Sustainable Food Consumption Practices: Case Studies and Contexts from Edmonton, Canada

Rachel Touchie
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Abstract:
The globalized food system poses many systemic challenges that have significant impacts on the environment and human health. In order to tackle these challenges, especially those relating to climate change, it is assumed that consumers need to be accountable for the role they play in these issues, requiring them to alter their harmful consumption habits. In terms of the food system, this means that people need to evolve into ethical consumers and become more invested in what and how much they eat, where it comes from, etc. However, throughout the literature and in policies, there remains a focus on altering what people buy, rather than reducing waste from their overconsumption. Reducing waste and consumption would have a more beneficial impact for the environment, human health, and urban sustainability, yet it remains secondary to the narrative of buying sustainable alternatives. A waste reduction narrative would encourage sustainable behaviours that would also be more accessible to households of various socioeconomic backgrounds, and would provide more tangible results in terms of money saved, reduced greenhouse gases and waste output, and increased sustainability. However, food consumption is the result of many ingrained daily food practices influenced by a multitude of factors that prevent people from consciously considering the consequences of their actions.

Food consumption and waste management as a phenomenon can therefore be interpreted using Social Practice Theory (SPT), which states that all humans act autonomously and according to social norms. This means that practices are recursive and routinized, subject to change, yet somewhat unconscious. All practices lead to consumption in some way, and changing such deeply embedded routines to become more sustainable requires a full understanding of these deeply entrenched practices. Practices can be broken down into three main components that drive how practices are formed and maintained: materials, competences, and meanings. This project uses mini-ethnographic studies to highlight SPT in order to understand the factors (contextual, materials, competences, and meanings) influencing households in Edmonton, Canada as they navigate the current sustainability narrative, and how they approach sustainable food consumption and food waste management.

The results from this study lend some insight into what materials, competences, meanings, and other factors drive people already somewhat aware of sustainable food consumption issues to practice such types of behaviour. These influential elements have been found in many other recently published works, and give further insight into how broad external factors and specific internal factors can drive consumption practices. Prevention and reduction behaviours were already somewhat prevalent in this group. It is important that education programs targeting sustainable food consumption behaviours understand what drives certain food related practices, and how they can target the barriers that prevent certain groups of people from adopting more sustainable habits.

Keywords: consumption, food system, food waste, participant observation, social practice theory, social science, sustainable development

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Summary:

The globalized food system has many negative consequences on the environment and human health. The current system is a large contributor to climate change because of overconsumption and waste habits, which produce greenhouse gases and use an excess amount of natural resources. Consumer habits related to the overconsumption and wastage of food play a large role in the impacts the food system has on the planet. Much of the literature and many highly regarded institutions state that people need to be accountable for their practices and reduce the impact of their consumption habits, which means that they need to become more invested in what and how much they eat, where it comes from, etc. However, throughout research and policies, there remains a focus on altering what people buy, rather than focusing on reducing wasteful behaviours and consuming less. Reducing waste and consumption would be better for the planet and human societies, yet it is not as heavily publicized when it comes to encouraging sustainable behaviour. Encouraging households to reduce their waste rather than buy expensive sustainable food products would be a behaviour change that is more accessible to households of various socioeconomic backgrounds, and would provide more benefit to the environment. However, how people go about eating and disposing of food is the result of many factors that unknowingly influence household habits.

The acts of food consumption and waste management can be interpreted using Social Practice Theory (SPT), which states that all human habits are formed through conscious choices and external influences that result in behaviours that people do not often scrutinize. These deeply embedded routines need to become more sustainable, which requires a full understanding of what elements encourage or discourage sustainable behaviour. These elements can often be categorized as materials (tools), competences (understandings), and meanings (beliefs), as well as other external factors. This project observes participants in Edmonton, Canada, while they practice food consumption habits, and tries to understand what factors lead to more sustainable food related behaviours.

The results from this study can lend some insights to future studies. Most of the participants already had a general idea of what consuming food sustainably means and had adopted some environmentally friendly behaviours that did focus on waste reduction. The materials, competences, meanings, and other factors that drove this group to engage in such activities have been supported by other research. Participants were already trying to reduce their food waste, but people really need to challenge their behaviours in order to make them more environmentally friendly. It is important that education programs that target wasteful behaviours understand what drives certain food related practices, and how they can target the barriers, that prevent certain groups of people from adopting more sustainable habits.

Keywords: consumption, food system, food waste, participant observation, social practice theory, social science, sustainable development

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“The overriding principle must be to address the twin crises of inequality and climate change at the same time.”

- Naomi Klein, *This Changes Everything: Capitalism vs. The Climate*, p. 406

“Building a liveable world isn’t rocket science, it’s far more complex than that.”

- Ed Ayres, *God’s Last Offer*, p. 195

“Funny thing about garbage. Everybody creates it, but nobody wants to do anything about it.”

- Early Edmonton City Engineer A. W. Haddow (Cobb, 2016a)
Abbreviations

AFW — Avoidable Food Waste
Food and beverages that could have been consumed before becoming inedible, such as items that have spoiled or become mouldy. This includes food/beverage remaining in original packaging, and leftover items after a meal that are thrown away (WRAP, 2008; Kelleher & Robbins, 2013; Evans & Siemens, 2016). For the purposes of this study food waste and AFW does not included food related packaging, only organic material.

GHG — Greenhouse Gasses
Gasses such as N₂O, CO₂, and CH₄, which become trapped in the atmosphere as they are released from the burning of fossil fuels and other activities, which create a greenhouse effect that is warming the planet and contributing to climate change (IPCC, 2014).

PPP — Purchasing Power Parity
An economic concept that measures and compares currency of different countries and uses the United States Dollars (USD) as a base currency for comparison (Yunus, 2000; Alba & Park, 2003; Kamruzzaman, 2016). PPP is a doctrine that states that a person should be able to buy the same bundle of goods in each country for the same amount of money (ibid.). It is based on the exchange rates between countries and the relative change in the price of goods within each country (ibid.).

SDG — Sustainable Development Goals
A wide ranging set of 17 goals developed by the United Nations in 2015, aimed at trying to create a more sustainable world by 2030 (UN, 2015).

SPT — Social Practice Theory
A social theory created by Bourdieu, Giddens, and others. They describe human actions as practices that are shaped by internal and external factors, which lead to practices that are both recursive and routinized (Giddens, 1984; Reckwitz, 2002; Warde, 2005).

UN — United Nations

WMK — Waste Measuring Kit
Measuring tool method utilized for this study and others, which allows participants to measure the amount of food waste they produce at home (Evans & Siemens, 2016). For this study, the kit includes a food scale and a waste diary.
7.2. Acknowledgements..................................................................................................................58
References ...........................................................................................................................................59
Appendix 1 Case Study Protocol ........................................................................................................72
Appendix 2 Interview Guide ................................................................................................................74
Appendix 3 Food Waste Diary Excerpt ...............................................................................................76
Chapter 1. Introduction

The following chapter is meant to give a brief introduction to the issues and questions that are explored in this thesis. What follows is a overview to the broad issues concerning sustainability and food consumption practices; the phenomena problem background and problem are also explored. The aim and research questions for the study are then described along with the delimitations for the study and the outline of the rest of the thesis.

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The impacts of severe weather patterns from human-caused climate change show few signs of abating, since the global amount of Greenhouse Gas (GHG) emissions continues to rise, despite limited reduction attempts (IPCC, 2014). Agriculture and food system activities are responsible for at least a quarter of total global GHG emissions, and have played a large part in putting extreme pressure on or completely surpassing the 9 planetary boundaries (freshwater sources, biodiversity, land-use, climate change, ocean acidification, etc.) (Rockström et al., 2009; Garnett, 2011; Aschemann-Witzel et al., 2015; Berry et al., 2015).

As a result, the United Nations (UN) has ratified the 17 Sustainable Development Goals (SDGs), which address various interrelated aspects of life on earth, and all must be realized in order to achieve sustainability (UN, 2015). In response to the impacts of agriculture on the planet and food crises, there is a large emphasis on goals such as eradicating hunger (through sustainable agriculture) and the highly related issue of poverty, and encouraging responsible consumption and production (ibid.). These overarching goals are heavily interrelated and have resulted in a sustainability narrative that has called on individual people to do their part to adopt more sustainable habits, which play a large role in meeting many of the SDGs. As a result, sustainable food movements have emerged in many developed nations, including Canada – a rich country with an abundance of food, land, and resources all facing their own sustainability challenges (Wakefield et al., 2014).

As part of this movement, sustainable eating habits are often encouraged, such as adopting less meat-centric diets, buying fair-trade, organic, and local foods, buying more healthy foods, encouraging food biodiversity, reducing consumption of refined and processed foods, reducing electricity and water usage of foods, generating less waste, and generally reducing food overconsumption (Jungbluth et al., 2000; Hoogland et al., 2005; FAO, 2010; IPCC, 2014). However, the reduced consumption aspect of behaviour changes, although the most important, is usually ignored in favour of buying more sustainable alternatives (Vanhonacker et al., 2013; Graça et al., 2015a, b; Verain et al., 2015). There is also often a higher cost associated with adopting sustainable eating habits, since they tend to be directed towards middle and upper-class consumers, whereas those who are less-fortunate tend to be forgotten by the larger sustainability narrative and are even encouraged to consume more through proposed poverty interventions (Blake et al., 2010; Garnett, 2011; UN, 2015). The UN’s sustainability narrative also tends to highlight the aspects of sustainable consumption that still require consumption, while neglecting to emphasize the most important aspect of sustainability: prevention of waste and reduction of consumption (see Figure 1) (IPCC, 2014).

As a result, various classes of people are privy to different parts of the sustainability narrative and most only engage with it superficially, meaning that the current methods of trying to affect real behavioural change are not sufficient to help prevent furthering the climate crisis (Garnett, 2011). The main problem is that the issues with the food system are systemic, and most of the proposed solutions rely on individual consumer behaviours, which are not sufficient to change the entire system, yet are still a major contributor to the problem.
1.1. Problem Background

One of the main underlying concerns of the climate crisis is that the overuse of natural resources, and humans turning a blind-eye to their own impacts on nature will create more resource scarcity and make life on Earth increasingly difficult (Rockström et al., 2009; Garnett, 2011; IPCC, 2014; Berry et al., 2015). An important resource that will be impacted is food production, which has resounding implications for global food security (Nelson et al., 2009; FAO, IFAD & WFP, 2015). In developed countries, such as Canada, food is plentiful, but food waste is a huge issue, as it is responsible for 8% of total GHG (FAO, 2015). Food waste also costs Canada upwards of $27 billion a year (Gooch et al., 2014). Food waste has many definitions, but can be defined as any food that was meant for human consumption, but was not consumed for some reason; this also includes the inedible parts food (Aschemann-Witzel et al., 2015; Thyberg & Tonjes, 2016). Even if the food waste is recovered or disposed of through various methods in the waste management hierarchy, food is still considered food waste if it was not ingested by humans because of the squandered resources it represents (see Figure 1) (Aschemann-Witzel et al., 2015). The abundance of waste exemplifies deeply rooted societal routines that lead to rampant overconsumption, even in the face of growing concern for sustainability, including sustainable food (Gooch et al., 2014). Even as awareness of sustainability issues grows, so is the amount of waste being produced (Gooch et al., 2014; Aschemann-Witzel et al., 2015). Food consumption practices are beginning to embody sustainability concerns at the purchasing phase of consumption, yet they are even slower to translate to the disposal phase (Vermeir & Verbeke, 2006; City of Edmonton, 2012; Infact Research and Consulting Inc., 2016). Social Practice Theory (SPT) states that this is due to the fact that food consumption is routinized behaviour that is not often reflected upon, and influenced by a multitude of factors, thus making it slow to change (Warde, 2005). Sustainable food consumption also requires that actors embody certain competences, materials, and meanings before sustainable change occurs to food consumption practices (Shove et al., 2012).

These phenomena have been documented in Edmonton, Canada where the awareness and purchasing of sustainably produced food is increasing, yet food waste, especially avoidable food waste (AFW) is a significant portion of the garbage produced (Vermeir & Verbeke, 2006; City of Edmonton, 2012; Evans & Siemens, 2016; Infact Research and Consulting Inc., 2016). Food waste has a large impact on the food system and the environment, which will only exacerbate the impacts of climate change and other sustainability issues if it remains unaddressed (FAO, 2014; Gooch et al., 2014; Aschemann-Witzel et al., 2015). The City of Edmonton is beginning to investigate the issue and come up with potential interventions and solutions (Evans & Siemens, 2016).

This research is attempting to address the knowledge gap that less attention is paid to hunger in developed countries (Riches, 2002; Rideout et al., 2007; World Bank, 2016), and to the lived experiences of households with low-income as they navigate food security and sustainability. This paper is also trying to keep in mind the historical, political, and social contexts that are often ignored when studying behaviour (Health Canada, 2013), while also giving critique to the sustainability narrative. This research also wishes to study and compare the sustainability of food consumption practices of households from a wide variety of socioeconomic backgrounds, which has been stated as a gap in the literature (Evans & Siemens, 2016). More information on how people practice and consider food consumption (purchasing and disposal) needs to be collected in order for future programs to better achieve sustainable behavioural change.

1.2. Problem Statement

The sustainability narrative has been corrupted so that it no longer emphasizes the most desired echelon of sustainable consumer behaviour according to the Intergovernmental Panel on Climate Change (IPCC) – reduction of consumption and prevention of waste (Pais, 2008; Kneafsey et al., 2013; Vanhonacker et al., 2013; IPCC, 2014; Graça et al., 2015a, b; UN, 2015; Verain et al., 2015). Buying sustainable alternatives is a practice that is more accepted and embraced, which still feeds into business-as-usual economics and rampant overconsumption (Vanhonacker et al., 2013; Graça et al., 2015a, b; UN, 2015; Verain et al., 2015). Sustainable alternatives are often only marketed towards middle- and upper-class consumers, while
low-income families feel the burden of overconsumption and waste, and are often ignored from the sustainability narrative and solutions (Radman, 2005; Vermeir & Verbeke, 2006; Blake et al., 2010; Ceccarelli, 2014; Verain et al., 2015; Vitterso & Tangeland, 2015; Bryla, 2016). The daily routine of food consumption is where these issues become apparent, and an area of sustainability in which all people participate and can potentially improve the quality of their participation. Consuming food more sustainably would benefit households and society (IPCC, 2014).

1.3. Aim and Research Questions

The aim of this study is to identify factors, socioeconomic, contextual, and others, that influence consumers’ food consumption practices. These different factors may result in different interpretations, considerations, and outcomes of the sustainable food consumption narrative. These perspectives are important for policymakers to understand and address as they try to encourage wiser food consumption in developed countries.

The following research questions are used in order to meet the aim:

What practice components (meanings, competences, and materials) deter or lead to sustainable food consumption behaviour?

How do food consumption (procurement and disposal) practices and views of Edmontonians reflect the broader sustainable food consumption narrative?

This project utilizes the food consumption social practices of people living in Edmonton, Canada as a case study in order to answer these questions.

1.4. Study Delimitations

This thesis focuses on food consumption and food waste habits and their implications for achieving sustainability. These topics also play a large role in other global sustainability issues, such as food security, equality, poverty, and climate change and although I attempt to mention each of these issues, entire theses could be written on each subject. Hence this thesis tries to narrow its focus while acknowledging the role of food waste and food consumption behaviours in each of these topics.

Edmonton was chosen as the location for this study due to ease of access for the researcher, and due to the amount of literature, research, and programming currently being created to address sustainability issues in the city, including food consumption and food waste (City of Edmonton, 2011; 2012; Evans & Siemens, 2016). Edmonton as a case study municipality will have some different characteristics and factors that influence its citizens’ consumption habits, and each municipality will need to be observed in order to understand those unique qualities. In order to look at how food consumption factors are influencing households, this study focused on two areas of the population in Edmonton where there were more likely to be people from a wide spectrum of socioeconomic backgrounds. This was done to attract a wide array of participants, and to respect the time and budget constraints of the project.

For this study’s methods, a flexible approach using qualitative methods rather than quantitative methods was chosen for this study, such as semi-structured interviews rather than closed interviews or surveys. These method techniques help with gaining insight into people’s thoughts in order to explain actions, but it means that they cannot create a generalizable study. This understanding is supported by Crang & Cook (1995), Robson (2002), and Yin (2009). These methods allow more insight into how certain people think, which can generate outcomes that might be useful for future, more generalizable studies. These qualitative methods also allow for the use of SPT, which can help elucidate the factors that influence behaviour, as stated in Shove et al. (2012), as well as its future possible uses for informing social marketing programs (Hargreaves, 2011). It has also been stated that most research on consumer behaviour has used self-reporting techniques, as opposed to observation, which biases data (Kraus, 1995). This was also a reason
for choosing SPT theory, which encourages observation and integration into people’s daily habits in order to better understand them, rather than relying on participants to self-report. Further limitations of the chosen methods are explained in Chapter 3, section 3.4.

Food consumption choices are influenced by a myriad of factors that are difficult to track; however, income can be a major determinant with direct and indirect consequences, and has not been studied in an Edmontonian context (Evans & Siemens, 2016), which is why this factor is focused on (Stewart et al., 2003; Vermeir & Verbeke, 2006; Milway et al., 2010; van Lenthe et al., 2015).

1.5. Outline
In this paper I explore the links between poverty and wealth, food security, food consumption, and sustainability (see Table 1 for a brief outline). Chapter 1 serves as a brief introduction to the topic and study layout that guide the rest of this paper. Chapter 2 is a literature review that expands on the problems mentioned in Chapter 1, and focuses on the systemic sustainability issues of the current food system and the international narrative on climate change and the SDGs, which hope to address those problems. Chapter 2 then explains how this instead perpetuates the current status quo of lifestyles, propagating socioeconomic inequalities and an unjust and severely impactful food system. Chapter 2 then discusses how this relates to SPT and discusses the theoretical framework that is used to enact the study and analyze data. Chapter 3 explains the research methods and design chosen for this study, and how this follows SPT guidelines. Chapter 4 discusses the background empirics, which detail the Canadian, and more specifically Edmontonian, context in relation to food consumption and inequality that are looked at in my research and how this follows patterns discussed in Chapter 2. Chapter 4 also moves away from the broader background of the food system discussed in Chapter 2 and discusses more about the practicalities and issues facing sustainable food consumption in Edmonton. Chapter 5 describes the results that were obtained from using the methods explained in Chapter 3, and how these results relate to the theory of SPT mentioned in Chapter 2 and other related literature. Chapter 6 discusses the results and how they answer the research questions outlined in Chapter 1. Finally, Chapter 7 contains concluding remarks and the contributions of this thesis project, suggestions for future research and improvements for this project, as well as the acknowledgements for all of those who helped out with this paper.

<table>
<thead>
<tr>
<th>Table 1 Outline of chapters and content</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chapter 1</strong></td>
</tr>
<tr>
<td><strong>Chapter 2</strong></td>
</tr>
<tr>
<td><strong>Chapter 3</strong></td>
</tr>
<tr>
<td><strong>Chapter 4</strong></td>
</tr>
<tr>
<td><strong>Chapter 5</strong></td>
</tr>
<tr>
<td><strong>Chapter 6</strong></td>
</tr>
<tr>
<td><strong>Chapter 7</strong></td>
</tr>
</tbody>
</table>
Chapter 2. Theoretical Background

Chapter 2 discusses the main topics of the literature review and the theoretical framework used in this thesis. Section 2.1 is the literature review and gives an overview of the status of the current food system, consumption and waste habits of consumers, and how the UN’s narrative on sustainability fuels current problems. Section 2.2 examines the theoretical framework of SPT, which was chosen in order to understand consumer shopping and waste practices, and the components (also called elements) that influence such practices.

2.1. Literature Review

The following section is a review of the literature relevant to this study. Section 2.1.1 presents a general description of the food system, how it functions, and its flaws, along with how the role of consumer behaviour and sustainable food fits into the picture. This is followed by section 2.1.2, which describes how sustainability, the food system, and food security are so heavily intertwined and integral to achieving global sustainability. Sections 2.1.3 and 2.1.4 discuss and then critique the UN’s stance on poverty, sustainability, and sustainable consumption and how this further perpetuates food system issues discussed in section 2.1.1.

2.1.1. Overview of the Sustainability Challenges of the Current Food System

Sustainable development/sustainability is defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs,” (WCED, 1987, p. 43). Sustainability concerns itself with every facet of life on earth, but the sustainability of food and the food system, might be one of the facets most integral to human survival. The current estimate is that there are 800 million to 1 billion undernourished people across the globe, and even more who are malnourished, including the 2 billion people considered overweight and obese (Pais, 2008; Godfray, et al., 2010; Ng et al., 2014; FAO, IFAD & WFP; 2015; Friel & Ford, 2015). These numbers are the result of a food system rife with inequality and sustainability issues.

Food is seen as one of the most important elements for human survival, therefore it is recognized as a basic human right, as enshrined in international declarations and many national declarations (UN, 1948; Riches, 2002; Rideout et al., 2007; Pais, 2008). Yet food is treated and traded as a commodity on the market – subject to the whims of the invisible hand of the free market (Pais, 2008). This is peculiar for something inherently needed for survival when other commodities are considered non-essential (ibid.). Food is therefore reduced from a basic human right to a commodity only available to those who have the purchasing power to afford it (ibid.).

In addition to the market impacts on the food system, environmental repercussions are also taking their toll. GHGs such as nitrous oxide (N₂O), methane (CH₄), and carbon dioxide (CO₂), which are the main emissions of concern in regards to climate change, also arise from all steps of the food system, “from the farming process and its inputs, through to manufacture, distribution, refrigeration, retailing, food preparation in the home, and waste disposal” (Garnett, 2011, p. S23). Although the global impact of the food system is difficult to quantify, the GHG emissions released from the food production chain combined with land-use change, degradation of agricultural lands, and unequal market distribution leads to the conclusion that the current food system, besides already failing to meet the needs of all those who depend upon it, is further eroding the planet’s ability to feed its inhabitants (Rockström et al., 2009; Garnett, 2011). The current conditions will lead, and are leading, to shifts in precipitation patterns, crop yields, food prices, and consumption (Nelson et al., 2009).

This situation is further aggravated by the fact that transnational corporations have vertically integrated themselves into the food system, thus eliminating competition and forming oligopolies that control prices, and product variety and quality (Pais, 2008). These companies have thereby reduced the sustainability of
the system by having severe impacts on the production, distribution, transportation, and consumption practices of the food system (ibid.). Production has been subject to a forced transition from agriculture to agribusiness, which relies on factory farms focused on profits and relying on high yields, genetic reduction and modification of seeds/animals, high water, pesticide, and fertilizer use, and over-farming (Pais, 2008; Berry et al., 2015). Those in control of the system influence distribution, whereby foods are made cheaper and more prevalent in areas where there are high-paying customers (global north vs. south, urban vs. rural or northern communities, and high-income vs. low-income communities) (Smoyer-Tomic et al., 2006; Pais, 2008; Godfray, et al., 2010; Health Canada, 2013). This disparity occurs even though more food is already produced than needed, and it exacerbates other inequalities that already exist, and offers no solutions for future generations (Pais, 2008; Health Canada, 2013). The transportation of food has also evolved with time, allowing food to be tradable at local and global scales, while depending on cheap fossil fuels that have their own environmental consequences (Pais, 2008; Berry et al., 2015). This transition from local to global has also created a reliance on imported food, which is not only unsustainable, but also increases food insecurity (Schiffman, 2013). Consumption practices have also been altered by prices that are dictated by oligopolies and marketing ploys that encourage the overconsumption of food items that are not required for a nutritious diet (i.e.: refined foods, ultra-processed foods, and excess meat and dairy) (Popkin, 2004; Pais, 2008; Monteiro et al. 2011; Moubarac et al. 2013; Berry et al., 2015; Friel & Ford, 2015). These unsustainable food habits are now integral in the diet of the developed world and are quickly spreading to the developing world (Pais, 2008; Godfray, et al., 2010).

