PLANT-BASED FOODS AND SUSTAINABILITY: PERCEPTIONS OF FARMERS MARKET CONSUMERS IN KAMLOOPS, BRITISH COLUMBIA

by

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ABSTRACT

Plant-based (PB) foods are generally more sustainable than animal-based (AB) foods when considering impacts on humans, animals, and the environment. Minimizing harm from the AB foods that are unsustainable may be done by reducing consumption and increasing the consumption of the PB foods that are sustainable. Consumers at the Kamloops Regional Farmers Market (n = 94) were surveyed to determine their perceptions of PB foods, AB foods, and lab-grown (LG) meats. Part one of the study included closed-ended questions. Quantitative statistical analyses (Spearman's rho, Mann Whitney U, and Independent samples *t*-tests) were conducted to determine relationships and differences in consumer food perceptions based on sociodemographic factors. Results were consistent with existing literature–being more educated, younger, already PB, and a woman are predictive of consumer PB food acceptance. AB food acceptance was highest amongst those who have a lower level of education, are older, and are omnivores. Part two of the study included free association questions on food perceptions. Qualitative analyses (thematic, content, and sentiment) were conducted. Consumers perceived PB foods positively while feeling unsure of AB foods and LG meats. The overarching themes consumers reported when reflecting on PB foods, AB foods, and LG meats were *Ethics*, *Curiosity*, and *Food and Health*. Consumers perceived AB foods as least ethical toward animals and the environment, were most skeptical of AB foods and LG meats, and viewed PB foods most positively in terms of food and health. There are possibilities for increasing the acceptance of sustainable foods by educating consumers at the micro-level and stakeholders at the macro-level on their benefits.

keywords: plant-based food, vegan, vegetarian, animal-based food, omnivore, lab-grown meat, sustainability, farmers markets, consumer perceptions, questionnaire, survey, qualitative, quantitative, Kamloops, British Columbia

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DEDICATION

First, I would like to dedicate this thesis to the nonhuman animals who are no longer with us due to anthropocentric use and abuse. Their plight has served as a driving force behind my research, as I strive to make a positive impact on their behalf. More specifically, I would like to extend infinite gratitude to my feline companion, Bugsy, whose unwavering presence has kept me going throughout my studies. He knows exactly when to hold my hand when I need support, and always keeps me company when I am working.

I would also like to dedicate this work to two significant people in my life. My interest in vegetarianism began at a young age, largely because my mother is predominantly vegetarian, and my brother has been vegetarian for as long as I can remember. As a young child, I often wondered why animals 'allow' humans to eat them. However, as time passed, I quickly realized that animals do not have a choice in this matter. I knew then that I would eventually become vegetarian as an adult. What I did not anticipate was that I would become plant-based and dedicate my academic career to the causes of animal welfare and animal rights.

I am immensely grateful to my mom and brother for inspiring me ever since I was a child, and to nonhuman animals and Bugsy for keeping me motivated and focused.

Thank you for helping me help animals. ♡

GLOSSARY OF ACRONYMS

AB: animal-based (foods)

AE: *Animal Ethics* (theme)

BC: British Columbia

CU: *Curiosity* (theme)

EE: *Environmental Ethics* (theme)

GC: green criminology

GMO: genetically modified organism

GHG: greenhouse gas (emissions)

IAI: *Illness, Allergies, and Intolerances* (theme)

KRFM: Kamloops Regional Farmers Market

LCA: life-cycle assessment

LG: lab-grown (foods/meats)

MRCD: meat-related cognitive dissonance

NR: *Naturalness or Realness* (theme)

PB: plant-based (foods)

TT: Taste and Texture (theme)

(+): *Positive* (sentiment)

(-): *Negative* (sentiment)

(?): *Unsure/neutral* (sentiment)

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CHAPTER 1. INTRODUCTION

The Food and Agricultural Organization of the United Nations (2018) defines a sustainable food system as "a food system that delivers food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition for future generations are not compromised" (p. 1). It is the responsibility of humans to ensure that we can adapt to help mitigate the effects of climate change. According to the Intergovernmental Panel on Climate Change, enabling climate resiliency involves achieving the goal of limiting global warming to 1.5°C by 2030 (Portner et al., 2023). One method to help mitigate the effects of climate change is through consumer dietary 'choices'[1] and adopting sustainable food systems. This introductory literature review chapter explores topics such as food and sustainability, the impacts of food on the environment, humans, and animals, consumer perceptions of food and diet, and other approaches to sustainable food. An overview of researcher positionality and research objectives follows.

Sustainability and Food

Sustainability, in general, is complex to define, and existing definitions of sustainability using the triple-bottom-line approach merit criticism. The United Nations (n.d.-a) defines sustainability as "an integrated approach that takes into consideration environmental concerns along with economic development," where "the needs of the present [generations are met] without compromising the ability of future generations to meet their own needs" (n.p.). The United Nations Industrial Development Organization (n.d.-a) defines corporate social responsibility as a method of achieving current and future sustainability goals, via the same 'triple-bottom-line approach' as their approach to a sustainable food system. Organizations may 'bluewash' consumers, which is when they utilize the United Nations' sustainability guidelines without grounding to mislead consumers into believing the organization is socially and environmentally responsible, even if their actions are not in line

[1] This thesis acknowledges that there are systemic barriers (e.g., intersectional factors including socioeconomic status) in regard to individual decisions on food, and that the foods individuals consume are not always a result of free choice. Alternate wording is used where possible, such as 'decisions' or 'options,' since these do not indicate that the foods consumed are a result of choice. Using such wording helps encapsulate that food may be consumed based on decision factors, including cost and other accessibility barriers.

with such claims (Berliner & Prakash, 2014). 'Greenwashing' is also common amongst organizations, where claims of sustainability in advertising are misleading via selective disclosure, false claims, misleading labels or certifications, misleading claims of ineffective volunteer programs, misleading discourse, and ineffective partnering with non-government organizations (Becker-Olsen & Potucek, 2013; Jones, 2019)[2]. Greenwashing, or green capitalism, creates a false sense of 'ethical consumerism' where consumers believe they are making green decisions on the products they are purchasing (Budinsky & Bryant, 2013; Jones, 2019).

German et al. (2017) argue that there may be up to 37 factors involved in sustainability, which include broad categories such as water use, profit, costs, welfare (humans and animals), yield, energy use, biodiversity (plants, invertebrates, and vertebrates), greenhouse gas emissions, pollination, and soil. Drury et al. (2023) argue for a more inclusive definition of sustainability:

> In all decisions and actions on any scale, from the individual to the institutional, we should minimise our immediate and future negative impact on humans, other animals, and the planet, while simultaneously maximising our positive impacts on these domains (p. 1925).

This thesis includes the following three main ethical factors to define sustainability: (1) the environment, (2) humans, and (3) animals. Environmental ethics include justice for all living beings that are not animals, whether human or nonhuman. Some examples include water, biodiversity (plants, invertebrates, and vertebrates), air, land, and soil. Animal ethics includes all animals that are not humans, including mammals, birds, fish, reptiles, and amphibians. Human ethics include health, social, and economic factors related to the well-being of humans. The approach toward a sustainable future to reduce the harmful effects of climate change needs to be one in which the interconnected needs of the planet are considered together. Overall, animal agriculture impacts the environment, human health, and animal welfare (Anomaly, 2015; Drury et al., 2023), amongst many other intersectional factors, including but not limited to ethnicity, gender, and species (Lynch, 1990).

