119). These factors are interesting from a design and marketing perspective because consumers will either draw upon brand recall or they will potentially make a new decision based on the marketing or design aesthetic of whatever they are seeking.

One of the major areas of difficulty in the evaluation of consumer behaviour in the decision-making process is a consumer information search. It is difficult to quantify consumer information searches (Newman & Lockeman, 1975). In studying consumer information searches as part of purchasing behaviour, there could be a variety of reasons to explain why consumers undertake little or no information searches. For example, Newman & Lockeman suggest that the purchaser may have known enough information to buy without the need to acquire more information (1975). Through the methods used, this thesis attempts to study consumer information search more in-depth, and through qualitative research methods, the results are discussed in details in chapters four and five.

2.1.6 Influences on Food Shopping

Influences on a buyer's shopping experiences are distinguished by (1) emotional impressions that affect customers' moods and (2) product information that affects rational decision-making (Groepel & Bloch, 1990). The main influencing factors for food choices are the lived experiences a consumer has gone through, the different mindsets a consumer brings to the food choice scenarios and personal indicators that consumers have developed over time through various food choice experiences (van der Merwe, Kempen, Breedts, & de Beer, 2010). When it comes to food products, there is a discrepancy between researchers as to what kinds of foods are considered high-involvement vs. low-involvement. Further research is required to classify different food product categories. Moorthy et al. (1997) have defined price, taste, nutrition, ease of preparation and brand as variables that measure product involvement in food selection. Other researchers have also found these factors to be important when making food-purchasing decisions (Rose, 1994;

Thayer, 1997).

2.1.7 Food Label Information

Following the introduction of relevant knowledge and theories in the general scheme of consumer behaviour, this section will relate some of the research to food products, which addresses the core of this paper. Focusing on food shopping in the in-store environment, the main method for customers to learn about health-related information about a food product is by reading food labels. Food labels are information sources that provide knowledge about food items and dietary intake including country-of-origin or where it's made (Dimara & Skuras, 2005; Jordan Lin et al., 2004). The food label is associated with food purchase decisions that assist consumers in making food choices (Kriflik & Yeatman, 2005) according to (Baltas, 2001; Cotugna & Vickery, 1998; Davies, 2000). If consumers understand and use the nutrition information correctly, it will assist them in maintaining a healthy diet or lifestyle. This emphasizes the importance of informative food labels, as they are currently the major source for health information a customer can use to make his or her food choice during in-store food purchasing.

2.1.7.1 Nutrition Label

In May 1994, the 1990 Nutrition Labeling and Education Act (NLEA) mandated that most processed foods under the jurisdiction of the Food and Drug Administration (FDA) would display nutrition information presented in a "Nutrition Facts" label format panel (Cotugna & Vickery, 1998). The goal of the food label is to provide nutrition

information that is consistent, readable, understandable, and useful to consumers for selecting a more healthy diet (Sims, 1993). The ability to understand and use food labels is necessary for consumers to be able to make food choices to achieve a healthier diet (Cotugna & Vickery, 1998). However, food labels do not always convey comprehensive contents or the origins and nature of production. It is almost impossible for the food labels tell the full story of what ingredients are in the food or its health attributes due to the static form of the labels (Lang & Heasman, 2004). A study report by the Ministry of Agriculture, Fisheries and Food (MAFF) in the U.K found that nutrition information on food packaging is often difficult for consumers to understand. For example, when participants were asked to read figures from a nutrition label, or make comparisons of nutrient levels between two labels, a third of respondents were unable to answer (Rayner et al., 2001). This demonstrates that improving the format of nutrition information on food packages would be critical to aid consumer's food purchasing behaviours (Guthrie et al., 1999).

2.1.7.2 Label Endorsement Programs

Due to the poor readability of nutrition labels for consumers, food companies have designed symbols that resemble a health-related food label choice in order for consumers to avoid too much information processing on nutrition labels that are already difficult to understand. The objective of this strategy is to reduce the confusion and difficulty of understanding the label (Rayner et al., 2001). Health-related food endorsement labels on product packaging mark food products as healthy or healthier choices (Raats, Royce, & Stockley, 2007). (Figure 2) is an example of an endorsement

label.



Figure 2 – Example of a Label Endorsement Label (source: http://img.timeinc.net/time/photoessays/2010/food_labels_choices)

However, an endorsement label does not substitute health information from other information on food packages. Instead of replacing existing information, endorsement labels have become an added piece of information to be gathered, processed, and evaluated by consumers. Numerous shoppers who use health endorsement labels also try to look for evidence to support the endorsement rather than putting all of their faith in the label information (Rayner et al., 2001). Compiled, nutrition labels and endorsement label programs are static by nature – labels printed on packaged products. This is challenging for consumers who demand information not available on food labels, including product reviews, price comparisons, and back-story of the food produce, which all can be made available using mobile technology. In addition, this further confuses consumers and illustrates the difficulty in negotiating the balance between an over-abundance of information and the right amount of information and how to present it. The next section will study static labels in more detail.

2.1.8 The Challenge With Static Food Label Information

Currently, food companies provide consumers with static product information in the form of printed product package labels. However, it seems that the information does not adapt to consumer needs at all. For instance, the information on the static label does not provide price comparison and access other consumers' actual opinions about the product, which is one of the important product purchase decisions (Maass & Kowatsch, 2008, p. 1). That is where consumers usually use the Internet as an accessible source of product information at home or work. However, this information is not easy to access at the point-of-purchase during in-store shopping. In part, this is because many purchases are unplanned, referred to as impulse purchases (Resatsch et al., 2008).

Thus, the consumer must rely on the expertise of the sales assistants in providing viable product information at the point-of-purchase. According to (Bettman, 1973; V. W. Mitchell & Boustani, 1994), the lack of knowledge and information about a product can make this purchase decision difficult (Resatsch et al., 2008). The main purpose of the pre-purchase risk reduction essentially focuses on increasing certainty that a satisfactory product will be purchased, in addition to reducing the negative consequences should the purchase be unsatisfactory (V. W. Mitchell & Boustani, 1994).

This is where the introduction of DPI comes in to leverage these limitations: Information on products that are presented according to consumer demands and that use real-time communication at the local point of interaction. This information can be provided through mobile devices using MRAs at the point-of-purchase in a mobile location (Maass & Kowatsch, 2008, p. 1).

2.1.9 Summary

To conclude, understanding how consumers approach a purchase decision is critical for designers in order to understand how to design products and services. Understanding when, why, how and where people purchase products and services in an attempt to understand the buyer's decision-making process is essential knowledge for designers. Supermarkets are complex environments with many product choices, and choice uncertainty is a common attitude that consumers exhibit. Choice uncertainty increases the need for information search (V. W. Mitchell & Boustani, 1994). This emphasizes the importance of informative food labels, as they are currently the major source of health information that a customer can use to make his or her food choice during in-store food purchasing (Kriflik & Yeatman, 2005). However, supermarkets provide consumers only with static product information in the form of printed product package labels. This kind of food product information does not adapt to consumer needs. Static label information does not provide the ability to compare prices or access consumer opinions about a product, which is part of the overall product purchase decision (Maass & Kowatsch, 2008, p. 1) as has been exhibited in this section. This is where the idea of integrated mobile technology can aid in the creation of DPI, and a much more adaptable system of dynamic information that customers can access at the point-of-purchase. Supermarkets should concentrate on enhancing the end-to-end shopping experience and aim to win customer loyalty by inventing innovative ways of satisfying customer needs (Roussos et al., 2004).

2.2 MOBILE TECHNOLOGY

This section introduces the technology part of the literature review and focuses on mobile technology and how it can aid consumers' access to information in in-store environments at the point-of-purchase.

2.2.1 The Mobile Smartphone Industry

As outlined in the first chapter, the rise in global mobile technology and smartphone usage has increased dramatically. Mobile devices are emerging as principal tools for information transfer between users. In 2010, Canada had an estimated 5 million users of the iPhone and other smartphones; “these on-the-go computers are making regular cellphones out-of-date” (Lombardi, 2010, p. 1), and the numbers continue to grow. The acceptance of smartphone devices has risen due to (1) rapidly increasing repurchase rates and (2) a rise in the tendency for consumers to own multiple phone devices. Price competition can also be attributed to the global expansion in the mobile industry, including the evolving applications and mobile entertainment services industry (Kımlıoğlu, Nasır, & Nasır, 2010).

2.2.2 Mobile Smartphones And Users

Many consumer lifestyles are becoming increasingly dependent on their mobility. The value of products that enable people to work, communicate or entertain themselves in a location-free manner has risen accordingly. One of the most obvious examples of this product type is the mobile phone. Mobile devices are evolving into permanent consumer

companions (Nath et al., 2006). In many developed countries, including Canada and the U.S, the mobile phone penetration is well above 90%, meaning that almost everybody is using a mobile phone (Reischach, Guinard, Michahelles, & Fleisch, 2009). New mobile devices, known as smartphones, provide extended functionalities such as Internet connection and mobile barcode recognition, known as NFC technology (Near Field Communication) (Nath et al., 2006). For the first time smartphones with Internet capabilities allow people to generate content and share experiences with products independent of computers fixed to specific locations. This ability opens opportunities for both consumers and retailers to use mobile devices as shopping aid tools. Moreover, emerging auto-ID capabilities, such as NFC technology, simplify linking web based information to physical products, and thus lowering the barriers for users to access content in a location free manner (Reischach et al., 2009, p. 1). Current mobile providers should aim to offer unique and competitive products that incorporate attributes appropriate to individual needs, e.g., food shopping is an individual need for every household, thus, mobile providers can grasp this need to create opportunities for the users and retailers. To achieve such objectives, a more thorough understanding of consumers is necessary (Kımlıoğlu, Nasır, & Nasır, 2010). Mobile technology, referred to by Maas, Filler & Janzen (2008) as “Electronic and wireless point of sale solutions” are revolutionizing the nature of interaction between customers, retailers and producers (Maass, Filler, & Janzen, 2008, p. 165).

2.2.3 Consumer Information Search Using Mobile Technology

Newman and Lockman (1975) found that considerable information searching

prior to purchase takes place in the store itself. Product experience and product communication have important roles in influencing consumer preferences and behaviour (Narayanan, Manchanda, & Chintagunta, 2005).

In 2011, mobile smartphones accounted for about 19% of all web traffic in the UK. In 2009 that figure was only 0.02%. The rise in mobile web browsing has been dramatic and will continue to increase as phones become faster and smarter, and more people use them (Caterer & Hotelkeeper, 2011). Furthermore, the proportion of visitors booking services and purchasing goods is considerably higher on a mobile site than a standard website. Google statistics suggest that 88% of people who search for local information on their smart-phone proceed with an action relating to that information within 24 hours. For example, a user could be looking for a restaurant to dine in, thus would make a reservation (Caterer & Hotelkeeper, 2011). This is referred to as “action oriented browsing”. One looks for information on a mobile phone when one wants to do something with that information. Browsing through a mobile phone has a purpose (Caterer & Hotelkeeper, 2011). This outlines the importance for marketers to consider mobile smartphones as a serious marketing and purchasing tool. This extends the future of mobile designs, including everyday consumer needs, such as food grocery shopping, and ultimately, any kind of shopping.

2.2.3.1 Mobile Applications

Mobile applications are currently being developed for consumers to communicate harmoniously with physical products (Maass & Varshney, 2008). Thus, mobile shopping

assistants such as MyGrocer (Kourouthanassis & Roussos, 2003), Massi (Kowatsch & Maass, 2010), and EasiShop (Keegan, O'Hare, & O'Grady, 2008), all allow consumers to request product information directly at the point-of-purchase. This, theoretically, allows physical products to be enriched with digital product information services relevant to consumer needs. However through examining existing applications, it is apparent that the majority of products on a supermarket shelf do not have information databases, and the overall environments including technology, do not support these mobile applications. The technology infrastructure needs to be created in order to have a cohesive *smart environment*.

2.2.4 Smartphones And Grocery Shopping

As suggested in the literature, there are three problems grocery shoppers hope smartphones can help them with: the cost of the product; where it can be found in-store; and back-story information such as the production and origin of the product including ingredients (Lombardi, 2010, p. 1). According to Sakaria¹, as noted in Lombardi (2010), developing smartphone apps for shoppers means thinking not just about the information consumers want when they're in the stores, but what happens before and after. "Right now, no one's offering an integrated shopping solution that helps consumers through the whole process: seeing a recipe on the Food Network, then generating a shopping list, finding the ingredients and how much they cost, and so on" (Lombardi, 2010, p. 2). Thus, there are significant and promising opportunities where designers and design in general

¹ Neela Sakaria is the vice-president of Latitude, a digital consultancy based in Beverly, Massachusetts

could play a role in developing mobile tools for consumers to use during in-store shopping. This applies to a variety of retail environments including supermarkets.

2.2.5 Purchase Decisions Within In-Store Shopping Situations

Purchase decisions within in-store environments rely on product information that can be imperfect which lacks the feature to compare competing brands and includes biases in product evaluation from the producers (Maass & Kowatsch, 2008). The information disproportionateness between consumers and producers results in the emphasis of price and quality attributes during purchase decisions at the point-of-purchase (Tellis & Gaeth, 1990). If a consumer knows little about the quality of a product, he or she will base the decision on the price. However, as consumers expect to know more about product information such as quality, consumers tend to rationalize their decisions over both attributes (Tellis & Gaeth, 1990). The influencers for a consumer's shopping experience are distinguished into both (a) emotional impressions that affect customer's moods, and (b) product information that affects rational decision-making (Groeppe & Bloch, 1990). Product recommendation systems such as MRAs provided through mobile applications and tools are intrinsically focused on communicating important product information (van der Heijden, 2006).

2.2.6 Recommendation Agents (RAs)

During the pre-purchase stage, consumers depend on precise and comprehensible product information at the point-of-purchase. Product information strongly influences purchase behaviour as evidenced by consumer research for in-store shopping situations

(Tellis & Gaeth, 1990). RAs increasingly help customers to make educated buying decisions, to better understand customer needs but also to exert influence (Xiao & Benbasat, 2007).

2.2.6.1 Recommendation Agents In Online Purchasing

In online purchase environments, the value of product information can be increased with the use of RAs as they obtain the interests or preferences of individual users for products by making personalized recommendations (Xiao & Benbasat, 2007) and confirmed by (Maass & Kowatsch, 2008, p. 2). In this sense, product information provided by online RAs becomes adaptive and therefore more relevant to individual consumers' information needs, whereas product information on printed product labels is static by definition. Correspondingly, several studies revealed that online RAs help to reduce search complexity and consumers' information overload (Häubl & Trifts, 2000; Todd & Benbasat, 1999), improve decision quality (Pereira, 2001), increase trust in decisions (Gregor & Benbasat, 1999), and finally impact the ingredients a consumer has available (e.g. allrecipes.com). Xiao and Benbasat (2007, p. 137). Recommendation agent services are defined as “software agents that elicit the interest or preferences of individual users for products either explicitly or implicitly, and make recommendations accordingly”. MRAs are counted as a type of RA with a specialization on in-store situations (van der Heijden, 2006).

2.2.6.2 Mobile Recommendation Agents (MRAs) In In-Store Purchasing

This section is of great significance to the focus of this thesis research. The use and impact of MRAs in in-store shopping situations are a significant issue from both the consumers' and the retailers' perspective (Kowatsch & Maass, 2010). Until now, little research has been conducted on the utility of MRAs for in-store purchase decision-making. Thus, this section is of particular importance to the overall thesis. In a lab experiment conducted by Maass & Kowatsch (2008), it was found that product information provided by MRAs was perceived as being better than static product information (e.g. information printed on food labels) in in-store situations (Kowatsch et al., 2008; Maass & Kowatsch, 2008). Further, the results concluded that MRAs improve the quality of a product consideration set (van der Heijden, 2006).

By using MRAs, product information asymmetry between producers and consumers can be reduced in front of the product shelf. For example, product reviews provided by user-communities through MRAs may reveal information about the quality of the product, which may change the purchase behaviour (Reischach et al., 2009). The MRA supports consumers in buying situations as it helps them find relevant product information. With higher degrees of perceived usefulness of the MRAs, buying intentions are increased as relevant information for purchase decisions is provided. This relation is also supported by marketing and information system research (Kamis et al., 2008; Tellis & Gaeth, 1990). MRAs are intrinsically focused on product information (van der Heijden, 2006). The value of product information is increased by the use of MRAs as

information adapts dynamically to the interests and preferences of consumers (Kowatsch & Maass, 2010).

2.2.7 A Growing Field of Research

MRAs are a relatively new research field that specializes in research on recommendation services with a stronger emphasis on physical and social contexts, and a focus on smaller technical devices (van der Heijden, 2006). Recent studies have shown that the importance of efficient information coding systems helps to reduce cognitive load (van der Heijden, 2006). Kleijnen, de Ruyter & Wetzels (2007) in addition to showing that benefits (e.g. time convenience, user control and service compatibility), and costs (e.g. risk and cognitive effort) affect the intention to use mobile recommendation services. However, on the business side, consumers are currently unwilling to pay for mobile services for cost reasons and lack of appropriate content (Kleijnen et al., 2007).

MRAs provide new means to reduce information asymmetries between consumers, retailers and producers. Online shopping at home differs in many ways from mobile contexts (Venkatesh, Ramesh, & Massey, 2003). In-store situations are interactive and dialogue-oriented. MRAs are perceived as a means for delivering product information into in-store purchase decision situations (Maass & Kowatsch, 2008).

2.2.8 Dynamic Product Interface

With the growth of digital media, product information has exploded (Maass &

Janzen, 2007). Virtual product information and tangible products are commonly used in separated situations. For example, information created for supporting purchase decisions is offered on the Internet through the company's website and can reduce overall search costs (Bakos, 1997). However, this information is currently unavailable in tangible shopping environments. *Dynamic product information* (DPI) is defined as information on products that are presented according to consumer demands (Maass & Kowatsch, 2008). Empirical studies indicate that consumer groups, such as shopping lovers, would intend to use value-added shopping services in tangible shopping environments that provide, for example, shopping alerts and product information (Mort & Drennan, 2005). These findings are consistent with the visibly higher product information demand consistent with the growth of digital media (Maass & Janzen, 2007).

The amalgamation between physical, tangible products and virtual information is referred to as a *smart product* (Maass & Janzen, 2007). *Smart products* add value to mobile services that allow embedding of digital product information into tangible products; thus supporting product-mediated communication between products and users (Maass & Filler, 2006). This approach enables new forms of product interfaces by merging information user interface design and products and packages designed by industrial designers.

2.2.9 Smart Products

The introduction of *smart products* bridges the gap between offline and online information. As previously described, *smart products* are “products that share information with consumers and are designed to combine the online and offline world of information. *Smart products* can be defined as products with digital representations that allow adaptation to situations and consumers” (Resatsch et al., 2008, p. 218). In Mühlhäuser (2008), the author defines a *smart product* as an entity (tangible object, software, or service) designed and created for self-organized embedding into different *smart environments* in the course of its lifecycle they improved simplicity and openness through improved product to the user and product to product interaction by means of context awareness, semantic self-description, proactive behaviour, multimodal natural interfaces, AI planning, and machine learning. This entails the adaptability, openness and response of *smart products* to users and merging physical objects with digital information supported through a *smart environment*; thus, creating opportunities for users to acquire more knowledge and information about specific products at the point-of-purchase.

In the context of food items, this can enhance the customer’s experience in gaining more DPI rather than only static label information. Moreover, the minimization or even possible elimination of employee staff assistance, because through *smart products*, one can access a wide array of information available on demand. By merging physical products and information products into so-called *smart products*, *smart products* and *smart product* information services are sought to help lower negative influences on purchase decisions, such as uncertainty and making shopping a more positive experience (Loebbecke & Palmer, 2006; Maass & Filler, 2006).

2.2.9.1 Smart Products For Consumers

Smart products communicate with the consumer and also enable new ways of interaction with products. Today's in-store products provide only static information, but future *smart products* may provide information about the product's journey to their current location (i.e. when the product has multiple countries of origin), information about their ingredients (i.e. news articles on problems with a particular supplier) and possibly some embedded intelligence that determines the customer's needs (i.e. the types of difficulties others have had in assembling the product) (Fleisch & Thiesse, 2007). According to (Resatsch et al., 2008, p. 218), useful information, such as user-generated product ratings, product reviews, or opinions from friends and family would be a great help at purchase time. "*Smart products* and *smart product* information services are sought to help lower negative influences on purchase decisions, such as uncertainty and making shopping a more positive experience" (Resatsch et al., 2008, p. 217). Additionally, due to the massive penetration of mobile phones, the mobile phone could serve as the ubiquitous user device for interacting with *smart products* (Kaasinen, 2005).

To conclude, *smart products* have the potential to present consumers new possibilities of communication and interaction with physical products in in-store environments, creating an enhanced, personalized, less stressful shopping experience. This can have a great impact when applied to food shopping; food shopping has numerous personal and societal impacts including health, environment, economic and social aspects. Food affects one's well-being.