One such behavioural trend that has a large environmental and economic impact is the food waste generated from such a system. The Food and Agricultural Organization (FAO) estimates that about one third of the food produced globally is wasted, equalling 8% of total GHG emissions (FAO, 2014, 2015). This amounts to a total of $2.6 trillion USD squandered globally on an annual basis through direct and indirect social, environmental, and economic costs (FAO, 2014, p. 79). This wastage results in food industries having to increase their costs 15-20% in order to recapture operation costs (Gooch et al., 2014). This translates into increased prices and lost income for consumers when they throw out food (ibid.). When food is thrown out in the home, it means that all of the time, money, and fuel spent upstream in the food system to produce and transport that product were wasted on food that will now contribute to GHGs in a landfill (ibid.). The amount of avoidable food waste (AFW) is of great concern considering that these were foods that were in good condition yet, due to poor planning, were not consumed (WRAP, 2008; Kelleher & Robbins, 2013; Evans & Siemens, 2016). This is the result of living in societies who in a post-war era are now focused so narrowly on overconsumption and not on the impacts of human actions (Schneider, 2011). Humans have always wasted food, but now it is occurring on an increasingly affluent and industrialized scale (ibid.).

Instead of addressing these larger systemic issues in order to create a more sustainable food system, it is more heavily encouraged that consumers should become more sustainable in their food choices and consumption (Pais, 2008; Kneafsey et al., 2013). Individual consumers are encouraged to adopt eating behaviours that reflect more sustainable production, such as buying products with organic, fair trade, local, and free-range labels, and reducing the quantity of their consumption, such as eating less meat and junk food, and reducing general overeating, as well as reducing waste production (Jungbluth et al., 2000; Hoogland et al., 2005; IPCC, 2014; Verain et al., 2015).

Reduction and prevention behaviours are the most important as they reduce the amount of resources and GHGs utilized in order to create products (see Figure 1) (IPCC, 2014). Every step down the hierarchy of waste management means an increase in resource use and GHG release; even recycling and recovering energy from waste require significant amounts of energy (ibid.). Furthermore, disposal of items is a much more ingrained practice due to the world’s sociocultural and economic views on consumption. This means that less emphasis has been put on educating people about preventing and reducing waste, due to the consumption/throwaway economy (Cooper, 2005). However, humans have wasted food since the beginning of time, but it is especially apparent that with increased affluence comes a certain disregard for reducing food waste (Schneider, 2011).
When the system has been focused on encouraging consumers to embody disposal behaviours, it is incredibly difficult to go against the system and re-educate consumers to practice behaviours located at the top of the waste management hierarchy. This is evident by the fact that consumers seem to be more open to buying sustainable alternatives to conventional products rather than trying to curtail their consumption, especially in terms of meat consumption (Vanhonacker et al., 2013; Graça et al., 2015a, b; Verain et al., 2015). The literature also recognizes that simply shifting consumption to more sustainable food products is not sufficient in order to achieve a sustainable food system; a much larger emphasis needs to be put on preventative and reduction behaviours, which provide more environmental benefits (EC, 2008; Blake et al., 2010; Garnett, 2011; Verain et al., 2015). The sustainable consumption narrative of shifting consumption to more sustainable products is also only a luxury that belongs to the wealthy and food secure (Blake et al., 2010; Garnett, 2011; Verain et al., 2015).

![Hierarchy of Waste Management](https://example.com/hierarchy.png)

**Figure 1** The hierarchy of waste management. Behaviours that are towards the top of the echelon have less of an impact in terms of resource use and GHG emissions. Adapted from (IPCC, 2014, p. 786), colour and priority based on the waste hierarchy as outlined by the European Commission (EC) (EC, 2008, p. 10).

Although sustainably produced food alternatives, such as local, organic, and fair-trade products represent necessary agricultural shifts towards more ethical and environmentally friendly methods, they represent barely 1% of the products offered in markets globally (MacGillivray, 2000; Vermeir & Verbeke, 2006). This is due to the fact that these products are targeted towards a niche market, the reflexive and ethical consumer who considers their consumption habits and their impacts on society and acts on these reflections, which most consumers do not (Vermeir & Verbeke, 2006; Vitterso & Tangeland, 2015). This is due to the fact that consumption habits are routinized and dependent on a multitude of decision-making factors, and the ethical consumer remains an outlier and usually a “middle-aged person with a higher income, who is above average educated, with a prestigious occupation and who is well-informed,” (Vermeir & Verbeke, 2006, p. 171). In addition to recuperating costs for growing food unconventionally and paying to label their products, this is why sustainable foods tend to be, and are perceived as being, more expensive than their conventionally produced counterparts, which makes them less affordable for those people living on a strict budget (Radman, 2005; Blake et al., 2010; Ceccarelli, 2014; Verain et al., 2015; Bryla, 2016). Globally, people with low-incomes have the lowest carbon and consumption footprints simply due to a more restricted ability to purchase resources, yet their diets also have an impact on overall sustainability (Gadotti, 2008). All consumers have a role to play in sustainability, but these individual roles are not as impactful, nor as successful, as systemic change (Vitterso & Tangeland, 2015).

In developed countries, households with no incomes, low-incomes, and the working poor are almost completely ignored by the UN, yet they often experience food insecurity and are also vulnerable to fluctuations in food prices (Pais, 2008; Godfray et al., 2010; Schiffman, 2011; Green et al., 2013;
Kneafsey et al., 2013; Vellakkal et al., 2015). When food prices spiked globally in 2007-08 due to food shortages, increased biofuel production in a food commodity market, and inflation, many more millions of people were unable to afford the price of food and went hungry (ibid.). Lower income households tend to spend the majority of their budget on rent and food, and they cannot afford the volatile price fluctuations of food traded on a commodity market, much less more expensive, healthy or sustainable alternatives (Schiffman, 2011; Health Canada, 2013). When prices shift, poor countries, and likewise poor households, are more adversely affected than their rich counterparts (Green et al., 2013). Food staples such as cereals, oils, and fats tend to have a steadier demand no matter their price than animal products, which demonstrates animal products’ status as luxuries, yet they are essential for health (ibid.). Meat, grain products, and dairy are all controlled by marketing boards that have increased prices more than the level of inflation, making them less accessible to poorer families (Milway et al., 2010).

These conditions, along with other economic woes, have led to an increase in dependence across the world on emergency food aid and food banks, which have taken on a more central role in hunger management (Riches, 2002; Maxwell, 2007; Rideout et al., 2007). In Canada, this manifests as reliance on food banks due to cuts in social safety nets (Riches, 2002; Rideout et al., 2007). Food banks were meant to be charities that helped families meet acute food insecurity needs, but have increasingly been relied upon to provide chronic support in a non-holistic, undignified, and unsustainable way (ibid.). Food banks rely on donated food, where donations are dependent on the local economic conditions, and the food provided tends to be cheap, repetitive, and less nutritious, which has been a trend since antiquity (Riches, 2002; Rideout et al., 2007; Rock et al., 2009; Schneider, 2011). Compounding this is the fact that low-income families tend to eat less nutritional foods, such as those that are prepackaged and take less time to prepare (Milway et al., 2010; van Lenthe et al., 2015). This results in poor people eating higher concentrations of processed foods, carbohydrates, salt, sugar, and fat, rather than the fresh meats, fresh fruits and vegetables, and low fat milk that wealthier people tend to consume (ibid.). Thus households with lower incomes can be at a disadvantage while trying to maintain health, food security, and sustainability in the current food system. However, lower-income households have been found to be smaller producers of food waste, which means that they have important experiences and perspectives to provide to others who are trying to become more sustainable (Bawa & Ghosh, 1999; Aschemann-Witzel et al., 2015; Thyberg & Tonjes, 2016).

In Canada, it currently costs less to buy a 1-liter bottle carbonated beverage than 1 liter of low fat milk, further impeding the ability of families to meet the definition of food secure and sustainability (Milway et al., 2010). There is also evidence that if a low-income household received more money, they would not be likely to spend it on healthier/more sustainable alternatives, such as fruits and vegetables, as other factors such as lack of general education, lack of knowledge of how to prepare healthy foods, time constraints, taste preferences, and the need to provide food acceptable to children all prevent these households from increasing their fruit and vegetable consumption (Stewart et al., 2003; van Lenthe et al., 2015). Healthy food (as well as more sustainable food) is just not a priority until a person’s basic needs are met (van Lenthe et al., 2015).

All of these factors result in conditions that do not just make it difficult to eat healthily, but also sustainably, as current diets are entrenched in unsustainable foods. Additionally, fast-food is becoming increasingly popular, further encouraging unhealthy and unsustainable eating habits, and a loss of cooking skills and connection with food (Euromonitor International, 2012; Green et al., 2013; Black & Billette, 2015). The current conditions of the food system only point to an increase in food insecurity.

2.1.2. Food Security and Sustainability
The goal of the food system is to allow all people on the planet to achieve food security, yet the current system does not work that way. Food security and sustainability are highly intertwined, as seen in Figure 2. Food security is most recently defined as “a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life,” (Berry et al., 2015, p. 2295). Food security infers that
there is stability in terms of food availability, accessibility, and utilization \((ibid.)\). The availability of food depends on the amount able to be produced and distributed to different areas \((ibid.)\). Accessibility refers to a household’s ability to acquire food resources and the ease with which this is possible \((ibid.)\). Utilization refers to how households use food resources in order to meet their nutritional needs, but could also be considered in terms of how much food is wasted and the impacts of such waste \((ibid.)\). How food is utilized, especially if it is squandered, can then go back and impact things such as availability and accessibility, which then means natural resources and other environmental factors are also wasted, which has further implications on other sustainability factors.

All of the food security factors are influenced by broader sustainability issues, such as those that impact environmental, economic, and social aspects of society \((ibid.)\). Food security became the focus of political concern during the 1970’s energy crisis and has continued to dominate discussions in more recent crises (FAO, 2002; Wakefield et al., 2014; Berry et al., 2015; Friel & Ford, 2015). Without a properly functioning food system with every individual, organization, and government doing their part to make it sustainable and accessible to all people, then there can be no food security. The current food system practices of all agents make it unlikely that food will continue to be able to be produced on the same levels as today, thus sustainability and food security are unlikely to be achieved.

![Figure 2 The reciprocal relationship between food security and sustainability (Berry et al., 2015, p. 2295). How we use (or do not use) food can impact the environment, the economy, and society and therefore has implications of food security and sustainability.](image)

The international sustainable development narrative is concerned with how food and sustainability are so heavily linked. However, the narratives that do exist ignore the facts of the current system, as discussed in section 2.1.1, and suggest changes that will continue to see the rapid exploitation of resources and growing poverty, hunger, and inequality across the world. Food security and poverty are also heavily related, as will be discussed in section 2.1.3, but the current globalized food system has been designed in a way that exacerbates these inequalities and increases food insecurity, even while there is a frantic search to make food systems more sustainable (Pais, 2008; Godfray, et al., 2010; Berry et al., 2015). If the systemic failings of the food system are not addressed, then the more heavily emphasized solutions of more sustainable agriculture and sustainable food products will not help in addressing food insecurity. For example, many people feel that potential food waste (food that has not yet spoiled) should be given to those who cannot afford it (Aschemann-Witzel et al., 2015). This requires addressing the behaviours of
individuals and other agents in order to encourage more wise and fair usage and distribution of resources.

All of these conditions within the food system are leading to a health and environmental crisis that cannot be supported by society (Green et al., 2013). Hunger and poverty are symptoms of the inequalities and unsustainability that plague the current food and economic systems. The feedback created in these systems will continue to exacerbate the number of hungry and poor people in the world if the root causes are not addressed. Although the UN is most concerned about the unsustainability that poverty poses for the globe (UN, 2015), how food is utilized by the developed world and industries through rampant overconsumption, a throwaway mind-set, and controlled sustainability narrative pose the greatest threats to sustainability (Cooper, 2005; Caney, 2006; 2010; Dauvergne, 2016; Wapner, 2016). Well-being and happiness levels can only rise to a certain point with increased material comforts, yet the people of the world are continually striving to increase their wealth and consumption (Lane, 2000; Warde, 2005). These unsustainable sentiments are still reflected in the UN’s 17 Sustainable Development Goals that are meant to create a better world by 2030 (UN, 2015). If the highest international authority on sustainability is fueling confusion and a misdirecting narrative, then it is unlikely that sustainability will be achieved.

2.1.3. The United Nations’ Stance on Poverty, Food Security, and Sustainable Development

The current global capitalist system (and therefore its subsidiary food system) is not compatible with attaining sustainability goals (Rockström et al., 2009; Garnett, 2011; IPCC, 2014; Berry et al., 2015). The UN also emphasizes that in order to attain sustainability, the world must focus on the needs of “the poor”, and the limits of technology, social organizations, and the environment (ibid.). In 2015, the UN ratified the 17 Sustainable Development Goals (SDGs) to be achieved by 2030 (2015). Achieving the 17 SDGs should, in the UN’s opinion, allow the people of Earth to achieve sustainable development. The idea behind these goals is that once they have been accomplished, the world will be more in balance with nature, equal, and just, and therefore it should also be more resilient to the problems caused by climate change (ibid.).

The UN views poverty as the primary challenge facing sustainability since approximately 10.7% of people on the planet (~800 million) currently live in abject poverty with low levels of well-being, health, and productivity (UN, 2012; World Bank, 2016). Poverty is closely tied to, and the result of, all of the other 16 SDGs if they are not achieved, but poverty can most directly be associated with food insecurity (ESDDFAO, 2002; UN, 2012; 2015). The UN estimates that approximately the same amount of people and more, are consistently undernourished, hence why the first two lofty UN SDGs are to “1: End poverty in all of its forms everywhere” and “2: End hunger, achieve food security and improved nutrition, and promote sustainable agriculture” (ESDDFAO, 2002; UN, 2012; 2015, p. 14; FAO, IFAD, and WFP, 2015)

Poverty is defined in many ways, but a definition that tries to encompass all of the different methods of considering poverty is “an unstable social condition due to the abnormal functioning of economic, ecological, cultural, or social systems, depriving people of the capability to adapt, live, and meet their minimum living needs,” (Opschoor, 2007; Zhen et al., 2014, p. 84). Institutions and other organizations that attempt to measure poverty tend to define it in their own way, usually focusing on economic poverty and defining it in monetary terms (the UN defines it as living on less than $1.25 Purchasing Power Parity (PPP) a day) (UN, 2015; Kamruzzaman, 2016). PPP is an economic doctrine that states, “one should be able to buy the same bundle of goods in any country for the same amount of currency,” (Yunus, 2000, p. 99; Alba & Park, 2003; Kamruzzaman, 2016).

Continuing with the UN’s economically related definition, poverty occurs for a multitude of reasons that cannot be explored in this paper, but a lack of economic means most importantly infringes on a person’s ability, and right, to acquire food resources and to meet their nutritional needs for a healthy and active
lifestyle (ESDDFAO, 2002). This results in hunger and malnutrition, which also lead to poverty by (ESDDFAO, 2002, p. 10):

- Reducing the capacity for physical activity and hence the productive potential of the labour of those who suffer from hunger – and that is usually their only asset.
- Impairing people’s ability to develop physically and mentally, retarding child growth, reducing cognitive ability, and seriously inhibiting school attendance and performance – thus compromising the effectiveness of investment in education.
- Causing serious long-term damage to health, linked to higher rates of disease and premature death.
- Passing from generation to generation: hungry mothers give birth to underweight children who start life with a handicap.
- Contributing to social and political instability that further undermines government capacity to reduce poverty.

Thus people finding themselves in a situation of poverty and hunger tend to be caught in a situational feedback loop that only reinforces their poverty and hunger, and leads to further deterioration of quality of life (ESDDFAO, 2002).

Throughout the period of 2014-16, there was an estimated 800 million people globally who were chronically undernourished (about 1 in 9 people), and 98% of those people were in developing nations (FAO, IFAD, and WFP, 2015). The percentage of undernourished people from the period of 1990-92 was halved by 2014-16 even amidst a growing global population; however, hunger is still a huge issue for millions of people even though we are currently producing more food than the world consumes (ESDDFAO, 2002; Godfray, et al., 2010; FAO, IFAD & WFP, 2015). However, production is also being impacted by climate change, such that water and land are facing increasing stressors that impact production and other globalization factors, such as poor distribution and food waste (Godfray et al., 2010; Schiffman, 2011). This situation points to the systemic causes of poverty as being the main culprit of global hunger, rather than a lack of food - a distribution, inequality, and behavioural problem rather than a capacity problem, which are not the problems that the UN and other global and national powers are trying to tackle (ESDDFAO, 2002; Godfray, et al., 2010; FAO, IFAD & WFP, 2015). It is also imperative to remember that as the UN and other global organizations cheer at the approaching end of extreme poverty, there are still plenty of poor people who are ignored by statistics and international efforts: those making just over the $1.25 PPP line or making more and still effectively having no money left to meet all of their needs (Kneafsey et al., 2013; Kamruzzaman, 2016).

2.1.4. Critique of the UN’s Sustainability Narrative
The UN, its affiliates, and plenty of other institutions only define poverty according to economic terms, which is not a proper reflection of the multitude of ways people can be considered poor (UN, 2015; Kamruzzaman, 2016; World Bank, 2016). It also does not reflect the many ways in which people can be made economically poor, such as through social discrimination. The economic definition of poverty lends itself to a simple, linear solution that most institutions, such as the UN, the World Bank, and countless national governments throughout history, have used as excuses to follow a business-as-usual economic development agenda (Chambers, 1995; Kamruzzaman, 2016). The idea behind this is that if people make more money, they can then afford to meet their basic needs, such as achieving food security, although this idea is flawed. Such agendas that solely focus on Gross Domestic Product (GDP) growth continue to encourage the unbridled exploitation of natural resources and human capital without due respect or compensation (Chambers, 1995; UN, 2015; Kamruzzaman, 2016; World Bank, 2016). The language used in the new SDG reports and other supporting documents (such as the quote used in the last section) still unapologetically support the economic development of the developing world in order to lift people from only “extreme poverty” by targeting the poorest people and giving them low-wage jobs (Chambers, 1995; UN, 2012; 2015; World Bank, 2016). This is a smart economic decision, as making plans that target the
The poorest people who probably do not have a job (but who may be subsistence farming or bartering for goods) is an easily attainable leverage point (Kamruzzaman, 2016). Although the company that offers these people a job may be an environmental polluter or does not pay a living wage, that company will be considered to be helping the sustainable development of the globe by reducing poverty by elevating those from extreme poverty to simple poverty (ibid.).

The mathematics and explanations behind measuring dollarized poverty are also made to be purposefully confusing and are kept at very low levels (ibid.). By ignoring all of the other facets that cause poverty (inequality in wealth and power, gender inequality, racial discrimination, hunger, lack of education, war, climate change and extreme weather, etc.), businesses can continue to offer bad jobs, with minimal pay, and environmental repercussions, yet say that they are lifting people out of poverty (ibid.). The $1.25 PPP poverty line does not even take into account that the same amount of money in each nation’s currency would not buy the same amount of goods in each country, nor would it be sufficient for people to procure enough healthy food for themselves for a day (ibid.). A beggar in this context who receives even minimal cash would not be considered ‘poor’ by the UN’s standards (ibid.). All of this is an excuse to continue development as usual while using the façade of helping to create a better and more equal planet. The $1.25 PPP sets minimum goals that will claim to have fixed the world when severely ingrained sustainability problems still persist throughout all corners of the planet.

The UN’s first SDG does nothing to address the fact that labour in developing nations is heavily devalued (yet promoted as the best asset of developing nations) and will continue to be through the fixes they are suggesting (UN, 2012; 2015; Kamruzzaman, 2016; World Bank, 2016). The language used in the SDGs and other sources can be seen as encouraging the eradication of poverty and reduction of food insecurity in order to promote healthier labour sources, which eventually leads to more production and consumption (Chambers, 1995; ESDD/FAO, 2002; FAO, IFAD & WFP, 2015; UN, 2015; Kamruzzaman, 2016; World Bank, 2016). There is an urgency and importance associated with attaining the first SDG, as it is described as being necessary to solve the other SDGs (FAO, IFAD & WFP, 2015; UN, 2015). It is also the most easily quantified – albeit in a biased and misguided manner. If calculations can be made to show that the UN’s low-bar goal of poverty eradication can be met, then it could be argued that governments are taking steps to become more sustainable in all other aspects, thus there is no rush to make large headway on other important sustainability projects or policies due to trickle down or indirect effects.

In contrast to the UN, the World Bank looks at the results of poverty reduction movements that have already occurred in the real world (World Bank, 2016). The World Bank recognizes the law of diminishing returns and the empirical evidence from developed nations, such as the United States, the United Kingdom, Australia, and Canada, that development and economic growth alone will not fully eradicate poverty (ibid.). Economic inequality, racism, gender inequality, wars, climate change leading to natural disasters, etc., will all ensure that poverty, as well as hunger, are never fully eradicated from the globe (Kamruzzaman, 2016; World Bank, 2016). However, in order to attempt to reduce poverty, the World Bank also encourages economic growth – and although they call for more sustainable businesses, the same business-as-usual undertones exist in their narrative as well (World Bank, 2016). Such growth is needed in developing countries, but it needs to be balanced with a decrease from developed countries in order to create more equal distribution. Overall, the focus on poverty as the cornerstone for achieving sustainability in other sectors diverts more attention and resources to attempting to elevate people from poverty, which will not be completely successful (Kamruzzaman, 2016). This is as opposed to having the main focus be on the wealthy lifestyles of developed countries, which have been chiefly responsible for current planetary situations and have the most global impact due to consumption economies, and throwaway societies and behaviours (Cooper, 2005; Caney, 2006; 2010; IPCC, 2014).

The UN begins to focus on the lifestyle behaviours of the developed world in SDG “Goal 12: Ensure sustainable consumption and production patterns” (UN, 2015, p. 14). The goal also uses language that is reminiscent of the current neo-liberal mindset. Although the goals mention that there is a desire to reduce food waste and waste in general through prevention/reduction, recycling, and reuse practices, there is no
clear emphasis on the first echelon of practice in the waste management hierarchy (Figure 1) (UN, 2015). The UN also states that if the global population reached 9.6 billion by 2050, it would require three planets-worth of natural resources in order to sustain current lifestyles – this includes the lifestyles of the extremely poor and ‘simply’ poor of today (Gadotti, 2008; UN, 2016). Should this poor portion of the planet actually be lifted from poverty through the business-as-usual use of economic growth and wage paying jobs (as we are beginning to observe now throughout the developing world), the consumption and waste levels of these societies would also increase, and drive up the demand and cost of food and other resources (Godfray, et al., 2010). Therefore, developed nations are the main parties responsible for overburdening the natural resources of earth to this point in time, and even if sustainable development is achieved to the UN’s standards, then more people will have the means to consume and waste more (Gadotti, 2008). This is why it is imperative that the UN should be encouraging a severe reduction in total consumption levels of all natural resource uses of developed countries, so that there is room for developing nations to gain a higher standard of living. However, this should also be tempered with the idea of moderation.