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[2] Greenwashing is a term originally coined by Jay Westerveld in 1986 (Becker-Olsen & Potucek, 2013).

Sustainability: Impacts of Plant- and Animal-based Foods

Regarding sustainability, meaning various sub-factors affecting humans, animals, and the environment, there are drawbacks to both PB and AB foods. However, PB foods tend to be more sustainable than AB foods when considering environmental factors throughout the life-cycle assessment (LCA), such as GHG emissions, water use, and land use (Poore & Nemecek, 2019; Van Kernebeek et al., 2014; Van Mierlo et al., 2017; Wickramasinghe et al., 2021), human health factors (Maier et al., 2023; Richi et al., 2015; Sievert et al., 2022; World Health Organization, 2023), and animal ethics (Anomaly, 2015; Delon, 2018). However, some PB foods do have adverse effects on the environment (Food Empowerment Project, n.d.-b, n.d.-a; International Labour Organization, 2023), human health (Maier et al., 2023; Rodrigez-Martin et al., 2023), and human justice (e.g., forced labour) (Fairtrade International, 2018; Food Empowerment Project, 2022; International Labour Organization, 2023; International Labour Organization & United Nations Children's Fund, 2021; Whoriskey & Siegel, 2019)

Environmental Impacts

Food and agriculture tend to have a significant impact on the environment. Compared to omnivorous diets, vegan and vegetarian diets tend to have lower overall environmental impacts (Baroni et al., 2007; Chai et al., 2019; Clark & Tilman, 2017; Rosi et al., 2017). For example, 26% of greenhouse gas (GHG) emissions,[3] 50% of land use, 70% of water use, 78% of eutrophication (includes ocean and freshwater pollution), and biodiversity, including livestock which take up 94% of mammal biomass[4] and poultry which take up 71% of bird biomass, are the result of agricultural food practices globally (Food and Agricultural Organization of the United Nations, 2018; Poore & Nemecek, 2019; Ritchie et al., 2022). Food decisions impact climate change, and AB foods[5] tend to have a larger environmental

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[3] GHG emissions are produced across the supply chain, including from land use change (e.g., from deforestation and soil carbon changes), farming (e.g., from livestock, rice, fertilizers, manure, and farm machinery), animal feed (e.g., from crop production and processing feed), processing (e.g., from energy use from farm-to-table), transportation (e.g., from energy use on a local and global scale), retail (e.g., from energy use including refrigeration), and packaging (e.g., from production, transport, and disposal) (Poore & Nemecek, 2019; Ritchie, 2020).

[4] Excludes humans.

[5] For the purpose of this thesis, animal based (AB) foods include any food products sourced from animals, such as meat, dairy, fish and seafood, and eggs.

impact than PB foods[6] (Van Kernebeek et al., 2014; Van Mierlo et al., 2017; Wickramasinghe et al., 2021). PB foods are generally lower in GHG emissions, land use, water use and eutrophication than AB foods, with some exceptions discussed below (Poore & Nemecek, 2019; Van Kernebeek et al., 2014; Van Mierlo et al., 2017; Wickramasinghe et al., 2021).[7] However, it is important to consider that omnivorous and PB diets do overlap in what they consume, as omnivores do still consume PB foods (e.g., coffee, chocolate, nuts, and other foods such as fruits, vegetables, and grains) in addition to AB foods (e.g., dairy milk, beef, and other foods such as cheese, fish, lamb, and poultry).

When comparing PB and AB protein and milk sources, PB foods generally fare better than AB foods. GHG emissions from AB foods such as beef and dairy, with beef cattle producing 99.48 CO_2eq/kg and dairy cattle producing 33.30 CO_2eq/kg, are much higher than that of comparative PB foods such as tofu (3.16 CO_2eq/kg) and soy milk (0.98 CO_2eq/kg) (Poore & Nemecek, 2019).[8] Land use follows a similar trend where both beef cattle (326.21 m^2/kg) and dairy cattle (43.24 m^2/kg) utilize more land than tofu (3.52 m^2/kg) and soy milk (0.66 m^2/kg) (Poore & Nemecek, 2019).[9] Water use also follows a similar trend where both beef cattle (2714 L/kg) and dairy cattle (1415 L/kg) withdraw higher volumes of freshwater than tofu (149 L/kg) and soy milk (28 L/kg; Poore & Nemecek, 2019).[10] Dairy (365.29 PO_4eq/g) and beef (301.41 PO_4eq/g) cattle fare similarly in that they result in more eutrophication than tofu (6.16 PO_4eq/g) and soy milk (1.06 PO_4eq/g) (Poore & Nemecek, 2019; Ritchie et al., 2022). These results are consistent with Clark and Tilman's (2017) findings on the environmental impacts of food:

> For all indicators examined, ruminant meat (beef, goat and lamb/mutton) had impacts 20–100 times those of plants while milk, eggs, pork, poultry, and seafood had impacts 2–25 times higher than plants per kilocalorie of food produced (p. 8).[11]

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[6] For the purpose of this thesis, plant-based (PB) foods include any food products sourced from plants, such as fruits, vegetables, nuts, seeds, beans, legumes, and grains.

[7] Measurements typically include all stages of the LCA of food, animal being transport between stages, pre-farm activities, farm processes, packaging, distribution, household activities, and waste (see Veeramani et al., 2017).

[8] GHG emissions are measured over a 100-year cycle and per kilogram of food.

[9] Land use is measured via square meters per kilogram of food.

[10] Water use is measured via litres of freshwater withdrawals per kilogram of food.

[11] Clark and Tilman (2017) used the following indicators: GHG emissions, land use, energy use, acidification, and eutrophication.

Findings were also consistent with Baroni et al. (2007) and Kustar and Patino-Echeverri (2021), who found that in terms of overall environmental impacts, omnivorous diets, in general, had the highest impacts, with beef having the highest impacts, and dairy following closely behind.

There are some exceptions of PB foods that fare high regarding their environmental impacts. In terms of GHG emissions, coffee produces 28.53 CO_2eq/kg and dark chocolate produces 46.65 CO_2eq/kg, which is much higher than that of other PB foods (Poore & Nemecek, 2019; Ritchie et al., 2022). In terms of land use, dark chocolate (68.96 m^2/kg) and coffee (21.62 m^2/kg) use more land than that of other PB foods (Poore & Nemecek, 2019; Ritchie et al., 2022). Regarding water use, nuts (4134 L/kg) withdraw much more freshwater than other PB foods (Poore & Nemecek, 2019; Ritchie et al., 2022). In terms of eutrophying emissions, coffee (110.52 PO_4eq/g) and dark chocolate (87.08 PO_4eq/g) produce more than most other PB foods (Poore & Nemecek, 2019; Ritchie et al., 2022).