2.2.9.2 Smart Products For Retailers

Smart products give physical stores the opportunity to compete against the intense rivalry of online shopping, because *smart products* provide direct access to online information, which was previously not accessible in physical locations (Maass & Janzen, 2007; Roussos, 2005; Smith, Davenport, & Hwa, 2003) according to (Resatsch et al., 2008, p. 218). In addition, retailers can benefit from investing into *smart products*, because *smart products* can act as a process interface and information source for retailers (i.e. how many times the product has been picked up by customers off the shelf (Resatsch et al., 2008, p. 218). “*Smart product* information has a wide application through retail environments by merging physical products and information products” (Loebbecke & Palmer, 2006) according to (Resatsch et al., 2008, p. 218). *Smart products* come with noticeable benefits not only to consumers but also retailers. Further investigation and study in this area is required to study the optimum positive impacts and benefits *smart products* can bring into retail environments (e.g. supermarkets).

2.2.10 Smart Product Information Usefulness

The perceived usefulness of *smart product* information services depends on the product category and if the product is for long-term or short-term use. For example, within the experience goods category: products for which the consumer does not initially know the quality and value of the item, aside from the price (Conjecture, 2012), short-term use products often have a shorter life cycles than long-term use products. For example, purchasing soup blenders may require less information than purchasing a

fridge. In contrast, consumer electronics involves a higher intensity of information seeking (and evaluation of alternative search) through online and offline shopping behaviour. In addition, because consumer electronics as a product category are less routinely bought, they are more valid choices for the application of *smart product* information services compared to short-term experience goods, or even everyday consumer goods such as food items (Resatsch et al., 2008). From such research, it is evident that having product information can influence product purchases depending on the product category. As explained earlier, product information is especially relevant for online purchase situations where the value of product information is increased by the use of online recommendation agent tools that act as mediators of information, where information adapts dynamically to the interests and preferences of consumers (Kowatsch & Maass, 2010). In in-store situations, product information may also exhibit such positive impacts depending on the product category.

2.2.11 Smart Products And Technology

Digital representations of local physical environments can be gained through multiple available technologies such as low-level remote sensing systems, e.g., RFID (Radio Frequency Identification) technologies, NFC (Near Field Communication) technologies, barcode scanning systems, and video-based systems. Hence, markets are heading towards a future in which any physical space has several digital representations so that both the digital and the real become interconnected. Products are increasingly required to intelligently adapt to consumer needs and changes in usage situations (Maass & Varshney, 2008). The future of *smart products* will involve having intelligent

technology, e.g., RFID, embedded in a product or the package, which will rely on sensors, processors and communication modules to create smart interactions with customers, other products, and the larger environment, (e.g. supermarkets) (Maass & Varshney, 2008).

2.2.12 Smart Environments

As argued above, the definition for *smart environments* should be taken into account since *smart products* have to be considered in the context of their *smart environment*. *Smart environments* must exhibit a certain level of intelligence, in which the *smart product* environment can act as a recommendation system by suggesting what products match what the customer is looking for at their location. So if the inventory does not have those products, the environment should be able to proactively order the products (Maass & Varshney, 2008). Thus, *smart environments* are an integral part of the *smart system*; they act as the underlying infrastructure that supports *smart products* and MRAs within in-store environments (e.g. supermarkets). In order for *smart products* to function optimally, they are to be available within a *smart environment*.

2.2.13 Smart Environment Intelligence

The *smart product* environment should enable its occupants (products and people) to download, process, and store information, and prior interactions with products, as well as have the ability to create pleasant experiences for consumers (Maass & Varshney, 2008). The environment can also act as a recommendation system by suggesting what

products may match what the customer is looking for along with the product and customers' location. If the inventory does not have those products, the environment can proactively order the products, or, alternatively, the environment can select products available in the inventory system that could match what a customer might be looking for (Maass & Varshney, 2008). There is a need for a considerable advancement in the way that information, information technology (IT), and products (such as smartphones and physical products in in-store environments) are integrated.

There are various technologies that enable *smart environments* and *smart products* to work together, to create a more synchronized technological solution that can benefit both consumers and retailers. It is noteworthy to mention that some retailers are currently testing MRAs using mobile application technologies, such as the *PC Plus* application from Loblaws, which is available for smartphones. The *PC Plus* application includes personalized offers, dinner suggestions, and a shopping list feature. The retailer uses this application as a means for delivering product information and offers to consumers to impact in-store purchase decisions, while emphasizing the loyalty rewards program. Included in (Appendix I) is a list of available food applications. The majority of these applications do not serve any useful purpose in in-store shopping situations as they lack the technological innovation and *smart product* information base.

2.2.14 Summary

With the continuing growth of smartphone mobile device usage amongst young consumers, it seems logical for supermarket retailers to focus on mobile technology innovations as tools that aid consumers to make better-informed food choices.

Smartphone web browsing allows consumers to access information by interacting with *smart products* supported through *smart environments*. Often, browsing through a smartphone is an action-oriented browsing; that is, browsing that has an immediate purpose (Caterer & Hotelkeeper, 2011). Numerous mobile applications have been developed; mobile applications are a growing trend, but applications alone cannot function without the necessary interaction with *smart products* in a supported environment, referred to as *smart environments*. Retailers must create and invest in a technologically friendly data infrastructure that supports Internet access in order to have a cohesive *smart environment*. DPI can adapt to a consumer's individual needs, and this creates a level of personalization. This is where MRAs play a significant role because product information provided by MRAs is better than static product information (e.g., information printed on food labels) in in-store situations (Kowatsch et al., 2008; Maass & Kowatsch, 2008). All of these enhancements can provide positive impacts for consumers, including reducing the overall search cost (Bakos, 1997), decreasing information knowledge uncertainty and lowering negative influences on purchase decision (Resatsch et al., 2008), which can lead to higher purchasing satisfaction rates.

In conclusion of the literature review, understanding the consumer purchasing cycle is key knowledge for designers in order to develop the right mobile tools, which could allow consumers to find food information at the point-of-purchase using existing mobile technologies. MRAs can play a significant role in aiding consumer's to make healthier food choices, resulting in healthier food selections for a healthier lifestyle. The relevance of the study's research question fall under this large context by analyzing the

type of product information young participants look for, and most importantly, investigating how current mobile technologies support the consumer purchase decision cycle by searching for food related information in in-store food shopping situations.

CHAPTER 3

METHODOLOGY

The purpose of this interdisciplinary study is to explore the behaviour of young adults while grocery shopping and how current mobile technology can aid consumers' in-store food shopping with particular reference to a consumer's decision-making process. This thesis is an attempt at building an understanding of consumers' in-store shopping behaviour and how the design of mobile technology tools through the use of MRAs and *smart products* may assist consumers' access to digital information through DPI at the point-of-purchase. This study was tested using a multi-qualitative study method in order to determine how this young demographic seeks information during grocery shopping, and in particular, what information they look for at the point-of-purchase. The study addressed four research questions.

The first set of research questions:

1. During their routine grocery-shopping visit, what information do young participants want to know about food products during the information search stage and evaluation of alternatives stage prior to food selection and purchase?
2. What information related to food is useful for consumers in their decision-making that designers can incorporate into existing and future mobile technologies?

The second set of research questions: (These questions can only be answered after

answering the first set of questions).

3. How can current mobile technology support the consumer purchase decision cycle by searching for food related information in in-store food shopping situations?
4. What types of information individuals need to customize and personalize mobile devices for food shopping situations?

This chapter describes the study's research methodology and includes discussions around the following areas: (a) rationale for qualitative research approach, (b) research sample, (c) setting and materials, (d) data collection procedures, (e) analysis and synthesis of data, and (f) ethical consideration.

3.1 RATIONAL FOR QUALITATIVE RESEARCH APPROACH

Qualitative research directly investigates subjective experiences and allows for naturalistic participant observation and description (Auerbach & Silverstein, 2003). This identifies with the goal of this thesis, which is to discover the behaviour of young adults while grocery shopping and how current mobile technology can aid consumers' in-store food shopping of a particular proposition. Food shopping is an individual activity that is subjective by nature. People's experiences and emotions differ from one another, thus, the choice of qualitative research that involves analyzing and interpreting context in order to discover meaningful pattern is the rational methodological choice for this thesis (Auerbach & Silverstein, 2003). Bloomberg and Volpe (2008) state that qualitative methodology involves an emphasis on discovery and description, with an objective to extract and interpret the meaning of experience as cited in (Bogdan & Biklen, 1998;

Denzin & Lincoln, 2003; Merriam, 1998). The basic idea was to choose research participants who have lived through the phenomenon that the researcher wanted to learn about. These objectives are contrasted with the objectives of quantitative research, where the testing of hypotheses to establish facts and distinguish relationships between variables is usually the intent (Bloomberg & Volpe, 2008). The researcher is interested in understanding the subjective experiences of the research participants who are food shoppers, and qualitative design research allows for understanding that insight.

Using the framework of qualitative research, three distinct methods were used: (1) a survey questionnaire, (2) behavioral observation through shadowing and (3) semi-structured interviews were conducted to gather supporting qualitative information. For this study, these qualitative methods of choice were used to assist the researcher in order to learn about subjective food shopping experiences by incorporating meaningful stories and asking and listening carefully to what the shoppers said. This research focused on questioning rather than measuring. Thus, this qualitative research is based on contextual data rather than quantitative data, and on participant human stories rather than statistics and raw data. The researcher used audio recording tools during the shadowing study and interviews for data gathering, which were then transcribed in full until the recurrent themes presented themselves.

3.2 RESEARCH SAMPLE

The researcher has completed a multi-phase study with seven (N=7) participants from Ottawa and Toronto in Canada, three of whom went shopping as couples, raising

the number of participants to 10. These participants are young men and women between the ages of 20-34 composed of diverse cultural backgrounds and marital status, with a mean age of 26.4 years of age. (Table 1) below outlines the demographics of the research participants. All the participants had a master's degree educational level including a Masters in Design (MDes) and a Masters of Business Administration (MBA). Each participant went through three methodologies including (1) answering two surveys; the first survey was filled out prior to beginning the shadowing study, and the second survey was filled out after the shadowing study ended, (2) an observational shadowing study, which was audio recorded and (3) a semi-structured short interview. All participants were regularly encouraged to "think aloud" during the exercise in order to understand what the research participants were thinking, compared to what they were saying and doing.

The participants were recruited using a convenience sampling technique, meaning enrolling interested participants who fit the research criteria and whom the researcher had access to, including colleagues from the School of Industrial Design at Carleton University in Ottawa and elsewhere from the researcher's social network. In addition, the chosen strategy also falls under criterion-based sampling; in which all the individuals studied have experienced the same phenomenon under examination which is food shopping (Bloomberg & Volpe, 2008). The criteria for selecting a participant included:

- Participant is a young adult between the ages of 20-34
- Participant is an independent food shopper
- Participant agrees to participate in a study on food shopping behaviour in his or her preferred supermarket location.

To ensure adequate personal experience as an independent food shopper, the researcher set a delimiting time frame of five years as optimal in which the individual participant would have built his or her own personal food preferences and adequate knowledge that would allow for a comprehensive and consistent food shopping experience.

The shadowing study was audio recorded and then transcribed. The researcher under the supervision of the research supervisor analyzed the transcription. It was important to choose a qualitative method that allowed the research participants to behave as naturally as possible, therefore allowing the participants could choose an environment that they were accustomed to in order to encourage normal behaviour. The researcher's concern was to learn about their lived experience.

The researcher's intention was to avoid pressuring any participants to participate in the research study due to personal relationships as acquaintances from the researcher's social network. Thus, the researcher was cautious as to the ways of enrolling interested participants through the screening guidelines according to the criteria mentioned. Three methods were used including: (1) a generic letter sent by email to the Master of Design graduate students and to the researcher's social network (see Appendix A), (2) a poster ad that was placed around Carleton University campus (see Appendix B) and (3) a generic letter sent through SMS to the researcher's social network. The researcher avoided personal face-to-face enrollment and direct phone calls in order to avoid personal and peer pressure.

Table 1 - Participant Demographic Information

Initials	Gender	Age Group	Family Status	Number of years as an independent food shopper
S.S.	Female	20-23	Married	3-4 years
R.S.	Male	27-29	Single	3-4 years
T.S.	Female	27-29	Single	5 years or more
T.H.	Male	24-26	Single	5 years or more
C.G.	Female	30-35	In a relationship	5 years or more
M.Q.	Female	27-29	Married	5 years or more
O.M.	Male	30-35	Married	5 years or more

3.3 SETTING AND MATERIALS

The setting for this study varied depending on each research participant and their chosen supermarket location based on convenience and comfort. This flexibility was a way to guarantee the comfort of the participants' by choosing the environment they were used to shop for food in. All the seven different locations were large supermarket chains in urban areas, in both Ottawa and Toronto, in Ontario. According to the free Merriam-Webster dictionary, a supermarket is defined as “A self-service retail market selling especially foods and household merchandise” (Merriam-Webster Encyclopedia Britannica, 2013). As can be seen in the following picture example in (Figure 3) below.



Figure 3 – Supermarket Example

The study took place around the food area section in each supermarket, excluding any non-food related sections such as household items. It was important to encourage the participants to move around the supermarket freely according to their natural behaviour, while keeping a short distance away from the participant so as not to disturb him or her. The goal was to observe the participants in their usual environment with their usual behaviour without any alterations or disturbance. All the research methods were conducted in the supermarket itself, beginning with the preliminary surveys, then the shadowing study, followed by the secondary survey and interview questions.

The materials that were used to conduct this study include the following:

1. Audio Recorder

- Used for audiotaping the shadowing study and the interviews
2. Clip-on Microphone
Used for audio recording the participant's voice
 3. Digital Camera
Used for capturing photos of the participant during the shadowing portion of the study
 4. Note pad
Used by the researcher to take notes during the research study

All the research participants received the same materials during the study. Prior to beginning the study, the participants were informed about the process including the materials that were being used through a consent form and a verbal description by the researcher.

3.4 DATA COLLECTION PROCEDURES

In order to achieve an in-depth understanding of the phenomenon under study, three research methods were utilized to obtain data while seeking to attain triangulation. The methods include including two surveys, a shadowing/observation study, and a brief interview. These instruments were chosen as a means of triangulation to compare participants' behavior in action to increase the validity of the findings, by comparing what they verbally say, what they think, and what they actually do. This comparison

provides the research breadth and depth and provides corroborative evidence of the data obtained (Denzin & Lincoln, 2008) according to (Bloomberg & Volpe, 2008). The research took place between May-October 2012 in both Ottawa and Toronto in Canada.

3.4.1 Survey Questionnaires

After the participants had been contacted and agreed to participate in the study, each participant chose their preferred supermarket location to complete the study. At the beginning of each study, participants had to fill a survey questionnaire prior to beginning the shadowing study, which was used to gather general demographic information in addition to food shopping patterns. The second survey was to be filled out after the shadowing study ended, which included more open-ended questions that sought to tap into personal experiences and shed light on participants' perception. The second survey was developed using a list of criteria which was developed in a previous study done by Errol A. Simms and Marilyn Narine in 1994, titled *A Survey Of Shopping Behaviour Of Consumers In Trinidad And Tobago: The Case Of Grocery Shopping*. The two survey questionnaires appear as Appendix D and Appendix E. An advantage of survey methodology is that it is relatively unobtrusive and easily administered and managed (Fowler, 2009). But surveys also have limitations for examining complex social relationships or complicated patterns of interaction (Bloomberg & Volpe, 2008). The researcher's advisors reviewed the survey questionnaires and changes were made to the questions to improve its structure and ultimately increase its reliability. Like all methodologies, the research questionnaire had to be approved by the research ethics board at Carleton University prior to conducting the study.

3.4.2 Shadowing Study

The shadowing or observational study was selected as the primary method for data collection in this study. The researcher's decision for using this data-collection method was that it encourages participants' natural behaviour whilst food shopping in their preferred supermarket. Moreover, participants were encouraged to think aloud during the study; this provides the researcher valuable data that expressed the meaning of the participants' experience in their own words.

As previously stated, participants were encouraged to think aloud as they completed their shopping. This became the primary research method as it allowed the researcher to have valuable insights into the personal motivations of each shopper when selecting foods. During the exercise, the majority of data collected was verbal. Each participant was provided with a clip-on microphone connected to a small audio recorder they kept in their pockets that ensured the exercise had been audio recorded in full and would thus be transcribed verbatim. The time of participation varied between participants according to the time spent food shopping. The time ranged between 20-50 minutes each, averaging approximately 35 minutes per observation study. During the observation, the researcher took notes of certain behaviours using a pen and paper pad while following the participant around in the supermarket. Moreover, the researcher took random photographs throughout the shadowing study. The goal of the observations was to note particular behaviours that were occurring during the food shopping process, specifically when participants were faced with food selection and information seeking. These observations were valuable for answering the research questions about information

participants want to know about their food products during the information search stage prior to product selection and purchase. The behaviours included any physical or verbal expression worthy of noting.

3.4.3 Interviews

The interviews took place after the shadowing study was completed, and after the participant has already paid for his or her groceries at the cashier. Denzin and Lincoln (2008) state that a major benefit of data collection through individual interviews is that they help to capture a person's perspective of an event or experience. Further, the semi-structured interviews provide the researcher an opportunity to clarify statements and to gather supporting qualitative information to answer any questions the researcher had that appeared during the shadowing study.

All the interviews were conducted inside the supermarket in person. Participants knew that they were going to be interviewed as part of the research study. The interviews followed the research protocol of Carleton University. The interviews were roughly ten minutes or less in length. Each participant was asked different questions according to their in-store behaviour. Similar to previous methods, on completion of the interviews, the audio recordings were transcribed verbatim; recording word-by-word. After completion of all the three stages of the study, participants were presented a small gift of \$5 coffee gift card to thank them for their time and co-operation.

3.5 ANALYSIS AND SYNTHESIS OF DATA

The researcher used a qualitative coding method developed by Auerbach and Silverstein (2003) a procedure used to organize the text of the transcripts to discover patterns. Through the qualitative coding, the researcher moved from raw text to research concerns in small steps, each step building on the previous one. The reliability and validity of data interpretation is supported with participant quotes (Auerbach & Silverstein, 2003). The following procedures are the steps used to analyze and synthesis the findings:

Phase 1: Making the text manageable

First, the collected data was transcribed in full. Each participant was assigned an acronym based on his or her name to keep his or her identities private. On a separate document, the researcher wrote the study's research questions and concern, which explains what the researcher wants to learn and why. This document was kept in sight of the researcher as reading the transcript began. Second, from the transcript, relevant text in reference to passages of the transcripts that express a distinct idea related to the research questions and concerns were highlighted for further analysis. This was done by reading through the raw text, while keeping the research questions and concerns in mind. It was important to keep track of all the passages and quotes. The researcher developed a numeric and alphabetical system to track each quotation. When deciding which text was relevant, the researcher asked the following three questions:

- i. Does it relate to my research concerns?
- ii. Does it help me understand my participants better? Does it clarify my thinking?

- iii. Does it simply seem important even if I cannot say why?

Meanwhile, the researcher wrote notes that would describe the relevance of each highlighted text. These memos helped the researcher in the content analysis and synthesis stages.

Phase 2: Hearing what was said

This phase included grouping repeated ideas together. Having selected the relevant text, the researcher noticed that different participants often used similar words and phrases to express the same idea. While working on each transcript separately, the researcher highlighted and categorized the relevant text and created new files, which would become a master list of all repeating ideas. Repeating ideas that have something in common were grouped into themes and coherent categories. Themes are topics that organize a group of repeating ideas (Auerbach & Silverstein, 2003).

Phase 3: Developing Theoretical Constructs

In getting closer to the research concerns, themes were grouped together into more abstract concepts consistent with the study's research questions to create theoretical constructs. Theoretical constructs are abstract concepts that organize a group of themes by fitting them into a theoretical framework (Auerbach & Silverstein, 2003). Finally, theoretical constructs were organized into narratives as a list of design recommendations based on the findings and overall abstract themes that answer the research questions. The recommendations are the culminating step that provides the bridge between the

researchers' concerns and the participants' subjective experience. The research recommendations summarize what was learned from the study.

The researcher utilized Microsoft Excel to manage the large amount of data that was divided according to recurring patterns. (Figure 4) below illustrates the process of coding and analysis:

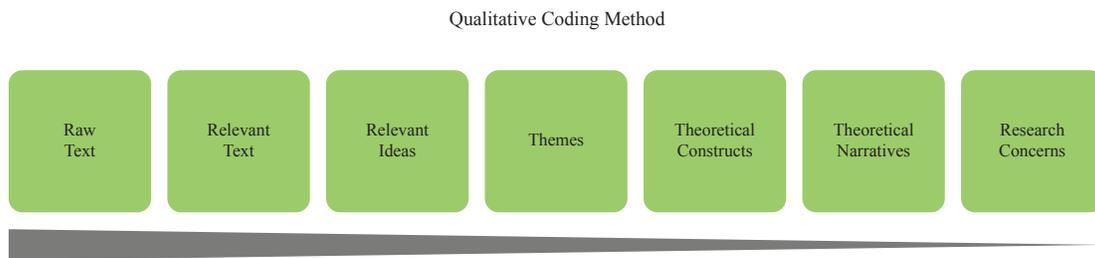


Figure 4 – Qualitative Coding Model (Auerbach & Silverstein, 2003).