Throughout SDG Goal 12, the UN only calls for the sustainable use of resources and does not go into detail about what behavioural changes this would require (UN, 2015). The facts and goals they list also only hint at lightly reducing consumption of resources, such as by buying energy efficient light bulbs or buying from sustainable businesses and enjoying sustainable tourism (ibid.). These are all activities that in effect still encourage consumption that is not needed for survival and really only target people living in developed nations who can afford such things (UN, 2015; 2016). These small ‘sustainable’ changes still encourage bigger consumption habits that are detrimental to the planet without the use of strong language to indicate the consequences. The language used in the SDGs and the worldviews they represent will only continue to encourage the current food system’s impacts on the planet and perpetuate the hunger, poverty, and unsustainability that are naturally entwined with it.

This is why it is important that research looks into how quickly behaviours and attitudes are accepting and adjusting to this new climate reality by looking at what sustainable practices are actually being adopted in daily habits, and by how many people. This research would be relevant to education campaigns targeted at encouraging people to adopt truly sustainable behaviours that can be practiced by more people rather than just a select, wealthy few. Social Practice Theory is one method of research that would allow for some insight into the current sustainable practices of people and their views in order to create a starting point for educational campaigns.

2.2. A Theoretical Framework

The following section examines the chosen theory for this thesis – Social Practice Theory – its history, and uses in other literature (2.2.1). Section 2.2.2 delves into the conceptual framework for this paper, which looks at the three components of practices, materials, meanings, and competences, and how these are used to analyze data.

2.2.1. Social Practice Theory

Two main theories exist that try to explain human behaviour and how this leads to social order: homo economicus and homo sociologicus (Reckwitz, 2002; Vlasov, 2015). The former states that people are focused on the self and make individual choices that result in some sort of social order (ibid.). In the latter theory, social order is the result of normativity, as it is determined by a group of people who share values, norms, and an idea of how people ought to behave (ibid.). Social Practice Theory was created as a way to reconcile these two opposing theories by stating that social practices are a result of both individual choices and social norms leading to a social order (ibid.).

Social Practice Theory (SPT) has emerged from the early work of Bourdieu, Giddens, and others and has been further discussed and refined by researchers such as Reckwitz, Schatzki, and Warde (Giddens, 1984; Reckwitz, 2002; Warde, 2005). Social practices have been defined in slightly different ways, but
Reckwitz’s definition covers the general idea behind SPT (2002, p. 250): “A practice is social, as it is a ‘type’ of behaving and understanding that appears at different locales and at different points of time and is carried out by different bod[ies]/minds” due to various outside and internal factors. Schatzki (1996, p. 89) states that practice theory is about linking the “sayings and doings” or the understandings, procedures, and engagements that constitute a practice (Warde, 2005). Humans act both autonomously and according to social norms (Reckwitz, 2002); therefore, the social practices of humans are “routinized” and “recursive”, thus they change over time since a multitude of elements and circumstances are continually influencing behaviour, including the development of the practice itself (Giddens, 1984, p. 2; Reckwitz, 2002, p. 250; Warde, 2005). SPT is more interested in observing what people do rather than what they say they do and comprehending the “established understandings, procedures, and objectives” that a person believes accompanies a practice (Warde, 2005, p. 140). This also implies that since practices are the result of internalized influences that different people in altered situations will perform the same activity differently (Warde, 2005). As a result, SPT “emphasizes processes like habituation, routine, practical consciousness, tacit knowledge, tradition and so forth,” (Warde, 2005, p 140). This also means that the focus of SPT is on how groups of people perform a practice (Reckwitz, 2002; Hargreaves, 2011; Vlasov, 2015). This is done by using individuals as case studies and representatives of the larger population, rather than focusing solely on how an individual performs a certain practice (ibid.).

Due to these reasons, SPT demands that certain questions are analyzed, such as: What is the role of participants or their positional structure in a practice? What are the most common types of practices? What range of practices do different people participate in? What are the most common combinations of practices? and What level of commitment is displayed to various practices? (Warde, 2005).

Furthermore, almost all human practices demand and cause consumption in some form or another (Warde, 2005). This is why practice theory lends itself well to studying the various aspects of practices of consumption, and for the purposes of this study, the practice of sustainably consuming food. The whole process of consuming food (from buying it at the store to disposal) is a familiar practice to all people, which means that the performance of such an activity is neither “fully conscious nor reflective,” and is “deeply entrenched and embodied” (Warde, 2005, p. 140).

The usefulness of practice theory is that it “emphasizes routine over actions, flow and sequence over discrete acts, dispositions over decisions, and practical consciousness over deliberation” (Warde, 2015, p.126). Practice theory allows me to analyze the actions of participants since I am interested in looking at those habits and outside influences that manifest in unconscious routines related to food consumption, sustainability, and survival (Warde, 2015). Practice theory is increasingly being utilized to study consumption habits of daily activities, such as eating (Holm, 2013; Moruzzi & Sirieix, 2015) and in terms of these daily activities’ impacts on sustainability and climate change (Shove, 2003; Hitchings, 2007; Christensen & Ropke, 2010; Shove et al., 2014; Warde, 2015). The current sustainability narrative that asks for slight changes to behaviours (usually involving consuming more ‘sustainable’, but expensive products) is trying to create citizen-consumers or those “consumers who take on the political responsibility we usually associate with citizens to consider the general good of the nation through their consumption,” (Cohen, 2000, p. 204; Warde, 2015). However, it is a well-acknowledged fact to those that engage deeply with the sustainability literature that small alterations to consumption patterns are not enough to avoid the catastrophes of climate change and natural resource depletion; a severe reduction in consumption levels is essential, especially in the West considering consumption in developing nations will likely increase (Jackson, 2009; Schor, 2010; Garnett, 2011; Warde, 2015). It is also apparent that a lot of environmental campaigns put too much onus on the consumer to make resolute, personal, ethical pledges without fully educating them or considering personal circumstances and factors (Barnett et al., 2011). This is why my research focuses on participants from varying socioeconomic backgrounds and their food consumption, in order to gauge how they engage with the sustainability narrative. The results contribute to the literature by giving a better understanding of the priorities of people from different socioeconomic backgrounds. SPT provides a framework through which it is possible to break down and analyze practices from the environmental to the individual scale and extrapolate these practices to groups/populations.
Shove et al. (2012); however, this perspective on practices is also a delimitation for this study. SPT allows researchers to examine how people understand the sustainability narrative and act or do not act on it, which could be important for helping to inform better-targeted sustainability campaigns and policies.

2.2.2. A Conceptual Framework

“The accumulating international evidence highlights that the empowerment of all social groups and nations to achieve food security is influenced by conditions of everyday life – those daily social experiences; physical environments; financial resources, and material living conditions. Promoting food security also means tackling some of the fundamental political, economic and cultural influences on people’s living conditions and their local food environments,” (Friel & Ford, 2015, p. 446). This quote highlights the complexities of trying to measure the influence of factors on people’s daily routines, yet the importance of trying to understand how these are formed in order to make more sustainable behaviours enticing for people facing different barriers.

Shove et al. (2012) describe practices as being made up of three interconnected components (also called ‘elements’): materials, meanings, and competences, as illustrated in Figure 3. Materials are the things necessary to perform a practice, such as “objects, infrastructure, tools, hardware, and the body itself” (Shove et al., 2012, p. 23). Competences refer to the various forms of skills, knowledge (first-hand, second-hand, communal, tacit, learned), abilities, and understanding that can inform a practice (ibid.). Meanings refer to the mental activities that surround a practice, such as social and symbolic significances, emotions, and beliefs – the internalized reasons of why a practice is done a certain way (ibid.). These components all influence each other and are affected by outside contextual factors, which all change over time and make practices change (ibid.).

Studies have found that reducing food waste is not so much related to the simple intention/desire to reduce food waste, but to habits and behaviours found in daily routines that may be deliberate or unconscious (Stefan et al., 2013). Much research has been done on the variety of factors influencing the practice of wasting food, with the literature stating that food waste can be linked to socioeconomic and psychographic factors, as well as economic, cultural, political, and geographic factors, which all vary person to person and will inevitably change in different societies and different years (Bawa & Ghosh, 1999; Aschemann-Witzel et al., 2015; Thyberg & Tonjes, 2016). These factors can be categorized into contextual factors and the three elements of practice of SPT.

The infrastructure of the household, such as the age composition of the household, number of people in the household, the life-phase of the household, and household income can all be considered types of materials that can influence food waste (ibid.). Richer and larger households tend to spend more money on the consumption of food and have more varied diets, which have been linked to a higher potential for waste (ibid.). Households on a stricter budget are less able to over-consume, and eat repetitive staples that
can more easily be turned into other meals and are less likely to spoil (ibid.). Larger households can also mean that families tend to buy more foods in bulk, which has the potential to lead to more wasted food, but they are also more likely to plan meals as opposed to smaller/younger households, which could reduce the potential for food waste (Aschemann-Witzel et al., 2015). Households with children are also more likely to produce food waste due to health/safety concerns and picky food preferences (Aschemann-Witzel et al., 2015; Thyberg & Tonjes, 2016).

Competences that can influence food waste are those such as life experiences, cooking skills, ability to learn from mistakes/wasted food, and the knowledge of how to use leftovers or potentially wasted food in other ways (Aschemann-Witzel et al., 2015). Previous life conditions, such as living during war-time austerity, might influence the amount of food waste a household produces, whereas those who have limited cooking abilities might avoid cooking fresh meals and thus buy pre-packaged meals that create less food waste (Thyberg & Tonjes, 2016). There is also the tendency to cook and provide more food than is necessary, which reflects upon the skills of the chef to make judgment calls about how much each household member can eat (ibid.). Also falling under this category would be a lack in consumer ability to understand expiration dates on food, which has been linked to a large percentage of food wastage (Aschemann-Witzel et al., 2015; Thyberg & Tonjes, 2016).

Psychographic factors are deemed to be some of the most important factors driving food waste; they fall under the practice element of meanings, which tend to be the reactionary dispositions people have which can drive a practice, rather than conscious thought or deliberation (Aschemann-Witzel et al., 2015). Elements of practice that would fall under meanings would be people’s motivations and degree of motivation for reducing food waste, ethical reasons, priorities, trade-offs, and emotional reactions to food (such as leftovers, spoiled or possibly spoiled food) (ibid.). Each of these factors could instigate an increase or decrease in a household’s food waste production, but could benefit from increased competences through education.

The current sustainability narrative is attempting to increase the knowledge and abilities (competences), and influence the significance (meanings) of adopting sustainable practices, while new businesses are trying to introduce sustainable products (materials) to the market. However, these competences and meanings are not directed sufficiently at addressing behaviours so that they reflect the top echelon of waste management, prevention and reduction (Figure 1). This is especially troubling since competences are a main determinant for how quickly and to what depth people will adopt a practice (Shove et al., 2012). It is incredibly important that the sustainability narrative, where a main goal is to expand the availability of sustainability knowledge, is done objectively and simply, so that practices can be influenced in the proper direction. The narrative is also not doing enough to point out flaws and alter systemic problems, such as inequality, that really affect the materials people have at their disposal to adopt sustainable behaviour. It is imperative that there is an understanding of the depth people are currently engaging in sustainable practices and how the components of practice are informing these behaviours in order to begin to address barriers for different people.

In this study, the observations and questions directed at the participants aim to flesh out each of these three components of practice, and how different people navigate them, resulting in certain sustainable food related behaviours and not others. This research also focuses on trying to understand what materials, competences, and meanings certain groups of individuals already have and how this results in their current level of concern for sustainable food consumption. This allows future research to create intervention methods that could help eliminate certain barriers groups of people face when trying to increase the sustainability of their food consumption.
Chapter 3. Method

The following chapter discusses the mixed-methods approach utilized in this study. The methods used for the literature review and data collection are described and accounted for (3.1), followed by discussions on the study area (3.2), quality assurance (3.3), delimitations (3.4), and ethical considerations (3.5).

3.1. Research Design

Referencing the literature, Kraus (1995) states that although people may say on paper that they have certain attitudes and embody them in specific behaviours, that in reality these behaviours, habits, and practices are actually less commonly practiced. Hence, this research project used a variety of techniques, including observation techniques in order to avoid relying upon self-reported data, which can easily misrepresent reality when it comes to human behaviour. In order to understand factors that drive sustainable consumption and food waste, it was important that people were observed during the behaviour, or tracked their behaviour diligently, rather than only relying on participants to self-report behaviours or attitudes through a less accurate means such as a survey. Self-reported perspectives are important to understand and can give insight to events, but they should be followed up with research into what behaviours are actually being practiced.

3.1.1. Summary of Literature Review

This thesis required a literature review in order to gain a brief understanding of the current work in the fields related to food waste, the food system, food sustainability, and food behaviour. The journal database Web of Science, JSTOR, and the Google Scholar search engine were used to find papers related to the subjects discussed in the literature review sections 2.1.1 to 2.1.4. Some key phrases used for the literature search were: sustainability issues food system; reducing food waste; impacts of food waste; causes of food waste; climate change impacts food system/agriculture; food security in Canada/Alberta/Edmonton; socioeconomic inequality food system; poverty/low-income food environments (in Canada/Alberta/Edmonton); United Nations Sustainable Development Goals; sustainable food consumption practices/behaviours; (critique of) sustainable food movement.

The biggest takeaway messages from the literature review were that the food system is responsible for a large proportion of the GHGs warming the planet, but it is systemic issues as well as wasteful human behaviour that are driving the problems in this sector. The literature recognizes that changing consumption to more sustainable alternatives is not the only answer, and that changing the entire world’s outlook on consumption and encouraging the embodiment of behaviours related to prevention and reduction are of utmost importance in order to meet the UN’s SDGs. However, the SDGs are not pushing for extreme enough behavioural and systemic change in order to create a sustainable food system.

Slowly, more research has come to focus on the experiences of those with lower-incomes and how the challenges created by man-made climate change will affect them first. It is important that creating a sustainable planet involves all people, so that the new system will work for everyone, and not just the privileged. Food waste and sustainably consuming food in various types of households has not been thoroughly researched, yet it should be in order to gain better insights into the whole picture of food waste, and increase the success rate of possible solutions.

3.1.2. City of Edmonton

In order to gain a better understanding of how food waste is managed within Edmonton’s city limits, I reached out to the City of Edmonton Waste Management department in order to get a tour of their organics composting facilities. The rest of the information about Edmonton’s waste management process was gleaned from online publications, and is detailed in Chapter 4, section 4.1.3.
3.1.3. Participant Research

It has been stated in the literature that it is important that researchers and policymakers employ studies that encourage participatory methods in order to attempt to understand more fully the complex situation of different socioeconomic conditions and the complexity of people’s daily routines (Chambers, 1995). Thus, for this thesis I engaged with participants in their daily lives through the use of qualitative research methods, such as mini-ethnography in order to try to better understand their lived experiences (Robson, 2002). Multiple case studies, with the unit of measurement as individuals and their households, were chosen to help illuminate the research questions by offering a variety of variables and circumstances that can influence food waste and food related behaviours (Yin, 2009).

This study has three main components: participant observation, food waste diary, and interview.

**Participant Recruitment:** Casting a wide net of contacts is suggested by Crang & Cook (1995) to be done early on in the study process in order to speed up the recruitment and data collection processes. This was done by contacting organizations that deal with issues related to food sustainability, like the City of Edmonton and Food4Good. A snowball method was utilized through sending out posters, contacting organizations, relatives, and acquaintances and using their connections in order to gain access to as many volunteers as possible (Noy, 2008). Facebook was also utilized as a method to recruit volunteers for my thesis, which has been shown to be a useful way to reach other people (Baltar & Brunet, 2012). Although the snowballing technique does not allow for the recruitment of random volunteers in order to create generalizations, the aim of this study was to gain some insight into possible patterns of food consumption habits, and snowballing can help researchers with limited time and money gain access to hard to reach social groups (Noy, 2008).

At least 6 participants were required for this study who had varying levels of interest in sustainable food and food issues, and had to be the ones who usually took responsibility for household grocery shopping and food preparation. This is due to the fact that such participants have the most control over what food items end up in the household, although they are influenced by a number of things including habits, rationality/irrationality, emotions, and familial influence (Bawa & Ghosh, 1999; Gram, 2010; Aschemann-Witzel et al., 2015; Thyberg & Tonjes, 2016). The participants were also required to have been living at their current residence for at least one year, and they had to usually cook and eat at home at least three times during a typical week. These were similar to criteria found in the study by Evans & Siemens, which were in place in order to choose participants that had “established at-home routines,” (2016, p. 10). This is important due to the fact that food consumption routines are altered during the moving process, but become automatic again within a year, and as long as those habits are undertaken in a similar environment, such as a functioning kitchen (Verplanken & Wood, 2006; Lally et al., 2010). Gender is not of importance to this study although some patterns may appear in the data. It was expected that most participants would be female, since women still dominate the roles of food procurement and preparation (Inness, 2001; Meah & Jackson, 2013).

In order to try to get a range of participants, some participants were attempted to be found through the non-profit organization, Food4Good, who said they would help me find volunteers fitting my. Food4Good works in the west-end neighbourhoods described in 3.2.1. Other participants were found by putting up posters advertising the study in local businesses, and by snowballing with family, friends, neighbours, and acquaintances around the southwest end of the city. The interested participants were asked a series of questions to ensure they would be engaged for the whole process. This allowed me to have some direct control over participant selection as I had already targeted two specific socioeconomic groups (Robson, 2002).

**Participant Observation:** This study used the method of mini-ethnography with participant observation in order to gain an understanding of the lived experiences of the participants (Crang & Cook, 1995; Robson, 2002). This required me to first gain access to participants through the methods described in the above paragraph. Then I gained their trust and collaboration for the research project, which required them
to allow me to participate in their food consumption culture (ibid.). Once participants were identified I accompanied each participant on a typical grocery-shopping trip and watched what sorts of products they chose and other interesting habits. I utilized direct observation techniques and paid attention to the behaviour they exhibited and explanations they gave leading up to why they chose the products that ended up in their basket. These observations required a notebook, pen, and voice recorder. I took a non-intervention standpoint throughout the observation, although I was visibly observing participants (Zikmund & Babin, 2010; Gillespie & Michelson, 2011). I did not actively help participants choose items in order to minimize impacts on their normal behaviour, although this was not completely unavoidable (Gillespie & Michelson, 2011). As stated by Gillespie and Michelson (2011), it was beneficial to aid with small activities throughout observation, such as helping carry empty bags into the store, pushing the cart, or carrying bought items out to the car, in order to establish trust and a more relaxed atmosphere. I also accompanied some participants home to help unload groceries and give them the materials for the waste diary. The grocery-shopping observation marked the beginning of the study period.

**Waste Diary:** The waste diary used was similar to the one in Evans & Siemens (see Appendix 3) (2016). Immediately after the shopping excursion each participant was given a Waste Measuring Kit (WMK), which consisted of a journal and food scale. The food scale was an Etekcity Digital Kitchen Scale, Model No. CK772, which participants were allowed to keep as a ‘thank you’ present (ibid.). Participants used the journal for a weeklong period to keep a diary of the food waste they threw out (ibid.). The goal was to look mostly at the amount of AFW; however, participants were told to mark down any food waste they threw out, whether it could be categorized as unavoidable (e.g.: bones, tea bags, potato and apple peels, etc.) or avoidable (e.g. food that should have been eaten before it went bad.). Participants marked down what items they threw out and if the food/beverage that was thrown out was one of the items that they bought on our shopping trip. They marked the weight of the wasted food and beverages in grams. They also added important food descriptors such as if the item(s) were organic or grain-fed, local, homegrown, etc. Participants wrote the condition of the item when it was thrown out: fresh/cooked/prepared/leftovers or original state. This diary only applied to meals prepared at home for consumption, no restaurant/out-of-home meals were considered. If lunch was prepared at home, but eaten at work/school, the waste was brought back to the residence for measurement.

**Semi-Structured Interview:** Once the waste-measuring week was complete, a follow-up, thirty-minute semi-structured interview with each participant ensued. The interview took place wherever the participant felt most comfortable or wherever was convenient (my home, the participant’s home, or a café), and a tape recorder was used throughout the entire interview.

Semi-structured interview methods are meant to make the researcher ask questions related to the study’s literature review, themes, and research questions, but with the flexibility to be adaptable to each case study’s context, as new observations can lead to the asking of different questions and new revelations (Pretty et al., 1995). The purpose of a semi-structured interview is that it is investigative, and the questions are left open-ended, which means that participants are encouraged to give highly detailed answers that test the limits of their knowledge, which gives insight into the reasoning behind their actions (Crang & Cook, 1995; Pretty et al., 1995). As Robson & McCartan (2016) state, semi-structured interviews provide for “rich and highly illuminating material” (p. 286) and “unexpected and unanticipated answers” (p. 289).

My interview questions were formulated based on the literature review (Chapter 2, Section 2.1), SPT (Chapter 2, Section 2.2), and my research questions (Chapter 1, Section 1.3), but they were also influenced by observations made of each participant during the grocery-shopping excursion (Pretty et al., 1995). Some participants performed certain habits that I wanted to discuss at a later date to more fully understand the reasoning behind these actions. During the interview I asked questions related to their shopping habits, food preparation, and food disposal routines, and the materials, competences, and meanings associated with their food consumption (the interview guide can be found in Appendix 2). The conversation was allowed to flow freely through the use of some questions designed to keep the conversation on topic, but the point was to get the participants to reveal their versions of events and their views of the world (Crang
& Cook, 1995; Robson & McCartan, 2016). I intended my questions to be non-threatening and allow for a non-judgemental flow of conversation, as has been suggested by the literature (Crang & Cook, 1995; Leech, 2002). Rapport was made with participants previously during the identification and grocery-shopping phase of the research, which should have helped make the interview less intimidating, as stated by Leech (2002). The questions were also designed to be non-judgmental and non-leading (ibid.).

**Data Analysis:** The recordings from participant observation and interviews were then transcribed by hand onto a computer in Word. Qualitative research analysis deals with interpreting meanings, classifying such meanings into categories, and finding similarities and contrasts (Dey, 1993). Literature states that the conversations should then be analyzed for emergent themes through the use of open-coding, which allows researchers to glimpse common (or differing) ideas, topics, and themes from participants’ views as they appear throughout the conversation (Dey, 1993; Crang & Cook, 1995). These themes can then be compared between participants (ibid.). This technique described by the literature required that I interpret, explain, and classify the data into categories before drawing conclusions (Dey, 1993). The conceptual framework design of SPT was used in order to categorize responses into competences, meanings, and materials, as a starting point for analysis. Further subcategories then arose leading to more in-depth analysis. The results were then compared between participants.

### 3.2. Study Area

This study took place in the City of Edmonton, located in the province of Alberta in Canada. The city itself is bisected by the North Saskatchewan River. In Edmonton, a west-end pocket of neighbourhoods is the largest low-income area besides the downtown core (see Figure 4). *Neighbourhood poverty* (concentrations of low-income households living in the same area) has not been well studied or understood in Canada, which as a phenomenon began somewhere around the 1980’s-90’s as more people moved to the city, and a number of recessions affected the country during the same time-span (Kazempiur & Halli, 2000). Since then, neighbourhood poverty rates have only increased, leading to other social issues and degradation (ibid.). Some insight into the concentration of poverty in certain neighbourhoods comes from the United States, where continual circuits of investment and disinvestment encourage wealthy, and generally white, middle-class families to move to areas of new investment (suburbs), while those with smaller incomes are left in disinvested areas (downtown cores/older/less-desired areas) (Wilson, 1996; Goodling et al., 2015). The southwest end of Edmonton (as well as the city’s periphery) have seen a lot of new development in recent years, drawing predominantly middle-class, white-families to the suburbs, while leaving those with lower incomes to continue to live in older neighbourhoods with deteriorating infrastructure and less market demand (Wilson, 1996; Kazempiur & Halli, 2000; Goodling et al., 2015). More recent statistical data reflects that these pockets of lower income neighbourhoods continue to exist (see Figures 4 and 5).