While Crippa et al. (2021) found that only 4.8% of global GHG emissions are the result of food transport, a more recent study found that "food-miles emissions may be 3.5 to 7.5 times higher than previous estimates" (Li et al., 2022, p. 450). Li et al. (2022) found that food miles may account for 20% of global food system emissions. Fruits and vegetables are the highest emitters, and Li et al. (2022) found that local purchasing, rather than international trade, may be more environmentally sustainable. When thinking of environmental impacts of different transportation modes of food in general on a global scale, air transport fares the worst (1.13kg CO2eq per tonne-kilometer), followed by road transport (0.40kg CO2eq per tonne-kilometer), rail transport (0.06kg CO2eq per tonne-kilometer), and water transport (0.02kg CO2eq per tonne-kilometer) (Poore & Nemecek, 2019).

Food waste across the LCA has negative impacts on the environment. Higher quality diets, which include both PB and AB food items of high quality (emphasizing fruits and vegetables) and only moderate consumption of unhealthy foods, tend to fare worse in terms of food waste than lower quality diets (Conrad et al., 2018). While fruits and vegetables utilize less land than AB foods, they tend to be wasted more frequently by consumers (Conrad et al., 2018). However, another study found that at the food packaging level, cereals, dairy and fish fared the worst regarding food waste (Heller et al., 2019). In the EU, approximately 75% of food waste emissions result from the production process, and in this

case, AB foods demonstrated the highest impacts from food waste (Scherhaufer et al., 2018). There is conflicting evidence on food waste of PB and AB foods, but food waste is an issue, nonetheless.

Monocultures are problematic for the environment and sustainability. These consist of:

> An agricultural operation growing one type of crop, say corn or wheat, in a specific area of land. Sometimes, a monoculture can refer to planted forests or other human-made ecosystems that primarily contain one species of plant, like lawns. It can also include farming one species of animal in a single area (Olafsson, 2023, n.p.).

Monocultures have several social economic and environmental risks, including higher pesticide and fertilizer use (see the next section for the drawbacks of pesticide and fertilizer use), negative impacts on pollinators, decrease in ecosystem biodiversity (impacting plants and animals), susceptibility to pests, soil degradation, and economic risks for farmers if yield outputs are affected (Balogh, 2021; Crews et al., 2018; Olafsson, 2023; Yang et al., 2023). Switching to polycultures and diversifying crop rotation in a way that is more similar to the natural ecosystem can help mitigate some of these issues, including increasing food production yields, improving soil health (e.g., carbon, and nutrients), reducing GHG emissions, reducing water infiltration, and reducing biodiversity loss (Crews et al., 2018; Yang et al., 2023). Monocultures are the result of both PB and AB food production, whether it be not rotating crops, or monocropping (e.g., corn, wheat, and soy), for both human consumption and animal feed, or only having one species of animal produced for food on the land (e.g., livestock, and chickens) (Balogh, 2021; Crews et al., 2018; Olafsson, 2023; Yang et al., 2023).

Impacts on Human Health and Justice

Both PB and AB foods negatively impact humans in terms of health and justice. For instance, red and processed meats have the potential to worsen human health outcomes in terms of non-communicable disease, including increasing risk of heart disease, certain cancers, and diabetes, as well as obesity (Maier et al., 2023; Richi et al., 2015; Sievert et al., 2022; World Health Organization, 2023). Other issues resulting from the consumption of animals include antimicrobial resistance, transference of zoonotic diseases, food safety risks, respiratory health risks (residing near livestock production), issues regarding worker welfare, and excess consumption of calories (Smit & Heederik, 2017; World Health Organization,

2023). However, a possible concern in terms of PB diets is nutritional adequacy, such as lack of vitamin B12, iron, omega-3, and protein, as well as having higher contents of carbohydrates and sugars (Maier et al., 2023; Rodrigez-Martin et al., 2023). However, it is possible to supplement for nutritional deficiencies and look for PB foods with lower carbohydrate and sugar contents. Issues surrounding consuming carbohydrates, sugars, and processed foods can be problematic not only in PB foods, but also with AB foods.

Contrastingly, some literature found that Mediterranean diets,[12] consuming more white than red meats, PB diets, and consuming alternative proteins are linked to a healthier nutritional profile, including in terms of fibre and saturated fat contents (Fresán & Sabaté, 2019; González-García et al., 2018; Rodrigez-Martin et al., 2023). Overall, there is conflicting evidence regarding the health impacts of PB and AB diets, yet PB diets fare better in terms of health outcomes. This is permitting there is adequate supplementation for vitamins and nutrients (e.g., taking supplements and consuming healthy foods like fruits, vegetables, whole grains, legumes, nuts, and seeds), as well as ensuring to avoid carbohydrates, sugars and processed foods (Wang et al., 2023).

There are issues surrounding toxins that are present in the production and consumption of both PB and AB foods. One example is the 'dirty dozen,'[13] which include food additives and preservatives (Meyers, 2024). These toxins can be found in PB and AB foods, and include possible health risks such as cancer, developmental harm, reproductive harm, issues regulating metabolism and weight, behavioural difficulties, liver and kidney injuries, and hormone disruption (Meyers, 2024). Pesticides[14] and fertilizers used in agriculture are also of concern, as they can lead to both acute and long-term toxicity by ingestion by food and contaminated water and exposure (e.g., to farmers and nearby communities), which include effects on the nervous system, endocrine system, hormone

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[12] The Mediterranean diet can be defined as being "predominantly a plant-based diet, rich in fruits, vegetables and nuts, with moderate consumption in olive oil as fat source, as well as low in meat, added sugars, saturated fatty acids and salty snacks" (González-García et al., 2018, p. 78).

[13] Includes potassium bromate, butylated hydroxyanisole (BHA), tert-butylhydroquinone (TBHQ), propylparaben, butylated hydroxytoluene (BHT), titanium dioxide, brominated vegetable oil (BVO), artificial colours, propyl gallate, artificial sweeteners, azodicarbonamide (ADA), and sodium benzoate (Meyers, 2024). Some of these are banned in Canada.

[14] Includes various pesticide subgroups targeting different pests, including antimicrobials, fungicides, herbicides, insecticides, and rodenticide (Srivastava & Kesavachann, 2016).

system, reproduction system, circulatory system, respiratory system, and energy system (Dhankhar & Kumar, 2023; Srivastava & Kesavachann, 2016). The Earth Working Group (2023) analyzed 46 fruits and vegetables in the United States for pesticide content. While PB foods contain pesticides and fertilizers, some contain low amounts, and organic foods are the safer choice in this regard (Earth Working Group, 2023).

Of concern as a result of animal husbandry is antibiotic use in the breeding of farm animals (e.g., livestock, poultry, and pigs) (Khmaissa et al., 2024). Human health risks can occur as a result of environmental pollution from antibiotic use in animal husbandry (e.g., contamination of water, soil and plants through the use of antibiotics as fertilizers and manure) and by direct consumption of meat (Khmaissa et al., 2024). While antibiotic use in animal agriculture results from the production of AB foods, it nonetheless still affects the PB foods being grown nearby (Khmaissa et al., 2024).