3.6 ETHICAL CONSIDERATIONS

The researcher was responsible for both informing participants about the study and protecting their identity and information (Bloomberg & Volpe, 2008; Merriam, 1998). The researcher began the study by enrolling interested participants. Those who volunteered to participate were informed about the purpose and steps of the study through a detailed email and a verbal conversation with the researcher. Each study began with a signed written consent form that outlined the involvement of the researcher and the participant, including audiotaping and photography. The consent form was reviewed and cleared by the Carleton University Research Ethics Board, which can be found in Appendix F. It was anticipated that the study would pose no risks to any participant.

Measures of confidentiality of information were taken into consideration by the researcher, including maintaining the anonymity of participants throughout the study publication. In addition, the researcher was committed to safeguarding the storage of recorded data including written text, audiotapes and photographs. Nobody other than the researcher had access to this material.

CHAPTER 4

RESULTS

This thesis is an attempt at building a better understanding of consumers' in-store food shopping behaviour and how the design of mobile technology tools through the use of *Mobile Recommendation Agents* (MRAs) and *smart products* may assist consumers' access to digital information through *Dynamic Product Information* (DPI) at the point-of-purchase.

In this chapter, the results of the qualitative research are presented in light of what was discovered from the research process through seven primary participants. These results are displayed into meaningful data that is presented as themes based on the stages of the consumer purchase decision process discussed in the literature review chapter. The approach the researcher uses to present the findings is by marking individual excerpts from the transcripts and grouping these in thematically connected categories. Quotations from participants are used to demonstrate the findings using participants' own words for each pattern using key passages from audio recordings and interviews, as well as key pieces of evidence from the survey analysis. For further detailed quotes, the reader can find additional list of quotes in the appendix, grouped into similar themes and patterns identified in this chapter.

From the qualitative shadowing observational study, multiple patterns emerged as being particularly relevant for this thesis. The results are presented under the first four

stages of the purchase decision model; they are (1) Problem recognition, (2) Information search, (3) Evaluation of alternatives, and (4) Purchase decision. The bulk of the results are presented under stages two and three that are the focus of this thesis, while still connecting the results of the other three stages as being part of the overall decision process as inseparable fragments. Each section includes detailed sub-sections where the results produced key insights into themes and patterns that were emerging in response to the research questions. The latter helped to paint a picture of the findings and set the context of the concepts presented.

4.1 PROBLEM RECOGNITION

Problem recognition is the first stage of the consumer purchase decision process. It is the initial step in the purchase decision, where the person perceives a difference between ideal and actual situations that are big enough to trigger a decision (Crane et al. 2008). This section speaks to the first set of research questions in order to understand how the need to purchase is triggered in consumers through in-store food shopping.

What was found under this first grouping stage in some cases is that the problem recognition stage was activated by the in-store shopping visit. Participants utilized the in-store shopping visit as a way to trigger the problem recognition stage. Stage one of problem recognition includes both pre-planned and unplanned shopping. The results include four major categories as displayed in (Figure 5) below including (1) identifying that the food product is no longer available at home, (2) the food item is a predetermined ingredient as part of a planned meal through a pre-written shopping list, (3) visually

seeing a food product in-store and remembering they need it, and (4) habitual purchase practice in which participants always purchase the same food item in every shopping visit. The latter helped to paint a picture of the findings and set the context of the concepts presented.

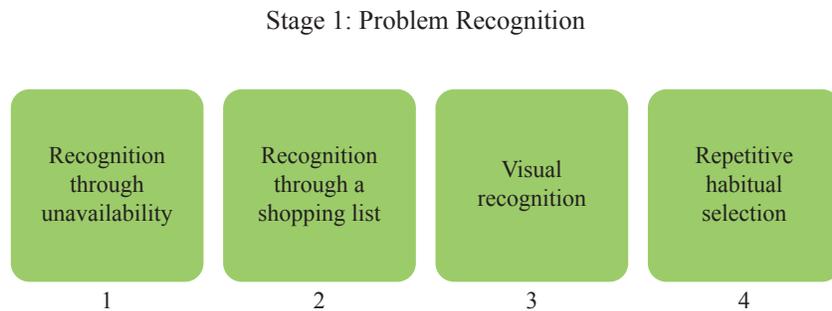


Figure 5 – Problem Recognition Stage Findings

4.1.1 Recognition Through Unavailability

A few participants (3 of 7 [43%]) expressed recognition for food items based on the unavailability of food items at home. When a food item was no longer available at home, it prompted them to purchase the item while shopping in-store, which can be described as a planned food shopping purchase, as two couple participants noted:

- MQ: The eggs, we don't have any?
- P2 (Husband): Are you sure?
- MQ: I swear we do not have any. I'm pretty sure we do not have any!
- MQ: Okay, now we need an App to check our fridge, haha...to check what we have at home. (MQ, p. 4)

Unavailability of food items at home is one of the ways participants triggered a problem recognition that created an immediate need for purchase by producing to a written shopping list.

4.1.2 Recognition Through Shopping List

The majority of participants (5 of 7 [71%]) selected food items based on a written shopping list they had whilst shopping. The participants repeatedly referred back to their shopping list for food selection as a point of reference for managing their food selection. The shopping list results from problem recognition as part of food selection. The following quotation exemplifies this finding, where young participants used their smartphones as their shopping list:

- Researcher: You have a list?
- OM: Yeah, just like I said; we always come prepared with a list. We usually have it on the phone using notes iPhone application, because she usually writes it down, copy, paste, and email it to me, it is easy for sharing.
- Researcher: Do you use the app?
- OM: No, if there is an app, let me know, I will be open to using that. (OM, p. 2)

The consumer's shopping list is an integral part of the overall shopping experience, and it is one of the central used methods that result from the need for purchase.

4.1.3 Visual Recognition

All participants (7 of 7 [100%]) exhibited a repetitive behaviour during their in-store visit. When participants visually saw the food item in-store, it immediately triggered a problem recognition that activated the participant's memory for a need to purchase the food item. Some of the purchases were part of a pre-planned decision, while others were impulse or unplanned purchases. One participant described this behaviour as follows:

“I need salsa; I’m going to get some... medium, umm, yeah, medium salsa. That is why I like going to the grocery store because then I always see things that I don’t remember I need”. (NS, p. 2)

Such an example statement demonstrates the importance of visual recognition. Often, participants utilize their in-store visit to remember what food they need to purchase, which may have been a pre-planned decision.

4.1.4 Repetitive Habitual Selection

A recurring pattern for a need to purchase was determined when some participants (4 of 7 [57%]) already have meals pre-planned for the week, and therefore have a specific menu for necessary food items. Thus, food selection for this group was based on the ingredients of a certain dish. Here, the participant recognized a problem or need to purchase a food item based on a planned menu. The following is a quotation that describes this finding:

“I know that I’m going to make a salad this week, so I’m going to grab some lettuce”. (TH, p. 2)

The researcher also observed participants identifying a specific need when they stated the phrase “I always buy this”. With or without a shopping list, the participants routinely bought the same food items when they shop in-store. These food selections could relate back to one’s subjective food diet and lifestyle. The following quotation exemplifies this repeated idea:

“Yeah, oranges, is a must for every shopping, because they are a fast and healthy snack. So that is why I always choose them”. (MQ, p. 2)

As such, the following chapter suggests how mobile technology can suggest certain purchases based on the participant's previous repeated purchase history.

4.2 INFORMATION SEARCH

Information search is the second stage of the consumer purchase decision process. It is defined as the stage in which the consumer begins to search for information by accessing their memories, or through available external information search (Crane et al. 2008). This section addresses the first set of research questions to initially understand how consumers need for purchase is triggered through in-store food shopping. Information search denotes the sequence after the problem recognition is triggered once the customer is in-store, not before creating a list. The findings in this stage also contribute to address the second set of research questions in looking at how mobile technology can aid consumers' in-store food shopping through personalization of experience using mobile tools.

In this phase, the researcher found that the participants completed both an internal and external information search depending on the food product category and if the participant had any previous experience selecting the food product. The established results under this second grouping stage include three major categories, wherein participants searched for a variety of information prior to food selection at three different levels: (1) in-store product information, (2) direct product information, and (3) specific traits and attributes of food. Each category is divided into sub-sections. The following helped to describe the findings and set the context of the concepts presented.

4.2.1 In-Store Product Information

This section relates to in-store food product information including product stock availability and product location. The following sub-sections detail the results using quotations from participants as part of the information search stage of the consumer decision process. (Figure 6) below displays the subsections under this grouping.

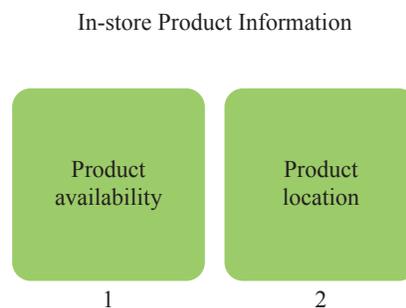


Figure 6 – In-store Product Information Findings

4.2.1.1 In-Store Product Availability And Location

As part of the information search stage, a few participants (3 of 7 [43%]) sought out whether or not the food item was available in-store. The following example illustrates this finding, where the participant sought in-store employee assistance to ask for the item's availability:

- OM (asking employee): Do you have hot dogs? Hot dogs?
- Employee: Yes, over there
- OM: Okay.
- OM: So we are on the hunt for hot dogs, I do not even know where it is to be honest. There they are, perfect! (OM, p. 4)

In addition, the majority of participants (6 of 7 [86%]) repeatedly spent time searching for the location of food items. This behaviour is an essential part of the information search stage and as part of the overall shopping experience. Search for location of food items was most prominent with participants who were less familiar with the supermarket layout. The following quotation exemplifies this behaviour:

“Yeah, oranges, oh, they are not here. They are normally here! Maybe they are over there”. (MQ, p. 2)

In some cases, the location of food items made participants confused as demonstrated in the following example:

- Researcher: did you find the vanilla?
- RS: Yeah found it in a different place, it should be next to the baking stuff. The location was confusing; it is next to spices! It should be next to baking stuff. (RS, p. 4)

In addition, participants often sought help from in-store employees to assist in locating the food items:

- (Asking a worker) Do you know if you have got tomatoes and lettuce?
- Worker: Tomatoes and lettuce? Yes, tomatoes are right over here.
- No, like large tomatoes not baby tomatoes
- Worker: It should be beside them.
- Okay, where is your lettuce?
- Worker: Lettuce is beside the cooler over there
- Okay perfect, thanks (OM, p. 4)

These three examples demonstrate a common element, which is searching for the location of food items in-store.

4.2.2 Direct Product Information

This section of information search relates to any information that is directly related to the food products based on visual observation in-store including price, size, expiry date, and brand. The following sub-sections detail the results using quotations from different participants. (Figure 7) below displays the results found under this grouping.

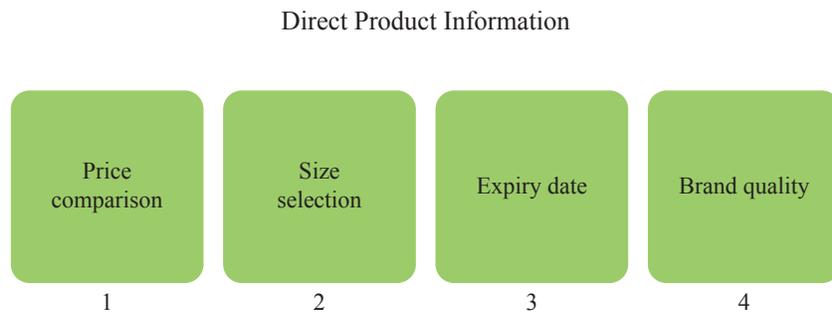


Figure 7 – Direct Product Information Findings

4.2.2.1 Price Comparison

Within this study, price is the primary information that is crucial to the consumer’s decision making. Attention to price sensitivity was noticeable in the meat, frozen, and dairy food categories. Price is a piece of information that all (7 of 7 [100%]) participants searched for during the information search stage. Price is a general term used in this context, which represents cheaper price comparatively between food items, whatever is on-sale, and overall monetary value. The following quotation captures how price is the essential information that participants searched for under the information search stage:

“I need curry powder; looking for cheaper one. Ah! Lots of options, looking for curry powder, found one, but looking for something else cheaper”. (RS, p. 4)

In other scenarios, price was complemented with other information such as health concerns:

“So we get fresh skim organic milk, the PC brand, or organic Meadow, whichever is on sale, I usually base it on whichever one is on sale, and when neither one is on sale, I close my eyes and pick”. (CG, p. 3)

Price, as an information criterion is not only part of the information search stage, but also transcends to the third stage of the consumer decision process; evaluation of alternatives.

(Figure 8) below as an example of a participant comparing prices in the juice aisle.



Figure 8 – Participant comparing prices

4.2.2.2 Size Selection

Searching for a particular size is a repetitive behaviour demonstrated by all participants (7 of 7 [100%]). Most prominently, for example, participants looked for size in their choice of eggs. The following quotation reflects this finding:

“So... we always get the same, umm, for the eggs, we always get the large size eggs because we think that even the large is pretty small; but we always try to get large or extra large, if we found like jumbo eggs or extra large, because it is pretty small, and I don't really see any difference, but I think the large is a bit larger, so we always get this because of the price and, we are just used to it”. (MQ, p. 4)

In this example, size selection was the primary criteria that the participant considered.

This information criterion is also essential in the second stage of the consumer's decision process.

4.2.2.3 Expiry Date

Some participants (3 of 7 [42%]) considered the expiry date as part of the information search stage, mainly for the foods that would expire in the near future such as the dairy and packaged foods category. Under these food categories, the expiry date is considered an essential piece of information to assess the purchase of food items, as seen in the following quotation:

“I need milk, half & half, looking for expiry date, and... they are all the same”. (RS, p. 2)

In this example, the participant was seeking to choose milk that had the farthest expiry date amongst other milk packages on the shelf.

4.2.2.4 Brand Quality

Some participants (4 of 7 [57%]) searched for the brand of the food item as part of the product information search stage, with particular relevance to the packaged food category. The researcher found that there is a relationship between brand familiarity and a consumer's trust in the food quality. In addition, some participants associate store brand with food quality trust, such as Costco. As a result, participants become used to selecting specific brands they are familiar with repeatedly from the same supermarket they shop from. The following quotations exemplify this finding:

- Researcher: For salsa, are you familiar with the brand?
- Yeah, I've gotten this before, and it's good. (NS, p. 2)

“Yeah, for the cereal, I always buy the one that...I always get the one that, yeah, Kellogg's Special! Yeah, Kellogg's Special. I always buy it because I'm used to the taste of it and also because of the diet I'm working on. It's a good price too”.
(MQ, p. 3)

Brand familiarity in these cases is associated with taste preference and trust due to repeated purchasing behaviour. This repeated purchase behaviour denotes brand loyalty, a key accomplishment for retailers and marketers to achieve.

4.2.3 Specific Traits And Attributes of Food

This section relates to specific characteristics, traits, attributes and different influences of food products as outlined in (Figure 9) below. The results in this section begin to blend stages two and three of the consumer decision process. The overlap between the two stages demonstrates that there is no clear separation between each stage of the process, and so they begin to merge. This part of the information is more subjective

to individual's needs, attitudes and beliefs. This section concludes the information search stage in introducing the next stage of the consumer decision process; the evaluation of alternatives. The following sub-section of results detail the findings by using quotations from participants as part of the information search stage, including (1) information search for low-fat, low calorie healthy foods, (2) information search to understand the ingredients and components of foods, and (3) dietary restrictions information search, all of which are subjective compared to the objective information presented in the previous section.

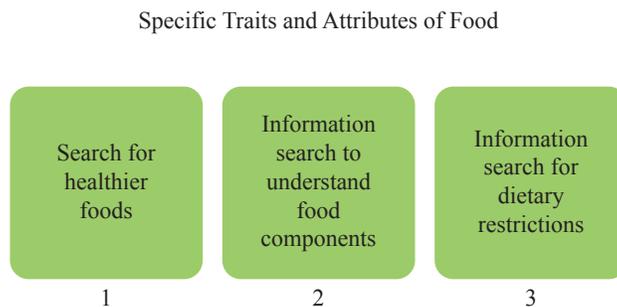


Figure 9 – Specific Traits and Attributes of Food Findings

4.2.3.1 Search For Healthier Foods

Interestingly, some participants (4 of 4 [100%]) showed a conscious concern regarding health information, in which they expressed interest in a low-fat diet, which presumes a health-conscious lifestyle. This information search attribute applied mainly to the packaged foods and grains category. The following is an example that describes this outcome:

“Well, I’ve never had tuna in oil, we always just get water, and like my parents, and what do you need the oil for? Really...Okay like the oily tuna just adds extra fat, and that’s not good”. (NS, p. 3)

Here, the participant specifically searched for a tuna pack with a label indicating water based tuna. The participant described that she often tries to choose low-fat foods as a healthier choice, which is identified through a light blue coloured label that she is familiar with. All three participants who were shopping in pairs with their significant others have demonstrated this behaviour. This circumstance may have encouraged the search for healthier products, because as people mature and grow older, they tend to become more health conscious.

4.2.3.2 Information Search To Understand Food Components

Most participants (5 of 7 [71%]) searched for information about food products by reading the labels in order to process the ingredients and food components and determine how to consume the food, how it could be used in a meal, or simply to explore the difference between the choices they are faced with. This behaviour applied primarily to the packaged foods and Animal Products categories where participants found static label information insufficient. One participant said:

“I’m just reading the labels for the meat to see like when they are the best before date and just like what it is? Because usually if I just see meat, I really don’t know what it is for unless I read what it says”. (NS, p. 2)

“I don’t like the flake stuff, I want the chunky stuff. What’s the difference between solid and chunk? I don’t know, I will just get the chunky one”. (NS, p. 2)

In such examples, the static labels were not enough to understand the component or the use of the food item. Mobile tools can provide consumers with access to digital information not available in-store that may assist consumers in making the right decisions; such information may not necessarily be found on labels only. That is precisely what I am suggesting to include as a feature in mobile applications or tools, because such information is not available on static food labels.

4.2.3.3 Information Search For Dietary Restrictions

Some participants (3 of 7 [43%]) searched for specific information by reading the food package label in search for specific attributes and ingredients that their diet excludes specific ingredients such as alcohol due to health, cultural or religious reasons. The following quotations validate this finding:

“Oh! I need soya sauce. I want to check if it has alcohol or not, yes it has, the soy sauce has alcohol. Umm, check another one, [Pause] this one has... okay, no alcohol, checking the label, okay”. (RS, p. 3)

“The only reason I’m choosing these because they are halal hot dogs, that’s the only reason. And I do not see any other kind”. (OM, p. 4)

In these cases, the participants were looking to exclude specific ingredients from their diet due to social and religious reasons, such as alcohol. Mobile technology can personalize one’s preferences to suggest products based on one’s own dietary restrictions.

4.3 EVALUATION OF ALTERNATIVES

Evaluation of alternatives is the third stage of the consumer purchase decision process. It is defined as the factors that represent both objective (e.g.: taste preference, ease of preparation) and subjective (e.g.: brand prestige) attributes that a consumer uses to compare different products and brands (Crane et al. 2008). There are noticeable similarities and overlaps between stages two and three of the consumer decision process, wherein the commonality of results in the two stages begin to blend the findings and recognizes that there isn't a distinct beginning and end to each stage of the process, and so they begin to merge. During this stage, consumers evaluate the food products on a scale of attributes they are seeking in a food product. Consumers are influenced by the degree of involvement that they may have with the food product and brand. Ultimately in this phase, consumers are assessing the value of the food products or brands in their evoked set² before they can move on to the next step of the decision process. The researcher found that participants have diverse evaluation criteria when selecting food products, which can translate into a different hierarchy from one person to the other, but, comparably, the majority of participants shared similarities in the evaluative criterion. Participants used decision-making heuristics, which are small rules of thumbs that may or may not be the correct assumption based on facts. These heuristics were used to help in making the decision based on individual beliefs and attitude.

This is an important finding that will be discussed in the next chapter, as it contributes to real implementations for design, wherein the results will help contribute to design a sequential structure for mobile technology tools that could assist consumers

² The number of alternatives that are considered by consumers during the problem-solving process.

during food shopping. The design implication suggests that mobile tools and applications can enhance the decision-making heuristics, and maybe these mobile tools are replacing commonly used decision-making heuristics. The chapter that follows discusses a recommendation for a design sequence board that allows individualization and customization using MRAs.