Since this study uses income as a main comparison factor, participants were mostly drawn from the highlighted areas where there tends to be a congregation of high-income and low-income households (see Figure 5). This made it easier to find households falling within a wide range of socioeconomic circumstances desired for this study, with the goal of drawing similarities and contrasts between households.
Figure 4 Map of average household income by neighbourhood in the City of Edmonton from 2000 data. The neighbourhoods targeted for participant recruitment in this study are highlighted. Some newly built neighbourhoods are missing from the periphery of the city. From: (City of Edmonton, 2017a).

Incomes in the highlighted study areas have grown since the 2001 census data, on which the above map is based.
The average income in Edmonton is $90,340 and the median income is $72,248, according to 2011 Census of Canada data (City of Edmonton, 2017b). Since a living wage in Edmonton is deemed to be approximately $70,000 a year for a four person household (Sharifi, 2016, p. 3), for the purposes of this study, households making under $50,000 annually might be considered low-income, depending on family
size. Households making more than $100,000 annually could be considered high-income. The low-income limit fluctuates under $50,000 since poverty lines are calculated based on family size, due to the recognition that larger families require more financial resources in order to meet their needs (Kolkman et al., 2015a, p. 6; Statistics Canada, 2015). For international comparisons, a four-person household Low-Income Measure (LIM) statistic is used; in Canada this LIM would equal $41,866 after taxes (Statistics Canada, 2015, p. 23).

3.3. Quality Assurance
Case studies are commonly used research methods for the social sciences, yet they are often heavily scrutinized (Yin, 2009). Therefore it is of utmost importance that case study research utilizes techniques that demonstrate validity and reliability throughout the research process in order to create relevant outcomes, and address such critique (see Table 2) (Riege, 2003; Yin, 2009). Multiple techniques for addressing these concerns are mentioned by other authors and have been replicated in other studies (Riege, 2003; Yin 2013; Vlasov, 2015).

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Case study validity and reliability techniques. Adapted from Yin (2009, p. 41-45); modified by author</th>
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<tr>
<td>Case Study Design Tests</td>
<td>Case Study Techniques</td>
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<tr>
<td>-------------------------------</td>
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<tr>
<td><strong>Construct Validity</strong></td>
<td>Use multiple sources of evidence in data collection</td>
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<td></td>
<td>Establish chain of evidence in data collection</td>
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<td></td>
<td>Key informants review draft case study report, third-party review of evidence</td>
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<tr>
<td><strong>Internal Validity</strong></td>
<td>Pattern matching in data analysis</td>
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<tr>
<td></td>
<td>Explanation building in data analysis</td>
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<td></td>
<td>Address rival explanations</td>
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<td></td>
<td>Use logic models</td>
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<tr>
<td><strong>External Validity</strong></td>
<td>Research design must make use of theory</td>
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<tr>
<td></td>
<td>Research design uses replication logic</td>
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<tr>
<td><strong>Reliability</strong></td>
<td>Case study protocol is used during data collection</td>
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<td></td>
<td>Case study database is developed during data collection</td>
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<td>Peer review/examination</td>
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Multiple sources of data collection such as participant observation, waste diaries, and semi-structured interviews were employed in order to look for data that converges in order to make conclusions (Yin, 2009). All interviews and observations were recorded either by hand or through the use of a tape recorder and were transcribed, which were then validated through the use of follow-up emails to participants. Internal validity in this exploratory research was assured through the use of pattern matching when looking at results through the lens of SPT, which lends categories for analysis, such as materials, competences, and meanings (Shove et al., 2012). External validity was reached by using multiple case studies, in measurable units of individuals/households, for this research, while under the context of the theory of SPT. A case study protocol and database were employed according to literature and past research in order to assure reliability, replicability, and to leave a chain of evidence (Yin, 2009; Vlasov, 2015). Finally, this research throughout its conception and finalization has been subjected to peer review and examination.

3.4. Methods Delimitations

Case studies are useful tools to help analyze ‘why’ and ‘how’ questions related to contemporary social phenomena where there is no direct control over events (Yin, 2009). Since my research questions are focused on the how and why of the practice of sustainable food consumption, case studies focusing on people as individual cases is used, as has been suggested by literature (ibid.).

The study is limited in scope to certain parts of the City of Edmonton for easier access to data and people. The results of this study cannot be generalized, since they are limited due to the small-scale, case study nature of the study, the number of participants involved, the methods and theory utilized, and a lack of resources (Yin, 2009). However, the point of the study is not to be able to generalize, but to gain a better understanding of the similarities and differences of views and practices of participants in different socioeconomic and life contexts, which may be reflected by the larger population upon future, more in-depth examination.

People living in low-income situations tend to dislike researchers and face-to-face conversations, or releasing private details, thus it is generally more difficult to engage with this demographic (Berry et al., 2015). My connections with the non-profit group Food4Good, who work in the study area, were used to try to get in contact with people who were more willing to work with researchers. However, this means that the study cannot be generalized since both the high-income and low-income participants are participating voluntarily and through snowballing techniques, rather than through random sampling.

Participant observation also has its flaws, due to the fact that the researcher undoubtedly has some influence on the behaviour of the subjects (Gillespie & Michelson, 2011). This is lessened by creating rapport with participants and creating a friendly and non-judgemental atmosphere and questions (ibid.). Participant observation also requires that a lot of details be recorded over relatively short interactions; therefore, this decreases the amount of participants that it is feasible to study. Since I am also using the technique of direct observation as part of the participant observation, there is the potential error of observer bias due to my own subjectivity (Zikmund & Babin, 2010). These same issues can apply to SPT as well, considering that many details must be recorded and sometimes not all components of a behaviour are easy to observe without asking certain questions, which may have the unintended side-effect of altering participant behaviour.

Some potential issues with semi-structured interviews are that they do not collect objective facts, but people’s views on certain phenomena; however, it is the meanings that people assign to reality that shape their social practices, which are important for researchers to understand (Yin, 2009).

Finally, this research design is a single point-in-time understanding of the phenomena rather than a longitudinal study, but it can be used as a starting point for future studies. That is why this study utilizes multiple people and methods in order to at least generate a broader view of the situation (Yin, 2009).
3.5. Ethical Considerations
Due to the nature of this study and the utilization of human participants, it is essential that the participants are fully aware of and fully comprehend the nature and scope of this study, as stated by Robson (2002). Other authors have also stated the importance that the participants feel they can trust the researcher with information and personal views (Crang & Cook, 1995; Robson, 2002). Confidentiality was granted to participants due to the collection of sensitive information, such as income levels and personal views. Participants also signed a waiver declaring that they understood the study and agreed to the release of certain information, as long as said information was used confidentially and respectfully.
Chapter 4. Background Empirics

The following chapter discusses some of the background information regarding specifics of the food system and food security in a Canadian context, and more specifically an Edmontonian context, since it is the study area for this project. The following information provides some background to the contextual factors affecting this study’s participants. This chapter then discusses what is currently known about sustainable food behaviour in Edmonton and historical data on waste management and food waste in the city.

4.1. Case Study Background: Edmonton, Alberta, Canada

The following sections discuss information relevant to food sustainability and food waste in an Edmonton context. Section 4.1.1 describes some of the current conditions and statistics about the food system in Edmonton, Alberta, and Canada and how this relates to poverty and food insecurity in the country. Section 4.1.2 then describes the most current information on sustainable food consumption practices in Edmonton.

4.1.1. Food System Conditions in Edmonton, Alberta, Canada

Many factors influence the food practices of individuals, and many factors can prevent people from increasing the sustainability of their practices. Certain aspects of different cities and socioeconomic conditions can push consumers to practice food consumption in different ways. The following section is a short description of some of the realities facing consumers trying to practice food consumption in the City of Edmonton.

As noted by the World Bank (2016), poverty and hunger continue to exist in developed countries alongside rampant overconsumption, which demonstrates that economic growth does not spell the end of poverty, hunger, and sustainability issues. Since Canada’s discovery, it has been publicized as a country of abundant land that is full of potential and perfect for farming (Wakefield et al., 2014). This discourse has been utilized throughout Canada’s history without much attention paid to the underlying belief of unlimited growth and the fallacy that people have always been able to achieve food security (ibid.). Canada does have a food self-sufficiency rate of 70%, which allows it as a country to be more resilient to food shocks and to be one of the world’s largest producers of meat, grain, and fish products (Statistics Canada, 2012a; Wakefield et al., 2014). Despite all of this, a failing safety net and increased pressure on natural resources has seen an increase in the rates of poverty and food insecurity (Riches, 2002; Rideout et al., 2007). Currently 1 in 12 Canadian households (8.3%) are food insecure, with higher proportions of these households either belonging to people in low-income households, dependent on government tax benefits, of Aboriginal descent, in single-parent households, living in a rental home, or located in the northern territories (Wakefield et al., 2014; Roshanafshar & Hawkins, 2015). These same demographics are the ones that experience poverty the most often (ECF & ESPC, 2013).

In Edmonton, Alberta, demographic statistics for hunger and poverty reveal the same patterns as national statistics (ECF & ESPC, 2013; Kolkman et al., 2015b; Sharifi, 2016). The province of Alberta has the highest proportion of working poor (people employed, but still earning less than the poverty line) out of the entire country (Kolkman et al., 2015b; Sharifi, 2016). In Alberta, this means earning a yearly income of “$17,371 CAD for a single person household, $24,319 CAD for a lone-parent family with one child, and $34,742 CAD for a two-parent family with two children under age 16” (Kolkman et al., 2015b, p. 64; Sharifi, 2016). In a city of 877,962 people in 2014, 1 in 8 adults, and 1 in 5 children, lived in poverty (approximately 100,870 people total) (Kolkman et al., 2015a). These families are struggling to pay for necessities in a city where rent can at times account for over 50% of a person’s income, and a nutritious food basket costs over $900 CAD a month for a family of four - and these figures are always increasing (Kolkman et al., 2015b). It is no wonder that a significant proportion of people experience food insecurity, which makes focusing on trying to eat sustainably more difficult.
Compounding this is the fact that winters in Edmonton are very cold, which prevents farming and home gardening of food except during the summer months; therefore, there is a high reliance on imported fruits and vegetables during the winter (Furtan & van Melle, 2004). Additionally, on average an Edmontonian needs to walk 1.4 km to the nearest supermarket for fresh food, in a cold-winter city where car travel is dominant, this makes convenience a major factor rather than sustainability (Smoyer-Tomic et al., 2006; 2008; Hemphill et al., 2008). Fast food outlets are also positively associated with neighbourhoods containing a higher proportion of low-income people, unemployed residents, renters, Aboriginals, and people without car access/who use public transportation (ibid.). This has also been shown to be the case in the United States (US), although the US tends to be plagued by food deserts (areas typically populated by low-income households with reduced mobility issues and long distances to food services) (Smoyer-Tomic et al., 2006; Kwate et al., 2009). Edmonton and Canada do not have as dire a food desert problem, yet access to grocery stores can still be quite the hurdle for those who are less mobile (Smoyer-Tomic et al., 2006). Another concern regarding food and sustainability in Edmonton is that 1 in every 16 calories consumed by a Canadian comes from fast food, and this measurement and fast food sales are only expected to increase in the coming years (Euromonitor International, 2012; Black & Billette, 2015). Although immediate food environments are not a direct predictor of food consumption, they have more of an influence on low-income households, which being less mobile, can encourage more unhealthy and unsustainable eating habits (Health Canada, 2013).

Furthermore, the top 1% and 0.1% of tax filers in Edmonton have seen their incomes grow by 50-150% over the past three decades, yet the bottom 50% have seen no real tangible increase in their incomes (Kolkman et al., 2015a, b). This is evidence that the gap between the rich and poor continues to grow and that lifestyles are not being cut back. This phenomenon is occurring even while the city and province turn their focus to implementing more sustainable and equitable endeavours, such as promoting local agriculture, reducing waste, increasing green infrastructure and transit, and ending poverty by increasing food security and raising the minimum wage (City of Edmonton, 2011, 2012; End Poverty Edmonton, 2015; Ministry of Labour, 2016).

Low-income households in Edmonton would not be considered a priority under the UN’s current sustainability policies, yet the various levels of government in Canada recognize their own sustainability issues and are trying to implement appropriate policies. During this time it is also important that green/sustainable policies are carefully considered for their impacts on those with low-income while trying to attain sustainability as such policies have left others behind before (Goodling et al., 2015). It is important that whatever sustainable endeavours are implemented should provide tangible benefits for everyone.

4.1.2. Sustainability and Food Consumption Practices in Edmonton

Although there has been a marked increase of interest in sustainability and sustainable consumption in Edmonton, the views of Edmontonians towards their practices and sustainability can be contradictory (Vermeir & Verbeke, 2006; City of Edmonton, 2012; Infact Research and Consulting Inc., 2016). There exists a cognitive dissonance within Edmontonians since most recognize the gravity of global environmental challenges, yet two-thirds believe that Edmonton will be able to avoid these problems or is unaffected by them (City of Edmonton, 2012). Edmontonians are not alone in this regard since a Swiss study found a similar sense of denial in regards to mitigating climate change (Stoll-Kleemann et al., 2001). This is interesting considering that Alberta is home to the oil sands and a large cattle industry, and both the province and Edmonton are highly reliant on fossil fuel resources (Atkins & MacFadyen, 2008). There is an inability to connect the issues happening across the world with the solutions that need to be implemented at local levels in order to avoid both local and global catastrophes (ibid.). This is due to a failure to recognize any significant afflictions on daily life in Edmonton (ibid.). Perhaps this could also be due to a desire to avoid changes that could upset the status quo.

Although many Edmontonians are indifferent to sustainability, most have already adopted some form of ‘green’ behaviours and are open to adopting other behaviours, as long as it is in their self-interest (ibid.).
Curiously, approximately 93% of Edmontonians voluntarily participate in the curbside recycling program (City of Edmonton, 2011, 2015b), yet approximately 27% of their garbage consists of food waste, 60% of which is avoidable (Evans & Siemens, 2016). For Edmontonian households that are consistently throwing out more garbage on average (called large volume producers (LVPs), who produce 6-10 bags per week rather than the average household’s 2 bags per week), their food waste tends to make up 45% of their weekly waste (a quarter of which is AFW) (Faulder, 2014). Of these people, 60% stated they take no actions to reduce food waste at home and 42% were not even open to discussing the idea of how to reduce food waste (ibid.). For most LVPs, food waste was just not something households thought about; they also did not connect it with environmental problems and tended to believe that Edmonton’s Waste Management Centre reduces any environmental impact that food waste might have (ibid.). This is as opposed to a random sample of Edmontonians where 54% stated that they would be open to taking actions to reduce food waste (ibid.); however, this is still not a reassuring measure of people’s openness to altering their habits.

Food waste in Canada (and therefore Edmonton) is equivalent to households throwing up to $2,000 CAD annually in the garbage, and having to pay an estimated $1,000 CAD extra in elevated food costs due to the waste (WRAP, 2009; Neff et al., 2015; Evans & Siemens, 2016). It is also common practice in Edmonton for households to have large pantries for food storage, and to buy and cook more food than is needed, thus contributing to extra waste (Evans & Siemens, 2016). It is also common for leftovers to be thrown out right away or after a matter of days, since people are not taught about the expiration dates of home cooking and follow emotional distaste (ibid.). Self-interest, as of yet, has not prevented people from over-consuming and better planning their food consumption. This may be due to the fact that small amounts of food are thrown out at a time, making the true amount and cost of food waste more invisible to households (ibid.).

In contrast to Edmontonians’ lack of awareness about food waste, the awareness of Edmontonians towards the benefits of buying local and organic foods is increasing, along with consumption of these foods (Infact Research and Consulting Inc., 2016). The most common places to buy such foods are at large supermarkets, followed by farmers markets and restaurants (ibid.). It is interesting that despite raised concern about the importance of local and organic foods that food waste continues to be a large and expensive issue. This may be why the City of Edmonton’s Waste Management Services is beginning to study and address the topical and urgent issue of food waste (ibid.).

4.1.3. A History of (Food) Waste Management in Edmonton
In Edmonton, some of the earliest recollections of waste management come from the start of the 20th century (see Figure 6) (Cobb, 2015). Edmonton in 1900 was a small prairie city that consisted of what is currently considered to be the ‘downtown core’, which lies right next to the network of ravines and the river valley surrounding the North Saskatchewan River (ibid.). In order to dispose of their waste, Edmontonians would push their garbage into roads or alleyways that surrounded their homes (ibid.). A sort of rudimentary waste economy existed; human scavengers picked through the refuse, and reused or recycled bits of wood, linen, glass, and metal, while livestock, such as pigs, would roam the streets and feed on leftover food waste (ibid.). Whatever waste remained after these processes was then pushed down the cliff onto the banks and into the water of the river (ibid.). One resulting dump, Grierson Dump, was located on the north bank of the river right downtown, within view of an upscale hotel (ibid.). The City Engineer encouraged the dumping of waste on the bank because it reduced the steep slope of the valley, despite the fact that a slum was forming, and the Health, Fire, and Police Departments all had some issue with the dump (ibid.). Residents living right next to the dump complained of the smell, but were “told to keep their windows shut” in order to solve the problem (ibid.). In 1908, the city also boasted an incinerator with the capability of 50 tons of garbage per day that was quickly pushed to maximum capacity, caused odour/health complaints, and was shut down before the 1930’s (Cobb, 2016a).
In 1917, a law was passed limiting the amount of garbage a person could add to the dump in a week in the hopes of curbing the ever-expanding pile on the river banks, and the slum and health issues that plagued it (Cobb, 2015). Workers were paid to start burying the waste on the hill, so that it was not simply left in the open air to decompose (ibid.). The first regular residential garbage pick-up began in 1929, but persistent health and fire hazards had many officials wanting the dump to close (ibid.). The Great Depression caused the amount of people living as scavengers in the dump’s slum to increase (ibid.). The city desired a new incinerator downtown in 1931 to deal with the waste at the Grierson Dump, since they were the new, trendy, British technology (Cobb, 2016a). One was built, but was quickly unable to keep up with the city’s waste production (ibid.). The Grierson Dump was closed around 1940 so that waste could instead be sent to the incinerator, and the health menace and slum could finally be dealt with (Cobb, 2015). By 1943, the city had outlawed pigs in the city and had already made it illegal for them to eat leftover food waste, due to health concerns that had been related to the dump – this policy was adopted in the United States around the same time (Cobb, 2016a; Thyberg & Tonjes, 2016). Between 1950-54 the incinerator was upgraded; a more mechanized operation system and the ability to handle up to 290 tons of various types of waste per day were hailed as being the solution to Edmonton’s garbage woes (Cobb, 2016a). Immediately, people began to complain about the ash and smells coming from the incinerator; and due to the post-war economy surge and consumer paradigm shift from waste conservationist to super-consumer, Edmontonians were producing more waste than ever before (Cobb, 2016a, b). By 1970, calls to shut down the incinerator due to noxious fumes and modern environmental concerns became louder, and its inability to keep up with demand had people leaving their garbage strewn about the outskirts of the facility (Cobb, 2016a). The infamous downtown incinerator finally closed in 1971, which was then restored into a beautiful ravine and botanical garden; this is a common theme with most of the old river valley landfills (Cobb, 2016a, b).

By 1975 the city opened its largest landfill yet (Clover Bar), which is located on the city’s outskirts – finally far from the downtown core, and mostly out of sight (out of mind) (City of Edmonton, 2014; Cobb, 2016a). A study conducted in 1986 found that most of Edmonton’s waste was sent to landfill, aside from a few companies who continued the early profession of scavenging by paying for some paper, glass, and aluminum that they could sell or turn into new products (Cobb, 2016a). This meant that the Clover Bar landfill would be full in a number of years, meaning the city had to scramble to find a new landfill location (ibid.). Many citizens were against creating new landfills; even though landfills were the cheapest way to dispose of garbage, citizens were concerned about the aesthetic, health, and environmental implications of landfills, thus leading to the city’s “landfill crisis” (Habib, 2012; Cobb, 2016a). This lead to the consideration of next-generation incinerators, which could turn trash into energy, and other waste

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**Figure 6** Timeline of waste management in the City of Edmonton.
management techniques, such as recycling and reusing materials, that would be capable of reducing the city’s waste (Cobb, 2016a).

As a result, the City of Edmonton quickly rolled out a number of waste management initiatives from 1986 onwards in order to cut down the amount of waste heading to landfill (City of Edmonton, 2014, 2017c). This included, but was not limited to: a curb-side recycling program (for paper, plastic, cardboard, glass, and metal), hazardous waste materials collection and sorting, Christmas tree recycling, landfill gas recovery, a composting facility, construction and demolition recycling, a reuse centre, and a Waste-to-Biofuels and Chemicals Facility (see Figure 7) (ibid.).

![Diagram of the current waste management process in the City of Edmonton](City of Edmonton, 2014, p. 3).

Edmonton’s Waste Management Centre is now situated on 233 hectares of land near the Clover Bar landfill, and is a world-renowned facility that researches waste and helps other municipalities and countries reduce their waste (Habib, 2012; City of Edmonton, 2014, 2017c). The current waste system has allowed Edmonton to divert 55% of its waste from landfill (City of Edmonton, 2015b), with the goal of being able to increase the diversion rate to 90% once the Waste-to-Biofuels and Chemicals Facility is fully functional in the coming years (City of Edmonton, 2017c). On average, approximately 10,000 tonnes of waste are weighed entering the Waste Management Centre each week (City of Edmonton, 2014).

In terms of the path that food waste takes in Edmonton (which has not been measured in tonnes/year), the majority is put in the garbage and then picked up by Waste Management Services (City of Edmonton, 2014, 2017c). This food waste is then dropped off at the Integrated Processing and Transfer Facility,
which mechanically separates the organics - which are then sent for composting - from the waste dedicated for biofuels production or landfill (see Figure 7) (ibid.). The compost is a mix between organic waste (food and yard waste) and biosolids (human sewage), which amounts to approximately 160,000 tonnes of those materials being turned into compost per year (City of Edmonton, 2017c). This compost is then sold to markets in the agricultural and horticultural sectors, and even to residents (ibid.). However, the composting system can only handle steady streams of material, and Edmontonians’ organic waste habits are quite irregular (MacDonald, 2016). A large increase in the amount of yard waste entering the facility during the spring and summer months means that capacity is exceeded, and some organics have to be sent to landfill (ibid.). A new Anaerobic Digestion Facility, able to manage 48,000 tonnes, is being built in the coming years in order to help with the yard waste spikes, but a growing city also means that even more yard and food waste will soon be edging into the facility (City of Edmonton, 2015b; MacDonald, 2016).