Environmental racism is an issue resulting from the production of food in general. Some imported PB foods result in labour rights issues, health risks, and environmental racism in peripheral communities, including bananas, palm oil, chocolate, and coffee (Rainforest Alliance, n.d.). Workers in developing nations experiencing forced and child labour in these production sectors face working conditions that are sub-par, resulting in exposure to chemicals, injuries, not seeing their families, not making a living wage, and not having access to education (Fairtrade International, 2018; Food Empowerment Project, 2022; International Labour Organization, 2023; International Labour Organization & United Nations Children's Fund, 2021; Whoriskey & Siegel, 2019). Coffee and banana production in developing nations also result in deforestation, loss of soil biodiversity and water pollution in peripheral communities (Food Empowerment Project, n.d.-b, n.d.-a; International Labour Organization, 2023). The production of palm oil in Malaysia and Indonesia has led to environmental destruction, including:

> Fires set to clear forests and create land for more palm plantations are the top source of greenhouse gas emissions in Indonesia, a country of 261 million people. The financial incentive to produce more palm oil is helping to warm the planet, while destroying the only habitat of Sumatran tigers, Sumatran rhinos and orangutans – driving them towards extinction (Tullis, 2019, n.p.).

Tofu production also results in environmental racism. One example is tofu production in the Suhigmanik Village in Indonesia. Tofu production has led to solid and water waste in

the community, meaning the peripheral communities suffer from groundwater and nearby river pollution (Hartini et al., 2023). However, animal feeding operations (AFOs) can also result in environmental racism (e.g., water and air pollution), possibly causing human illness, including gastrointestinal and respiratory illnesses in developing nations and peripheral communities (Centers for Disease Control and Prevention, n.d.). Additionally, rather than allocating land use for animals and animal feed, "growing food exclusively for direct human consumption [meaning, plant-based foods] could, in principle, increase available food calories by as much as 70%, which could feed an additional 4 billion people" (Cassidy et al., 2013).

Migrant workers in Canada also experience slavery and exploitation. A United Nations (2023) expert calls this contemporary slavery and points out that out of the fear of deportation, migrant workers may not be able to report abuse from employers. Those who already experience systemic discrimination are most likely to experience contemporary slavery, including not only migrant workers, but also Indigenous Peoples, persons with disabilities, and people of colour, who then experience trauma a second time over (United Nations, 2023). Migrant workers typically work in agriculture, including "the planting and harvesting of fruits and vegetables to meat processing" (Al Jazeera, 2023). This worker exploitation unfortunately occurs in both the production of PB and AB foods.

Impacts on Animals

Food decisions not only impact the environment and humans, but they also impact animals. Whether it be agricultural farming practices, backyard chickens, the destruction of habitats (e.g., palm oil and resulting deforestation), or hunting, there is a degree of physical harm to animals. Harm to animals can be defined as the mistreatment of animals, which may or may not lead to death. Factory farming operations, also called concentrated animal farming operations (CAFOs), result in the unethical treatment of farm animals via inadequate regulating policies (Halteman, 2011). In Canada, there lacks federal laws protecting the well-being of farm animals, as only minimal provincial regulations and federal guidelines exist on space allotted per animal on farms and in transport, for their veterinary care, and for their access to food and water on farms and in transport (Government of Canada, 2022c; Health of Animals Regulations, 2022; National Farm Animal Care Council, n.d.). Animals in CAFOs

are typically confined into the smallest spaces possible for reasons of cost, time and space efficiency (People for the Ethical Treatment of Animals, n.d.; The Humane League, 2021a).

In order to minimize pain and suffering, farm animals used for food are initially stunned during pre-slaughter (Canadian Food Inspection Agency, 2019; The Humane League, 2021b). However, these are not without fault, as animals are not always adequately stunned (David, 2020). This is followed by slaughter practices that vary depending on the animal (e.g., livestock, poultry) (see Canadian Food Inspection Agency, 2019; The Humane League, 2021b). While this is not the case in every farming operation, footage has been released of farm animal mistreatment in pre/slaughter practices. David (2020) and McArthur et al. (2020) have documented through both video and photo footage what occurs behind closed doors in CAFOs, and policies to reduce harm to animals are not always followed. While CAFOs result in the most extensive degree of harm to animals and the environment, they also magnify human health concerns, including poor worker conditions including long hours, workers experiencing physical pain from the intensive physical nature of the job, unsanitary conditions, and negative effects on mental health (Anomaly, 2015; David, 2020).

There are other cultural or religious approaches, including Halal practices of pre-slaughter stunning and slaughtering of farm animals. Despite efforts to reduce harm, there is a debate about the ethics of modern-day Halal practices (not traditional practices), which, without generalizing, now share some similar approaches to other practices mentioned above (Animals Australia for a Kinder World, 2015; Riaz et al., 2021). Grandin and Johnson (2006) suggest improved measures for slaughtering farm animals, which emphasize ensuring that protocols are carefully followed to minimize harm during both pre-slaughter and slaughter. However, it is important to note that animals are not always consumed disrespectful, particularly in some Indigenous hunting food practices (see p. 14-15). Reducing the consumption of AB foods produced in unethical ways, particularly in CAFOs, means reducing harm caused to animals.

Other Possible Sustainable Food Options

There are other approaches to perceived sustainable foods besides consuming PB foods. Some possible approaches to sustainable eating and food production include consuming local, seasonal, and organic foods, urban agriculture, sustainable agriculture, insects, lab-grown meats, and traditional Indigenous approaches to food. Although, whether

due to mixed evidence or degrees of greenwashing, selecting sustainable foods may not be straightforward for consumers. However, to reduce the environmental impacts of food, consuming PB over AB foods may be helpful (Ritchie, 2020), as well as selecting foods based on the assessment of various LCA factors, including reducing food waste. Other potentially sustainable food options are nonetheless presented below.

Another possibility is eating local and seasonal foods. Consumers commonly assume that local and seasonal foods are more sustainable than imported food, but this may not always be the case (Macdiarmid, 2013; Polleau & Biermann, 2021). The locavore movement assumes that foods that travel farther from farm-to-table emit higher GHG emissions and are consequently worse for the environment (Lewis & Mitchell, 2014). Food miles as a single factor do not necessarily equate to the degree of environmental harm, as LCA factors such as land use, GHG emissions, animal feed, processing, transport, retailing and packaging must be taken into consideration (Lewis & Mitchell, 2014; Poore & Nemecek, 2019; Ritchie, 2020). In terms of beef, which is the least sustainable food based on the above factors, transport only accounts for 1.0% of its total environmental impact (Poore & Nemecek, 2019; Ritchie, 2020). However, local foods that are in season can be lower in energy use (due to the use of natural vs. artificial lighting) and GHG emissions than those out of season (Macdiarmid, 2013).

There is conflicting evidence on the sustainability of organic foods. Regarding factors such as resources used, the quality of the ecosystem, and human health, organic diets fared better than their conventional counterpart, whether omnivorous, vegetarian or vegan (Baroni et al., 2007). Clark and Tilman (2017) found that, in general, organic food systems may be less sustainable than conventional counterparts in terms of land use (25 to 110% higher) and eutrophication (37% higher), yet they are more sustainable in terms of energy use (15% lower) and fare similarly into terms of GHG emissions (4% lower) and acidification (13% higher). In terms of GHG emissions, Chiriacò et al. (2022) found that organic foods (both PB and AB) tend to be more sustainable than conventional foods, specifically in terms of GHG emissions per land unit (43% lower) and per produce unit (12% lower). However, specific differences are based on various food items (see Table 1.1).