This section is divided into the five food categories: (1) dairy, (2) fresh fruits and vegetables, (3) animal products, (4) grains, and (5) canned and packaged foods. The qualitative data in this section presents the hierarchy of repetition for the number of times each specific criterion was repeated within each food category, and to simplify the presentation of data, visual figures are used in each section. It is noteworthy to point out that the evaluative criteria's hierarchy changes from one person to another. However, the overall mentioned criteria are the same. This section addresses the first set of research questions in order to understand how the need for purchase is triggered through in-store food shopping. In addition, the findings in this stage also address the second set of research questions that examine how mobile technology can aid consumers' in-store food shopping through personalization of experience using mobile tools.

4.3.1 Dairy

In the dairy food category, the main evaluative attributes that were assessed by participants during the third consumer decision stage were price, brand, taste preference, size and expiry date as seen in (Figure 10) below which illustrates the number of times each criteria of assessment was mentioned under this food category.

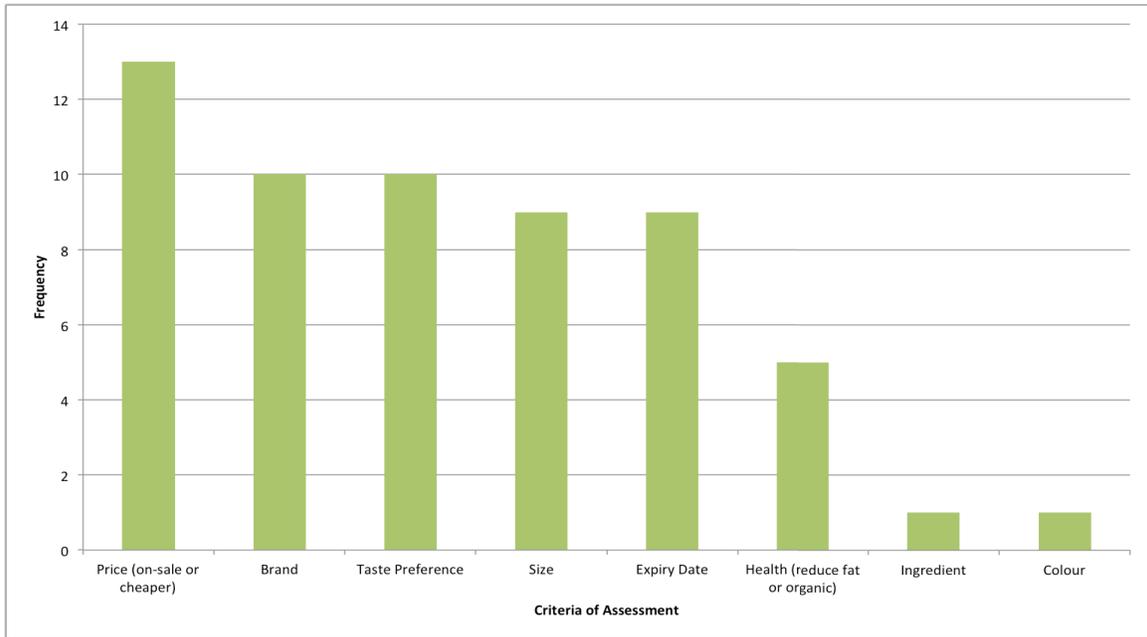


Figure 10 – Dairy Product Criteria Assessment

The data presented in (Figure 10) summarize the evaluative criteria that were assessed by participants. These criteria were assembled into the number of times each specific criterion was repeated by all participants. This repetition demonstrates the importance of each evaluative criterion for young consumers. The following examples are quotations support and explain this finding. The top five evaluative criteria in the dairy category are selected and presented.

4.3.1.1 Price

Price related evaluation was mentioned 13 times when choosing dairy food products. The following is an example of how a participant expressed this evaluative criterion:

- Cheddar cheese, good deal. Umm, there is no price tag? I will take this one; it's cheaper.
- Researcher: Why did you choose this specific cheese?

- Just because it is cheaper than the other one's. (RS, p. 1)

Other participants also expressed similar preferences in price reductions with dairy products.

4.3.1.2 Brand

Brand as an evaluative criterion was mentioned 10 times when choosing dairy food products. The following is an example:

“Yogurt, yogurt, yogurt... Okay. This is what I buy because it is the brand that I usually buy, and it does not have gelatin in it. I'm looking for a date, checking if any of them have longer expiry date? Okay, they are all the same”. (RS, p. 2)

Repeated purchase behaviour develops brand familiarity and brand loyalty. Different participants have diverse brand preferences; thus, any mobile applications will need to encompass such diversity in selection.

4.3.1.3 Taste Preference

Taste related evaluation was also mentioned 10 times when choosing dairy food products. The following is an example that expresses this evaluative criterion:

- We need some yogurts; they are all on sale, so now it is a big decision. Which one do you want to get?
- Husband: Well, you like the vanilla, I like the blueberry.
- Let's see what types are in each package of yogurt to decide which one will satisfy both of us? So those are good: three vanillas, three blueberries. Okay, yeah, that is the perfect one. So we will pick zero Astro zero yogurt pack that is on sale that has strawberry, blueberry, vanilla and raspberry in it. Because I like vanilla, it is my favourite, my boyfriend likes blueberry. (CG, p. 5)

In this example, the participants decided to select a particular flavor of yogurt that satisfies both of them. This demonstrates the individuality in taste preferences among participants.

4.3.1.4 Size

Size related evaluation was mentioned 9 times when choosing dairy. The following is an example quote where participants expressed this evaluative criterion:

“I like the big packs of cheese because they last a long time, umm, if they have the old light, I always get the light one. Umm... because you know, its less fat, because you know; cheese is pretty fatty!” (NS, p. 2)

4.3.1.5 Expiry Date

The Expiry date also had a prominent significance when choosing dairy food items, where it was mentioned 9 times. One participant explains the importance of expiry dates:

“For dairy products, I usually check the expiry date because usually they stay in the fridge for a long period of time, so sometimes I forget about them; they do not have smaller portions that it is enough for what I need them for. So that is why I look for something that lasts for a longer time”. (RS, p. 5)

4.3.2 Fresh Fruits And Vegetables

The main evaluative attributes or criteria that were assessed by participants during the third consumer decision stage when choosing fresh produce included freshness, price, and size, but the dominant evaluative criteria in fresh fruits and vegetables were freshness. The researcher’s observations are represented in (Figure 11) that illustrates the number of times each criteria of assessment was mentioned under this food category.

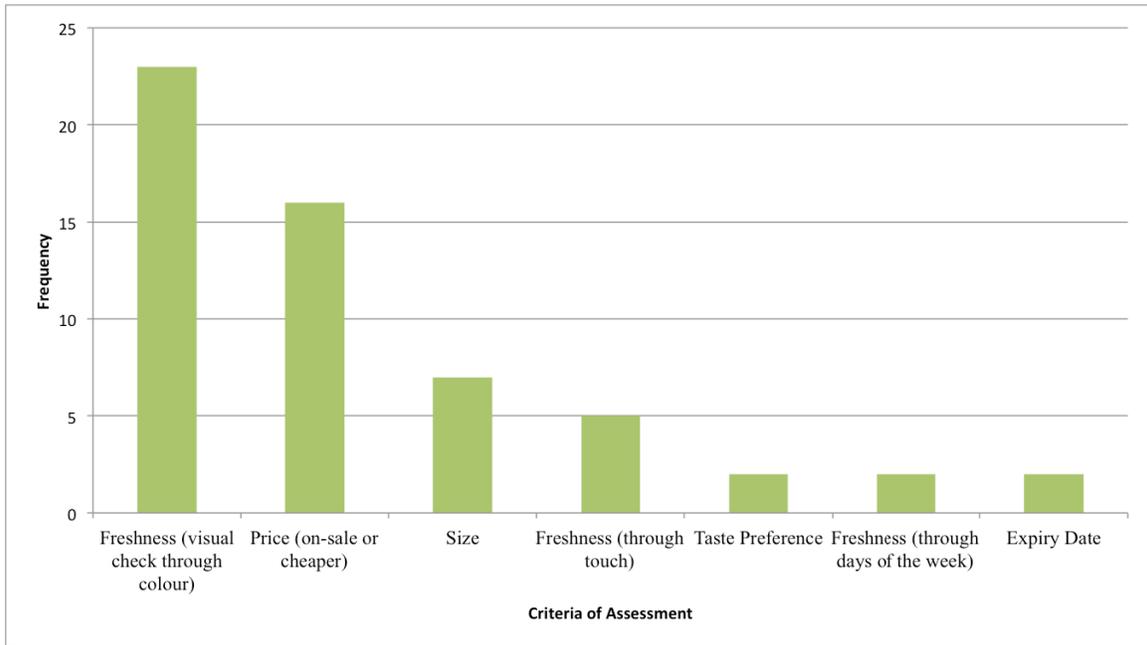


Figure 11 – Fresh Fruits and Vegetables Product Criteria Assessment

4.3.2.1 Freshness

Freshness related evaluation was mentioned 30 times when choosing fresh fruits and vegetables. This section can be divided into three categories including (1) visual assessment through colour freshness, (2) freshness assessment through touching the food product, and (3) freshness assessment through determining which day of the week the product was shelved.

4.3.2.1.1 Visual Freshness

Participants explained that an evaluative criterion to determine freshness was through visually assessing the health of the food, mainly through colour as described below:

“Strawberries, we are scanning for ones that look the freshest out of the bunch. So we try to find strawberries with no mold on them, because that seems to be a problem”. (CG, p. 1)

“So for the pineapples, they look good, they look fresh, so we are going to take some. They are orange not green here, I will show you why. Because here, they look orange, when they look green, like this, they are not... no, not fresh, Okay, I think this one, no this one, no, no, here, wait, I will show you, yeah, this one looks good! So, we chose the one that looks most fresh”. (MQ, p. 1)

Participants often considered colour as determinant of freshness for produce. Some items were easier to assess than others. In the above-mentioned example, the participant found it more difficult to determine which colour the pineapple should be? (Figure 12) below is a picture example of a participant choosing a pineapple.



Figure 12 – Choosing a Pineapple

4.3.2.1.2 Freshness Through Touch

Participants explained that an evaluative criterion for freshness assessment was through touching the food item, to assess the quality of the product as described below:

“With peaches, I squeeze and feel the firmness of them again, if they are a bit soft they are quite ripe, but these ones are fairly hard. Oh! I found a bit of a soft one, so that is good”. (TH, p. 2)

4.3.2.1.3 Freshness Through Days of The Week

Participants elucidated that an evaluative criterion for freshness assessment was through determining which day of the week it was because they assumed that the food is least fresh at the end of the week, which is a decision-making heuristic as described below:

- (Asking husband) Okay, today is what, Friday? Because most of the...
- Today is Friday, so yeah most of the, okay. I do not really find any good, umm, No, yeah, those... there is not too many new groceries here, so... never mind, we skip the grapes because there are only few left, and of course the bad one's are left, so...
- (Asking husband): did you find oranges? They are all bad, I only found this. Because obviously it is Friday, so, I do not know, a lot of things are missing today, so... okay. (MQ, p. 2)

In effect, a future mobile tool can include a notification feature that notifies on when the fresh produce is arriving at the store based on the consumers purchase list.

4.3.2.2 Price

Price also had a prominent significance when choosing fresh fruit and vegetable produce, where it was mentioned 16 times. The following is an example quote:

“Ah! The strawberries are on sale still too, so I am going to get some of that”. (TH, p. 1)

4.3.2.3 Size

Size related evaluation was mentioned 7 times when choosing fresh produce. In the following excerpts of participant observations, it is demonstrated how participants reflected on and chose based on size:

“For corn, Ahh, I’m just looking for a big one, this one is big!” (NS, p. 1)

“This is like a club packer, very large pack, and since I’m only eating for myself, I do not know if it is worth getting that or if I just get one of these small packs? Which are best before a few days from now, so that is better. I question whether I should go with the big pack because it is on sale, even though they are going to go bad in a few days, it comes down to what I want to do for the price. I don’t know! I can spend a lot of time just sitting here trying to make a decision. So one thing I realized that I’m very bad at making decisions in the grocery store. All right! I’m going to do it! Because these things are delicious, and it is a healthy choice”. (TH, p. 1)

In this example, as with many other examples, there are several criteria that the participant is assessing simultaneously including size, price and taste preference. At the end, the participant chose the largest size of sugar snap peas according to the best value and liking of this food product. In such scenarios, what if the mobile tool can aid the consumer in making the best decision based on the hierarchy of evaluative criteria the participant chooses for each food category.

4.3.3 Animal Products

The main evaluative attributes or criteria that were assessed by participants during the third consumer decision stage when choosing animal products include taste preference, price, freshness and expiry date, and weight and size as seen in (Figure 13)

below which illustrates the number of times each criteria of assessment was repeated under this food category.

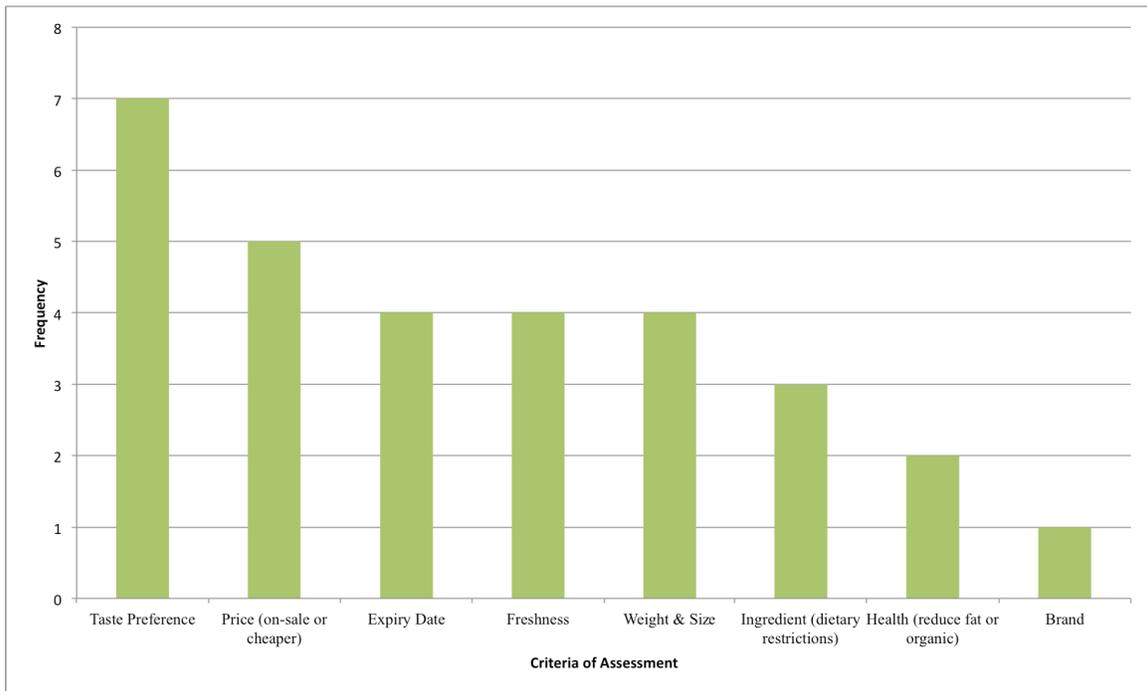


Figure 13 – Animal Products Criteria Assessment

In explaining the results of this finding, the data is a summary of the evaluative criteria that were assessed by participants, assembled into the number of times each criterion was repeated within this food category by all participants. This repetition demonstrates the importance of each evaluative criterion for young consumers. The following are excerpts from the researcher’s observations that support and explain the findings.

4.3.3.1 Taste Preference

Taste preference as an evaluative criterion is most important under animal products food category. This behaviour was mentioned 7 times when participants chose

animal products. The following is an example quote that expresses this evaluative criterion:

“So, Tuna, I don’t like the flake stuff, I want the chunky stuff”. (NS, p. 3)

In this context, the participant is faced with the selection of packaged tuna, wherein taste preference plays an important role in selection.

4.3.3.2 Price

Price was the second main evaluative criteria assessed in this food category and was mentioned by participants 5 times. The following is a lengthy example that describes this criterion.

- Okay, so I enjoy red meat, and it looks like there is a bunker here with some good sales, some good prices.
- Yeah, definitely if you are going to BBQ it up, I say it’s a great choice especially for the price.
- Okay so, its pretty good price. Since it’s a good price, I will probably get it. Even the ground beef is on sale. Hmm... And I usually get club pack; because it’s cheaper, and I can freeze the portions, and then consume them cook them up later. Sometimes I will even look at the difference between the individual pack prices per kilogram \$14.20 dollars vs. \$11.99 dollars, so I mean I usually just pick up. This one looks pretty good...\$16 dollars.
- So definitely when it comes to meat, I always look at sales. Like steaks are so expensive, you kind of have to pick the sales. Oh! And often see these little tags which means they are going to be expiring soon shortly; 30% off, even though I wouldn’t buy this particular cut, it catches my eye definitely. 30% off, it’s nice. If I want to cook it tonight, I can do it. I do everything to cut price! (TH, p. 3)

To this participant, meats and steaks are considered an expensive food, thus, searching for sales labels is a primary initiative for selecting meats. This example demonstrates the importance of price for price savvy consumers. Thus, one of the proposed ideas of this

thesis is to allow mobile tools become customizable according to consumers' own preferences and hierarchy in food selection based in their individual needs.

4.3.3.3 Freshness And Expiry Date

Mentioned 8 times in total, expiry date and freshness are evaluative criteria that participants used when choosing animal products foods. There is a clear correlation between the expiry date and freshness of the meats. Participants determined freshness by checking the expiry date and by visually checking the meat's colour and texture. The following two quotes explain this finding:

“These look interesting; pepper steaks. Oh, that actually looks kind of good! Maybe I will try those. [Pause], are they fresh? Pass before May 14th, Eww! (That's today! That is not good! Let's see if there is something fresher? Um, let's see... what is this, sirloin strip, sandwich steak? I'm just reading the labels for the meat to see like when they are the best before date [referring to the expiry date]”. (NS, p. 2)

“For meat, well, I look at the date of course, but yeah definitely the color, the texture, this one kind of looks interesting, it's sort of different than the others, As long as there is no like brownness then it's pretty good. These look quite fresh”. (TH, p. 2)

The expiry date is used as a guideline in determining freshness. In the above example, the participant N.S. did not select the cut meat because the expiry date was on the same day of the purchase, which translates to an old piece of meat that may not be tasty or healthy to consume.

4.3.3.4 Weight And Size

The search for weight and size criterion were repeated 4 times under the animal products food category, an evaluative criterion that participants used to determine preference and value as seen below:

“Three for \$5 dollars! Summer is served. So that is kind of catching my eye. I like these \$10 dollar bags, I get a few of them once in a while, often times I will get the fish, I have a bag at home, so I don’t need to get them, but umm... makes me think that I’m saving some money, if it is like; Oh, \$10 dollars for this giant bag! I do not know if you are actually saving a whole lot? I don’t know what kind of... and because it is frozen as well, it is not like fresh stuff, so I either get the fish or chicken fingers or something like that. I always, I tend to buy in bulk, because, especially frozen fruit, frozen foods, because I just throw it in the freezer and I have it for a while, I do not need to continue to buy it, and often times bulk food is cheaper too, so... you get a price cut when you buy in bulk”. (TH, p. 3)

When the participant is faced with the choice to pick and choose the size of a meat package, often times, buying in bulk or larger size is perceived as more valuable.

4.3.4 Grains

The main evaluative criteria that were assessed by participants during the third consumer decision stage when choosing grain products such as bread include taste preference, price, brand, and health assessment as seen in (Figure 14) below which is organized into the number of times each specific criterion was repeated within this food category by all participants. The repetition demonstrates the importance of each evaluative criterion young consumers assesses when choosing foods such as bread and pasta.

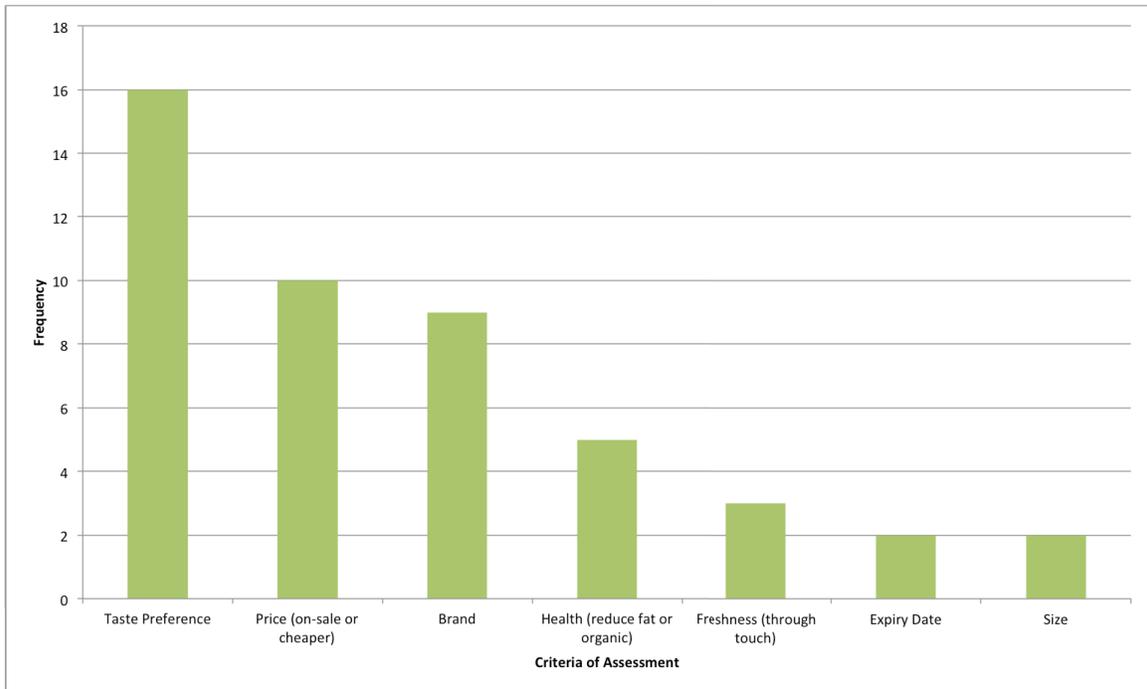


Figure 14 – Grains Product Criteria Assessment

4.3.4.1 Taste Preference

Taste preference is mentioned 16 times, making it the most important evaluative criteria under the grains category. In the following example, the participant is selecting bread, and taste preference as a criterion plays a major factor in the purchase decision process.