Furthermore, the mechanical separation process of organics from other residential waste is imperfect. I toured the City of Edmonton’s composting facility, and since the organic waste is sorted mechanically by size from the rest of the garbage rather than by hand in residences, small pieces of plastic and other items remain in the organics stream, which makes it more time consuming to separate further and compost. It was also quite obvious that a decent portion of the food being sorted out was avoidable food waste. Whole potatoes, carrots, oranges, and other foods, were visible and formed a mountain of food, which waited for the next steps of the composting process. The fact that whole foods, which are mostly produce, and some in perfectly edible condition, are making it into the garbage means that there is a lot of room for improvement on the residents’ side before waste even makes it into the hands of Edmonton’s Waste Management Services. Despite the improvements at Edmonton’s Waste Management Centre over the last hundred years, none of these have really focused on reducing food waste or consumption in general.

The food waste that was visible at the composting facility provides evidence of the wasteful habits of Edmontonians (see section 4.1.2). This makes it easier to comprehend the statistics often reported about food waste in Canada: $27 billion CAD in food waste thrown out in Canada each year, with 51% of all food waste thrown out at the household level (Figure 8) (Gooch et al., 2010; Gooch et al., 2014).

![Percentage of Food Waste Throughout the Chain (field to home) in Canada](image)

**Figure 8** The percentage of food waste produced throughout the food production chain in Canada, figure created by Gooch et al. (2010, p. 5).

As stated throughout this paper, there are many reasons influencing households’ food consumption habits, and each sector of the food system has its share of the responsibility. However, the impacts that food miles
and plastic packaging play in contributing to GHG pales in comparison to the emissions created from household food waste (see Figure 8) (Gooch et al., 2010; Thyberg & Tonjes, 2016). The issue at hand that really needs to be combatted is irresponsible consumerism in a system that is perpetually encouraging irresponsible consumerism.

Hence why the City of Edmonton has begun researching the consumer side of food waste, with the goal of eventually creating information campaigns that will help reduce the amount ending up at the Waste Management Centre (Faulder, 2014; Evans & Siemens, 2016). Perhaps one day these campaigns may even go as far as the governments of Ontario and South Korea who have attempted to ban food waste due to the amount of wasted resources unused food represents (Stuart, 2009; Ministry of the Environment and Climate Change, Government of Ontario, 2017). A lot less food waste could be making its way to the processing facility if people would alter their behaviours, which means less time and money spent on the behalf of the city in order to deal with the waste (Faulder, 2014). In the mean time, it is important that there is a broad understanding of what leads to food waste and gauging residents’ levels of knowledge and interest in reducing the impacts of such an issue. Whatever methods are utilized in order to achieve a reduced amount of food waste, making it as successful as Edmonton’s voluntary recycling program should be a top priority.

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Awareness of sustainable food issues is slowly increasing in Edmonton, but this has been slow to translate to permanent, sustainable changes to consumption habits. Although many of the sustainability issues plaguing the food system are systemic, some can be influenced by consumer power, such as reducing demand for conventional agriculture by increasing demand for sustainable products, and reducing waste. However, these habits need to be adopted and made habitual by a majority in order to create systemic impact. Without truly sustainable practices and systemic intervention these conditions, along with other deeply rooted political, social, and historical contexts, will allow hunger, poverty, and unsustainability to continue their reinforcing cycle (Wilson, 1996; Health Canada, 2013; Goodling et al., 2015). In order to start tackling this problem, the faux-sustainability narrative needs to be addressed and discussed with all citizens. The cognitive dissonance between people’s impacts on others, and tacit understandings of sustainability problems, beliefs, and behaviours need to be challenged in order to correct course. How these develop into and are acted out in everyday practices need to be understood, so that they can be addressed and altered.

However, reaching the upper echelon of waste practices (see Figure 1) such as reducing consumption and preventing waste are practices that are not limited by income and can be adopted by households no matter their socioeconomic characteristics. This would have the benefit of encouraging wiser use of food resources and reducing food costs to families, which would also benefit the environment and hopefully help some families reduce food insecurity. By adopting these mentalities at home, it would also hopefully influence organizations and businesses to adopt similar behaviours that reduce food waste. Understanding what barriers households face and what abilities and outlooks they have towards food waste can help in taking these first steps towards creating a more sustainable food system.
Chapter 5. Analysis of Results

The following chapter contains the results of the study, along with an analysis of how they relate to the conceptual framework of SPT in section 2.2.2, and their relevance to other literature. The results are presented and discussed chronologically according to how they were collected. Section 5.1 discusses characteristics of the participants that became involved in this study and how these are related to practice components that influence households’ sustainable food consumption habits. Section 5.2 explores the data collected during the grocery shopping observation and how this relates to other literature and SPT. Section 5.3 depicts the results from the food diary phase of the research, and discusses how it relates to trends in the literature. The answers to questions that I asked during the follow-up interview are scattered throughout the three sections where they help provide extra details on practice components as they relate to participant characteristics, and their grocery shopping and food waste behaviours. Food related behaviours and their connection to creating food waste are driven by uncontrollable and unconscious factors, but by becoming critical about habits and the unconscious decisions that lead to certain actions can alter habits to make them more conscious and sustainable decisions.

5.1. Participants

The data collection process took approximately 3 months to complete - from February 19, 2017 to May 3, 2017. Overall, 7 households participated in this study, with a total of 9 participants taking part in the observations, food waste diaries, and interviews. None of the participants resulted from any connections with Food4Good or their actions to recruit participants on my behalf. Table 3 depicts the participant households and the dates of data collection, as well as how these data were collected and validated.

<table>
<thead>
<tr>
<th>Household, Participant</th>
<th>Shopping Observation</th>
<th>Waste Diary</th>
<th>Follow-up Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Date (DD/MM/YY)</td>
<td>Type</td>
<td>Date (DD/MM/YY)</td>
</tr>
<tr>
<td>*HP.P1/P2</td>
<td>19/02/17</td>
<td>In-person</td>
<td>20-26/02/17</td>
</tr>
<tr>
<td>H1.P1</td>
<td>19/03/17</td>
<td>In-person</td>
<td>20-26/03/17</td>
</tr>
<tr>
<td>H2.P1</td>
<td>23/03/17</td>
<td>In-person</td>
<td>24-30/03/17</td>
</tr>
<tr>
<td>*H3.P1/P2</td>
<td>02/04/17</td>
<td>In-person</td>
<td>03-09/04/17</td>
</tr>
<tr>
<td>H4.P1</td>
<td>29/03/17</td>
<td>In-person</td>
<td>30/03-05/04/17</td>
</tr>
<tr>
<td>H5.P1</td>
<td>18/04/17</td>
<td>In-person</td>
<td>19-25/04/17</td>
</tr>
<tr>
<td>H6.P1</td>
<td>21/04/17</td>
<td>In-person</td>
<td>22-28/04/17</td>
</tr>
</tbody>
</table>

*HP.P1/P2 – represents the pilot study household. Two participants were interviewed only for the follow-up conversation since they both equally shared the shopping duties, but took turns. H3’s two participants partook in all steps of the research process. Throughout the texts I will refer to a total of 7 participants since households where more than one person shared the shopping and cooking duties shared very similar ideologies and responses.

All participants answered a short, ten-question survey before participating in this thesis project. The questions were related to eligibility to participate in the study and socioeconomic/demographic household data, which is summarised in Table 4. This data was pertinent to flesh out the infrastructure (materials) of the households and the dates of data collection, as well as how these data were collected and validated. Further, through the three sections where they help provide extra details on practice components as they relate to participant characteristics, and their grocery shopping and food waste behaviours. Food related behaviours and their connection to creating food waste are driven by uncontrollable and unconscious factors, but by becoming critical about habits and the unconscious decisions that lead to certain actions can alter habits to make them more conscious and sustainable decisions.
as was predicted earlier (Inness, 2001; Meah & Jackson, 2013), with only one participant being male; he shared the shopping and cooking duties equally with his partner. The ages of participants fell between the range of 18-54, although most participants were in their 30’s to 40’s. Household incomes also varied along the spectrum, but all households made above $50,000 CAD per year. Households had at least two adult members, although most households in this study had children as well. All of the participants had some level of post-secondary education with most participants having an employment status as either working full-time or homemaker. Almost all of the participants felt that they were ‘somewhat aware’ of sustainable food issues, one declared that they were ‘very aware’, and one declared that they had ‘no awareness’ of sustainability issues relating to food. This question provided an idea of participants’ base competences as they related to sustainable food consumption. I was curious about participants’ perspectives on their own awareness of sustainability, and it should be noted that such awareness takes place on a spectrum, rather than the four options I offered my participants during the questionnaire. It was also interesting that I would have classified some participants differently in regards to their awareness of food sustainability, but this reclassification would of course be according to my own subjective opinion.

Table 4 Case study database of participant/household socioeconomic information

<table>
<thead>
<tr>
<th>Household, Participant</th>
<th>Gender</th>
<th>Age Group</th>
<th>Income Category</th>
<th>Household Size (Adults: Children)</th>
<th>Education</th>
<th>Employment Status</th>
<th>Awareness of Food Sustainability Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP.P1</td>
<td>F</td>
<td>45-54</td>
<td>$50,000 to $75,000</td>
<td>3:0</td>
<td>Some University/ College</td>
<td>Employed Full-Time</td>
<td>Somewhat Aware</td>
</tr>
<tr>
<td>H1.P1</td>
<td>F</td>
<td>45-54</td>
<td>$150,000 or more</td>
<td>2:3</td>
<td>Bachelor’s Degree</td>
<td>Homemaker</td>
<td>Somewhat Aware</td>
</tr>
<tr>
<td>H2.P1</td>
<td>F</td>
<td>25-34</td>
<td>$75,000 to $100,000</td>
<td>2:1</td>
<td>College Diploma</td>
<td>Self-Employed</td>
<td>Not Aware</td>
</tr>
<tr>
<td>H3.P1/P2</td>
<td>F/M</td>
<td>18-24</td>
<td>$50,000 to $75,000</td>
<td>2:0</td>
<td>Bachelor’s Degree</td>
<td>Student/Employed Full-Time</td>
<td>Somewhat Aware</td>
</tr>
<tr>
<td>H4.P1</td>
<td>F</td>
<td>45-54</td>
<td>$150,000 or more</td>
<td>2:2</td>
<td>Technical Degree</td>
<td>Homemaker/Employed Full-Time</td>
<td>Somewhat Aware</td>
</tr>
<tr>
<td>H5.P1</td>
<td>F</td>
<td>35-44</td>
<td>$150,000 or more</td>
<td>2:3</td>
<td>Trade/vocational/technical training</td>
<td>Homemaker</td>
<td>Somewhat Aware</td>
</tr>
<tr>
<td>H6.P1</td>
<td>F</td>
<td>35-44</td>
<td>$50,000 to $75,000</td>
<td>2:1</td>
<td>Master’s Degree</td>
<td>Homemaker</td>
<td>Very Aware</td>
</tr>
</tbody>
</table>

My original intention was to have a wide range of participants from various socioeconomic backgrounds with a much wider variety of familiarity with food sustainability issues. A larger assortment of SPT practice components would have led to very different practices in regards to food consumption. This participant variety did not occur (more discussion on this in section 6.1). Instead, I acquired participants/households that could be classified as types of ethical consumers since they fit the description almost perfectly: “middle-aged person with a higher income, who is above average educated, with a prestigious occupation and who is well-informed,” (Vermeir & Verbeke, 2006, p. 171; Vitterso & Tangeland, 2015). This type of participant has already begun to analyze and alter their behaviour, although this is more likely due to associating a meaning or importance to sustainability consuming food, rather than identifying other factors that influence their behaviour and attempting to alter those influences (Vermeir & Verbeke, 2006). Some participants had started to alter habits and put importance on sustainable food consumption issues due to certain competence triggers, such as environmental concerns brought to light by new information, material triggers, such as health concerns, and contextual cues from informed relatives or communities. This interplay of factors on habits reflects the work of Shove et al., (2012) and other authors who study SPT.
Further characteristics of participants that seemed to reinforce this idea were that six out of seven households also gardened at home, and five out of seven also made use of farmers markets/Community Supported Agriculture (CSA), while one also frequented a specialty organic food store. When participants were asked what role food played in their lives, most said it was very important and should be healthy, but cooking also provided a chance to try new things and have fun. A couple of the households from the $50,000 to $75,000 income range said that it was more of a chore/job, meaning that food was sustenance and just something that needed to be dealt with.

During the follow-up interview, I asked participants more questions that were aimed at gauging their competences, such as their level of knowledge about, and engagement with, sustainable food issues; these verified my assumption made after looking at the survey data that most participants could be classified as ethical consumers. When participants were asked to give examples of sustainable food consumption issues, although most participants said they were somewhat aware of food related issues, the challenges that participants were aware of varied greatly. Almost all participants (excluding H2.P1) were aware that avoiding wasting food and supporting sustainable food endeavours (local, organic, etc.) were important. Most linked these to larger world issues such as climate change and strains on the food system.

This question may have been influenced by the fact that it was asked after participants had done their waste diary. I also asked participants to define sustainable food consumption, which most participants described as not wasting food or using food to the best of their abilities. Two participants went even further implying that food should have a net zero impact in terms of its effect on the environment and the cost to use the item.

H3.P1: I would describe sustainable food consumption as involving the whole chain. Like how was your food made, how did you get, and what did you do after, like what was the waste. So you might buy premade stuff, but they could be wasting a lot more than you would if you bought fresh, even though you’re throwing out a bunch. I think whole sustainability would have to do with the entire chain. Being mindful, trying to minimize your waste. [...] Self-sufficient too, like you could have a sustainable chain by gardening yourself, composting, and you’re completing the circle that way so you’re having a net-zero impact that way.

When participants were asked to give examples of what sort of daily food related activities this would involve, all of the participants stated not wasting food, with all participants but one also saying gardening and composting were important activities to achieve this (although H2.P1 refused to compost, they said that it would help reduce waste). At least three participants also said that eating organic and local food would also factor in. What participants described were also usually activities that they already participated in. Although not exhaustive, these are all activities that have been suggested by the literature that would create a more sustainable food system (Jungbluth et al., 2000; Hoogland et al., 2005; FAO, 2010; IPCC, 2014). When participants were asked what their opinion was of sustainably labelled food, all participants but one (H2.P1) had a mostly favourable opinion of sustainably labelled food (some participants were more supportive of local food, or anything sustainably labelled that came from a farmers market or a CSA, rather than the grocery store). Participants enjoyed the flavour of organically, locally or other sustainably labelled food, and they also associated these things with being healthier and better for the environment, which are common consumer beliefs found in literature (Vermeir & Verbeke, 2006). They also believed that these sustainable foods should be encouraged/supported more and that people should become more aware of its importance. A reason behind this belief was that these foods would eventually become more affordable. Households within the $50,000 to $75,000 income band expressed this more often:

H3.P2: I think we need to have a better way of encouraging that in our community and supporting it more. I think there isn’t enough support for people doing these local things, and therefore their price is higher. And I think awareness- I mean I think there are some people who are getting eggs from neighbours and stuff like that and they have chickens in the backyard and stuff and I have no idea where
to find these people. [...] Although I think we’re heading down the right path in trying to be more sustainable as a city overall, but I think we have a lot to get through to get to that point. I think there needs to be more awareness about it, so that other people will do it too. I know I’m trying to encourage people I know, but then I know it’s the complaint of effort and cost is huge.

**H3.P1**: I feel like all of our food should be more sustainable, but I feel like having sustainably labelled food just increases the price because it’s a selling point for some people after all. So I feel like the focus should actually be on being sustainable or local or organic or what have you and not so much as advertising it as that. Which is kind of weird because it’s a catch-22 I guess. You have to advertise so people know about it so people can choose the better option, but if you do that then it’s more expensive and it might even drive up the price higher because it’s a market as well.

**Rachel**: A fashion-label kind of thing?

**H3.P1**: It can very well be that, and then you’re defeating the purpose. You’re making the barriers even higher to get that product because now it’s something special instead of something local. I guess people should advertise more about what is a sustainable food? Your locally grown, farmers market stuff, those are sustainable too. You don’t need to go to the grocery store and get the locally grown package. You could just go to the farmers market and buy this stuff from the people too. I feel that’s a better initiative too. You don’t need to put all these labels on things for it to be sustainable, just know what things are sustainable.

These results reflect what has been found in the literature; eating sustainably usually comes with a higher price tag, preventing some households from engaging with this highly advertised aspect of sustainability (Radman, 2005; Blake et al., 2010; Garnett, 2011; Ceccarelli, 2014; Verain et al., 2015; Bryla, 2016). The participants in this group embody many competences in regards to sustainability issues, such awareness and knowledge of actions that can be taken to eat more sustainably, although some may feel prevented from embodying certain behaviours due to material realities such as income. This also reflects the idea in SPT that materials such as income can play a large role in determining consumption habits (Vermeir & Verbeke, 2006).

Although it is still intriguing to understand this group’s habits as they relate to food consumption and food waste, they still represent outliers, or at least not the ‘average’ person in Edmonton since almost all participants could be considered ethical consumers. Conversely, the results might help provide insight for future studies and programs by understanding what motivates behaviours embodied by people who are already engaged with food sustainability. The Evans & Siemens (2016) study, which was also done in Edmonton, did not analyze certain competences, materials, and meanings, such as gender, education, income level, employment status or thoroughly account for participants’ relative awareness of food sustainability issues during their weeklong-waste diary. Their study also had three parts starting with a door-step survey, then an interview, followed by a food waste diary; at each step less people became interested in participating in the study, and it was noticed that a higher percentage of people who gardened or home-composted took part in the interview. This may mean that they have also inadvertently attracted more ethical consumers for the observational portions of their study.

To summarize, the survey was used in order to gain insight into some of the SPT components that drive sustainable food consumption, especially the material-related components. This, plus subsequent questions led to the realization that almost all of the participants were some type of ethical consumer, but with different practice components influencing them. These SPT components can predispose people to sustainable consumption behaviour, but certain components can also unwittingly encourage behaviours that are not sustainable, such as producing food waste.

### 5.2. Grocery Shopping Observations

Food waste at the consumer level begins with practices at the grocery planning and shopping phase (Aschemann-Witzel et al., 2015); hence why data collection began by joining participants on one of their average shopping trips. It was interesting that most participants had stated some level of awareness of
sustainability, so I was interested to see how (or if) they incorporated this into their shopping habits. I asked participants some questions related to the planning of shopping, but mostly I asked them to describe why they were choosing certain items, and what led to these decisions as we walked around the grocery stores. Their answers have been considered in light of the SPT practice components.

5.2.1. Grocery Planning
In regards to the practices that go into the planning of grocery shopping, most participants visited a chain grocery store (sometimes a bulk store or a specialty store) once every week or two weeks with shorter, smaller trips for fresh foods and top-ups on specific items in between; this was also found to be the most common behaviours in two other studies (Farr-Wharton et al., 2014; Evans & Siemens, 2016). Evans & Siemens (2016) found that households that only shopped once per week had lower food related waste and avoidable food waste than households that shopped more or less frequently. Other literature has also linked shopping frequency to wasted food, with shopping and planning practices having a significant influence on food waste (Stefan et al., 2013; Aschemann-Witzel et al., 2015; Thyberg & Tonjes, 2016). My participant sample was too small to draw any such conclusions on the impact of shopping frequency on waste, but shopping frequency can be considered a SPT material since it depends on accessibility of stores and time, which influences behaviours, waste production, and sustainable consumption habits.

All participants had a list that they were shopping from while I was in attendance, but further discussion on the matter revealed that some participants made more thorough lists than others, and some stuck to them diligently while others did not. Two households (H2.P1, H3.P1/P2) stated that they do not usually use lists, but they helped with remembering items that were important for certain recipes that were going to be made that week. One participant (H3.P2) stated that they were trying to make an effort to use a list more often because they found them helpful for remembering needed items, meal planning, and to reduce waste. Furthermore, the participants that used lists more diligently all bought food according to some form of meal planning, whereas those who barely used a list, or strayed from it more often, did not indicate nearly as many intentions for making specific meals. Rather, these participants were noticed to be choosing items based more on desire (in terms of flavour or liking an item)/repeated use of these items in the household, without specific meals in mind. Shopping with a list and meal planning are competences such as skills and abilities that have been found to reduce food waste by helping people avoid impulse buys and food that will not be eaten (Stefan et al., 2013; Farr-Wharton et al., 2014; Block et al., 2016; Evans & Siemens, 2016). Skills such as meal planning and checking food inventory before shopping have also been linked to reduced food wastage and over-purchasing of food (Stefan et al., 2013; Farr-Wharton et al., 2014; Thyberg & Tonjes, 2016). Although some participants did mention doing an inventory check, the thoroughness of this check could not be verified. In the Evans & Siemens (2016, p. 35) report, they noticed a possible trend of reduced food waste coming from households that created a list just before grocery shopping.

H5.P1: I usually make my own meal plans too because otherwise I find that I have a lot of extra ingredients and wasted stuff. [...] Usually I shop with a list, I used to not up until a couple of years ago, I used to just wing it, but then I had random ingredients that I just didn’t know what to do with, and I’d just end up with a lot of wasted food, really. I find it works better this way for me.

In households that did a higher amount of meal planning (H1, 3-6), some stated that the realities of life could interfere with the plan and prevent that meal from being made on a certain day. This meant that this food might end up being wasted anyways, although the literature states that the human inability to adequately predict future situations, such as how long it takes to consume items put in the grocery cart and the time necessary for future food preparation, can also contribute to meal plan derailments (Block et al., 2016). This could possibly be combatted by a practice that H6.P1 did, which was to mathematically determine the appropriate portion sizes contained in groceries that could be fed to her family before the food item was stated to expire, which has also been suggested in other literature (Farr-Wharton et al., 2014).
According to SPT and other studies, meal planning, shopping with a list, and other pre-consumption practices are skills and abilities that build competences towards sustainably consuming food (Stefan et al., 2013; Block et al., 2016). As participants adopt these behaviours and become more aware of their positive influences, such as the personal – saving money, or the altruistic – saving the environment, they associate meanings such as the importance of practicing such behaviours, which also reinforces these behaviours (Warde, 2005; Shove et al., 2012). Proper grocery planning and shopping have been stated as being the most integral processes to reducing food waste (Stefan et al., 2013); however, it takes practice to develop these skills and as always, the realities of life can interfere in any well-planned event. On the other hand, the more these skills are practiced, the more they develop into useful abilities and competences at their agent’s disposal. Some observations of note are that the majority of my participants (in terms of mostly representing an ethical consumer perspective) had embodied planning and shopping behaviours to various extents that are expected to help reduce food waste. Such planning skills can help manage the factors that influence potential food waste production that occurs while grocery-shopping. Households that have the necessary competences, materials, and meanings that drive them towards a sustainable consumption lifestyle plan to buy sustainably labelled foods at some point. However, food waste is a more impactful problem that affects all households, is driven by a multitude of practice components that once identified, could allow all types of households to practice food consumption more sustainably.

5.2.2. Practice Components Influencing Food Choices While Grocery-Shopping

Sustainably consuming food can take on many meanings, and there are many practices that can be a part of that lifestyle. As stated earlier in section 2.2.2, food waste is influenced by a myriad of factors, which begin to become apparent even during the grocery-shopping phase (Bawa & Ghosh, 1999; Aschemann-Witzel et al., 2015; Thyberg & Tonjes, 2016). SPT factors also play a role in making food choices, and these food choices can lead to either sustainable or unsustainable behaviour. Each participant was influenced by a variety of materials, competences, and meanings, and other outside factors that drove their food choices, which of course alter over time and influence habits, and can impact the amount of food waste produced by each household. The priority of these components influences purchasing habits differently in each household, which could also be important for targeting food waste reduction messages to consumers (Stefan et al., 2013).