Table 1.1

Average Degree of Organic vs. Conventional Environmental Impacts of Different Foods

Food Groups	Environmental Impact Factors				
	GHG Emissions	Land Use	Eutrophication	Acidification	Energy Use
Cereals	Slightly Higher	Higher	Higher	Higher	Lower
Pulses/Oil Crops	Slightly Lower	Higher	Higher	Slightly Lower	Lower
Fruits	Lower	Higher	Higher	No Data	Slightly Lower
Vegetables	Slightly Higher	Higher	Higher	Higher	Higher
Dairy/Eggs	Slightly Higher	Higher	Slightly Lower	Higher	Lower
Meats	Slightly Higher	Higher	Higher	Higher	Slightly Lower
Total Impact	NS[1]	Higher**	Higher*	NS[1]	Lower*

Note. Comparison of the average degree of environmental impacts of different organic vs. conventional food groups. Based on Clark and Tilman (2017).

[1]Insignificant.

*$p < .05$, **$p < .001$

According to the Food and Agriculture Organization of the United Nations (n.d.), organic agriculture is more sustainable amongst various environmental factors. These include long-term sustainability (by taking a proactive approach to issues surrounding soil fertility and pests), soil health (by avoiding mineral fertilizers to reduce erosion and nutrient loss and increase biodiversity), water (using organic fertilizers to reduce groundwater pollution), air (mitigating GHG emissions and climate change by reducing uses of non-renewable energy), biodiversity (including in terms of genes, species, and ecosystems), and natural resource degradation (including "soil forming and conditioning, soil stabilization, waste recycling, carbon sequestration, nutrients cycling, predation, pollination and habitats") (Chiriacò et al., 2022; Food and Agriculture Organization of the United Nations, n.d.; Rahmann, 2011). The limitations of these findings on organic foods are they are predominantly from Western countries within Europe and North America.

Another potential option for sustainable food production is sustainable agriculture. For example, urban agriculture includes both commercial and non-commercial spaces, including personal home gardens, community gardens, aquaponics, rooftop gardens, and vertical indoor production (Gustavsen et al., 2022; Sanyé-Mengual et al., 2016). Urban food gardening may be a solution to the densification of cities. Still, there are challenges in measuring the sustainability of such food systems, whether in terms of water use, food security, biodiversity, or air quality (Gustavsen et al., 2022; Jahrl et al., 2022). However, turning urban spaces into productive spaces for the local production of food may provide benefits in areas of sustainability, such as social and environmental benefits, and economic opportunities for stakeholders (Sanyé-Mengual et al., 2016). Some examples of sustainable

agriculture include sustainable livestock ranching, sustainable forest management, crop rotations and varieties, high-yielding hybrids, conservation agriculture, soil redesign, agroforestry, and aquaculture and aquaponics (Campanhola & Pandey, 2018). The United Nations Environment Programme (2021) states that sustainable agriculture need not be vegan, but that a reduction in AB food consumption, particularly livestock, is imperative for current and future generations due to significant outputs of GHG emissions.

Insects as food may provide opportunities for sustainable food. Edible insects, an alternative protein source, can potentially help food security on a global scale (Alhujaili et al., 2023; Żuk-Gołaszewska et al., 2022). While insects have been eaten by various cultures historically, the main barrier to adopting this alternative is the low acceptance rates of edible insects among Western cultures (Alhujaili et al., 2023; Żuk-Gołaszewska et al., 2022). Factors of low acceptance toward insect-based foods include "disgust, food neophobia, familiarity, visibility of insects, and taste… [while] motivations for acceptance are found to be familiarity and exposure" (Alhujaili et al., 2023, p.1). Those who are younger and more educated tend to be most open to insect-based foods (Alhujaili et al., 2023).

Lab-grown meats and other cultured foods have the potential to be sustainable food options as well, particularly in the reduction of harm to animals. However, the LCA of lab-grown meat in its current small-scale and expensive production methods may be less sustainable than beef, specifically in terms of energy use, and carbon dioxide emissions (Risner et al., 2023). Contradictory evidence found that lab-grown meat can help reduce land use, water use, energy use, and GHG emissions from methane compared to beef cattle (Penn, 2018; Roy et al., 2021). Overall, there remain questions about LG meat and sustainability in terms of the environment, cost, culture, and human health (Roy et al., 2021).

Traditional Indigenous food practices merit consideration in the approaches to mitigating climate change. This brief overview utilizes many perspectives from different Nations and Peoples and does not aim to generalize Indigenous knowledge. At the 2017 Onjisay Aki International Climate Summit, which included global knowledge from Knowledge Keepers from 14 Nations, Elder Courchene stated the following, "Climate change is a reflection of values" (as cited in Climate Atlas of Canada, n.d., n.p.). In other words, Colonial values have led to the destruction of the land through Eurocentric values rooted in greed, disrespect, ignorance, and domination (Cameron et al., 2021). Traditional

food practices are typically perceived holistically, emphasizing wellness for all (including humans in present and future generations, animals, the land, and plants) (Cameron et al., 2021). (Cameron et al., 2021) summarize findings from conversations at the Summit:

> Community members shared observations about changes in the abundance, distribution, and health of species (e.g., fish are smaller and have sores). Drivers of these changes identified include climate-related differences observed over time, from more drought in the summer (necessitating frequent fire bans) to longer growing seasons. Also shared was the observation of a growing number of invasive species that have altered plants and local food, including the presence of wildlife in the area. Some shared that environmental contaminants have also been responsible for impacting water and soil quality (road spraying oil and salts), including chemical waste dumped in waterways from a factory… As a result of these changes to local sources of food, communities have expressed having to travel further to hunt and fish because there's not the same accessibility as there used to be (p. 8).

Williams Treaties First Nations in Ontario discusses the need for restoring traditional food systems and knowledge, which should be part of the solutions relating to food and climate change, particularly when considering food security and sustainable food (Domingo et al., 2021). Traditional Indigenous approaches to food differ from Western approaches based on commodity, as they are instead rooted in respectful relationships between human and nonhuman beings, notably the land and animals (Auerbach, 2018; Nadasdy, 2007). The local Indigenous Secwẻpemc Peoples within the traditional lands of Tk'emlúps te Secwẻpemc take a similar approach to the respectful relationships between humans, the land, animals, and plants (Stk'emlupsemc Te Secwepemc Nation, n.d.). Some Indigenous Peoples, particularly in Northern Canada, describe the hunting of animals as a gift resulting from "a process of reciprocal exchange between hunters and other-than-human persons" (Nadasdy, 2007). This relational approach to hunting can be viewed as an effort to maintain sustainable relationships between human and nonhuman beings.

Consumer Demographics and Food Perceptions

Intersectional factors such as being female, younger in age, already being PB, a higher education level, a left-leaning political orientation, and living in an urban space seem to be predictive of PB food acceptance (Bryant & Sanctorum, 2021; Onwezen et al., 2021).[15]

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[15] Onwezen et al. (2021) compiled data from Australia, Belgium, Germany, Italy, the Netherlands, Switzerland, the United Kingdom, and the United States. Bryant and Sanctorum (2021) collected data in Belgium.