“These hot dog buns are the normal ones that we get. Now even though I picked these because I have to, I would have probably picked them anyways because I like this brand. I like it because of the taste and the overall quality, as well. So the way the bun is: it’s not the hard ones or the soft, burgers usually taste good in this bun”. (OM, p.1)

4.3.4.2 Price

Price was mentioned 10 times under this food category. The following quote illustrates how one participant described price as an important criterion in bread selection:

- We always buy “Dempster’s”.
- Husband: We always buy the \$2 dollars.
- \$2 dollars, yeah, because it is cheaper, this is always \$2 dollars! So we always buy this bread because it is cheap and good. (MQ, p. 3)

4.3.4.3 Brand

Brand related criteria were mentioned 9 times in this food category. In the following example, the participant was selecting pasta.

“Okay, so we are going to grab a box of pasta, umm, so we always get “Kettle’s” healthy harvest whole-grain, whole-wheat pasta, always”. (CG, p. 6)

This example illustrates how brand familiarity and trust contribute to a habitual purchase selection, a repeating idea that is also visible in other food categories.

4.3.4.4 Health

Health is an evaluative criterion that was mentioned 5 times when participants selected grain foods. In the following quotation, the participant demonstrates the extent of their recognition of health properties for food purchases:

“I just want to see how much fat is in a box of vanilla almond granola, an organic box as we are walking by. Okay, so there is 9 grams. I always look at grams. I look always at the grams of fat, always in everything. The only reason I did not look at everything we have in the cart is because I have already looked at all the stuff so many times, we usually get typically the same type of stuff, but I never just buy something new, even if it is organic, and I know it is good for me, until I look at the grams of fat”. (CG, p. 5)

For the participant C.G., health is a primary factor in selecting foods. Currently, the participant finds this information through reading static labels on the available packaging. Mobile technology can be used as a tool to provide further information if available. A further discussion to this finding can be found in chapter 5.

4.3.5 Canned And Packaged Foods

The main evaluative criteria that were assessed by participants during the third consumer decision stage when choosing packaged food products such as frozen pizza.

These criteria are price, taste preference and size as seen in (Figure 15) below:

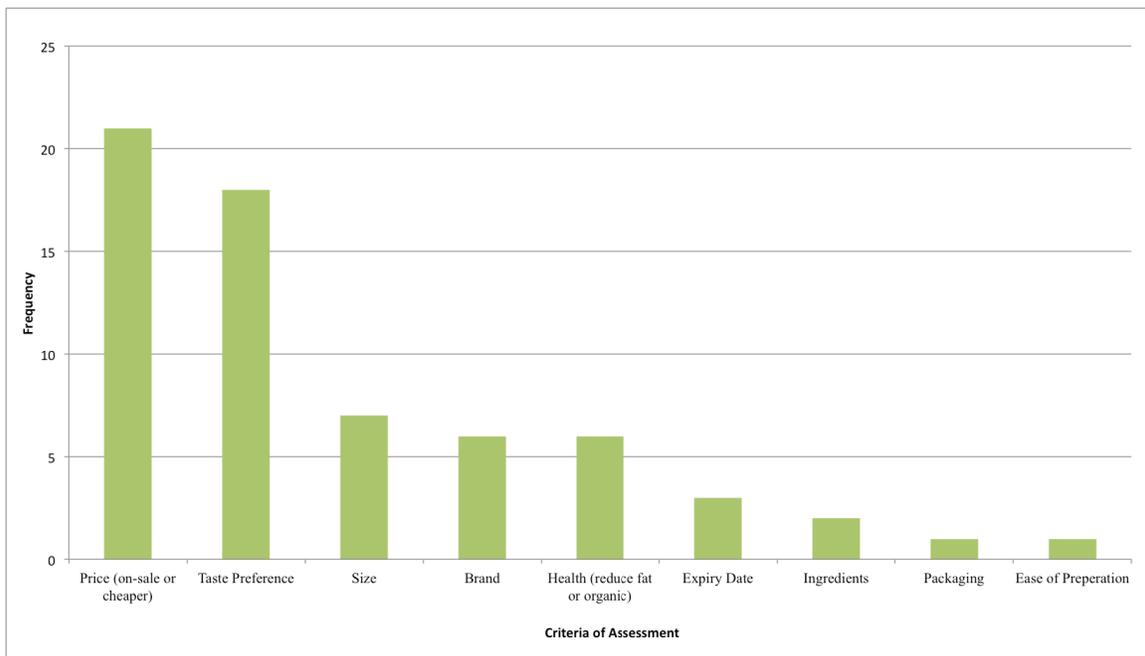


Figure 15 – Canned and Packaged Foods Product Criteria Assessment

The data presented is a summary of the evaluative criteria that were assessed by participants. This information was then organized into the number of times each specific criterion was repeated within this food category by all participants, in which this

repetition demonstrates the importance of each evaluative criterion for young consumers. Below are some excerpts that demonstrate these findings. The most prominent evaluative criteria include price, taste preference, and size.

4.3.5.1 Price

Price is one of the main evaluative criteria assessed in this food category mentioned 21 times in total. The following quotes are examples that describe this finding.

“Okay, Pizza is on sale, that’s so cheap, \$3.33 dollars! Okay, I’m going to get a pizza. So, yeah, it was on sale with the other ones, its only \$3.33 dollars, which is really cheap, so thought I would get one”. (NS, p. 2)

“Now, since it is getting hot, ice cream and cold desserts are quite intriguing, and since there is a yellow tag, I’m going to look. Six bars for \$5 bucks! No, I do not need it”. (TH, p. 4)

Both examples illustrate the importance of price in selecting packaged and frozen foods. These examples also illustrate the range of how price can play a role in making a purchase decision, thus, it is imperative for the suggested mobile tool to embody this variability in the prominence and meaning of price and all other criterions.

4.3.5.2 Taste Preference

Taste preference is another key evaluative criteria assessed in this food category that is mentioned 18 times in total. The following is a discussion between one of the participants and her partner that describes this finding.

- Okay, so we are going to choose the sauce of our stir-fry, we usually get different ones. We like curries, we kind of like a bit of everything, but usually

Asian flavours.

- I like this one, but you don't like this one.
- Husband: It's got ginger in it. I know it's good for you, but!
- No problem. (CG, p. 4)

In this example, the choice of the packaged sauce was influenced by the taste preference of both partners. Such an interaction between family members is an interesting observation because this can translate to the idea that food selection criteria may differ depending on whom the participant is buying the food for? For example, if the participant is buying food for other members of the family, such as kids, then the evaluative criteria may differ, and taste preference would be affected most significantly.

4.3.5.3 Size

Size related criteria are mentioned 7 times in this food category, an evaluative criterion that participants used when selecting canned or frozen foods. In this example, the participant is comparing value, a comparison between price and size:

“So...pizza is on sale, just looking at all the different flavors and types. The square pizza looks good; the flavor looks good, but it is only 665 grams compared to 897 grams [comparing size and weight] so again, looking at quantity, what am I going to get the most for the price”. (TH, p. 4)

4.4 PURCHASE DECISION

Purchase decision is the fourth stage of the consumer purchase decision process. At this stage, consumers are ready to make a purchase decision wherein two choices remain: from whom to buy, and when to buy (Crane et al. 2008). In the context of food shopping, the findings in the previous stage includes stage (2) information search and stage (3) evaluation of alternatives can be taken into consideration here as well. Similar

factors determine a purchase decision including brand familiarity, price, and taste preference. Moreover, the key findings for this stage are not only the product consideration sets presented earlier, but also include marketing influencers, such as marketing mix influencers, psychographic influences, demographic influences, and economic influences. The findings include (a) the overall pleasantness of the shopping experience through the store atmosphere, (b) store location convenience and trust, and among others (c) the easiness or difficulty in making a purchase decision as displayed in (Figure 16) below.

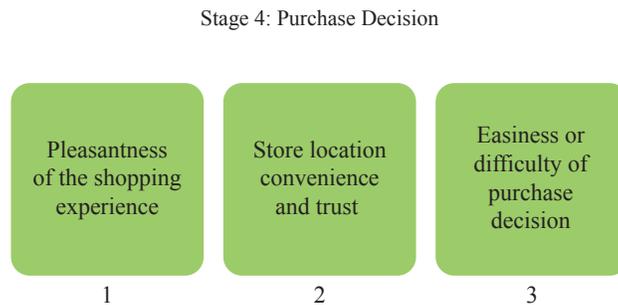


Figure 16 – Purchase Decision Stage Findings

4.4.1 Pleasantness of The Shopping Experience

To explain this in a better way, one of the participants made a remark that represents his emotional involvement regarding the food shopping experience by stating “I hate shopping. I don’t normally spend too much time”. When asked to clarify why the participant dislikes shopping for food and does not enjoy the experience of selecting the food they eat, the participant stated: “I hate shopping, period! For anything, food, clothes,

doesn't matter, because food shopping is something that I do because I have to, not because I like it" (OM, p. 2).

4.4.2 Store Location Convenience And Trust

An essential part in making a purchase decision is determining from whom to buy the food product. The majority (7 out of 7 [100%]) of participants chose a food store location that is familiar and convenient. In most cases, this is where they always purchase their food, depending on the area they live in. One participant describes this by stating:

"We shop here at Costco because of convenience; we can stock up for the whole week, some items for two weeks. We don't like to shop more than once a week". (OM, p. 1)

More in-depth findings related store familiarity with brand trust and quality assurance. When the researcher asked a participant what he really meant by quality being a major determining factor in food purchase as mentioned by the participant himself during the shadowing study earlier, and in specific, how did the participant rate quality for different food categories, the answer surprisingly had nothing to do with food quality attributes as described by the participant:

"Milk or eggs, I, umm, it's not really quality, I go to the store and I get it, you know what I mean, It is not really, it's whatever Costco has, I usually buy it only from Costco. So if I need eggs and milk, when I go to Costco I grab it. Umm, for poultry, I usually go to Halal shops, when I go to these things, you know, I have my butchers that I deal with based on the quality, perceived quality, cleanliness and all their stuff in the store, and I just go there, then that is it, I do not go anywhere else, Okay". (OM, p. 5)

This statement describes the importance of store trust as an essential factor for consumers in making purchase decisions. This finding was also observable with other participants of

the study, and in effect, participant chose a familiar supermarket that they always buy their groceries from.

4.4.3 Ease or Difficulty of Purchase Decision

The easiness or difficulty of the purchase decision leads the way to the next chapter. Here, several participants explicitly stated how sometimes food shopping purchase decision is a difficult task due to either (1) the lack of knowledge about a food product that results in the difficulty in making the right choice, and (2) the complexity of determining information factors to assess, the following are quotes that exemplify this finding:

“Looking at cantaloupes. Okay, so my boyfriend chose the cantaloupe, I’m not really sure how to choose cantaloupes, I usually just guess”. (CG, p. 1)

The above example demonstrates that food selection is not always as simple as one may think. In fresh fruits and vegetables, the choice of cantaloupes demonstrates that consumers often lack the knowledge in making better choices due to the intermixing of various evaluative criteria’s, as such, the participant was unsure of the best choice.

4.5 RESULTS OF SURVEY

In a typical week, participants visit an in-store supermarket twice, spending on average 30 minutes per visit. In the survey that participants completed after the shadowing observational study took place, participants were asked to rate the importance of each criterion for food grocery purchase decisions. Remarkably, the findings from the shadowing study corroborated with the criteria in the survey, which was developed in a

previous study done by Errol A. Simms and Marilyn Narine in 1994, titled *A Survey Of Shopping Behaviour Of Consumers In Trinidad And Tobago: The Case Of Grocery Shopping*. The participants' of this study verbally identified the majority of these criteria, which means that the participants were conscious of the factors considered when deciding which foods to purchase. (Figure 17) below presents the data from the after-shopping survey.

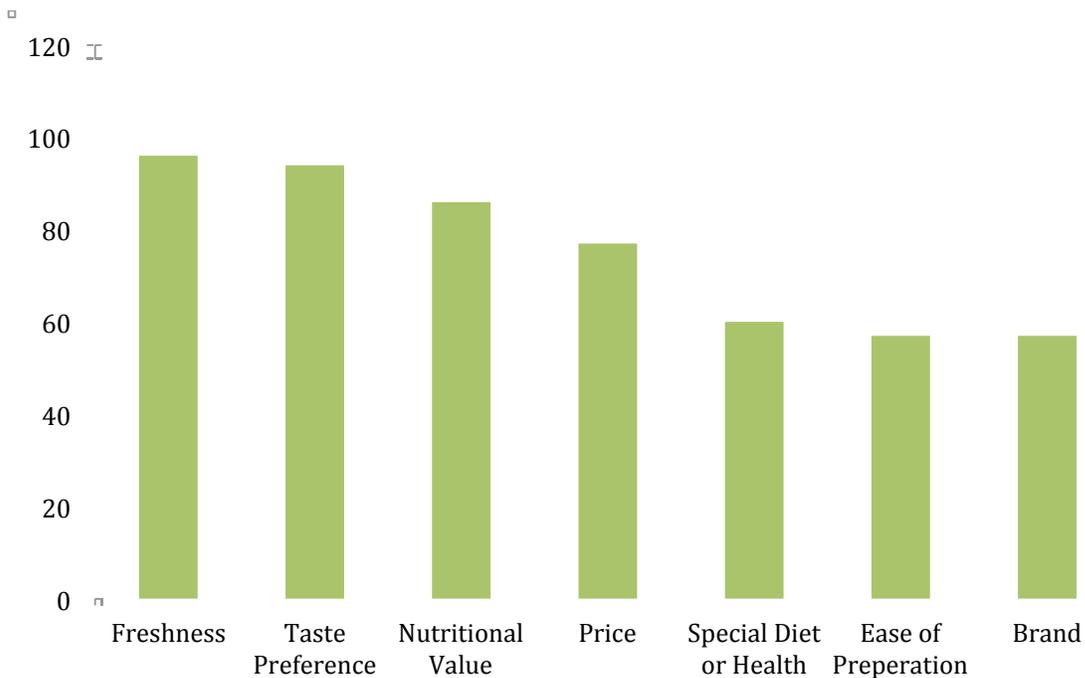


Figure 17 – Results of Survey Product Criteria Assessment

The results of the shadowing study and the survey may be similar in content, but they differ slightly in the ranking of the criteria. In the next chapter, the researcher takes a closer look at how the shadowing study and interview supports the ranking of criteria, and in what way the survey results differs.

4.6 SUMMARY

This chapter presented the findings revealed by the study as objectively as possible. The results were organized according to the first four stages of the purchase decision model. The primary finding of this study through the data collected from the shadowing study and survey show that there are a number of influential factors that contribute to in-store food purchase decisions in answer to the first set of research questions. This chapter specifically focused on stages two and three of the purchase decision process; information search and evaluation of alternative stages. For the transcriptions of the observations conducted, the reader can refer to (Appendix G), grouped into similar themes and patterns as identified in this chapter.

The evident variation in the ranking of the presented criteria between participants and in different food categories indicates that each consumer has diverse preferences and needs within a food shopping experience. The importance of this variation is discussed in more detail in the following chapter, which presents the notion of individualization and customization in food shopping. This speaks to the idea of designing a mobile tool that enhances the value of food shopping that is personal, customizable, and could accommodate the distinctions in consumers' personal shopping needs.

CHAPTER 5

SYNTHESIS AND DISCUSSION

This chapter provides insights and the synthesis of results that answer the second set of research questions, (these questions can only be answered after answering the first set of questions).

1. How can current mobile technology support the consumer purchase decision cycle by searching for food related information in in-store food shopping situations?
2. What types of information individuals need to customize and personalize mobile devices for food shopping situations?

This chapter is an attempt to construct a more holistic understanding of the research results and to depict a more integrated picture of the study.

The first part of this chapter is a synthesis of the findings in Chapter 4, which provides relevant answers to the first set of research questions. The second part of this chapter is an interpretation and suggestion for potential ideas, which provides a solution to set two of the research questions. The chapter concludes with the implications, limitations of the study, recommendations for future research, and finally a brief summary of the research.

5.1 PART ONE: SYNTHESIS

This section of the chapter synthesizes the findings of Chapter 4 through analyzing the evaluative criteria participants consider in food shopping purchase situations. The synthesis places meaning into the evaluative criteria findings, highlighting the most important results that answer the first set of the original research questions by outlining what information participants want to know about food products during the information search stage and evaluation of alternatives stage prior to food selection, and what other information related to food is useful for consumers in their decision-making that designers can incorporate into existing and future mobile technologies as part of the design consideration set to develop a design interface.

5.1.1 Price And Size

As discussed in Chapter 4, there are various factors that the consumers evaluated during the information search and evaluation of alternative stages when faced with a food purchase decision. One of the important findings this study identified was the relationship between price and size. Participants explicitly considered price more than 65 times during the shadowing study. Interestingly, it seems that the price refers not only to a monetary number but other alternative meanings and implications, which comprise (a) in-store sales, (b) cheaper brand selection, (c) value comparison, and (d) various preferences for size selection.

5.1.2 On-Sale And Cheaper Brand Selection

Price mattered the most for the majority of participants, specifically with certain food items such as frozen pizza, dairy products, and meats. These findings emerged when this price sensitivity was compared with other evaluative criteria such as the products' expiry date and the consumers' taste preference. The significance of cheaper prices as a factor differs from one participant to another, as is the case with all other factors defined in this study. One participant summarized this well by stating:

“Even though we don't look at price for most things we buy, for some reason, it makes a difference with the pizzas, I don't know why? And for the yogurt too, for me, the yogurt is a big deal, no sale is a deal breaker”. (CG, p. 4)

Consistently, sale prices encouraged purchase, especially for items that are considered relatively expensive such as cheese and meat. One participant described her selection for cheaper cheese by stating the following:

“For the cream cheese, I just prefer the cheaper one, I do not care about the taste. If Philadelphia cheese is on sale, for sure I will get Philadelphia brand, if it is not, then I will just get the Great Value brand”. (MQ, p. 4)

This quotation indicates how cheaper price was a major factor of selection. In addition, some participants said they sought to choose the cheapest alternative of any available food product in-store; Generally, these purchasing behaviours may relate specifically to the participants' income and available resources. The selection was validated through price comparison by a quick price scan of available alternatives, or, by selecting a specific brand that participants trusted would be the most affordable alternative. One participant described her selection by saying:

“We always choose Mr. Noodles brand because of the price”. (MQ, p. 3)

In such scenarios, a specific brand would be associated with a great price, resulting in repeated selection of the food item. In various scenarios, cheaper prices and brand name value will be the most important factor in food selection, even though other criteria would encourage the participant to choose otherwise, such as expiry date.

5.1.3 Perceived Value: A Comparison Between Price And Size

Based on the observations of the participants in the study, as well as their verbal comparison between the price and size of different objects, it is clear that participants perceived a specific value for each food item. This is where the price and size intersect to create perceived value to the consumer. Size as a consideration set was explicitly mentioned more than 29 times during the shadowing study. For the majority of participants, selecting a larger size product was perceived as the product having better value, especially when the food items were similarly priced and appeared to have no set shelf life (like frozen vegetables). For example, one participant carefully compared and evaluated the net weight of frozen pizza compared to the price. Here, the participant was aiming to get the most value for their money. He said:

“So pizza is on sale, just looking at all the different flavors and types, the square pizza looks good, the flavor looks good, but it is only 665 grams compared to 897 grams, so again, looking at quantity, what am I going to get the most for the price”. (TH, p. 4)

In another example, the participant was searching for packaged chicken by comparing price to the amount; he chose the larger portion for a better value. As he described it:

“I’m looking for chicken breast, I’m looking for a good deal. This is two pieces, this is six pieces, and so I’m looking for something in between. They have the same price, so, I might just take the six pieces”. (RS, p. 2)

For food items that tend to last for longer periods of time such as frozen fruits and vegetables, some participants made an effort to choose larger sizes, which was perceived as a better value. One participant described this behaviour by stating the following:

“Getting larger bags of frozen foods makes me think that I’m saving some money, if it is like; Oh, \$10 dollars for this giant bag! I do not know if you are actually saving a whole lot? I tend to buy in bulk, because I just throw it in the freezer, and I have it for a while, I do not need to continue to buy it, and often times bulk food is cheaper too, so... you get a price cut when you buy in bulk”. (TH, p. 3)

To note, the participant above was not able to accurately determine if he or she is saving money with choosing a larger size. In such scenarios, it would be valuable if a tool can assist to show the criteria of “value” by comparing price to size, and to brand. In addition, it would be useful if the tool could provide other customer reviews and ratings that shoppers could access easily at the point-of-purchase.