Material influences such as price and food qualities (which I coded to encompass multiple considerations including the health, freshness, brand, size, texture, flavour, colour, looks, and sustainable labelling (organic, local, free-range, etc.) of products) featured in every participant’s running dialogue of their reasons for choosing certain food items. Out of all the food qualities listed, health and flavour were present in every participant’s considerations with some participants expressing that organic foods were synonymous with making healthier choices. Participants want quality, fresh ingredients, which can lead to food waste due to consumer choice at the retail level (Block et al., 2016), but this is out of scope for this project. Price tended to be more heavily emphasized and more of a priority for households falling within the $50,000 to $75,000 income bracket. Since the cost of food is quite dear to all households, and especially to households with lower-incomes, this material component might actually reduce the likelihood of food waste, especially when food wastage is accounted for in dollars (ibid.) However, this message might only resonate with lower-incomes households since richer households have more disposable incomes and might not see food wastage as a problem (Bawa & Ghosh, 1999; Aschemann-Witzel et al., 2015; Block et al., 2016; Thyberg & Tonjes, 2016). This is especially true when items are on sale, which encourages consumption and could actually lead to increased food wastage:

H3.P1: As for fruit, sometimes [H3.P2] is like “Oh there’s fruit on sale” or “Oh there’s berries, they smell great, I’ll get some.” Last time we got two one-pound containers of strawberries because they’re free at Superstore if you spend X amount of dollars. We actually bought one of them and they were like “Oh it’s free, and you get an extra one for free too.” So we were like “Sure!”. I think we actually got through all of them except for seven strawberries.
Since food waste is driven by habits rather than intentions, households whose habits revolve more around the price of food may be more readily influenced by an education program about the cost of wasted food (Stefan et al., 2013). However, this does not necessarily translate to households that give the cost of food less priority, and many participants anecdotally stated that they encounter these types of households quite frequently:

**HP.P1**: Definitely. Just from talking to friends and people that I know. Food waste is a huge- Family! Oh my gosh, don’t get me started.

**HP.P2**: Yeah because some people don’t eat leftovers so they throw everything in the garbage. And you know, if they make too much for supper it- you know. “I don’t eat leftovers!” What do you do with them? “I throw them out!”

**H6.P1**: I have some friends [...] they sometimes ask us to go to their house to have dinner and things like this, and they cook lots and lots of meals. And after that they throw it away, right away. And they say nobody wants to eat it, so I thought that that was kind of weird. So one day I asked, and my friend said, “It’s fine when we can buy more, why?” I don’t know, probably they’re too rich.

In terms of how competences (knowledge and abilities) influenced shopping, participants tried to pick ingredients that they were familiar with, knew how to use, and used often or had researched thoroughly (in regards to organic or sustainably labelled foods). Participants who had researched nutrition and sustainably labelled items (organic, local, free-range, etc.) bought such items with higher frequency. Participants shopping with certain recipes or meal plans in mind were shopping to their strengths and what they knew the rest of their household would eat. Participants that also mentioned their household’s busy and different schedules were also looking for convenient foods that were easier to make and required less time to prepare. Encouraging people to buy food that they are familiar with and have the competences to prepare can reduce food waste through a decreased likelihood of cooking errors or dislike of food (Aschemann-Witzel et al., 2015; Block et al., 2016). Buying new and unfamiliar items was something participants acknowledged as causing extra food waste, which has also been supported as a cause of food waste in the literature (Aschemann-Witzel et al., 2015):

**H3.P1**: [...] Sometimes you buy something interesting, but you forget to use it – like avocados.

**H5.P1**: I tried that sauerkraut before and it was not good. And then I feel bad because it just sits there.

However, this is something that could be combatted by households if they had the creative competences to think of multiple things they could do with a new item in the event that the household did not like consuming it in a pure form, such as H1.P1 mentioned while shopping (quote on p. 40).

Meanings driving participants’ food selections were the most difficult to track; each person had a variety of differently prioritized internalized beliefs and influences that drive practices, and only a few were made apparent while shopping. With all participants except one, there was some level of concern for the environment influencing choices, usually embodied by the amount of credit given to sustainably labelled food items (organic, local, free-range, sustainably farmed, etc.). Emotional tastes for certain foods (moods) also drove choices, and how each household prioritized meanings, competences, and materials resulted in certain beliefs, which led to choosing certain foods over others. One meaning that was influential on all participants was the importance of buying foods that the entire household would enjoy, meaning that they were influenced by the preferences of other family members, especially if children were in the family. Participants with children stated that it was important that they bought foods children would enjoy, and often these were foods only the children would eat:

**H1.P1**: All of my family likes Gala apples, so I will get some of these. They don’t taste as good now… [...] My son is wanting me to buy almond milk because he read that it is better for your skin. [...] So he thinks that will be good for him. [...] I guess I’ll have to figure out how to use it differently.
Rachel: So Kraft Dinner is just for your kids then?
H4.P1: Yeah, I don’t like Kraft Dinner. I tried to ask them to make the real mac and cheese [...] and he didn’t really like it [...] then he made extra for [daughter], but she didn’t like it [...] the rest was just left.

H5.P1: [...] the kids really like the Safeway bagels, but they’re so awful for you. I’ve tried to use these vegan, organic ones, but the kids [refuse to eat them]. At the end of the day I need them to actually eat food.

The pickiness of children stems from their overly emotional reactions to food, which makes it harder for parents to stick to their own priorities when it comes to purchasing food and reducing household food waste (Aschemann-Witzel et al., 2015; Thyberg & Tonjes, 2016). Evans & Siemens (2016) also found that households with children produced slightly more food-related waste than households without children.

The influence of family is also why it is important that observational studies are done on shopping behaviours, rather than relying on participants to self-report. During the follow-up interview I asked participants to state the factors they consider before putting an item into their basket at the grocery store: I received a much more succinct list of factors than I noted during their running dialogue during the act of grocery shopping. The factors they did name had appeared while shopping; however, the priority of certain factors shifted, which demonstrates the difference between unconscious behaviours and conscious thinking. When asked to list factors, almost all of the participants listed the practicality of “Do we need it?” as the first thing they considered, and while a shopping list and the need for items may have been what drove them to the store in the first place, they seemed to underestimate the factors that are sticking points and drive them towards particular items. Only one participant answered this question by mentioning the factor of pleasing family/child preferences, while this was a factor that heavily impacted families with children and still had a strong role in households without children.

I was curious how much importance participants would put on the sustainability or environmental impact of a product while shopping. With the exception of H2.P1 who stated they did not consider such things, four of the other participants said they consider local food as being more sustainable, while two participants also stated that organic food was more sustainable. However, while shopping at the grocery store only two participants went out of their ways to buy mostly organic items, while the rest mostly reserved buying these items for the farmers market or CSAs or if it happened to be cheaper/same price as a similar product. A majority of participants also considered the sustainability of food items in terms of packaging, and associated bulk items with less packaging and contributing to food waste. How participants prioritized the environmental impacts of food into their factors while shopping was complicated.

This was elucidated by another follow-up question: Do you feel that there are any barriers to consuming food sustainably? The priority (meaning) participants attributed the environmental impact of food products would often take a backseat to many of the factors that influenced participants’ shopping habits. One factor was the cost associated with buying sustainably labelled products, as well as a lack of knowledge about these products and where to find them. Participants tended to acknowledge that they knew what they should be buying, but other practice components would prevent such purchases. Participants also stated that there were barriers to other habits, other than grocery-shopping, that they considered integral to the act of consuming food sustainably. Another common answer to this question was that the Canadian climate and geography impacted the accessibility of local and organic products. The climate was also mentioned as a factor that reduced households’ abilities to compost their food waste. A lack of knowledge about other methods to reduce food waste was also brought up, (although this was only mentioned by two participants). A small living space and lack of time were also listed as complications.

Although reducing food waste was essential to all participants’ definitions of consuming food sustainably, knowing how to reduce food waste was infrequently listed as a barrier. Whether this means that
participants thought it was not a challenging part of the whole issue or was just not really considered compared to eating sustainably labelled foods is unclear.

It is important for future education programs to understand what practice components and factors families are impacted by, and which drive their consumption and food waste habits. It is also important to understand and track how these practice components shift during transitions through different life phases. Understanding what components are driving households’ habits can help in tailoring food waste reduction and food sustainability strategies to certain families. It is also pertinent that families recognize which components are already encouraging their household’s food waste production at the planning and shopping stage. This can help households come up with strategies that target food waste before food even enters the home, which would help households attain the first echelon of the waste management hierarchy: prevention and reduction behaviours.

5.2.3. Practice Components Influencing Food Waste Reducing Behaviours While Grocery-Shopping

In terms of demonstrated practices that reflected the participants’ relative awareness of sustainability while shopping, four out of seven households brought reusable bags with them to the store. Two later stated that they had forgotten them that day, but do have them; two of the four households that had brought bags later stated that they also often have trouble remembering their bags. When participants were asked about why they use reusable bags, most stated a dislike of accumulating plastic, whether that be in the landfill or at home, and plastic’s environmental impact (competences and meanings). It was also important to two participants that the reusable bags were sturdier than regular plastic bags. Four participants then stated that sometimes plastic bags are unavoidable, but when it does come into their possession they do their best to reuse the material in some way. Although this behaviour did not have much to do with food waste, participants still found it important as part of the overall process of sustainably consuming food.

All participants expressed a higher level of concern about plastic waste, but what I was most interested in seeing during the shopping excursion was whether or not participants were considering food waste in some form during the act of shopping. Since SPT states that habits are unconsciously done, reducing food waste requires an awareness of what a household throws out and pinpointing the factors that led to that action. Households can either make conscious choices to reduce food waste or be less consciously influenced by outside, systemic interventions (Spurling et al., 2013). While shopping, all participants demonstrated some level of awareness of their previous shopping and eating habits that had led to food waste, which in turn had led to altered shopping behaviours, which they embodied at the point I observed them:

HP.P1: Avocados, I need one dark one, a medium one, and a light one, so we can eat them all at different times.

H1.P1: My kids make their own lunches, so I am recognizing what is right for that. [...] And then they’re actually eating what they’re making. Which they were eating what I was making, but they said I sent them with too much, but then they were always hungry.

H2.P2: We usually get our meat from Costco and then a few bulk items, and then a big bag of broccoli because it usually takes a while for it to go bad. Just stuff that we don’t need as often.

H3.P1: We have a bunch at home, so we probably only need to buy one since we have a bunch at home. [...] So let’s get one of these [yogurts]. [...] Sometimes the ones in the back are a week newer. [...] We want the newer stuff to last longer because we don’t want to waste it.

H4.P1: At Costco the meat is some times too big. We cannot finish it unless I freeze them, but our freezer space is not much, so yeah I have to make sure I have enough space before I go to Costco.
**H5.P1:** I don’t eat a lot of cherry tomatoes, but because it’s in one of the salad recipes for my husband I will grab them. Otherwise if I just randomly grab tomatoes then they never get eaten and it’s such a waste, so I only buy them if I absolutely need them.

**H6.P1:** Since we only have 3 people at the house I don’t want to have too much in the house. So that’s why I always pick the smallest [package].

Some of the techniques used by participants at the grocery shopping stage to reduce potential food waste included: buying produce at different stages of ripeness in order to time consumption, buying foods that other family members like in order to make sure they eat, buying bulk items in dry-goods and certain produce that is less likely to spoil, avoiding bulk fruits/vegetables that easily spoil or will not get eaten in time, freezing bulk items, buying smaller packages of food, checking cupboards and the fridge before shopping in order to avoid buying too much or duplicates of items, buying the freshest items at the store, utilizing freezers to preserve bulk items, and avoiding buying spontaneous/new items that households may end up not liking or not eating due to unfamiliarity or forgetting about them (although many still did this). In regards to the last item in the previous list, some participants even went so far as to have a couple of alternate ideas for using up the new food items in case the household did not end up liking the item. All of these food reduction practices were considered during the grocery-shopping phase and are evidence of a consumer who reflects on their food consumption habits and is open to altering behaviour. These are also reduction techniques that have been supported in the literature as helping combat food waste (Block et al., 2016).

It might be interesting to investigate whether most consumers are just as aware of their food wasting habits while shopping, since the participant household that stated they were not aware of food sustainability issues had also altered their shopping habits. Determining which households are less likely to alter their shopping habits and what SPT component this most depends on, even when they notice they are wasting food, would also help in creating better targeted education programs.

Participants stated that their altered behaviours came from a sort of trial-and-error process of noticing waste and altering certain behaviours due to disgust with how much food was thrown out (meaning) and its relative cost in price (material) and to the environment (competence/meaning). I asked a participant later on if they thought that someone or something could have intervened earlier to help identify behaviours that would help them reduce food waste:

**H2.P1:** I don’t think so; I think trial-and-error was a way to see what works for our house, see what we like to eat or how often we eat certain things.

**Rachel:** Just kind of a process that you have to go through.

**H2.P1:** Yeah, I guess. I guess you could always just start off smaller and add more […]

The hesitation to start off buying smaller amounts of food and increasing those amounts when needed, rather than having to decrease food waste after buying too much is an important consumer culture context in North America that heavily influences food practices (Aschemann-Witzel et al., 2015). This is especially in contrast to developing nations where the culture is to buy enough food for that day’s meals, which could be linked to less food waste (Thyberg & Tonjes, 2016). A couple of participants also made anecdotal references to travelling in Europe, which changed their perspectives since consumer culture there is far different from that in Canada:

**H1.P1:** I buy as big as I can buy, 20 kg of flour because it is less expensive, it is less packaging. I also have the space to store that. We went to Paris, you don’t buy like that. You buy a little bit and enough for a meal and a little bag of flour, it’s just different. So where we live, we do have large houses, we have places to store that.
**H3.P1:** We’ve both lived in Europe and it’s a lot different. When I was there I would go shopping every two and a half or three days. I would never freeze my meat, and it was fine.

These quotes also reflect the impact that the Canadian consumer context plays on food waste behaviour, and how important the food system that people find themselves in shapes behaviours (Aschemann-Witzel et al., 2015). Even though these participants’ habits changed while they were abroad and they gained new perspective, buying in bulk, storing, and freezing excess food has again become the norm in a society with the luxury of low food costs and a heavy focus on a “culture of consumerism and abundance” (ibid., p. 6466). As one participant put it:

**H3.P2:** I think it’s also you’re working against the norm, because I think we’ve come to the point where people are just fine with wasting, and you’re working against the majority.

When I asked participants if they would rather buy items in bulk and less often or single items more often, almost all participants stated that they buy bulk of certain items (dry/non-perishable foods), but not of others, which they had noticed that they tended to waste (fresh produce, fresh bread, etc.). A couple participants stated that they would rather just buy single items and avoid bulk altogether, which one did whereas the other bought bulk of fresh items, but identified ways to prevent those items from going to waste (freezing food, buying bulk frozen fruit instead of bulk fresh fruit). This represents a conflict between the material and competence related components of the practice of buying in bulk. Participants appreciated the savings in time, number of shopping trips, and money by buying in bulk, but recognized they lacked the ability or desire to consume the food in time, thus leading to lost materials anyways. These behaviours are evidence of what has been found to be consumer “susceptibility to bulk packages,” although my participants seemed to be more critical of the wastage bulk packages represent (Block et al., 2016, Figure 2, p. 294).

Participants were also asked whether, if during shopping excursions, they thought about how a food item would be used, where the food would end up, or what part of the food would get thrown out. Although it was evident during shopping that all participants had a few thoughts about certain foods that would get wasted and had altered their purchasing habits accordingly, most said that they generally have a plan for the food they buy, but beyond that, most are not thinking about what will possibly get thrown out at home. Participants altered their behaviour once they had already noticed a problem, but most were not thinking presently about the food items entering their basket and which might get thrown out later in the week.

The participants demonstrated that they did consider food waste while they were shopping, but at an unconscious level, rather than actively considering each action they were taking in the store and how this might lead to food waste later on. Instances where they considered food waste were from occasions where they had noticed an unsettling amount of food waste at home that then urged them to alter behaviour while grocery shopping.

### 5.3. Food Waste Diary

After the grocery-shopping excursion, all participants managed to get their entire households involved in the weeklong food waste diary and measured their food waste for a week. The diaries were completed when there were no large holidays that would impact the regular amount of food waste, although a couple of participants did have some friends over for dinner one night, which definitely produced extra waste. However, social dinners are a common occurrence, therefore this should be considered when trying to gain an understanding of food waste.

#### 5.3.1. Food Waste Diary Results

The results from the food waste diaries of the 7 participant households are located in Table 5. The amount of food waste (organic material only) produced by households in this study varied from 2.1-7.3 kg for the
week, with an average of 4.068 kg. The percent of AFW varied per household and accounted for anywhere from 10-42% of the weight of all food waste weighed during the week. During the Evans & Siemens (2016, see graph on p. 26) waste audit, they found that total food related waste ranged from 0.54-19.76 kg, with an average weight of 4.95 kg. Their measurements contain the weight of food related packaging, so the weight of just the organic food matter would be less. Their waste diary data was also converted to litres, which I did not have the time to do for my study, so I cannot compare my waste diary results to their waste diary results in terms of kilograms. Evans & Siemens (2016) found that their 26 households for the waste audit produced 163.98 kg of food related waste in a week (15% of that is packaging, meaning 139.383 kg was organic food matter, of that 60% was AFW and 40% was UFW) while my 6 households produced 24.405 kg total food waste in a week with 79% of that being UFW and 21% AFW (see Figure 9). I did not ask participants to measure food related packaging, as has been done in other studies (Evans & Siemens, 2016), since I was only interested in the food matter that was thrown out and it was a difficult enough for participants to just weigh food. It may appear that my participants created less AFW than the Evans & Siemens (2016) study; however, this is difficult to say with certainty. The Evans & Siemens (2016) paper also did not include a breakdown of food waste per individual household, which would have made it easier to compare.

![Figure 9 Total amount of food waste created by all participants in the weeklong waste diary.](image)
When asked about the food waste they created in a week, participants’ perspectives on their amounts were mixed as to whether it was the amount they expected, although a couple participants were shocked by the weight they produced in a week. I also did not discuss with participants the fact that if this week’s food waste was their average weekly amount, extrapolated over a year it could add up to between 110 kg to 380 kg (23 kg to 71 kg AFW) of just food waste alone. At the end of the year, households have thrown out the equivalent weight in food of at least a couple of average-sized adults. These numbers are similar to studies done in Finland (23 kg AFW/person/year) and New Zealand (148 kg TFW/household/year) (Koivupuro et al., 2012; WasteMinz, 2015). Although producing UFW is inescapable, there are ways that it could be lessened at the household level; however, this would involve determining how palatable (meaning) people consider certain unavoidable food scraps to be and the creativity (competence) to turn them into different foods or the feasibility of new waste management programs. It would also be a better leverage point for campaigns to focus on the food that is palatable and could more easily be prevented from getting thrown in the trash, meaning the focus should be on AFW. Although AFW made up a smaller percentage of the total food thrown out by participants in my study, other studies have found that avoidable food waste can account for over 50% of the total food waste produced (WasteMinz, 2015; Evans & Siemens, 2016).

### Table 5 Case study household food waste diary results

<table>
<thead>
<tr>
<th>Household</th>
<th>Awareness of Food Sustainability Issues</th>
<th>Weight of Total Food Waste (TFW) (kg/week)</th>
<th>Kg / % Unavoidable Food Waste (UFW)</th>
<th>Kg / % Avoidable Food Waste (AFW)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP</td>
<td>Somewhat Aware</td>
<td>4.232</td>
<td>3.796 / 90</td>
<td>0.436 / 10</td>
<td>TFW: mostly produce. AFW: Mix of food groups, 50% produce, then 25% dairy, 25% grains, lost in fridge. 0.449 kg came from dinner with friends over, &gt;3.783 kg input, mostly likely.</td>
</tr>
<tr>
<td>H1</td>
<td>Somewhat Aware</td>
<td>3.065</td>
<td>2.328 / 76</td>
<td>0.737 / 24</td>
<td>TFW: mostly produce. When composting and freezing waste factored in: 1.194 kg TFW. Decrease of 61%. No food waste for 3 meals. AFW: Equal mix of food groups (produce, grains, dairy, fat).</td>
</tr>
<tr>
<td>H2</td>
<td>Not Aware</td>
<td>7.310</td>
<td>6.021 / 82</td>
<td>1.289 / 18</td>
<td>TFW: Mostly produce scraps, but more protein and oils/sauces. No waste for 8 meals, half due to eating out. 4.629 kg from 1 dinner with friends, waste would have been &gt;2.681 kg/week. AFW: Almost equal mix of food categories-60% produce/dairy, 40% grains/others, some would not exist w/out party. Banana diverted from trash – 7.1 kg TFW</td>
</tr>
<tr>
<td>H3</td>
<td>Somewhat Aware</td>
<td>2.101</td>
<td>1.580 / 75</td>
<td>0.521 / 25</td>
<td>TFW: Mostly produce scraps, but more protein, then dairy. No waste for 8 meals - not eating breakfast. AFW: 63% produce, 1 grain, dairy, and fat.</td>
</tr>
<tr>
<td>H4</td>
<td>Somewhat Aware</td>
<td>4.475</td>
<td>3.742 / 84</td>
<td>0.733 / 16</td>
<td>TFW: mostly produce. No waste for 4 meals, 1 due to eating out. Waste amount was 3.346 kg after composting factored in, 25% decrease. AFW: 50% produce/50% fats/others.</td>
</tr>
<tr>
<td>H5</td>
<td>Somewhat Aware</td>
<td>3.222</td>
<td>1.857 / 58</td>
<td>1.365 / 42</td>
<td>TFW: Mostly produce, mix of other food categories. 3 meals no waste: eating out, encouraging kids to eat everything on plate. AFW: mostly kids not finishing food, only some wilted/expired food. AFW: mostly produce and grains, followed distantly by meat/protein, dairy, and one fat. 61% of AFW items had some sort of sustainable label.</td>
</tr>
<tr>
<td>H6*</td>
<td>Very Aware</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

**AVERAGE** 4.068 3.220 / 79 0.847 / 21  -

*Household 6 did not complete the food waste diary according to instructions; therefore, the results cannot be compared to the other households.*
A trend for all participants was that over 50% of all food waste produced was fruit and vegetable related, this has been shown to be the case with most food waste (Farr-Wharton et al., 2014; WasteMinz, 2015; Evans & Siemens, 2016). Participants even noted that cooking meals from scratch with raw ingredients, especially produce, created more food waste, while eating leftovers or pre-made/convenient/packaged meals produced far less waste. The amount of food waste originating in this manner could be related to household competences (cooking skills), materials (time, money), and meanings (importance associated with home cooked meals).

**H3.P1: Most of our waste comes from if we cook fresh meals, with fresh ingredients, then you have to cut things up. If you buy pre-packaged stuff like frozen chicken breast and frozen veggies, you get a lot less waste that way.**

In terms of the 69 AFW items that participants threw out over the course of their food waste diaries, the food groups were more varied, but again the majority (36%) ended up being produce, followed by grains (22%), then leftovers (14%), dairy (13%), meat and alternatives (9%), and other (6%) (see Figure 10a). These were the same food groups most commonly thrown out in Farr-Wharton et al. (2014). A New Zealand study found that the most expensive AFW in terms of food groups were meat and fish, followed by fresh produce and homemade meals accounting for over $400,000 NZD dumped in the garbage per year (WasteMinz, 2015). This was likened to households throwing out nearly $11 of food each week ($563 per year) (ibid.). It is concerning that most food waste tends to be made up of produce and animal-related products because these put the largest strains on the environment, especially since people continue to demand these products from exotic places and during off-seasons (Aschemann-Witzel et al., 2015).