Older consumers (65+) tend to view dairy as the most acceptable, and PB alternatives as the most sustainable, while lab-grown meat was viewed as the least acceptable and sustainable (Grasso et al., 2019).[16] Contributing factors toward the acceptance of sustainable protein alternatives are pre-existing habits of eating sustainably and a higher achieved level of education (Grasso et al., 2019). Faber et al. (2020) found that young consumers aged 18 to 30 perceived PB diets as either neutral or slightly positive, citing benefits to human health, the environment, and animals.[17]

It is important to note that the majority of the studies being referred to in terms of sociodemographics and their relationships with PB food acceptance are in Westernized countries, including Europe and North America. However, none of the existing data on the acceptance of PB foods was collected in Canada, which this study attempts to help fill some of this gap at a small scale. This study did not have the opportunity to assess the differences in food perceptions amongst Eastern countries and cultures, nor Indigenous perspectives.

Kamloops, British Columbia (BC) is a medium-sized population centre of 92,442 (Statistics Canada, 2021) with a unique "mix of rural, small town, and small city dynamics" (Crabbe, 2011, p. 48-49) (see Table 1.2). In terms of age, the Kamloops population is dispersed similarly across adult age groups (Statistics Canada, 2021).[18] In terms of education, the majority of those in Kamloops have some type of postsecondary education (Statistics Canada, 2021).[19] The dispersion of men+ and women+ within the population of Kamloops is also relatively distributed equally (Statistics Canada, 2021).[20]

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[16] Grasso et al.'s (2019) data was collected in Belgium.

[17] Faber et al. (2020) collected data in Belgium, Denmark, the Netherlands, and Spain.

[18] Only adult ages are included and are based on the Statistics Canada (2021) census for Kamloops. The presented ages are based on existing age categories within the census, resulting only in the inclusion of the ages 20+.

[19] Based on a sample of 25% of the Kamloops population from Statistics Canada(2021). Postsecondary indicates any type of postsecondary education.

[20] According to Statistics Canada (2021), men+ is defined as "men (and/or boys), as well as some non-binary persons," and women+ is defined as women (and/or girls), as well as some non-binary persons" (n.p.). Population statistics on gender are based on the age category, as no total count of men+ and women+ was provided, and the age population count (92,445) is similar to the total population count of 92,442 (Statistics Canada, 2021).

Table 1.2
Kamloops, BC Population Centre Sociodemographic Characteristics

Characteristic	Population	
	N	%
Age		
20-29	12,935	14.0%
30-39	12,940	14.0%
40-49	10,735	11.6%
50-59	11,970	12.9%
60-69	12,020	13.0%
70+	13,355	14.4%
Gender		
Women+	47,080	51.0%
Men+	45,365	49.1%
Education		
No postsecondary	17,950	36.2%
Postsecondary	30,005	62.5%

Note. Kamloops, BC population sociodemographic characteristics. Based on Statistics Canada's (2021) census data ($N = 92,442$).

Being a farmers market consumer is a possible factor in more conscientious food decisions. This research specifically looks at Kamloops Regional Farmers Market (KRFM) consumers. However, Kamloops population statistics are not representative of the KRFM population, and the statistics available do not aid in making predictions of PB food acceptance in Kamloops. Generally, farmers market consumers who attend markets more frequently tend to be more conscious of their food decisions, displaying positive attitudes toward the environment and negative attitudes toward industrial food production (Cicia et al., 2021). Those who shop at farmers markets also tend to consume more fruits and vegetables (Jilcott Pitts et al., 2015). It is, however, important to note the privilege of farmers market consumers who are typically white women with access to education and economic resources (Alkon & McCullen, 2011a; Rice, 2015). The discourse on healthy foods tends to ignore decisions made based on cost and accessibility, while attempting to emphasize only the morality of consuming sustainable foods (Alkon & McCullen, 2011b). This presents a larger systemic issue where the onus of consuming sustainable foods should not be placed on the individual.

The Saturday KRFM is considered a large market (40-99 vendors) with an estimated 900 shoppers per hour during peak season, while the Wednesday market is a medium-sized market (20-39 vendors) with approximately 500 shoppers per hour (Connell & British Columbia Association of Farmers Markets, 2012). Of the 33 (out of 159) assessed farmers markets in BC, the Saturday KRFM was the sixth largest in average hourly attendance in

2012 (Connell & British Columbia Association of Farmers Markets, 2012). BC farmers market consumers viewed "nutritional content, grown/produced in BC, in season, grown/produced locally, and animal welfare" as the most important food purchase decision factors, while "brand name, low price, and certified organic" were perceived as least important (Connell & British Columbia Association of Farmers Markets, 2012, p. 13). Consumer food decisions on both PB and AB foods are limited in terms of farmers market populations. As such, a non-generalizable overview of general consumer perceptions is provided in the following paragraphs.

Consumers tend to perceive different foods in varying manners depending on a plethora of factors, including intersectional factors, while being picky lowered acceptance levels (Grasso et al., 2019). Other factors possibly impacting food decisions include a lack of knowledge on PB foods (e.g., preparing meals or nutritional information), perceptions of ethics and justice (e.g., humans, animals, and the environment), health, product availability, time, cost, taste, product origin, organic/non-GMO[21] vs. conventional, natural vs. processed, habits, convenience, values and beliefs, control over one's food decisions, and image (Faber et al., 2020; Lea et al., 2006). The meat paradox or meat-related cognitive dissonance (MRCD) may play a role in food perceptions due to contradicting beliefs and actions surrounding the consumption of AB foods (Bastian & Loughnan, 2017; Benningstad & Kunst, 2020; Bouwman et al., 2022; Monteiro et al., 2017; Rothgerber, 2014, 2020; Rothgerber et al., 2022; Rothgerber & Rosenfeld, 2021). It is, however, important to note that MRCD may not apply in all cases. For instance, Indigenous food practices do not perceive animal consumption as harmful, as a respectful relationship with animals is emphasized (Auerbach, 2018; Nadasdy, 2007).

If consumers can be made aware of their possible contradicting and inconsistent beliefs and behaviours surrounding consuming animals while believing, for example, that they love animals, that AB foods are bad for the environment, and that AB foods may not be healthy, then it may be possible for consumers to attempt to overcome MRCD (Monteiro et al., 2017; Rothgerber, 2014; Rothgerber & Rosenfeld, 2021). Some other ways that MRCD

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[21] Genetically modified organism.

displays itself is through self-image, where, for instance, a person holds the belief that they are compassionate, and that those who are compassionate do not harm animals, but they still consume animals (Rothgerber, 2014). Rothgerber (2014) found the following:

> There are a number of strategies that omnivores adopt to reduce this dissonance including avoidance, dissociation, perceived behavioral change, denial of animal pain, denial of animal mind, pro-meat justifications, reducing perceived choice, and actual behavioral change (p. 1).

However, being aware of such contradicting beliefs and maladaptive coping strategies to reduce the tension surrounding AB food consumption is likely only effective with those who are receptive to it and may even lead to the opposite behavioural changes of further justifying one's AB food consumption (Rothgerber & Rosenfeld, 2021). On the other hand, consumers likely cannot make more sustainable food decisions if they are not aware of how their own biases and beliefs play a role in what they choose to consume. However, MRCD does not necessarily apply in all cases, particularly in relational Indigenous hunting practices.