5.1.4 Size Selection Preference

In this study, it was observed that participants have different preferences in size selection for different foods, and the reasons for these selections varied. Some participants selected a specific size due to habitual purchase preference, while others did it due to the high consumption need, and others for convenience. For example, the participant M.Q. repeatedly sought to choose larger eggs, while the participant R.S. preferred to choose a smaller size. In addition, the participant C.G. chose larger eggs because of the high consumption at home due to a larger family size. Moreover, the participant M.Q. selected mini diet coke cans due to size convenience, whereas the

participant O.M. chose larger tomatoes and lettuce because they felt they were more suitable for burgers. No matter what the reasons are, this variation in behaviour should be taken into account for designers to apply in their design sequence and the customization of preferences to increase the personalization of the shopping tool experience through an interface design that takes the personalization of information for each user into consideration. In sum, this size preference behaviour in food selection was observed with all the participants of this study, and included diverse food type categories. It is also noteworthy to mention that larger size selection was associated with food items that tend to last for longer periods of time, such as cheese and frozen foods.

5.1.5 Taste And Brand Preference

Taste preference is another important criteria for evaluation that all participants (7 of 7 [100%]) considered, and repeatedly mentioned more than 53 times during the shadowing observation. This criterion was visible in all of the food categories. Simply, the participants demonstrated that they prefer certain tastes, and naturally, everyone's taste preference is different. As described by one participant:

“We are open to try different things all the time, but then if we like one thing after trying it for a few items, we just stick to it”. (OM, p. 2)

Another example that demonstrates this consideration was when the participant C.G. and her husband were faced with the choice of yogurt. After evaluating the available options on the shelf, the couples chose a packages that includes vanilla and blueberry flavours, a choice that satisfies both participants taste preferences (CG, p. 5). M.Q.

expressed similar behaviour when choosing milk. The participant consciously chose 2% milk over 1% or 3% fat, simply because of his or her taste preference (MQ, p. 4).

Brand familiarity and trust, repeated more than 26 times, were also contributing factors in food selection. One may explain this behaviour based on brands having specific flavours and tastes. For example, the participants C.G. and M.Q. described their choice of pasta based on familiarity with the brand by stating, “we always buy this”. This observation implies numerous food purchases were repeated based on brand familiarity, purchase history, and brand trust. These repeated purchases were based on personal experience. As one participant stated:

“For salsas, I always buy this one right here. It’s called *Patax*. I like the taste, it tastes like Indian restaurants”. (MQ, p. 3)

Additionally, the participant O.M. also expressed taste preference through brand. He described this choice:

“Some items such as potato chips, we are just used to it. Crispy potatoes, we only buy this; we never buy anything else, just because we like it. So we don’t even look at any other brands in this case; we just reach out and take it”. (OM, p. 2)

This finding of repeated purchase behaviour based on brand trust is an important consideration for any design application or tool to remember based on purchase history, which can enhance the mobile recommendation using a type of a recommendation platforms such as MRAs and customer relationship management (CRM’s), keeping in mind that other factors dictate selection and purchase as outlined in this study.

5.1.6 Freshness And Expiry Date

As outlined in chapter 4, participants determined the freshness of food through three measures, (1) visual assessment, (2) touching the food, and (3) expiry date. Freshness as a criterion prevails in the two food categories of fresh fruits and vegetables and Animal Products. This criterion was repeated more than 38 times during the shadowing observation. During the visual assessment, participants determined the healthiness of food by looking at the colour and making sure there was no mold, as the participant C.G. described in her choice of strawberries:

“We are scanning for strawberries that look the freshest out of the bunch. So we try to find strawberries with no mold on them, because that seems to be a problem”. (CG, p. 1)

An example of colour freshness is when the participant M.Q. described her selection of tomatoes. She chose the reddest tomatoes and associated the deep red colour with the healthiness and freshness of the food item (MQ, p. 1). If the colour of the fruits and vegetables did not seem right, the participants then would not select the food. In another example, when T.H. found oranges too green in colour (TH, p. 1). In addition, the findings associated colour freshness with food taste, where some participants preferred yellow bananas, and others prefer greener bananas; each participant has a unique taste preference.

In some purchases, it was difficult for participants to determine the freshness of the food item by colour, such as the case with M.Q. when she was faced with pineapple selection. The participant was confused which colour represented a fresher pineapple (MQ, p. 1). In scenarios where participants are faced with making a purchase decision

based on colour freshness, the mobile tool or application could assist consumers in making better-informed purchase decisions based on a freshness rating system using visual aids.

The second measurement method participants used to assess freshness of fresh produce was to touch the food item to determine how raw or ripe it was. As one participant, T.H, described when selecting peaches:

“With peaches, I squeeze and feel the firmness, if they are a bit soft they are quite ripped, but these ones are fairly hard”. (TH, p. 2)

Lastly, the third measurement method participants used to assess the freshness of food items was looking at the expiry date. This method was most prevailing in Animal Products, dairy, bread and canned food selection. It was observed that the behaviour of information search for the expiry date was repeated more than 20 times. The findings suggest that the expiry date was an essential piece of information participants often used to assess the purchase of any dairy product as described by T.H when selecting milk and N.S. when selecting meats:

“Okay so milk, I look at the date, May 30th”. (TH, p. 4)

“Maybe I will try this steak. Are they fresh? Pass before May 14th, Ew! That’s today! That is not good! Let’s see if there is something fresher”. (NS, p. 2)

Digital tools and applications can incorporate the expiry date information as found on printed labels, which is associated with freshness. When the expiry date is too close to the day of purchase, participants can search for an alternate dairy and meat products that have longer expiry dates.

5.2 PART TWO: SUMMARY OF INTERPRETATIONS, NEW IDEAS, AND RECOMMENDATIONS

The intention of this thesis is not only to outline and analyze the evaluative criteria participants consider in food shopping purchase situations, but also to shed light on how existing mobile technologies can play a role to (a) improve the overall food shopping experience, and (b) allow consumers to make better-informed purchase decisions by employing wireless and mobile tools (e.g. mobile applications) in everyday shopping situations. It is possible to imagine that mobile technology can help create a more enjoyable food shopping experience through customization and personalization based on the factors described above. Through careful application of the factors that have emerged as evaluative criteria for food selection, the value of the overall in-store food shopping experience may dramatically increase.

In effect, a more informed and joyful food shopping experience can enhance the five-step food purchasing decision process. Using existing mobile technologies, for example, a designer can develop smartphone applications and tools that would allow users to look for more information when needed at the point-of-purchase. This part of the discussion extends the interpretations of the results, highlighting the most important answers to the second set of the original research questions by outlining how current mobile technologies can enhance the food shopping experience, and how customization and personalization of mobile tools and applications may create personal value.

5.2.1 Extended Usefulness of Mobile Applications

Beyond printed product information such as price and ingredients, mobile technology tools and applications could have the capability to provide users with the ability to search for further product information beyond in-store static labels. Product information provided by MRAs is perceived as being better than static product information, particularly in in-store purchase situations (Kowatsch et al., 2008; Maass & Kowatsch, 2008). Empirical studies indicate that the use of DPI adds value within tangible shopping environments that provides additional product information (Mort & Drennan, 2005). As clarified in Chapter 2, the amalgamation of physical, tangible products and virtual information is referred to as *smart products* (Maass & Janzen, 2007). Then, the *smart products* could add value to mobile services that allow embedding of digital product information into tangible products; thus supporting the interaction between products and users (Maass & Filler, 2006).

It is noteworthy to outline one of the main reflections of this study, that when participants were faced with any food selection, they simultaneously assessed multiple evaluative criteria for any food selection and purchase. This observation is an important finding that outlines the consumer's thought process during their food selection. Thus, any mobile tools or applications designers develop must be able to process a variety of evaluative criteria instantaneously, which will be based on the priority for each individual user by using a sequential data entry that is personalized by individuals. For example, the design might encompass a checklist or a ranking scale for users to choose multiple criteria for different food categories. This approach may enable of the development of

new product interfaces by merging information from user interface design and product package design. The following sections outline potential ideas and suggestions that can be beneficially implemented to mobile tools and applications in the near future.

5.2.2 Digital Price Scan

In this study, participants occasionally found difficulty in reading price labels for packaged foods due to product shelf misplacement and crowded supermarket shelves. One participant suggested that it would be helpful if he could read the price of a product using a mobile application at the point-of-purchase (RS, p. 5). In such situations, mobile tools that make use of existing technologies such as barcode and QR code scanners can aid consumers in finding accurate food prices where it is difficult to read price labels, or when food products are misplaced on the shelf. Existing in-store technologies are available such as wall-mounted price scanners.

5.2.3 Digital Price Matching

The suggested mobile applications could be used for digital price matching. Price matching is a well-known marketing tactic that most supermarkets across Ontario use in a printed flyer format. For price savvy young consumers, mobile tools and applications could incorporate this beneficial feature that allow consumers to compare prices with other equivalent products in other supermarkets, in the surrounding area. One participant expressed her interest in using such a tool to enhance her shopping experience during the interview. She imagined that the mobile tool concept would allow her to digitally

compare prices with other supermarkets in the area within 5 or 10 miles radius (MQ, p. 6). A transcription of this can be found in (Appendix H) that describes the conversation with the participant.

5.2.4 Value Comparison

Based on individual differences (e.g. taste preference and living situation, etc.) that individual participants indicated for each food item by using the "individualized sequential data entry feature", mobile tools and applications could assist customers in selecting which items of food provide the greatest value. As outlined in the first section of this chapter, participants often seek value by comparing size to price, whilst taking in consideration brand name and taste preference. Every participant in this study repeated this pattern of behaviour. By employing data personalization or customization feature, individual users can customize the mobile tool or application to reflect their personal selection criteria.

5.2.5 Learning Consumers' Purchase History

As outlined in Chapter 4, all participants of the study exhibited the behaviour of repeatedly selecting the same food products they are used to purchasing in the past. This can be due to the complex set of influential factors and criteria such as taste preference, brand loyalty, lifestyle, cultural and religious tradition, product size, pricing, packaging...etc. These were food items that were routinely bought over and over again, such as the selection of bread by the participant C.G. and the selection of eggs by M.Q.

and the selection of bacon by R.S. (the transcription can be found in Appendix H). This is not a surprising finding, but an important design consideration where mobile tools and applications would be able to learn the individual consumer's purchasing pattern according to his or her shopping pattern in the past. Some participants have come to the conclusion that their food choices are the best choices, and will hardly reconsider alternatives, while other participants are open to trying new food products if it fits their evaluation criteria. The finding suggests that participants routinely bought the same food brands because they believed that a specific brand was always a great value for the price, such as the case with the participant M.Q. when choosing noodles.

5.2.6 Food Location Assistant

As described earlier in Chapter 4, participants repeatedly spent time to find the location of food products in-store. Some participants sought in-store employee's help to find the items they looked for as described in the quote by O.M searching for hot dogs in Chapter 4. It would be a convenient feature in mobile tools or applications, which can help consumers to navigate to find an item they are looking for. As described by Maass & Varshney (2008), *smart products* within a *smart environment* can act as a recommendation system by suggesting what products match what the customer is looking for at their location. Besides, it would also be beneficial if the device can show if the item is available in stock as well.

5.2.7 Mobile Notifications

It is possible that mobile tools and applications with the use of MRAs connected to smart intelligent environments can be used to notify consumers if the food items on their shopping list become available on-sale. On-sale prices encouraged participants to purchase food items if they found there were items in their shopping list on-sale. Participants hesitated to buy some food items if they were not on-sale or by postponing their purchase to a later shopping visit or until the food products went on-sale. Price savvy participants, particularly, demonstrated regret for purchasing food items that were not on-sale when they bought them in a previous shopping visit. This observed pattern was mostly prominent in the dairy, protein, and frozen food categories. Thus, the on-sale price notification feature could become a useful function to maximize consumers' purchase satisfaction. For example, the colour used in the in-store tags for the sale items could be matched with a similar color for on-sale notifications in mobile tools or applications for consistency.

Furthermore, for customers who purchase fresh fruits and vegetables, the mobile notification systems can be used to notify them when the food items on their shopping list become available in-store to guarantee peak freshness. For example, one of the participants did not select fresh produce items because the remaining available produce was the least fresh due to shopping on a Friday evening, marking the end of the week when there was little fresh produce remaining (MQ, p. 2). In this situation, mobile tools or applications can encourage the customer to make a purchase and optimize customer satisfaction through notifications that guarantee the freshest selection of food availability.

According to several studies, (Resatsch et al., 2008, p. 218) *smart products* could provide direct access to online information, which was previously not accessible in physical locations (Maass & Janzen, 2007; Roussos, 2005; Smith et al., 2003). They emphasized that *smart product information* has a wide application through retail environments by merging physical products and information (Loebbecke & Palmer, 2006), where MRAs can connect consumers with in-store product information that retailers expose. In a similar vein, two participants in this study suggested that it would be useful if a mobile tool and application were connected with the appliances at their home (e.g. fridge) to alert consumers about the food expiry dates. For example, consumers can scan the products as they place them in the fridge and received an alarm on their phone when the date of expiration approached. Alternatively, that there was a list that would be generated with expiration dates that could be placed on the fridge. A detailed quote can be found in (Appendix H).

5.2.8 Interconnection Between Recipes And Shopping Lists

For some participants, the shopping list was a mixture of special ingredients for a specific dish that the participant plans to cook at home (MQ, p. 5) and some basic food items that the participants would routinely purchase in every shopping visit. As a suggestion, for example, mobile tools and application could connect with mobile recipe networks and mobile platform such as the Food Network to create a mobile food-shopping list derived from mobile food recipes. During the interview with participants, they said they were open to try new mobile tools or applications that could assist them in enhancing their shopping experience.

5.2.9 Impulse Food Selection

A noticeable behaviour that most participants demonstrated was purchasing food items not on their shopping lists. These spontaneous purchases emerged by remembering that they did not have a product at home and by looking at something that drew their attention. As a suggestion, retailers, using integrated mobile technologies may track consumer's purchasing behaviour to suggest foods that would interest them based on the purchasing pattern of individual shoppers, using MRAs through visual aids.

5.2.10 Visual Indicator of Food Freshness and Usage

For some food items, participants lacked the expertise and knowledge in making the right food selection based on freshness criteria, such as the pineapple example described by the participant M.Q. in Chapter 4. As such, the use of coloured visual diagrams to illustrate the status of food from raw to ripe can demonstrate the health status and taste of food products. Mobile tools and applications can assist consumers in making better-informed selections using visual aids. For example, designers can create a visual indicator diagram to inform consumers which visual cues to look for when faced with food selection as illustrated in (Figure 18 below).

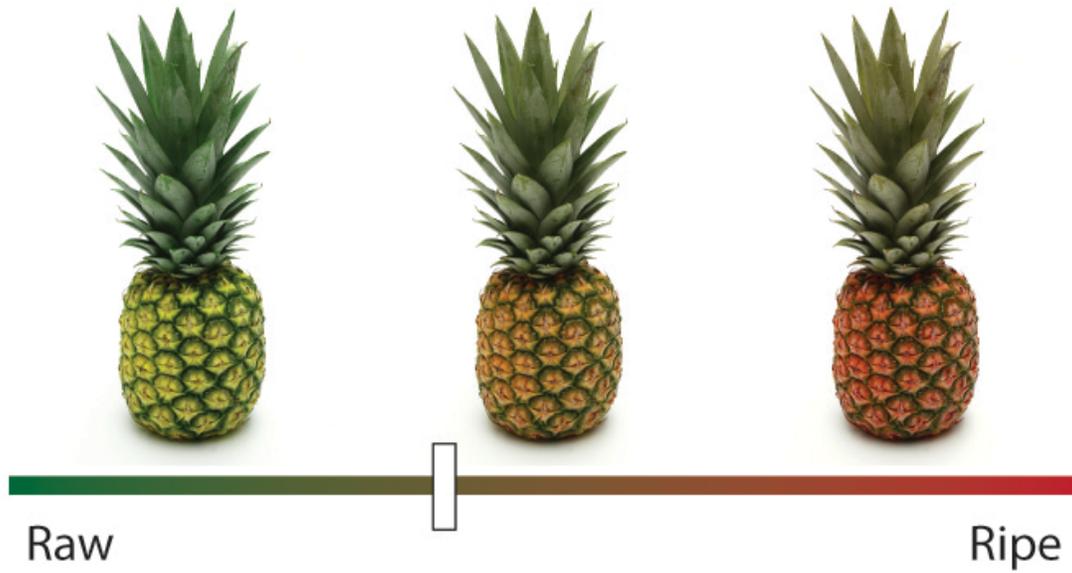


Figure 18 - Visual Freshness Indicator

Similarly, a considerable usefulness with any mobile tool or application is to provide valuable information to consumers that allow them to understand the components and usage of food products. Sometimes consumers simply did not know the difference between food choices because the necessary information was not available at the point-of-purchase, and could only be accessed through DPI using a mobile device or application. Descriptive quotes found in (Appendix H) describe this observation. With selections of meats, for example, it can be suggested that the mobile tool or application could show images or videos of the different cuts of meats, and different recipes demonstrated by visual drawings. This suggestion could provide value to the overall shopping experience.

5.2.11 Mobile Access To Dietary And Health Information

In this study, it is observed that numerous participants were searching for detailed dietary information such as low fat and organic foods by reading static food labels. Overall, the search for health related information was mentioned more than 24 times during the observation (refer to Appendix H for descriptive quotes). Mobile tools and applications can help in the recommendation of food products that are suitable and adequate for each individual's dietary needs, such as low fat, gluten-free, alcohol-free, and organic, etc. In addition, mobile tools and applications can also warn and make consumers aware of which food items should not be purchased based on the consumer's dietary criteria. For example, one of the participants said that she currently uses a mobile application that helps her track her dietary intakes through scanning the barcode of packaged foods such as bread, where the application saves the data, which then needs to be transferred to the user's desktop computer at home to a program that can help in tracking what the consumer is eating each day (MQ, p. 2).

During the interview, participants were asked if there were other health related information they wished to know that was not available in-store. The main response was that they wanted to understand the backstory of food production such as food safety and farming methods. If such information were available, it might increase the reliability of the health claims that food companies advertise. Currently, food labels in supermarkets do not communicate detailed information regarding the production methods and any advertised health claims, such as "organically grown". From this observation, I suggest that mobile tools and applications can be utilized to connect consumers with resourceful information that provide access to additional health information. Such an integrated

information system may require the development of smart packaging that can connect to web databases, which can be made available to consumers within a supported smart wireless environment.

5.3 SUMMARY

In summary, the previous discussion in this chapter illustrates the complexity of in-store consumers' shopping behaviour. The study reveals various evidence of the type of information young consumers look for during the information search and evaluation of alternative stages. The findings contributed to various recommendations of key functions that mobile tools and applications can incorporate using existing mobile technologies such as MRAs to improve the usefulness of such tools and applications, and to create a more personalized food shopping experience by using contextual and personal information. (Table 2) is a summary of the recommendations grouped into categories in answer to the second set of research questions:

Table 2 – Summary of Recommendations

Category	Description
Digital Price Scan	Participants occasionally found difficulty in reading price labels for packaged foods due to product shelf misplacement and crowded supermarket shelves. It would be helpful if a mobile tool could read the price of a product at the point-of-purchase.
Digital Price Matching	For price savvy young consumers, mobile tools and applications could incorporate this beneficial feature that allows consumers to compare prices with other equivalent products with other

	supermarkets in the surrounding area.
Value Comparison	Mobile tools and applications could assist customers in selecting which items of food provide the greatest value. By employing data personalization or customization feature, individual users can customize the mobile tool or application to reflect their personal selection criteria.
Learning Consumers' Purchase History	This is an important design consideration where mobile tools and applications would be able to learn the individual consumer's purchasing pattern according to his or her shopping pattern in the past.
Food Location Assistance	Location assistant could be a convenient feature in mobile tools or applications to help consumers navigate and find an item they are looking for. In addition, it would also be beneficial if the device can show if the item is available in stock as well.
Mobile Notification Features	Notify consumers if the food items on their shopping list become available on-sale. Furthermore, for customers that purchase fresh fruits and vegetables, the mobile notification systems can be used to notify them when the food items on their shopping list become available in-store to guarantee peak freshness.
Recipes and Shopping Lists	As a suggestion, mobile tools and application could connect with mobile recipe networks and mobile platform such as the Food Network to create an integrated mobile food shopping list.
Impulse Food Selection	Retailers, using integrated mobile technologies may track consumer's purchasing behaviour to suggest foods that would interest them based on the purchasing pattern of individual shoppers, using MRAs through visual aids.
Mobile Access to Dietary and Health Information	Mobile tools and applications can help in the recommendation of food products that are suitable and adequate for each individual's dietary needs.