![AFW - Food Groups](image1)

![AFW - Reasons for Disposal](image2)

**Figures 10a, b** Food groups and reasons for disposal of 69 AFW items over the course of 6 participant diaries. The ‘other’ category in 10a includes fats, sauces, etc. The ‘leftover’ category is defined as items that had been altered in some way from their store-bought form and were a mix of food groups. In 10b, ‘Cooking Error’ includes burning and dropping food; ‘Too Much’ refers to scrapings left on plates, making too much food, or people not finishing food; ‘Preferences’ refers to the pickiness of children and various reasons for not eating an item.

The reasons for which participants disposed of AFW were mainly due to the fact that they had prepared too much of an item or did not finish a portion (52%) or that the food had spoiled (32%). Again, this goes back to the previously discussed idea of consuming food in a context of abundance (Aschemann-Witzel et al., 2015). In contrast to other studies, the participants in my group were quite fond of eating leftovers, whereas usually leftovers are one of the main reasons for disposal of AFW (Aschemann-Witzel et al., 2015; Block et al., 2016; Evans & Siemens, 2016). However, the term ‘leftover’ has many definitions and it can be complicated to determine what is and is not a leftover, thus leading to some ambiguity when trying to compare between studies. **When participants were asked about their food waste and what led to certain items being disposed of**, items getting lost or pushed to the back of the fridge and forgotten (material: lack of an organizational system) was the most common answer, alongside cooking from scratch (competence), and kids having certain preferences (meaning). Other observations, such as buying in bulk (material), buying multiple of the same item (competence), cooking errors (competence), and some
of the household being on a diet (material: family structure) increased food wastage; these food waste factors have also been found in other research (Block et al., 2016). Certain material, competence, and meaning components of practices, such as the above, can all play a negative role in encouraging food wastage, especially when more than one are at play in a single household.

Some other interesting observations were that households who had food reuse competences such as composting or freezing food during the waste diary could significantly decrease the amount of food waste they were putting into the garbage. H1 and H4 managed to reduce their food waste by 61% and 25% respectively, while H2 also reduced their waste by 0.2 kg by repurposing an old banana for baking. Participants who composted also made me aware that the weather was still too cold to fully compost, and that their binned food waste would likely be even less once the weather warmed. Reuse practices such as the above are important to reduce waste heading to landfill; however, they are not prevention and reduction activities, which provide more benefit for the environment.

No sweeping conclusions can be made about how material practice components, such as socioeconomic characteristics, determined food waste production in my participant households. Almost all of the participants had some awareness of sustainability issues (competence), which I would have thought would be the main reason for food waste being lower in these households compared to H2 who stated no awareness. However, H2’s food waste was only so high because of a dinner party with friends, otherwise their waste might have been around the 3 kg mark. There does seem to be a possible trend that households with children had slightly higher AFW, which has been supported in the literature (Aschemann-Witzel et al., 2015; Evans & Siemens, 2016; Thyberg & Tonjes, 2016). No conclusions can be made on the impact of income on food waste due to not having a broad enough sample of participants, as well as the fact that some participants also had experiences from their childhood of living in lower-income situations, and this may also have influenced how they currently view food waste. Farr-Wharton et al. (2014) also did a similar study and tried to look at income, but also had the same problem of not having enough participants to make any conclusions; however, they also had participants from predominantly higher income situations. There is also no way to compare to the Evans & Siemens (2016) paper to determine if these participants created more or less waste than an average household in Edmonton. The only conclusion that can be made is that my participants created similar amounts of food waste to people in New Zealand and Finland (Koivupuro et al., 2012; WasteMinz, 2015).

Participants gave insight into materials, competences, and meanings that are unique to each family, yet still universal in all families lead to increased food waste. Materials related to family infrastructure such as organizational systems in food storage areas, family members being on a diet, or the types of food people bought could result in food waste. Participants noticed that certain competences such as cooking, shopping, and planning abilities could impact the amount of food waste they created. Finally, meanings, such as moods, food exhaustion, and picky eaters all had a role to play in creating food waste as well. Some families had learned new skills, abilities and how to properly use materials at their disposal in order to give food a second life. These competences and related materials (composting, freezing food, reusing food in something else, cooking proper portions) allowed families to get more out of their food and to reduce their food waste. These techniques for food waste reduction may not be palatable or practical for all people, but they tend to be invisible techniques that are only practiced within the home. The visibility of these techniques needs to be increased and they need to be shared with others so that more people can increase their competences in reducing food waste.

5.3.2. Competences and Meanings Related to Household Food Waste

The follow-up questions that I asked participants were aimed at fleshing out some of the beliefs (meanings) and knowledge (competences) participants had in regards to food waste. These beliefs and knowledge could be based on first-hand research and knowledge or more tacit understanding, second-hand knowledge and assumptions that can constitute total understanding and beliefs.
When participants were asked if they thought that their food waste had an impact on the environment, three participants were certain that it had an impact, but that it was unavoidable and composting really helped reduce the problem. Two participants were undecided about the impact of food waste, and two participants said that it did not have an impact. Reasons that food waste was not considered to have an impact on the environment were due to the fact that food waste is organic and will decompose, as opposed to say wasting the same amount in plastic materials. Another reason that was brought up was the fact that Edmonton has a world-class waste management facility that composts all of Edmonton’s food waste. Some households were less inclined to worry as much about what they were throwing out, nor did they feel as much of a need to compost it themselves:

HP.P1: Because we live in Edmonton... And we have a really good recycling plant and garbage system, I don’t... I don’t know because the foodstuff is going to decompose, right?

Some participants did recognize that Edmonton’s waste management facility, although it may be world-class, does require vast resources to run and manage waste:

H5.P1: Yes and no. I mean, because of our good facility, it is getting turned into good stuff like compost and people are taking care of it, but that also takes power and man hours from the people that work there. So everything kind of affects the environment, in a way. Everything. Everything needs electricity. Everything needs all these things to run these facilities.

These were also similar to sentiments found when participants were asked whether food waste was a problem in Edmonton, in Canada, or the world or whether participants would consider reducing their own food waste:

H2.P1: Well, I know [food waste is] not [a problem] in the city because we have the best garbage place in North America, but I don’t know about the world.

H4.P1: I think [food waste is a problem] everywhere. I think it just depends on people being educated, and I think here it is quite good and we have a system to keep that going. I think other countries they may have to start to educate people. We try to pass it on to kids as much as [we] can, and eventually it will be better for everyone.

H5.P1: I actually looked into it a few years ago, getting a composter, but because we don’t have a garden outside then I didn’t know what to do with the compost. Then I realized it takes months to actually get good compost, so I didn’t want to do all of the work and then not know what to do with it. And our waste management facility is so awesome, and has the aerobic composting facility now anyways, so I thought I didn’t really need to do it. I mean, it would be nice if it was all separated, but they kind of do it for us. I don’t compost and I don’t think I will just because the City does it for us.

Rachel: So then you said you wouldn’t try to reduce your food waste because you don’t want to compost. Just because you don’t like the fact that you put it inside and it develops bugs?

H2.P1: Yeah it creeps me out that you put food in there and then bugs develop. Yeah, not doing it. And besides, the garbage people, they compost it anyways, so we don’t have to- I mean I guess if we didn’t have such a good garbage system it would be different, but we have good people. We need to keep them in jobs.

H3.P1: I definitely think [food waste is] a problem, especially internationally, especially when you have a surplus of food in some areas and not in others. Obviously it’s not entirely practical to just send your leftovers that are going to expire in two days to a third world country, but it does seem a bit- I know Edmonton has good waste management, but that doesn’t necessarily mean what you’re doing is sustainable just because they can process your waste. It doesn’t mean that you should [say], “Oh, I’m
perfectly fine throwing out my leftovers because they’ll deal with it, or they’ll compost it.” That’s not a sustainable thinking, and it doesn’t apply in every single location.

These quotes demonstrate how different types of knowledge can inform habits and influence beliefs around food waste and its management. Some also reflect the notion found in City of Edmonton (2012) and Faulder (2014) that most Edmontonians recognize global environmental problems, yet the majority think that Edmonton is somehow immune to them or that the Waste Management Centre reduces the environmental impact of food waste. These sentiments also demonstrate that people are only partially reflecting on the impact that food waste has at the end of its life, and are even less aware of the amount of squandered resources food waste represents from the beginning of the food chain to the end. In a group where the majority consider themselves to be aware of food sustainability issues, it is concerning that some of these myths are still present. This can also lead to the licensing effect, where previous ‘good’ choices or factors boost people’s self-image and allow people to feel that they can indulge in another behaviour (Khan & Dhar, 2006). This effect has been noted as a problem in many facets of sustainability (Tiefenbeck et al., 2013). These attitudes could further encourage an attitudinal-behavioural gap between the feeling people have that food should not be wasted, and whether or not they take the initiative to actually reduce their waste (Vermeir & Verbeke, 2006). This phenomenon has been found with other food consumption issues like buying sustainably labelled foods (ibid.).

Participants were quite proud of Edmonton’s waste management system. However, Edmonton’s prowess at waste management might be coming at the detriment of resident willingness to engage with waste prevention and reduction strategies since as stated above, “They kind of do it for us.” Edmonton’s waste system is currently based on voluntary action on the behalf of residents, and is less visible than it was back in the 1900’s when everything was located downtown and people could see the impact of the city’s garbage from their windows. The city has tried to make the waste management process more transparent by offering free facility tours to anyone interested (City of Edmonton, 2017c). However, touring the composter, like I did, is not part of the main tour. Getting into the composting facility to see how the city’s food waste is processed is something most of the population will likely never do. Anyone who wants to visit the composting facility needs to wear personal protective equipment and coveralls to protect their clothes, be fit-tested for organic respirators, and go through safety training, since food waste decomposition does release noxious gases. Composting food waste has been shown to generate far less GHG emissions than landfilling food waste, since landfilling results in anaerobic decomposition and the production of methane (Lou & Nair, 2009). However, composting on a facility scale requires ample amounts of energy and machinery and still produces far more emissions than home-composting or even source separating food waste (ibid.). It is quite understandable that many households in Edmonton may be lacking certain practice components, such as not having the time or desire to compost at home; however, this might be reason for Edmonton’s Waste Management Facility to push for source separation of food waste in order to encourage sustainability. This would also allow households to further help the environment, especially those who face certain barriers (e.g.: living in an apartment) and are unable to compost. This small behaviour change would help most of my participants who wanted to reduce their food waste more, but also a few who felt that they were already doing as much as they could and did not think there were many feasible actions left to take.

Helping manage food waste in such a manner would also fit into my participants’ beliefs that individuals are responsible for reducing their own food waste, but that they can be aided in this process with the help of government. Participants seemed to think that only when both citizens and government work together are they really able to support each other and accomplish goals. It is the role of government to identify practice component barriers that citizens face in sustainably consuming food in order to help provide resources for them to overcome those barriers. Some examples would be to continue supporting local food movements and farmers, to encourage food waste diversion policies (such as donating food to non-profits and people in need), education campaigns about food waste and composting, as well as making tips and tricks to reducing food waste more pervasive throughout the city. Actions that consist of prevention and reduction measures need to be highlighted at all times. As stated earlier, this would benefit
the environment, as well as people, especially those with lower incomes who may have less practice component variables to work with, such as challenges accessing such knowledge or materials.

Although participants’ media was not saturated with it, most participants stated that they heard more about eating sustainably labelled food than they did about the importance of reducing their food waste. This matches the idea in the literature that less focus is put on reduction/prevention behaviours (Vanhonacker et al., 2013; Graça et al., 2015a, b; Verain et al., 2015), which is something the City of Edmonton could really put the spotlight on. Having the first echelon of the waste management hierarchy at the forefront of citizens’ minds, but more importantly, as a deeply embedded, unconscious habit, should be the focus of achieving sustainability. This requires addressing all of the factors: competences, meanings and materials, which includes the psychographic, socioeconomic, and contextual factors that influence food waste production, and addressing barriers, so that it becomes second-nature for citizens to reduce waste rather than produce waste.
Chapter 6. Discussion

The above research was done in the pursuit of gathering knowledge to answer my research questions (section 1.3) related to understanding how practices are encouraged to focus more on the sustainable consumption of food, especially in regards to how this influences food waste, and how this reflects the current sustainability narrative (section 6.1). The following section will summarize this study’s results and answer both research questions and how this relates to the general theory of SPT. Section 6.2 will discuss relevant trends found in the literature.

6.1. Answering the Research Questions

1. What factors and practice components (meanings, competences, and materials) deter or lead to sustainable food consumption behaviour?

Figure 11 Summary of the practice components and contexts found throughout the study and literature that influence sustainable consumption habits in terms of a Social Practice Theory conceptual framework

To reiterate, SPT is interested in social practices and how they emerge in a population, not in the details of individual practices (Reckwitz, 2002; Hargreaves, 2011; Vlasov, 2015). SPT looks at how practices are habitual and recursive, affected by internal and external factors, which means that practices are just as much the result of individual choices as less obvious social contexts (Reckwitz, 2002; Warde, 2005; Shove et al., 2012). Figure 11 depicts the factors that influenced the elements of practice that were embodied by participants in this study, which is also in line with what has been found in other studies (Bawa & Ghosh, 1999; Aschemann-Witzel et al., 2015; Block et al., 2016; Thyberg & Tonjes, 2016). This means that although a few factors may be unique to a specific location or family, in general most people are influenced by similar factors. SPT is used to understand the practices of groups rather than individuals, which makes it important to keep in mind that the group of participants involved in this study were mostly aware of, and had an interest in, sustainability issues in relation to food.

Although the participants had similar, yet differing characteristics (e.g. socioeconomic backgrounds) most participants practiced the same behaviours. As households attempted to achieve the same goal of more sustainable food consumption, households prioritized different practice elements and some practice components became barriers to certain behaviours. Although SPT states that practices are done habitually and without much thought (Reckwitz, 2002; Warde, 2005), the group of people called reflexive or ethical
consumers, are more likely to have begun to consciously question their habits and their impacts, and to alter their practices accordingly (Vermeir & Verbeke, 2006; Vitterso & Tangeland, 2015). The initiation of this process can come from any of the three practice components (competence, meanings, or materials), and due to their interrelation with the other components, results in a continual feedback loop of factors attempting to positively reinforce sustainable behaviour (Warde, 2005; Shove et al., 2012). In comparison to the one household with no awareness of sustainable food issues, the other households had increased their competences through research/education on food related topics, which in turn led to raised awareness and knowledge. These increased competences then led to acquiring different materials and meanings that reinforced sustainable food consumption behaviour.

As stated in the literature, the practices of sustainably consuming food are complex since they are influenced by many different factors and none by itself can completely predict sustainable or unsustainable behaviour (Bawa & Ghosh, 1999; Stefan et al., 2013; Aschemann-Witzel et al., 2015; Block et al., 2016; Thyberg & Tonjes, 2016). All of the different components of practice can work against or with each other; the more that components encouraging sustainable consumption practices are adopted or made available to each household, the higher the likelihood of deeply embedded sustainable behaviours being practiced. However, not every household is the same nor influenced by the same factors, which might make it more difficult for certain families to adopt sustainable consumption behaviours. This is where education programs come in that can help identify these barriers and help remove them, encouraging households to engage in sustainable behaviour. It is important that households are not just reflexive on their consumption choices, but also how their household practice components can encourage or impede their sustainable consumption behaviour. Awareness of influential factors can help households identify potential problems that may surface, and act accordingly to correct them or become more sustainable in their practices.

The sample size for my study was too small to look at the role of socioeconomics in determining behaviour of households. Overall, participants may have created less AFW than the average Edmontonian household. Some trends may have been that children increased the likelihood of AFW, while income may have played a role in determining the practice components that grocery shoppers are most influenced by. Certain realities like family size influenced the likelihood of certain competences such as meal planning and lists, which are important tools for reducing food waste. Understanding how all of these variables play off of each other and influence one another is quite important in order for future programming to effectively target the chain of events leading to the adoption of certain sustainable behaviours. It has been stated by the literature that waste prevention policies need to “target the circumstances and actions that lead to food wastage,” or as the SPT practice components can also be known as, the “values, skills, and logistics” that lead to food waste (Thyberg & Tonjes, 2016, p. 119). These components play a significant role in creating appropriate interventions (Spurling et al., 2013).

In the end, all of the practice components that consumers embody are heavily influenced by the outside context, and currently in Canada, the context is encouraging more unsustainable behaviours. It is important that these are also identified and addressed, and while consumers can do their part in fighting against a system that encourages waste, collective systemic action will be required in order to truly attain sustainability.

Overall, in terms of what practice components drive sustainable or unsustainable behaviour, the themes that became apparent during my study were repetitions of what has been found in numerous other large-scale studies (Bawa & Ghosh, 1999; Aschemann-Witzel et al., 2015; Block et al., 2016; Thyberg & Tonjes, 2016). The only new perspective comes from the fact that my participants are already more sustainably aware, but the influences on their lives are the same as the average consumer. However, they have attained more awareness of the impact of their choices, but possibly not of the extent of the role that practice elements play in determining how sustainable their behaviour can be. The results of this study also point out that the ethical or reflexive consumer may still have flawed ideas of what is truly sustainable behaviour, as is evidenced by this study’s discussion on the role of Edmonton’s Waste
Management Facility in consumer behaviour. Although other researchers in Edmonton have found similar consumer beliefs (Faulder, 2014), they usually came from Edmontonians who were larger producers of waste or less educated about the waste management facility. To find these same thoughts repeated to a lesser extent in a reflexive/ethical consumer group is something new that should be addressed by the city. According to SPT (Reckwitz, 2002), this demonstrates that this social understanding, although flawed, is pervasive throughout Edmonton, and influences the practices of Edmontonians.

2. How do food consumption (procurement and disposal) practices and views of Edmontonians reflect the broader sustainable food consumption narrative?

From the responses of participants, since most were somewhat aware of sustainability issues relating to food, most were more aware of their waste than the average Edmontonian. This was evident from some of their behaviour, from procurement to disposal practices. Almost all households embodied strong views about the importance of the environment and how it related to food and health, which prompted many to buy sustainably labeled foods, as well as try to reduce food waste. However, this is also the group that is most often targeted for sustainability messaging in order to encourage consumption of alternative products (Vanhonacker et al., 2013; Graça et al., 2015a, b; Verain et al., 2015). Participants seemed to have engaged with some sort of sustainability literature that informed their habits. However, the sources of their information are not known nor to what extent it was focused on marketing a sustainable product rather than truly sustainable behaviour. Participants also stated that they heard more about consuming sustainable foods rather than reducing food waste, which is consistent with what has been found in the literature (ibid.). This is also the main message that organizational bodies such as the UN are promoting (2015). It also seemed that for the most part, households with a smaller income felt far more limited in the possible depth of their engagement in this aspect of sustainability, which they felt had a large impact on overall sustainability. This is also consistent with the fact that households with lower-incomes are left out of the sustainability narrative and are not targeted by sustainable consumption messaging (Blake et al., 2010; Garnett, 2011; Vanhonacker et al., 2013; Graça et al., 2015a, b; Verain et al., 2015; UN, 2015). Overall, participants embodied sustainable consumption practices and views throughout the consumer chain that I had not expected at the beginning of the project, but through follow-up interviews I learned that knowledge about the impacts of food waste on sustainability were not necessarily where they should be for a group with a higher level of concern for the environment. Some participants still lacked the recognition that food waste results in squandered natural resources and GHG emissions from the beginning of the food chain to the end. As one participant put it, food consumption needs to be sustainable throughout the whole process, from start to finish, and the sustainability narrative just does not put enough emphasis on that.

Engaging in food sustainability is usually also tied to social pressures (social norms) and self-identity, which exert themselves no matter an individual’s socioeconomic background (Shove et al., 2012). As sustainable eating becomes more popular, people may pick up the habit, but superficially, and not consider, other impacts they may be having, such as how much food they are wasting. The hustle of daily life prevents people from really considering the impacts of their actions on the planet. This requires a paradigm shift where the focus is transferred from the self to the whole. Education programs and raised awareness and visibility of food waste issues can help in achieving this shift. This also reflects the notion in SPT that habits are unconscious and deeply embedded, and although social norms may be changing to reflect more sustainable behaviour (Warde, 2005), they are still not critically challenging it on a deep, systemic level, which is integral in a system that is based on, and encourages, unsustainability.

Understanding sustainable development and translating that knowledge into living sustainably is a complicated issue to navigate; with so many facets of life dependent on resources, and so many of us overusing resources, it is a difficult area to traverse alone. Achieving sustainability requires that we all have the same deep understanding of environmental issues, that we support each other, and that we take the steps to alter our behaviour in order to reflect this knowledge.
6.2. Trends

Overall, food sustainability issues, especially food waste, have gained a lot of attention in more recent scientific literature, resulting in a crisis that many municipalities and countries are becoming more aware of, and starting to design policy for. Europe, Oceania, South Korea, China, Japan, and North America are responsible for 56% of the world’s total food waste (Lipinski et al. 2013), in addition to being the developed nations chiefly responsible for human-caused climate change and other natural resource exploitation (Cooper, 2005; Caney, 2006; 2010; IPCC, 2014). As stated earlier, Finland, New Zealand, and the city of Edmonton have begun to analyze citizens’ food waste production in order to inform future programs on policies in order to address the issue (Koivupuro et al., 2012; WasteMinz, 2015; Evans & Siemens, 2016). However, other countries such as South Korea and France have already implemented sweeping reforms that harshly target practices that lead to food waste, especially at the consumer level (Stuart, 2009). France implemented education campaigns that encouraged consumers to eat mal-formed fruits and vegetables, which became widely successful (Block et al., 2016). In 2005, South Korea made food waste illegal, diverting 98% of all food waste from landfills, so that it could at least be given a second life, and a less impactful life, as compost, animal feed, or energy (Stuart, 2009). This required households to separate their food waste from their normal garbage, but it also made food waste more visible to its producers and encouraged them to be more mindful of their habits (ibid.). North America has been slower to implement policies regarding food waste, especially on a countrywide scale (Stuart, 2009). The government of Ontario in Canada is considering attempting a ban on food waste similar to South Korea, but by the year 2020 (Ministry of the Environment and Climate Change, Government of Ontario, 2017). Although the City of Edmonton has a composting facility that prevents most of its food waste from going to landfill, this process has done little to actually encourage consumers to reduce their environmental impacts through overconsumption and wasteful behaviours. Food waste reduction programs in other parts of the world have been implemented at a faster pace than food waste programs in Canada, which have mostly been left to individual municipalities to implement. Although the swift implementation of policies can cause unforeseen issues, the impacts of the current food system on climate change are also rapidly becoming more apparent and are posing serious risks for future food production, which demands quick action. As long as these programs are iterative processes that allow for checks and balances, it is important that broad-scale change be implemented immediately.