Consumer perceptions of food may change over time. Bryant & Sanctorum (2021) found that amongst consumers of AB foods, there was an increase in perceived fulfillment of needs from PB meats over time, where 44% of consumers in 2019 and 51% in 2020 agreed with perceived fulfillment. Consumers remained unsure over time on whether they would purchase lab-grown meats (Bryant & Sanctorum, 2021). Societal benefits (e.g., animal welfare, world hunger, environmental sustainability) were most cited for reasons to be motivated to purchase cultured meats, while personal costs (e.g., price, trust, healthiness, and unnaturalness) were most cited as barriers (Bryant & Sanctorum, 2021). While some consumers may view PB foods more positively, there is some conflicting evidence. Michel et al. (2021) found that meat was viewed as predominantly positive and PB alternatives as predominantly negative amongst consumers, while Polleau and Biermann (2021) found that only a minority of consumers viewed veganism and vegetarianism as part of a sustainable diet.[22] Vegan diets tend to be perceived as unhealthy (Polleau & Biermann, 2021).

There may be ways in which PB foods and diets may become perceived more positively. The methods in which governmental institutions promote PB foods and diets may

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[22] Polleau and Biermann (2021) utilized data from a survey in Germany.

influence how consumers perceive them. Presenting information in a clear and concise manner in terms of practical applications such as meal preparation, and theoretical applications, such as a consensus on the definitions of a PB diet (Faber et al., 2020), may be beneficial. It may also be beneficial for stakeholders to try to make PB meats replicate AB meat more closely in terms of taste, texture, and price (Michel et al., 2021). Schiano et al. (2020) found that consumers who were seeking sustainability information on food purchases tended to look at factors such as product labels, websites, word of mouth, newspapers, social media, and email newsletters. Other consumers cited a lack of knowledge on PB diets as a barrier to adopting one (Lea et al., 2006).

Possible barriers to learning about where food comes from include not only greenwashing, but also consumer deskilling and ag-gag legislation. Consumer deskilling[23] can be defined as consumers lacking food literacy, which consists the lack of knowledge on sustainable foods, healthy foods, and food preparation (Jaffe & Gertler, 2006; Kornelsen, n.d.; Lyon et al., 2003). Ag-gag legislation is used to prevent public trespassing into agricultural farming operations (Lazare, 2020). Some Canadian provinces, including Ontario, Alberta, Prince Edward Island and Manitoba, have implemented ag-gag legislation (Cecil, 2021; Lazare, 2020), which may worsen product greenwashing outcomes on consumers due to lack of transparency, potentially worsening consumer deskilling outcomes. As 'whistleblowers' could be sanctioned, this means that there are potential barriers to exposing animal cruelty, unsanitary farming practices, and the evasion of environmental laws and sustainability regulations (Fiber-Ostrow & Lovell, 2016; Rouse, 2013). While British Columbia has not implemented provincial ag-gag legislation (Bill M-277), there remains the danger of the proposed federal ag-gag law (Bill C-275) (House of Commons Canada, 2023; Legislative Assembly of British Columbia, 2019). Both bills currently remain in the hearing stages with the possibility of being passed (House of Commons Canada, 2023; Legislative Assembly of British Columbia, 2019).

Overall, perceptions of PB foods amongst farmers market consumers may help determine the relative success of such products at farmers markets. If PB foods, which are

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[23] 'Deskilling' was initially coined by Harry Braverman in 1974.

generally more sustainable than AB foods, are viewed positively by farmers market consumers, then there is a likelihood of more interest in purchasing alternative products. As the consumption of unsustainable AB foods is reduced, and the consumption of sustainable PB foods is increased, food will likely have less of an impact on humans, animals, and the environment. While this one study will not have such a generalized impact, it will begin to provide a body of literature on the topic. Exploring perceptions of PB foods amongst KRFM consumers may help predict the likelihood of the success of PB foods at the KRFM, potentially having a positive impact on sustainability and PB food availability in Kamloops, BC.

Researcher Positionality

As a social science researcher, I ensure to reflect upon my own positionality to remain transparent in the research process, as well as to attempt to reduce the effects of any implicit biases I may have. To attain this, I have utilized a reflexivity journal (see Bryman & Bell, 2016; Janesick, 2011; Lincoln & Guba, 2013; Rubin & Rubin, 2005). I have reflected on how my personal experiences and perspectives as a researcher have impacted my undertaking of this research topic. I recognize the ways in which my own positionality affects all aspects of my research, including my research topic, the process of research (e.g., literature review, methods, participants, data collection, and data analysis), and its results (data interpretations, research conclusions, and implications) (see Holmes, 2020). I position myself somewhere in the middle of the insider-outsider (emic-etic) continuum within my topic of research, as I have been both an omnivore and PB on several occasions. I also acknowledge that I am an outsider to Indigenous approaches to food and relationships between humans, animals, the land, and plants.

Putting Animal Ethics at the Center of Reflection

I acknowledge my privilege as a person living in a Westernized country with access to higher education, which may have influenced my ideologies surrounding animal rights and welfare. While vegetarianism was present within my family and my upbringing, most of my work as an advocate for animals began in my undergraduate degree. The courses I took influenced my interests and guided me toward beginning to research animal ethics in various contexts, including in the context of food. The care I have for animals has led me to provide a voice for them where possible. However, this work barely scratches the surface of the issues

surrounding animals used for food, meaning that my biases are likely limited as my thesis was not focused on solely animal ethics itself. No matter how significant or small the impact, I aim to always include animals in my academic work, as they have frequently been missed in intersectional work. However, being a woman of colour has allowed me to acknowledge, from an insider perspective, what discrimination and oppression can feel like. This has only increased my empathy for others that are being oppressed, including nonhuman animals.

My background as an animal ethics researcher did lead me to take the time to find literature on food and its impact on animals, rather than merely focusing on environmental sustainability and human justice. In an effort to reduce confirmation bias and the 'romanticizing' of PB foods, I ensured to include literature including the drawbacks of PB foods, within the food industry and at all levels of the LCA, in terms of environmental sustainability, human health and justice, and animal justice. Throughout the thesis, readers are reminded that not all PB foods are sustainable foods (e.g., identifying issues surrounding certain PB foods and eutrophication, environmental racism, health concerns, habitat destruction, and unethical worker welfare). Other options for sustainable food are also identified in the literature review (e.g., LG meats, consumable insects, and sustainable farming). The bulk of the effort to reduce romanticizing is in chapter one, where drawbacks of PB foods are discussed. Readers are reminded in the introductory and concluding sections of each chapter that not all PB foods are sustainable, and this is particularly emphasized when drawing conclusions based on the results. This thesis aimed to focus on PB foods specifically, which is why the thesis was guided in this direction. If the goal of this research was to assess food in general and sustainability, more space and attention could have been given to other various options to sustainable foods. Despite efforts to demonstrate benefits and drawbacks of different foods and food systems, it is potentially inevitable for PB foods to be at least somewhat romanticized in research on the topic of PB foods, similar to any research focusing on a given topic.