CHAPTER 6

CONCLUSION

The purpose of this study was to explore in-store food purchasing behaviour of young adults. It focused on the information search and evaluation of alternative stages in reference to the five-stage consumers' purchase decision-making processes. These findings led to recommendations for ways that current mobile technology can aid consumers' in-store food shopping. This study is an attempt to understand what specific information young adults seek during their grocery-shopping visits, and how the overall food selection process is structured, to provide valuable insight for designers to develop mobile tools and applications for food shopping situations using existing mobile technologies such as MRAs.

An understanding of young consumers purchase behaviour through an interdisciplinary approach using qualitative research methods allows designers to empathize with food shoppers by understanding the user experience to develop better mobile tools and applications based on personal usability and usefulness that aid consumers in-store food selection. The range of findings answers the research questions of this thesis that examine the type of information participants look for in food products during the information search and evaluation of alternative stages prior to food selection and purchase, in addition to any supplementary information about food products that consumers seek during in-store grocery shopping. In addition, the researcher proposes how current mobile technologies can enhance personal experiences, and how individual

customization and personalization of mobile applications can create personal value in in-store food shopping situations.

Virtual product information and tangible products are commonly used in separated situations. Most supermarkets currently provide consumers only with static product information in the form of printed labels. This kind of food product information does not adapt to consumer needs. Static label information does not provide the ability to compare prices or access consumer opinions about a product, which is part of the overall product purchase decision (Maass & Kowatsch, 2008, p. 1). Thus, there are significant and promising opportunities for designers and developers to play a role in developing mobile tools and platforms for consumers to use for their in-store shopping that can enrich the food shopping experience with relevant DPI, which can be applied to a variety of retail environments including supermarkets.

The amalgamation of physical, tangible products and virtual information inserts value to mobile services that allow embedding of digital product information into tangible products, referred to as *smart products* thus supporting product-mediated information between products and users (Maass & Filler, 2006). This approach enables new forms of mobile tools and applications through possible communication and interconnection of data, by merging consumers' information and products to develop a user interface design. Such technological enhancements can provide positive impacts for consumers, including reducing the overall search cost, decreasing information knowledge

uncertainty and lowering negative influences on purchase decision (Resatsch et al., 2008), which may lead to higher purchasing satisfaction rates.

In respect to the consumer's five-stage purchase decision process model, the first group of findings of this study revealed three related conclusions. First, during the first stage of problem recognition, it was found that participant's used their in-store shopping visit as a method to activate the need for food purchase using various techniques that included both pre-planned and unplanned shopping decisions. It is essential for designers to consider how problem recognition occurs in the design of mobile tools and applications as an interconnected process of food purchase, where the mobile device or application could allow retailers to stimulate this first stage. Second, during the second stage of the information search, the study revealed the various information participants considered during their in-store shopping visit, including (a) in-store product information such as product location and availability, (b) direct product information such as price comparison, size selection, product expiry date and brand quality, and lastly, (c) specific traits and characteristics of food products such as the search for food health information and specific dietary restrictions which were subjective information.

Understanding what information consumers search for in in-store environments is valuable data for marketers and designers to utilize, to create informative mobile tools and applications that can deliver the needed information to participants at the point-of-purchase. Finally, during the third stage of evaluation of alternatives, the study discovered that there are a number of influential factors that contributed to in-store food

purchase decisions which participants assessed; these included product price, brand, taste preference, size, freshness and expiration date.

There was evident variation in the hierarchy of assessment criteria between different participants and in variation within different food categories, which indicates that each consumer has diverse preferences and needs within a food shopping experience. The importance of this variation translates into the notion of individualization and customization in food shopping. This notion speaks to the idea of designing a mobile tool that enhances the value of food shopping that is personal, customizable, and could accommodate the distinctions in consumers' personal shopping needs. All the five stages of the consumer decision-making process are interconnected. Design implications can help in identifying when and where the problem recognition occurs, provide valuable information for consumers about food products, and assess multiple evaluative criteria based on the consumer's preferences.

The second and major finding of this thesis is that when participants were faced with any food selection, there was always a combination of evaluative criteria that were assessed simultaneously during any food selection. This finding outlines a repeated behaviour in the selection process during in-store food purchases. The conclusion to be drawn from this finding is that a truly personalized mobile tool or application design should possess the capability to evaluate multiple evaluative criteria for every product purchase based on individual consumer's personalized information hierarchy. As discussed in Chapters 4 and 5, the variation and importance of the evaluative criteria

differs from one person to another, and also varied between each different food category. This finding may translate to an individualized sequential information board that allows users to rate the priority for each evaluative criterion for different food categories, based on the identified evaluative criteria in this study. Therefore, the study proposes that the design of mobile applications and tools would incorporate this feature, which can integrate users' preferences. Such an important design element allows MRAs to suggest foods based on one's preferences and shopping habits.

The third major finding of this thesis is that personalization and customization of any mobile tool or application is a key design element, and is a desired aspect for young food shoppers. Personalization is a compelling feature for mobile systems for both end users and service providers, which can be achieved by the use of personal and contextual information, a finding that correlates with the study conducted by Hella & Krogstie (2010).

Therefore, to improve in-store food shopping situations, the study proposes that mobile data personalization is a desirable method. Personalization of personal and contextual information based on the importance and relevance to each individual user allows mobile tools and application systems to decide which information and food products are relevant in a particular situation. Based on the findings of this study it is likely that the development of personalized mobile tools and applications for in-store food shopping functions can positively influence the way consumers obtain product information and interact with products on the shelf, offering the ability to enhance a

person's unique food shopping experience and create more pleasurable shopping experiences. Personalization is needed to overcome information overflow and the traditional one-size fits all approach. By accumulating user data over time and learning user patterns, retailers can improve the quality of services delivered.

For retailers, understanding what consumers are seeking and specifically, what attributes are most influential in their decision-making process may increase the likelihood that their brand is part of the evoked set. As identified in this study, brand trust and store loyalty play a key role in the overall consumers' food shopping decision. Grocery providers, through well-designed mobile tools and applications using existing technologies, can personalize services according to user needs and interests to reach the right customers, and users can receive services and information that are relevant. Past research studies have focused on how systems need to adapt to their users, but much of the research focus has been intended for the application of stationary computers. Personalization for mobile systems has a different focus and is a growing field of research. Today and increasingly in the future for mobile users, it is necessary to be in charge of the flow of information and services (Hella & Krogstie, 2010).

The personalization of mobile tools and applications open up an array of user interactions, features, and benefits. For users who have health concerns, mobile tools and applications can help in the recommendation of food products that are suitable and adequate for each individual's dietary needs. For users who are price savvy, mobile tools and applications can also help in the recommendation of food products that provide the

best value. For users who are keen to choose a specific brand or prefer a certain taste, and then mobile tools and applications can also help in the recommendation of food products based on previous purchase history using recommendation platforms such as MRAs. There are multiple factors that dictate food selection and purchase; thus, personalization of the different evaluative criteria's hierarchy is a key design element in optimizing customization of mobile tools or applications that become useful tools during in-store food purchasing.

The contribution of this thesis is to provide designers with insightful design suggestions that could be used for the development of useful mobile tools and applications for food shopping situations using existing technologies. Using qualitative research methods based on consumer behaviour theoretical constructs, the study attempts to understand young consumers' food shopping experiences with a goal to improve the overall food shopping experience, and allow consumers to make better-informed purchase decisions; a steppingstone in achieving a better design. These suggestions encompass the entirety of the consumer's decision-making process, from creating a food-shopping list to product price matching and visual indicators for best food selections to allow consumers to independently generate a healthier, more personalized food shopping experience. The findings of the study contributed to various recommendations for key functions that mobile tools and applications can incorporate using existing mobile technologies such as MRAs to enhance the usefulness of such tools and applications, and to create more personalized food shopping experience by using contextual and personal information.

In conclusion, personalized mobile tools and applications have the potential to assist food shoppers to help consumers make the most appropriate informed decisions by seeking information at the point-of-purchase, alleviating any post-purchase psychological tension or anxiety, referred to as *cognitive dissonance* (Crane et al. 2008). By making the right food choices, consumers' post-purchase satisfaction increases, resulting in the tendency of buyers to buy from the same seller each time a purchase occasion arises (Crane et al. 2008).

6.1 LIMITATIONS OF THE STUDY

Some limitations arose that warrant a degree of caution that affects the validity of the study and its findings. These limitations relate to the sampling methods used and the challenges involved in the data analysis process.

First, recruitment of research participants was initiated using a convenience sampling technique including postgraduate students from Carleton University and elsewhere from the researcher's social and professional network. A wider participation sample through a broader sample of young adults could have led to more diverse perspectives. In addition, it would have been more valuable to conduct interviews with all 7 participants instead of only 4, to reflect the diversity among all participants.

Second, with regard to mobile applications and tools, it is only possible to comment on the tools the participants used or mentioned during the study, thus, no measurement was made of actual design usability of any tools the participants actually

used. Based on the time and resources available for this study, the mobile design recommendations were not developed and tested as guidelines, toolkits, or validated through other such interventional methods. Therefore, the findings of this study are speculative rather than prescriptive. Nevertheless, as an exploratory pilot study utilizing qualitative methods, this study was able to provide valuable preliminary insights into the type of information that young shoppers search for in supermarket situations. It provides valuable groundwork for future research in the area of mobile tools and application designs for food shopping environments.

6.2 RECOMMENDATION FOR FUTURE RESEARCH

Future research could look beyond contextual and product information to understand the consumer's food shopping behaviour to increase the study's validity and find more conclusive qualitative results for mobile design recommendations. As marketers established, there are numerous factors that affect the food shopping process, including subjective and objective heuristics or attitudes, psychographics, demographics, in addition to grocery store image, travel distance, satisfaction and behavioural intentions. For a more accurate study, these all have to be investigated in more depth. In addition, researchers and designers can further develop the design consideration set and evaluate the interface design of mobile tools and applications.

MRAs are a relatively new research field that specializes in recommendation services that have a strong emphasis on physical and social contexts and a focus on smaller technical devices, such as mobile smartphones (van der Heijden, 2006). With

limited field research available, this study brings insights from available literature and first-hand research. The findings from this first-hand research could be utilized in future studies as a starting point for additional comprehensive research. As an extension to the research in this thesis, a larger qualitative study with a more diverse and greater pool of young participants with various educational and socio-economic status using deeper investigation tools such as detailed interviews is possible. Firstly, this could improve the validity of the findings and would give designers and marketers greater confidence in the use of MRAs in food shopping environments using digital mobile technologies. Second, it could allow for further development for user experience design suggestions to improve the value for practical applications. Finally, this could provoke further investigation of the same questions through different research lenses relevant to this study.

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GLOSSARY

The terms listed below have the following definitions within the paper's context:

Obesity- The result of eating more food than is needed, rather than too little (Muñoz, Krebs-Smith, Ballard-Barbash, & Cleveland, 1997).

Consumer behaviour- The actions that a person takes in purchasing and using products and services, including the mental and social processes that precede and follow these actions (Crane et al. 2008).

Smartphone- A device that incorporates capabilities usually found on personal computers, such as Internet access and editing documents, in-addition to basic abilities as making telephone calls (Cassavoy, 2012).

Mobile recommendation agents (MRA's)- A type of recommendation agent (RA) with a specialization on in-store situations intrinsically focused on product information (van der Heijden, 2006).

Dynamic product interfaces (DPI)- Information on products that is presented according to consumer demands that exhibits real-time communication at the local point of interaction (Maass & Kowatsch, 2008).

Smart products- Products that share information with consumers and are designed to combine the online and offline world of information (Resatsch et al., 2008).

Smart environments- An environment that is able to acquire and apply knowledge about itself and to adapt to its inhabitants in order to improve their experience in that environment (Das & Cook, 2006).

APPENDIX A - Generic Research Enrolment Letter

Title of research project: The Study of young adult Canadian consumer's food shopping behavior for developing a smart mobile application

Dear students,

As part of my M.Des thesis under the supervision of Dr. Chung at the school of Industrial Design, I am investigating how young consumers; between the ages of 20 to 29 make their in-store food grocery shopping decisions. The study aims at gaining insight on what information young adults consider, which influences their food choice selection.

I'm looking for both male and female participants to take role in my study (limit of 10 participants), which will be conducted in your choice of familiar supermarket. Participants will be awarded a \$5 Tim Horton's gift card.

The study consists of three parts:

- **Part 1:** you will be asked to fill out a short demographics survey.
Time required: 3-4 minutes.

Part 2: The researcher will conduct an observatory shadowing method to observe your shopping behavior in a supermarket. In this process, you will be given a short shopping list and are asked to 'think aloud' during your shopping. This process will be both audio recorded and photographed.

Time required: flexible depending on how much time you spend on your food-shopping visit.

- **Part 3:** After the completion of the observatory shadowing, you are asked to complete a brief survey that relates to your shopping habits.
- *Time required: 3-4 minutes.*
In addition, a number of subjects will be selected to review and describe their shopping decisions.
Time required: 5-10 minutes

This study will help the researcher learn what information young adult Canadian consumers consider, which influence their food choice selection.

There are no anticipated risks in this study. My role during the study is to encourage you to 'think aloud' and discretely observe your food shopping behavior.

Participant's personal information will be kept confidential at all times. In addition, your name will be anonymous during the research study and any future publications.

By participating in this study, you can gain insight into your decision-making process for food selection. You may decline from answering any question that makes you uncomfortable, and may withdraw from the study at any time. Should you decide to withdraw, you have the choice to

request the destruction of information, or give permission to the researcher to use the data collected.

If you are interested in taking part in this study, please contact me through E-mail.

The project has been reviewed and received ethics clearance by the Carleton University Research Ethics Board. If you have any concerns or questions about your involvement in the study, you may contact the REB chair, or contact me for further clarifications.

The chair's name and contact information:

Professor Antonio Gualtieri, Chair
Research Ethics Board
Carleton University Research Office
Carleton University
1125 Colonel By Drive
Ottawa, Ontario K1S 5B6
Tel: 613-520-2517
E-mail: ethics@carleton.ca

The researcher's name and contact information:

Belal Alsibai
M.Des graduate student
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Tel: 416-820-2554
E-mail: balsibai@connect.carleton.ca

Researcher Signature:

APPENDIX B - Poster Ad For Research Enrolment



RESEARCH PARTICIPANTS NEEDED.

Ages between 20 - 33 | Get a \$5 Tim Horton's gift card

INTERESTED? contact BELAL ALSIBAI
E-mail: balsibai@connect.carleton.ca

Please contact the researcher for further detailed clarifications.

“The Study of young adult Canadian consumer’s food shopping behavior for developing a smart mobile application”

- ▶ **Looking for both male and female participants between the ages of 20-29 years old.**
- ▶ **The study will be conducted in your choice of familiar supermarket.**
- ▶ **Participants will be awarded a \$5 Tim Horton's gift card.**

This study will mainly be an observatory shadowing method performed in your choice of familiar supermarket. The researcher will join your routinely food shopping experience and observe how you shop for food.

There are no anticipated risks in this study. Participant's personal information will be kept confidential at all times.
“This project has been reviewed and cleared by the Carleton University Research Ethics Board
613-520-2517 or ethics@carleton.ca”

APPENDIX C - Carleton Ethics Approval

Ethics Clearance Form

This is to certify that the Carleton University Research Ethics Board has examined the application for ethical clearance. The REB found the research project to meet appropriate ethical standards as outlined in the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans* and, the *Carleton University Policies and Procedures for the Ethical Conduct of Research*.

New clearance

Renewal of original clearance

Original date of clearance:

Date of clearance	1 May 2012
Researcher	Belal Alsibai
Status	M. Design student, School of Industrial Design
Supervisor	Professor Won Joon Chung, School of Industrial Design
Funding status	Non-funded
Project number	12-1434
Title of project	The study of young adult Canadian consumer's food shopping behavior for developing a smart mobile application

Clearance expires: **31 May 2013**

All researchers are governed by the following conditions:

Annual Status Report: You are required to submit an Annual Status Report to either renew clearance or close the file. Failure to submit the Annual Status Report will result in the immediate suspension of the project. Funded projects will have accounts suspended until the report is submitted and approved.

Changes to the project: Any changes to the project must be submitted to the Carleton University Research Ethics Board for approval. All changes must be approved prior to the continuance of the research.

Adverse events: Should any participant suffer adversely from their participation in the project you are required to report the matter to the Carleton University Research Ethics Board. You must submit a written record of the event and indicate what steps you have taken to resolve the situation.

Suspension or termination of clearance: Failure to conduct the research in accordance with the principles of the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans* and the *Carleton University Policies and Procedures for the Ethical Conduct of Research* may result in the suspension or termination of the research project.

Antonio R. Gualtieri

Antonio R. Gualtieri, Chair
Carleton University Research Ethics Board

APPENDIX D - Pre Shopping Survey

Pre-Shopping Survey

1. Please choose your sex

- Male
- Female

2. Which category below includes your age?

- 20-23
- 24-26
- 27-29
- 30-35

3. What is your current family status?

- Single
- Married
- In a relationship
- Other (please specify)

4. In a typical week, how many times do you shop?

- Once or less
- 2 - 3 times
- 4 times or more

5. On average, how much time do you spend on each visit?

- 10 - 20 min
- 20 - 30 min
- 30 - 40 min
- 40 minutes or more

6. Who are you shopping for?

- Myself
- Family

Other (please specify)

Pre-Shopping Survey

7. How long have you been an independent food shopper?

- 1-2 years
- 3-4 years
- 5 years or more

8. Do you consider this supermarket your preferred location? Why or why not?

9. Do you plan food menu's before you shop? If yes, in what ways does that affect your shopping behaviour and your food choices?

10. Do you use any tool (i.e. memos, notes) or device (i.e. mobile apps, electronic shopping list) that assists you in your food shopping? Why or why not?

11. Do you or any member in your household have any health related concern that restricts your food selection?

- Yes
- No
- Prefer not to say

12. If YES, what ways do you use to help you make healthier food choices? (You may chose multiple answers)

- Food package labels
- Medical recommendation from doctor's
- Family and friends recommendations
- Personal knowledge from experience
- Publications (i.e. articles, open-web sources)
- Mass media (i.e. advertisements)
- Other (please specify)

APPENDIX E - After Shopping Survey

After-Shopping Survey

1. Do you own a smartphone or any internet capable mobile device?

- Yes
- No
- Don't know

Other (please specify)

2. Do you own or have access to a computer or laptop at home?

- Yes
- No

3. Imagine your complete shopping experience is supported through a digital mobile tool (i.e. smartphone application). In what particular situations would you use this tool? How would you use this tool? And why or why not would you use it? Please expand your answer

After-Shopping Survey

4. From a scale 1 to 5 (least to most), please rate the importance of each criteria for your food grocery purchase decision:

	1	2	3	4	5
Price	<input type="radio"/>				
Brand	<input type="radio"/>				
Taste	<input type="radio"/>				
Freshness	<input type="radio"/>				
Nutritional value	<input type="radio"/>				
Special diet or health restrictions	<input type="radio"/>				
Ease of preparation	<input type="radio"/>				

Other criteria (please specify)

5. Thank you for your time!

Please note the researcher may need to contact you for further clarifications to your observation. Please provide your personal information below

E-mail

Tel

APPENDIX F - Research Consent Form

Consent Form

Title of research project: The Study of young adult Canadian consumer's food shopping behavior for developing a smart mobile application.

Date of ethics clearance: May.01.2012

Ethics Clearance for the Collection of Data Expires: May.31.2013

I, _____ volunteer to participate in a study on food shopping behaviour in a supermarket. This study will help the researcher learn what information young adult Canadian consumers consider, which influences their food choice selection.

I am 18 years of age or older; I have read and understood the information provided to me, and I have had the opportunity to ask questions and received satisfactory answers. I was given enough time to think it over and decide about my participation.

I understand that my participation is completely voluntary and that I can withdraw from the study without giving a reason by informing the researcher. If I do withdraw, I understand that I will have two choices about what happens to the information I have already provided, including the following:

- Immediate destruction of the information collected
- The ability for the researcher to use the data already collected

I understand that I will be asked to take part in three or four activities:

1. I will complete a short demographics survey. *Time required: 3-4 minutes.*
2. I will go to my usual grocery store with the researcher who will shadow me and observe my shopping choices. I will be encouraged to speak out loud about my selections. The researcher will audio record and take photographs of this shopping exercise. *Time required: flexible depending on how much time I spend on my food-shopping visit.*
3. I will complete a brief survey that relates to my shopping habits. *Time required: 3-4 minutes.*
4. I may be asked to take part in a brief interview to review and describe my shopping decisions. *Time required: 5-10 minutes*

I understand that I can choose not to answer questions on the survey and I am not required to take part in the interview.