There seems to be ample literature summarizing the factors that play a role in food consumption behaviours, and how these factors are related to embedded habits and daily routines (Bawa & Ghosh, 1999; Aschemann-Witzel et al., 2015; Block et al., 2016; Thyberg & Tonjes, 2016). It is therefore encouraged, that institutions and governments take the next steps to begin to use this information to build information campaigns, which focus on altering behaviours and addressing barriers, and have seen much success (Spurling et al., 2013; Spotswood et al., 2015; Vlasov, 2015; Block et al., 2016). Awareness of sustainable food issues is increasing, but requires a strong and appropriately marketed push from institutions in order to spur paradigm shifting behavioural change.
Chapter 7. Conclusions

The aim of this study was to identify factors, (socioeconomic, practice element related, and contextual) that influence Edmontonian consumers’ sustainable food consumption practices. The factors that were found to influence participants’ sustainable consumption behaviour support findings in other literature. Some contextual factors (such as cultural norms of abundance and excess in North America and participants’ views on Edmonton’s Waste Management Centre) demonstrate that it is necessary for researchers to understand all of the different factors that influence sustainable food consumption, especially in terms of food waste production, before education programs are implemented in different locales. Some of the factors act as barriers that can sometimes be addressed through programs, individual action, and behavioural change; the rest depend on political motivations and collective action throughout the food system to create meaningful systemic change.

The main contributions of this study are that it provides case studies and insight into the factors influencing sustainable food consumption in an Edmonton context. Although the number of participants was small, the findings are supported by other research that found similar results; therefore, they represent real life examples of this research. Another contribution to the literature that should be followed up on and addressed is the finding that even among some ethical consumers there is confusion over whether or not food waste has an environmental impact. This could present a large barrier to implementing behaviour change programs if it is not addressed first. Thirdly, even though awareness of sustainable food issues is increasing, even among more informed consumers, the most commonly heard sustainability narrative is still supporting superficial sustainable behaviour. This can make it even more confusing and exasperating for the average consumer if the proper sustainability narrative is not put at the forefront.

7.1. Suggestions for Improvements and Future Research

Overall, participants said they enjoyed contributing to the research project, learned something new, and were quite thankful for the food scales. The following sections 7.1.1 – 7.1.4 will discuss the successes or suggested improvements for each step of the data collection process.

7.1.1. Finding Participants

At the start of the research project I had been quite optimistic about being able to find more participants than ended up partaking. I tried to cast a wide net, as Crang & Cook suggested (1995); however, I probably could have still put in more effort and been more aggressive in my efforts to find willing volunteers. In the beginning I had an issue with finding participants who had been living in their home for three years or more, so I altered the qualifications to one year or more, which allowed a lot more people to express interest in the project. I think this is also important to keep in mind for future studies, as this may limit data on waste production in households who move often, and although they may not be the majority, their habits also influence food waste.

I also had an issue with people saying they were interested in taking part in the research, but then never contacted me or responded to follow-up messages. I was quite dependent on snowballing to bring me more participants. Some of my participants/contacts said that other potential volunteers they had told about my study were wary of having a researcher enter their lives in such a private way or were also afraid of being judged, and therefore did not partake. The intimate nature of ethnographic research may have encouraged people who were already fairly comfortable with how well they managed their food waste to volunteer for this study, preventing me from talking to households who produce more waste on average. These may also have been reasons for households living in lower-income situations to not contact me.

I would have much preferred if I could have done a random sample; however, that required resources I did not have. I also think that by coming back to Canada to do my research, but having to note on all of my correspondence that I was associated with Uppsala University might have made some people suspicious of the authenticity of the study. This also probably had an effect on recruiting participants who were
complete strangers, possibly also on the lower-income individuals I was attempting to seek through Food4Good. Since I was also not affiliated with a university from Canada, it was also more difficult to understand what the proper legal channels were for trying to attract participants.

In regards to my attempts to gain participants through Food4Good, their email correspondence did not encourage any participants to contact me, so I tried to attend some of their events in person in order to advertise my research project. The dates of these events were supposed to occur in early April, but changed and ended up occurring in late April. I decided that this was too late in the thesis process to be trying to find new participants and that I would have to forgo trying to find participants from outside my own social sphere.

As participants began to go through the process of my study, they suggested alterations to the poster I had made to advertise my project. In the end, the poster’s wording was quite different from the original, which I had also sent to Food4Good, which probably impacted the amount of people that contacted me. I also believe that using the word ‘sustainability’ on my poster may have frightened some people away, as it became clear with H2 that my project had a certain focus, and when someone was not familiar with sustainability it became more difficult for them to answer some of my questions. This probably heavily influenced households that Food4Good tried to contact for me. I also struggled with the ethical dilemma that participants must know the full-extent of the research project. I considered simplifying the wording so that it did not include the word ‘sustainability’ or other terrifying phrases. This might have encouraged more people to approach the project, but possibly at the expense of the clarity of the intent of the project. However, Evans & Siemens (2016) did a similar project without using such phrases in their questionnaires and interviews with participants; the focus was on understanding habits. Therefore I would suggest that for future studies wishing to observe habits that they avoid complicated language and the use of the word ‘sustainability’.

7.1.2. Grocery-Shopping Observation
Out of all the data collection phases, I think the grocery-shopping observation went smoothly and as planned. It took a small bit of planning to figure out when and where to meet participants without interfering with their regular habits too much. Watching people grocery-shop and discuss their lives and reasoning for choosing certain items was quite interesting and fun to be able to witness. At times it could be awkward and challenging to join in with a participant whose practice was to get the grocery shopping done as fast as possible, but it was workable.

7.1.3. Food Waste Diary
The most satisfying part of the research project was that participants stated an increased awareness of what they were throwing out due to the diaries. It allowed them an easy way to visually analyze their own behaviour for ways to improve further.

H5.P1: I put all of the scrapings on one plate and I called the kids over and said, “You guys, we have an entire plate of food that we could have fed to one more person. But we can’t eat it because everyone’s had their different sauces or taken a bite out of this, no one is going to eat this now.”

It was good to see that all participants had a positive experience with the research project and it might be interesting if municipalities did a program encouraging households to measure their own food waste for a week in order to better understand what foods households are throwing out. This would help them identify ways to save money in addition to helping the environment. However, as a research project, waste diaries are susceptible to behavioural alterations that people make as they notice their habits throughout the week, which can impact data quality. This happened with a couple of participants who encouraged household members to change habits to reduce food waste halfway through the diaries.
I also felt that a one-week food diary was not enough time to gain proper insight into the average amount of waste a family produces per week. Some semi-irregular events (such as having friends over for dinner, going out for a dinner date) could occur that prevent the accurate measurement of the average amount of waste a family produces. These events might not warrant disclosure from the participants as being ‘unusual’; therefore, calculating food waste over a month-long period like Farr-Wharton et al. did might help in coming up with a better average (2014) or even a two-week waste diary might prove to be more accurate (Koivupuro et al., 2012). However, this also comes with its own issues since having a household measure food waste for a month might become tedious since some participants said even measuring for a week was tiring.

Some participants also ate out at restaurants and brought the food home, which sometimes resulted in waste that they included in their diaries. I was careful to not include these measurements in the tallies for their waste total, but it might be interesting to see if households tend to waste food from restaurants more than homemade food due to less involvement in its creation.

I was also not able to put a price to the amount of food waste thrown out by households. This would have required participants to write even more details in their diaries and would have taken me longer to try and calculate; however, I believe that there is much value in studies doing this.

7.1.4. Follow-Up Interviews

Logistically, getting together with participants to do the follow-up interview went well. As I did more interviews I realized that there were questions that I wished I had asked or that I had altered the wording of certain questions a little bit, but that is only something you learn after doing multiple interviews. Some questions that I would have liked to ask participants are “What is your opinion of food waste?” and “What is one tip or trick you would give to other families to reduce food waste?” I would also have liked to ask all of the participants if they thought that trial and error was the only way for a family to figure out how to reduce food waste. I also wish I had been able to better track and ask questions about new food items participants had bought during our shopping trip and learn if these items had been found to be satisfactory or if they were currently being wasted.

7.1.5. Future Research

This project was unable to make any generalizable conclusions about the influence of socioeconomic factors on sustainably consuming food or the amount of food waste created in an average household. Although I hope that some of the insights from participants might be able to help direct future research or programs. I think it would also be beneficial to be able to put a price tag on the amount of AFW households in Edmonton throw out, which would make it easier for people to comprehend food waste information. I also think that some organizational body should take advantage of the fact that visual cues really help make an impact, and someone should make Edmonton’s food waste, and the impact of it, more visible. Artistic displays, images, and social media can go a long way in helping messages go viral and possibly be the spark that commences necessary behavioural change. Future education programs should pay attention to barriers people face when trying to reduce their waste, since simply saving money will not be a behavioural change selling point for all people (Schneider & Lebersorger, 2011). It might also be worth looking into the success of war-time austerity measures that encouraged people to not waste food and see if there are certain aspects that could be successfully utilized in future food waste campaigns (Schneider, 2011).

Since my research was unable to engage a lower-income demographic and gain insights into their motivations for consuming food sustainably, it is important that future research also make an effort to reach these marginalized groups. This will ensure better insights and answers to questions that will help cities move towards more sustainable living.
During this study, participants were asked to put an asterisk next to items in their diary that were bought during our shopping excursion. This was simply due to interest’s sake, but a trend revealed that most households tended to use the items they bought within the beginning to middle of the food waste diary with fewer items appearing at the end of the week. This may be useful in future studies as a method to help researchers understand the process through which certain foods get forgotten and not used before they expire.

Future food waste reduction research might want to look into collecting all of the various methods through which people save food or reduce their waste. The goal would be to collect and disseminate this information in order to help battle the knowledge gap that many people face when attempting this task. It might also be interesting to look into whether there is a licensing effect with organic and locally grown food, or if this is an area in which the licensing effect does not appear. Additionally, buying groceries through the Internet and having them delivered to residences is a new emerging trend that is quickly gaining a following. Future researchers might consider looking into the additional pathways that food waste can be created through this practice, and whether or not this is also due to a further disconnection of the consumer from food.

7.2. Acknowledgements

I would especially like to thank my supervisor Cecilia for her expert guidance and encouragement throughout the past few months. She made the whole thesis process seem far less daunting and inspired me to take this research as far as possible.

I would also like to thank my evaluator, Hans Andersson, for graciously aiding with the writing process. I would also like to thank my examiner Mikael Höök and my opponent Nivit Tanglertpaibul who also gave me excellent feedback.

My classmates from the Masters program in Sustainable Development also deserve a thank you for supporting each other in numerous ways throughout our degrees, but I would especially like to thank those who read through my thesis, gave me feedback, and asked pertinent questions.

I would also like to express gratitude to those who also had a role to play in my thesis. Neil Burkard from the City of Edmonton who got me a tour of the composting facility at the Waste Management Centre, and Ashley Thompson from Food4Good who also helped me with my data collection. I would also like to thank all of my participants who were kind enough to let me observe their food related habits.

Finally, I would like to express my deepest appreciation to Uppsala University for granting me the IPK Scholarship, which allowed me to embark on this once-in-a-lifetime journey, and to my parents who also financed this journey. These past two years have been the best of my life and I will always be looking for a chance to come back to Sweden. Most importantly, I would like to recognize my partner, Doryn Nyroos, for giving up everything in Canada to follow me to Sweden and support me in this adventure.
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Value Chain Management Centre (VCMC) (2010). Statistics provided confidentially via industry managers.


Appendix 1 Case Study Protocol

Case Study
Sustainable Food Consumption Practices
The role of socioeconomic contexts in Edmonton

Case Study Background
Presented in Chapter 3 (3.1)

Research Questions
Presented in Chapter 1 (1.3)

Data Collection Methods
Tour with Edmonton Waste Management Centre, followed by publication search for historical information
Pre-observation survey/phone call with participants
Participant Observation at grocery store, preceded by signing of waivers, and other forms
Weeklong Food Waste Diary
Follow-up Semi-structured Interview

Data Collection Procedure and History
- Early February. Discussed conducting pilot study with a relative. Emailed the City of Edmonton Waste Management Department tour guide about touring the food composter and doing an interview
- February 19, 2017. Conducted pilot study with a relative. Demonstrated advertisement poster, went through survey, performed grocery shopping observation. Explained the food waste diary process.
- February 21, 2017 from 12pm – 2:20pm. Tour of the Edmonton Waste Management Centre (EWMC) Composter
- February 22, 2017. Created online survey for participants and sent it to friends for feedback
- February 23, 2017. Drafted and organized letters of study authenticity and informed consent forms
- February 27, 2017. Met relative again to look through pilot food waste diary and go through pilot follow-up interview
- March 6, 2017. Posted recruitment posters, waited for respondents.
- March 11, 2017. Sent recruitment poster to Food4Good who said they would disseminate the information. No emails were ever received from potential participants through this method.
- March 13, 2017. Snowball recruitment attempt made through Facebook, relatives’ businesses/connections, and friends.
- March 17, 2017. Communicated with Food4Good and said I would go to a fruit & veggie market on April 13th in order to find more participants.
- March 27, 2017. Was informed by Food4Good that there was a scheduling conflict and that the market on April 13th would change to April 26th.
April 19, 2017. I contacted Food4Good to let them know that I would not be able to make it to the market on April 26th as it was not enough time to find and work with more participants for this study.


Ethical Reminders
  - Survey will require first name only, phone numbers, emails, which are to be erased at a later date. Names will be changed for codes.
  - Participants and households need to sign a waiver acknowledging that they understand the scope of the project and will receive confidentiality in the research report. All observations and data containing their names associated with personal data will be transcribed and altered to create confidentiality.
  - Participants will be made aware of what is being recorded at each phase, and when a tape recorder is in use.
  - Participants must agree to all parts of the research project and sign the waiver in order to take part in the research.

Interview Guide
Available in Appendix 2

Required Tools and Extra Preparation
  - Paper, tape, tacks, printer, computer – for research recruitment posters going on boards in grocery stores, cafes, local businesses, etc.
  - Print out Letter of Certificate and Informed Consent forms to first grocery shopping observation
  - Bring notebook, pen – for writing notes during participant observation and interviews. Bring Dictaphone to all interactions with participant (Cost $57)
  - Print out Interview Guide (Appendix 2) and bring to final interviews
  - Waste Measuring Kit: food scale, waste diary (Total cost: $15 per household * 6 households = $90)
  - Book interview dates a couple days after the waste diary has been picked up from participant. Allow time for reading data before going to interviews.

Participant Database
Presented in Chapter 5, tables 2 and 3.
Names have been changed to allow for the use of certain data.
Appendix 2 Interview Guide

Introductory Question: *(Opening questions to get participant at ease)*
How did the last week go for you? Any interesting observations, insights or comments about this week?

What role does food play in your life?

Where do you normally get your food? Any other ways in which you acquire food? *(Gardening, BBC, specialty stores, farmers markets, etc.)* *(Materials, Competences)*

Can you list the main factors you consider before putting an item into your basket at the grocery store? *(Cost, taste, environmental impact, family preferences, etc.)* *(Practice/All 3 components)*

Would the sustainability or environmental impact of a product feature in your list? Where? *(Meanings)*

While you’re grocery shopping, do you ever think about how that food item will be used, where it will end up, or what part of it will get thrown out once it gets home? *(Competences)*

While you were grocery shopping I noticed that you did __________. For what reasons do you do this behaviour? *(Practice/All 3 components)*

Would you rather buy food in bulk and less often or buy single food items more often (ex: apples)? Why? *(All/practices)* *(Meanings)*

In the initial survey, you stated that you were __________ aware of sustainable food consumption issues. Could you expand on that by giving some examples of issues? *(What have you heard in regards to food that is an issue of sustainability? What are you concerned/not concerned about in terms of food sustainability?)* *(Competences)* *(If not aware: Have you heard of any issues concerning food? Do you concern yourself with those issues? Why or why not?)*

How would you define sustainable food consumption? *(Competences)* Can you give examples of what sort of daily food related activities would this involve? *(Practices)* *(If not aware of sustainability, talk about sustainability and ask them then to define sustainable food consumption).*

Do you have some daily practices that you feel would fit into your description of sustainable food consumption? *(Practice)* *(Possible question: What started these habits or your interest in sustainable food?)*

Do you feel that there are any barriers to consuming food sustainably? *(All 3 components)*

What is your opinion on sustainably labelled food, such as organic, local, free-range, etc.? *(Materials)*
During the weeklong waste diary, your household produced ____kg of food waste. Was that the amount you expected? The diary shows that most of that food waste was ____________, such as __________. Can you explain why that is or what household practices lead to that? (Practice)

The main reason you documented for throwing out food waste was __________. Why is that? (Practice/All)

Do you think that the food waste your household throws out has an impact on the environment? (Meanings)

What do you hear more about on TV, newspapers, or social media in regards to consuming food sustainably: buying sustainable food products (organic, local, etc.) or reducing food waste? Why do you think this is? Do you think this impacts your habits? Which do you think should be focused on more in regards to consuming food sustainably? (Meanings/Competences) Do you think creating a sustainable food system all depends on individual consumers? (Meanings)

Do you think food waste is a problem in the city, Canada, the world? (Meanings)

Do you think it should be the responsibility of individuals to reduce food waste? (Meanings)

Would you ever consider trying to reduce your household’s food waste? How would you do this and what would be your main motivations? What tools or information do you think you would need? (Or if they had no avoidable food waste, how do they do this would they still consider reducing food waste?) (All)

Last question, did you enjoy this experience and learn anything from it? Thank you for your participation, it is very much appreciated.
Appendix 3 Food Waste Diary Excerpt
Adapted from (Evans & Siemens, 2016, p. 96-99).

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**Household Food/Drink Waste Diary**

*Welcome to your Household Food Waste Diary*

Thank you for your participation in this Master thesis research project. The goal of this part of the project is to gain a better understanding of what food waste looks like in households in Edmonton. This should help inform future research projects and education campaigns related to food waste.

*What you need to do*

All food waste from meals prepared and eaten at home (including lunches taken to school or work) needs to be described and weighed each day for a week. Tracking your household’s daily food waste should only take about an hour a day. Food waste includes any food your household would normally throw away (peels, bones, apple cores, eggshells, tea bags, etc.), as well as any uneaten food/drink, leftovers, or food that has spoiled. It does not matter if it is a lot of food or a little bit of food, please write about it. **Please do not change your household’s weekly routine during the diary.**

All of the personal information collected here will be kept confidential throughout its use in the research project. No one is judging your household, and your household is not expected to change its habits or routines.

I have provided a waste measuring kit with some tools to help your household estimate its food and drink waste. This kit is yours to keep after the diary is complete.

---

**Instructions – Please read carefully**

1) The diary should take place over a typical week for your household. Starting on the morning of the first day and ending after the last meal on the 7th day (e.g. Start Monday morning and end Sunday evening).

   **Start Date:** ____________________________  **End Date:** ____________________________

2) This is your household’s waste diary. One sheet should be used to write down the waste from each main meal of the day (breakfast, lunch, and dinner). There are three sheets for each day. If your household eats many smaller meals or snacks throughout the day, record the waste on the meal sheet that is nearest in time.

   - e.g. Eating a snack at 10:30 am can be included with breakfast on the breakfast sheet
   - e.g. Dessert or a snack after dinner can be included on the same sheet as dinner

3) Please provide a full description of the food waste (as much information as possible), fill in all of the required information in each column. Some examples are given in the following pages. If you have a mixed food item such as soup, try to separate and weigh the ingredients individually. If this is impossible, simply describe the contents to the best of your abilities.

   - e.g. Soup (beef chunks, potatoes, carrots, celery, beef stock). 200g.

   In order to weigh out your food waste, please use the food scale provided. Please read the instructions on how to use the food scale. **Make sure the unit is set to grams (g) for both solid and liquid food. Do not include the weight of the packaging or container.** You can do this by putting a container on the scale, pressing “TARE” then adding the food waste into the container to be measured. Record this weight in the diary. **The scale has a weight limit of 5 kilograms (kg).** If your food waste weighs more than this, divide the waste and measure it a bit at a time.

4) Put a star (*) next to any food waste from food bought during our shopping trip. Keep receipt as a reminder.

5) An “Other Weekly Food/Drink Waste” sheet is included at the back of the diary. Please use this sheet to mark down any food/drink waste that is thrown out due to weekly cleaning out of the fridge/freezer/cupboards, or any extra food waste that did not fit into the three daily meal sheets.
Tips & Guidelines

- Please do not change your regular shopping, cooking, or eating habits during the diary. Continue with your daily habits and record any food waste thrown away.
- If anything out of the ordinary occurs for your household during the week, please write a description in the daily comments and thoughts section provided.
- If your household takes foods to work or school, please save the food waste so that it can be measured later.
- Do not leave any pages blank. If there is no food waste for that meal please leave a reason as to why in the comments section.

Remember - the information about your food waste should include:

- Waste from ALL household members
- Only food waste that is thrown away at home (do not include food bought at school, work or at restaurants).
- Please describe all types of food, no matter what it is (this includes food not normally eaten like coffee grounds, eggshells, bones, coroa, peels, etc.).
- Any extra food descriptions, (such as extra details about the food or if the food had a label that said it was organic, local, free-range, home-grown, sustainably farmed, etc.).
- The state of preparation of food items (fresh, still in packaging, prepared/served, cooked, canned, dried, etc.).
- All amounts of food/beverage measured in grams (from large amounts to amounts as small as 1 gram (g)). Liquids should also be weighed in grams.
- All reasons why food was thrown out (spoiled, leftovers, made too much, household didn't want to eat it, small amount not worth eating, going on vacation and food won't keep, not usually eaten, etc.).
- All means of food disposal (garbage, home composter, down the sink/drain, fed to animals, etc.).

At the end of the week, please return your entire food diary to Rachel, no later than April 20, 2017. Please call or email to arrange a pick-up time. racheltoschie@hotmail.com or 709-813-0933.
If you have any questions throughout the diary period please do not hesitate to call or email me. We will set the date for the follow-up interview at that time.

### Daily Food Waste Diary

**Date:** March 1, 2017  
**Day:** 1

<table>
<thead>
<tr>
<th>Meal</th>
<th>Breakfast</th>
<th>Lunch</th>
<th>Dinner</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of Food/Drink</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>State of Preparation</strong></td>
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<td></td>
</tr>
<tr>
<td><strong>Amount (g)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Extra Descriptions? Label?</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Method of Disposal</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Reason for Disposal</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cheerios</td>
<td>From box</td>
<td>5g</td>
<td>Fed to dog</td>
</tr>
<tr>
<td>Egg shells (2)</td>
<td>Fresh</td>
<td>18g</td>
<td>Garbage</td>
</tr>
<tr>
<td>Carrots</td>
<td>Fresh</td>
<td>200g</td>
<td>Garbage</td>
</tr>
<tr>
<td>Coffee</td>
<td>Prepared</td>
<td>100g</td>
<td>Sink</td>
</tr>
<tr>
<td>Soup (chicken noodle soup)</td>
<td>Prepared/Homemade</td>
<td>250g</td>
<td>Garbage</td>
</tr>
<tr>
<td>Type of Food/Drink</td>
<td>About Your Food Waste</td>
<td>Reason for Disposal</td>
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<td>Extra Descriptions? Label?</td>
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<tr>
<td></td>
<td>Method of Disposal</td>
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</tr>
</tbody>
</table>

**Thoughts/Comments on daily food waste?**

---

**Other Weekly Waste**

*Please include any food waste that occurred from cleaning out the fridge/freezer/cupboards, etc. or any other situation that was not a meal or snack.*

Thoughts or comments on Daily Food Waste: ________________________________

Any unusual circumstances that contributed to more waste than usual?: ________________________________

<table>
<thead>
<tr>
<th>Type of Food/Drink</th>
<th>About Your Food Waste</th>
<th>Reason for Disposal</th>
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