I understand that my participation in the shopping trip will be audio recorded and photographed.

I understand that all information collected by the researcher may be used for the research study.

I understand that I will not be identified in the study and my face will not appear in any presentation.

I accept that the researcher will keep possession of all information collected until December 31st 2015 for the purpose of future research on this topic.

I give permission to the researcher to contact me after the completion of this study if he requires further clarifications regarding my answers.

I understand that there is no anticipated risk to me by my participation in this study.

I understand that I will receive a \$5 Tim Horton's gift card as a thank you for my participation at the end of my participation in the study.

I understand that this project has been reviewed and cleared by the Carleton University Research Ethics Board. Any questions or concerns may be sent to the REB chair, Professor Antonio Gualtieri, Carleton University Research Office, Carleton University, 1125 Colonel By Drive, Ottawa, Ontario K1S 5B6, 613-520-2517 or ethics@carleton.ca

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Wonjoon_chung@carleton.ca

Signature of participant

Date

Signature of researcher

Date

Please retain a copy of this consent form for your records

APPENDIX G - Samples of Participant Quotes for Research Results

Stage One: Problem Recognition

Category	Quotes
Visual Recognition	“Oh, I want some bananas too. [Pause] so I’m just going to get two”. (NS, p. 1)
	“It’s more like certain items, I just look, and oh, I will take it, you know what I mean. It is not on the list. So I do digress quite often from the list. This zucchini for example, you saw how many I got, it was not even on the list”. (OM, p. 4)
Repetitive Habitual Selection	“Husband: One more thing we need to get are noodles for the...” (CG, p. 5)
	- Researcher: So you said you usually prepare a list, and today you did not have a list? - Yeah I usually do. For today, I do not have a list; I just have the basics, the things that we always use like bananas, pop drinks, eggs, and milk. So most important thing I just want is like the bread, eggs, and banana, they are very fast snacks. (MQ, p. 4-5)
Recognition through unavailability	“Do we have salmon in the freezer?” (CG, p. 2)
Recognition through a shopping list	“I only purchase what is on my shopping list because either I have the other stuff that I need at home, or if it is not on my shopping list, I don’t need it. That is why I prepared my shopping list a few days ago, and whenever I need something I added it on my shopping list, and that is how I know that only these are what I need”. (RS, p. 5)
Recognition through a shopping list	- Researcher: Okay, for the list that you prepare, is it usually random items or is it specific items for a recipe? - MQ: Exactly, specific recipe for a certain dish, like yeah...I always check on the internet or sometimes I have the cooking book which I take a look at just to make sure I’m not forgetting anything and I put a list for this meal, certain meal. (MQ, p. 5)

Stage Two: Information Search

Category	Criteria	Quotes
Direct Product Information	Price Comparison	“I will get some tuna, because that’s on sale!” (NS, p. 2)
Direct Product Information	Price Comparison	“I always check the price of vanilla almond Special K, because when it is on sale, I’m easily convinced to buy a box. When it is not on sale, I walk by. That

		is true!” (CG, p. 4)
Direct Product Information	Price Comparison	<ul style="list-style-type: none"> - CG: Honestly, we don't really look at prices at all. - Husband: I tell you what we do look at the prices at! - CG: What? - Husband: Frozen foodstuff, like frozen pizzas. - CG: Oh yeah! - Husband: We usually hold off on those until they go on sale. - CG: Yeah, that is true. I don't know why we only do the frozen... - CG: I think I'm more price consciousness than Brad. Brad doesn't really... He just wants quality. But I'm like: “that one is not on sale, we will wait till next week. (CG, p. 3) - Researcher: You don't buy them until they go on sale? - CG: Yeah, sometimes Brad will buy them when they are not on sale, but usually 90% of the time is when they are on sale. Even though we don't look at price for most things we buy in here. But for some reason, it makes a difference with the pizzas. I don't know why, and for the yogurt too, for me the yogurt is a big deal. No sale is a deal breaker. (CG, p. 4)
Direct Product Information	Size Selection	“So we need to pick some eggs, we usually get the club pack, or the prestige club pack, what is the brand name of that? We usually get the jumbo egg boxes because Bradley eats a lot of eggs, like four a day. Hahaha, okay, three a day, plus I do, plus my dog”. (CG, p. 3)
Direct Product Information	Expiry Date	“For dairy products, I usually check the expiry date because usually they stay in the fridge for a long period of time, so sometimes I forget about them, they do not have smaller portions that it is enough for what I need them for. So that is why I look for something that lasts for a longer time”. (RS, p. 5)
Direct Product Information	Expiry Date	“I'm a big fan of sugar snap! I always look at the expiry date, which is today, but these things always last a little bit longer than their actual expiry date”. (TH, p. 1)
Direct Product Information	Brand Quality	<ul style="list-style-type: none"> -We are going to get some tuna. He usually gets the Cloverleaf brand; small mini tins that have different flavors, usually with the olive oil. Why do you get that one when you have so many options? - Husband: because it tastes good. - Researcher: Are you used to only one brand from

		<p>the olive oil tuna? Or would you get another olive oil tuna brand?</p> <p>- Husband: This is the only brand I have seen that has olive oil.</p> <p>- But say if there were a yellow label that had the same type, would you care if it were yellow label?</p> <p>- Husband: Yeah, just like as I said, that is the only kind that I tried and liked. (CG, p. 3)</p>
In-store Product Information	In-store Product Availability and Location	<p>“I’m looking for, eggs. [Pause] eggs, okay.” (RS, p. 1)</p>
In-store Product Information	In-store Product Availability and Location	<p>“I need mayonnaise, hmm, is it on this isle? No, it is before, not here”. (RS, p. 3)</p>
In-store Product Information	In-store Product Availability and Location	<p>- RS: I’m looking for the spice I need, umm, it seems they do not have it. [Long Pause] Okay, there are lots of options here, hmm, they don’t have it. [Long Pause] they do not have cardamom. (RS, p. 4)</p> <p>- Researcher: Would it be helpful if your app tells you where it is right now?</p> <p>- RS: Yes! Or if they have it like... it might be out of stock [Pause] okay, they don’t have it. (RS, p. 4)</p>
In-store Product Information	In-store Product Availability and Location	<p>- (Asking husband): did you find oranges? Do you want to get oranges?</p> <p>- No? no, no, no, they are all bad, I only found this. Because obviously it is Friday, so, I do not know, a lot of things are missing today, so... okay. (MQ, p. 2)</p>
Specific Traits and Attributes of food	Search for Healthier Foods	<p>“So I usually pick out the blue label PC butter chicken because it is lower fat. (Blue label is in reference to lower fat). You know, maybe I should mention that we tend to buy a lot of blue label stuff, it has a lot to do with our life style. We try to eat very little fat and we workout”. (CG, p. 4)</p>
Specific Traits and Attributes of food	Information search to understand food components	<p>“I need baking soda; this is in French, baking... powder? Is it the same or not? Do you know if it is the same or not? Baking powder and baking soda? Oh, no, no, it is different; this is baking soda, okay”. (RS, p. 3)</p>
Specific Traits and Attributes of food	Information Search for Dietary Restrictions	<p>“These are... do they have pork in them? Reading ingredients; no they have pork! So these are not good. Checking if they have pork or not... these are, okay, these are good, because they are all beef, okay”. (RS, p. 2)</p>

Stage Three: Evaluation of Alternatives

Food Type	Criteria	Quotes
Dairy	Price	<ul style="list-style-type: none"> - Cheddar cheese, good deal. Umm, there is no price tag? I will take this one; it's cheaper. - Remove cheese from the list. - Researcher: Why did you choose this specific cheese? - Just because it is cheaper than the other one's. (RS, p. 1)
Dairy	Taste Preference	<p>"So, for the milk, we only buy this, that is it. That is the only kind we use, and it is always 2%, because we do not want it like 3% which has a lot of fat, and we do not want it 1% because we tried the 1% and it tastes just like water, white water, so, we always grab the 2% and this is like cheapest of them all, that is why we choose this "Nelson" brand because we know how it looks like". (MQ, p. 4)</p>
Dairy	Size	<ul style="list-style-type: none"> - I'm looking for eggs, normal one, raw eggs, okay. I chose this one because I usually buy these, yeah, eggs, the brown eggs. - Researcher: smaller size? - Yeah, smaller size and... yeah, that is what I usually buy, that is why. (RS, p. 2)
Dairy	Expiry Date	<p>"Okay so milk, I get skimmed milk, I prefer the taste. Again, I look at the dates for this stuff, May 30th?" (TH, p. 4)</p>
Fresh Fruits and Vegetables	Visual Freshness	<p>"So for tomatoes, of course, I try to find the freshest one's, and most red one's as well. So, sometimes I buy the small tomatoes, but they do not look nice today". (MQ, p. 1)</p>
Fresh Fruits and Vegetables	Visual Freshness	<p>"Now I know I want oranges, so I'm looking for the, hmm, they don't look too healthy! They are very green, not sure if I even want to buy them now. If I can find any good ones in this pile, I might decide to get them, but... I do not know. I'm not really seeing anything that looks too tasty, so... And since they are not on sale, I might not even get any, oh well! Yup, not today". (TH, p. 1)</p>
Fresh Fruits and Vegetables	Visual Freshness	<p>"Need bananas. Getting some bananas. Looking for yellow... Okay, I chose yellow bananas vs. the green bananas". (RS, p. 1)</p>
Fresh Fruits and Vegetables	Freshness through touch	<p>"For ginger, I was looking for the hard ones, softer means that it is not a good ginger; it is rotten". (RS,</p>

		p. 5)
Fresh Fruits and Vegetables	Price	“Yeah, oranges, and the price is good; \$4.97 dollars for the whole bunch”. (MQ, p. 2)
Fresh Fruits and Vegetables	Price	“Oh, peaches! They are on for a really good price! Since they are only \$0.99 cents a pound, I’m going to get a few”. (TH, p. 2)
Fresh Fruits and Vegetables	Size	- Husband: Do you want to get some broccoli for the stir-fry? - Yes, so maybe we will get a big one, I guess they are all pretty big, look at that one! (CG, p. 2)
Protein	Price	“I usually just look for what is cheap, and then I don’t even really know like how to make things specifically, I just like buy something and I try to make it at home, so... I will try this out”. (NS, p. 2)
Protein	Freshness and expiry date	“I’m just reading the labels for the meat to see like when they are the best before date and just like what it is? Because usually if I just see meat, I really don’t know what it is for unless I read what it says”. (NS, p. 2)
Protein	Freshness and expiry date	“I’m just trying to decide what kind of meat I should make, hmm [long pause], maybe some sausages? Hmm, those sausages look kind of weird and fake; I do not know what those are? So I wouldn’t really buy those. What are these gourmet sausages? I don’t know. Sausages weird me up sometimes, because I don’t know what is in them really, and also they are really fat, so that might be bad”. (NS, p. 1)
Protein	Weight and Size	“Three for \$5 dollars! Summer is served. So that is kind of catching my eye. I like these \$10 dollar bags, I get a few of them once in a while, often times I will get the fish, I have a bag at home, so I don’t need to get them, but umm...makes me think that I’m saving some money, if it is like; Oh, \$10 dollars for this giant bag! I do not know if you are actually saving a whole lot? I don’t know what kind of... and because it is frozen as well, it is not like fresh stuff, so I either get the fish or chicken fingers or something like that. I always, I tend to buy in bulk, because, especially frozen fruit, frozen foods, because I just throw it in the freezer and I have it for a while, I do not need to continue to buy it, and often times bulk food is cheaper too, so... you get a price cut when you buy in bulk”. (TH, p. 3)
Grains	Taste Preference	“90% of the time, I get whole-wheat bagel. Umm, I like this “Dempster” brand, because it is, umm, whole-wheat, and it is big, and I always look at the

		<p>nutrition facts, nutritional value in the back.</p> <p>Because, umm, like, it has a really good calories and it makes me full as well. It is like it is pretty big, and I like the taste of it, I'm just used to it, that is why I always choose it, and the price is good! Yeah, the "Dempster" brand, we always buy "Dempsters". (MQ, pg. 2)</p>
Grains	Price	<p>"I like to switch it up with the bread, try different kinds, hmm... Usually I see what is on sale, if there is anything good I will get it, but if not, I will just choose what I want. Usually I like the baked breads, but sometimes the other one's are on sale". (NS, p. 1)</p>
Grains	Price	<p>"I look at the tags again. Wohoo, yellow tags! What are the sales? Because bread can be expensive if it is not on sale! So I'm seeing hot dog, hamburger buns are on sale. Sometimes I will get like sausage or hot dog buns and use them as sandwich instead of getting a loaf of bread if the price is right. But there is only a \$0.20 cents savings on these sausage buns, not much there. Country brand is on sale, still the sweet, it is pretty good bread. And since bagels are on sale, I'm going to pick up I think bagels because I haven't had them in a couple of weeks". (TH, p. 2)</p>
Grains	Brand	<p>"I always buy the macaroni or pasta when it is on sale. So we always choose Mr. Noodles brand. I do not know if it is because of the price, but we just like the flavor". (MQ, p. 3)</p>
Grains	Health	<p>"Okay so we are going to grab a box of pasta, umm, so we always get "kettely's" healthy harvest whole-grain, whole-wheat pasta, always, or something that is a blue menu". (CG, p. 6)</p>
Canned and packaged foods	Price	<p>- Maybe I should get some chickpeas. [Pause] so I see those one's are on sale, so maybe I will get those. [Long pause] yeah, so I will get these chickpeas, because, yeah, they are the cheapest one's.</p> <p>- Researcher: Are you used to this beans brand?</p> <p>- Umm, I try usually, umm, I think I bought them, I don't really pay attention to the brand of beans I buy, I usually just, yeah, get whatever is cheapest. (NS, p. 2)</p>
Canned and packaged foods	Price	<p>- I need salsa; I'm going to get some... medium, umm, yeah, medium salsa.</p> <p>- The medium? Well it's on sale! (NS, p. 2)</p>
Canned and packaged foods	Taste Preference	<p>"Some items such as this, we are just used to. Potatoes, crispy potatoes, and we only buy this; we</p>

		never buy anything else, just because we like it. So we don't even like look at any other brands in this case, we just reach and take". (OM, p. 2)
Canned and packaged foods	Taste Preference	"Spices and like salsas; I always buy this one right here. Yeah, it is called "Patax" whatever, it looks very beautiful first of all, attracts, it is really good, it is just easy to use, it is like very, very fast and very tasty, it is like the restaurant, it tastes like Indian restaurants". (MQ, p. 3)
Canned and packaged foods	Size	"For the drinks, I get the mini diet coke, I found it very convenient because I do not really drink a lot, umm, it is a good price, it is two for \$5 dollars". (MQ, p. 3)
Canned and packaged foods	Size	"This is too big, another smaller one up there? Smaller, [Pause] walnuts, the walnut pieces, okay, this is, what the price? \$3.99 dollars? What is the price for this one? There is no price? There is no price tag? Okay! Okay, this is good". (RS, p. 5)

APPENDIX H - Samples of Participant Interviews And Detailed Quotes For
Research Discussion

Category	Quotes
Extended Usefulness Of Mobile Applications	<p>- So I have an app on my phone that just scans the thing, and yeah, and it gives you the whole list of everything, so I just scan the barcode, and it gives me this. So some of the food they do not have it, but this one has it, so it is easier for me to enter the calories. So I just scan it, and I have it on my phone. (MQ, p. 2)</p> <p>- Researcher: Do you scan it here?</p> <p>- No, when I get home, because it is easier to enter what I ate, for the whole day. So yeah, because if when you go home, I have to enter everything to the program, so yeah, it is easier, I just scan it, I will show you, I have two apps actually. So it is easier, you just scan the barcode, and it enters all of that, it enters even all of the vitamins, everything... so yeah, that is why I like this one as well (in reference to the bread she chose). (MQ, p. 2)</p>
Extended Usefulness Of Mobile Applications	<p>- Hahaha, I just told my husband that they should give us an App that lets us know what is in the fridge, because I normally do not have time to check before I come to know what is inside my home. (MQ, p. 4)</p>
Digital Price Matching	<p>- I was thinking that if I can like enter, punch in a code, or for example any certain brand, umm, food, umm and then, so I enter it, and then see how much they are selling it right now in specific supermarkets, example: Wal-Mart, Metro, or any specific place. (MQ, p. 5)</p> <p>- Researcher: How do you enter it?</p> <p>- On the App, so I just say the name. I'm just imagining, because I do not really do price match, I just come here and I buy, but I know a lot of people they...just come for specific list because the price match, lets say Wal-Mart here, they grab all the news flyers and they show it to them and price match it. So if I have it on my phone, I just show it to them, it is much easier. I do not have to hold it all the way. (MQ, p. 6)</p> <p>- Researcher: So it would be helpful?</p> <p>- Yeah, sure it would. (MQ, p. 6)</p>
Visual Indicator Of Food Freshness And Usage	<p>- (Indicator Idea explained) Sometimes, something that gives us an indicator, let's say pineapple today, me and my husband we were discussing which pineapple is more fresh, is it the green or the yellow?</p>

	So it is like an indicator to show us which one is better. Indicator for freshness of the fruits and vegetables. (MQ, p. 5)
Mobile Notifications	- (Asking husband): did you find oranges? Do you want to get oranges? - No? no, no, no, they are all bad, I only found this. Because obviously it is Friday, so, I do not know, a lot of things are missing today, so... okay. (MQ, p. 2)
Brand Trust and Store Loyalty	"Milk or eggs, I, umm, it's not really quality, I go to the store and I get it, you know what I mean, It is not really, it's whatever Costco has, I usually buy it only from Costco. So if I need eggs and milk, when I go to Costco I grab it. Umm, for poultry, I go to usually to Halal shops, when I go to these things, you know, I have my butchers that I deal with based on quality, perceived quality, you know, cleanliness and all their stuff in the store, and I just go there, then that is it, I do not go anywhere else, Okay". (OM, p. 5)
Evaluating Multiple Criteria Simultaneously	"This is like a club packer, very large pack, and since I'm only eating for myself, I do not know if it is worth getting that or if I just get one of these small packs? Which are best before a few days from now, so that is better. I question whether I should go with the big pack because it is on sale, even though they are going to go bad in a few days, it comes down to what I want to do for the price. I don't know! I can spend a lot of time just sitting here trying to make a decision. So one thing I realized that I'm very bad at making decisions in the grocery store. All right! I'm going to do it! Because these things are delicious, and it is a healthy choice". (TH, p. 1)
Learning Consumers' Purchase History - This is what I usually buy	- I'm looking for eggs, normal one, raw eggs, okay. I chose this one because I usually buy these, yeah, eggs, the brown eggs. - Researcher: you like brown? - yes. - This is what I usually buy. - Researcher: smaller size? - Yeah, smaller size and... yeah, that is what I usually buy, that is why. (RS, p. 2)
Learning Consumers' Purchase History - This is what I usually buy	- Yogurt, yogurt, yogurt, okay. This is what I buy because it is the brand that I usually buy, and it does not have gelatin in it. I'm looking for the date, checking if any of them have longer expiry date? Okay, they are all the same. (RS, p. 2)
Learning Consumers' Purchase	- 90% of the time, I get whole-wheat bagel. Umm, I

<p>History - This is what I usually buy</p>	<p>like this “Dempster” brand thing, because it is, umm, whole-wheat, and it is big, and I always look at the nutrition facts, nutritional value in the back. Because, umm, like, it has a really good calories and it makes me full as well. It is like it is pretty big, and I like the taste of it, I’m just used to it, that is why I always choose it, and the price is good! Yeah, and the “Dempster” brand as well. We always buy “Dempsters”.</p> <ul style="list-style-type: none"> - Husband: We always buy the \$2 dollars. - \$2 dollars, yeah, because it is cheaper, this is always \$2 dollars! So we always buy this because it is cheap and good, I don’t know, it tastes good. Actually, we are just used to it. Sometimes I get the great value, but it is like very thin and I did not like the taste of it, it is like you are eating air, it is not really full; it is fluffy. (MQ, pg. 2-3)
<p>Learning Consumers’ Purchase History - This is what I usually buy</p>	<ul style="list-style-type: none"> - Yeah, bacon style turkey. - Researcher: So you where looking for this specific brand? - Yeah, because I tried it before, it tastes good. (RS, p. 1)
<p>Search For Dietary And Health Information</p>	<p>“I always look at the grams of fat. We typically get the same type of food, and I never just buy something new, even if it is organic, and I know it is good for me, until I look at the grams of fat” (CG, p. 5).</p>

APPENDIX I - List of Available Mobile Food Applications



Wild Edibles



Find Fruit



222 Million Tons



Seasons



HarvestMark Traceability



ShopNoGMO



True Food



Clean Plates



In Season



What's Fresh?



Leloca



What's On My Food?



NRDC Eat Local



Locavore



GoPure



Seafood Watch