My animal ethics background likely influenced the fact that my survey did include questions asking about perceptions of food in regard to animal welfare (e.g., food decision factors and perceived benefits to a PB diet). I might argue that this is not a bias, but merely an effort to be inclusive of species. My quantitative data analysis included variables derived from the survey on animal welfare, while my qualitative analysis considered how animal

ethics was conceptualized by respondents. My background in animal ethics likely resulted in sensitivity to themes and variables of animal ethics, meaning that this portion may have been missed or not viewed as 'important' or 'meaningful' to those without such a background. My experience also likely led to my emphasis on policy changes surrounding not only the environment and humans, but also animals.

Utilizing a Reflexivity Journal

I utilized my reflexivity journal predominantly at the levels of pilot testing, participant recruitment, and data analysis. I conducted pilot testing both with academic peers and colleagues (e.g., in a classroom setting and by email) and at the farmers market. This helped me reflect upon how respondents perceive and understand certain questions and allowed me to make changes where needed to ensure questions had face validity. It also allowed me to reflect upon how my own biases could potentially impact recruitment of participants. The biases I identified during pilot testing at the farmers market included not wanting to inconvenience consumers that were walking on the strip of the farmers market, especially if they were with young children. This also helped me recognize that I needed to avoid any parts of the strip that were too close to any vendors, as I did not want to impact their sales.

I realized the best way to ensure such demographic was included, and for me not to project any uncomfortability of 'bothering' consumers, was to collect data in the areas where consumers were taking the time to sit down, chat with their friends and family, and consume food and beverages. This was predominantly at the Saturday market, which is much busier than the Wednesday market. The Wednesday market did not have any place to sit down, and I ensured to recruit survey respondents at either end of the market, or more so in the middle of the strip, not veering off too close to vendors on each side. I recognize that those at the Saturday market seemed to be taking in the farmers market as an entire experience and taking their time, as they were more open to participating than those at the Wednesday market. Those who tended not to participate at the Wednesday market were typically persons working nearby and they were on a time-constrained lunch break. I recognize that this likely impacted the demographics of my sample, but that it was beyond my control, as I attempted to approach a diverse sample.

I wrote in this journal after each round of surveys at the KRFM, reflecting on what went well and where I could have improved. My attempt to approaching a diverse sample meant ensuring to approach those that are not visibly[24] in my sociodemographic category (e.g., women around the ages of 20 to 30), in addition to those who are. The majority of my sample unintentionally did match my 'invisible' demographic, meaning someone who is also PB and has a university education. It is possible that those who match my demographic simply agreed to participate more so than those who do not, perhaps due to feelings of being 'the same.' While I did not disclose my dietary pattern unless asked and would only discuss this post-survey, the survey itself was on the topic of PB foods, meaning those who are more open to such foods, typically those in my demographic, may have been more likely to participate.

I had some uncomfortable encounters as a young female researcher, and these were predominantly with men who are older than I am. I debriefed about these in my reflexivity journal, as well as with some committee members. I acknowledged that these uncomfortable experiences could have easily influenced who I was approaching moving forward. I knew that within the grounds of the farmers market that I would be safe, and that maintaining a professional distance as a researcher would continue to be a protective factor. These experiences are unfortunately regular day-to-day experiences as a young woman, but this helped me handle the uncomfortable situations effectively, meaning continuing to approach consumers regardless of whether they fit the demographic of those who were not acting in an appropriate manner. I avoided generalizing and stereotyping individuals as part of a larger group, as anyone of any demographic can act in inappropriate manners.

My reflexivity journal helped me reflect upon how I was presenting myself, in terms of both dressing to be identified as a researcher, and my choices of words, tone, and body language. During pilot testing, I had not yet acquired a name tag, lanyard worn around my neck identifying me as a researcher administering a survey, and felt socially anxious. I

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[24] Not all intersectional factors are visible. This includes but is not limited to: 'white-passing' persons of colour (including myself), socioeconomic status (e.g., the way someone presents themselves does not directly translate to their income level), level of education (not possible to determine while speaking to consumers without asking), and those with invisible different abilities (e.g., mental illness, invisible physical illness, and different learning abilities).

recognized that obtaining and wearing a university shirt, a nametag, and a lanyard would be helpful in my presentation as a researcher. I did, however, wear a university t-shirt, as to not come off as overly intimidating (e.g., not wearing professional office-wear to avoid creating a potential perceived 'power dynamic' between researcher and respondent). My confidence became better with each survey, and I was up to speed very quickly ensuring that I was speaking confidently, and that my body language matched this. I recognize that having written out scripts for recruitment and informed consent helped me remain consistent throughout the process of administering surveys, and that most of my anxiety regarding how I was presenting was likely worse in my head, and that others likely did not notice.

My reflexivity journal was heavily utilized for both quantitative and qualitative data cleanup and analyses. The quantitative aspect meant reflecting on how I was creating variables. For instance, I reflected upon how to create groups for gender based on the open textbox that was provided for respondents to ensure that I was being inclusive, while ensuring to best represent respondents in the way that they described themselves. The survey included some open-ended options for respondents to expand, including on their dietary pattern, perceived cultural influence on food decisions, and highest achieved level of education. Open-ended responses were used where meaningful, particularly in terms of dietary pattern. This resulted in creating a dichotomous variable of 'non-omnivore' and 'omnivore,' as the responses were predominantly PB-leaning. Variables were transformed into various scales, into different types of variables to meet different tests assumptions (e.g., 5-point scales, 3-point scales, dichotomous) and my reflexivity journal helped make sure that these were transformed in a consistent manner and allowed me to record the entire process in detail to remain transparent (see Appendix C).

For the qualitative aspect, my reflexivity journal allowed me to reflect on the entire iterative process of content, thematic, and sentiment analyses (see Chapter 3). My journal also included sections on variables and tests that either could not be conducted or included. These are discussed in further detail, including their justifications, in their respective chapters. Excluded quantitative tests and variables are included in chapter two and Appendix D. Excluded qualitative themes are included in chapter three and Appendix D. My reflexivity journal included lists and tables of significant results, and graphics allowing me to visualize

all variables, themes and tests, making it easier for me to visualize the bigger picture of my findings, and include what is meaningful for the scope of a master's thesis.

Methods

A survey questionnaire was utilized in this study. Respondents (n = 94) were recruited via convenience sample. Criteria for participating in the survey included being over the age of 18 and a farmers market consumer walking around at the Kamloops Regional Farmers Market (KRFM) during the summer 2022 season. Participants were surveyed at both the Wednesday and Saturday markets. The survey was administered on a tablet using Survey Monkey, comprised of a total of 25 questions and took approximately 13 minutes to complete (see Appendix A). Virtual consent was sought in the first question prior to beginning the survey. Section one included qualitative free association questions, which included six questions where respondents were asked to reflect on their thoughts and feelings about AB foods, PB foods, and LG meats (see Chapter 3). Thematic, content, and sentiment analyses were utilized for the qualitative portion of the survey. Section two of the survey was predominantly quantitative and included seven questions (see Chapter 2). The last section contained eleven questions to collect demographic information (see Chapter 2). Respondent demographics are presented using descriptive statistics. Statistical analyses were conducted with quantitative variables and respondent demographics to determine relationships and differences in responses amongst consumers. Research methodology is discussed in more detail within their respective chapters due to differing approaches and questions being utilized from sections of the questionnaire (see Chapters 2 and 3).

Research Questions

Research questions, rather than specific hypotheses, are used in this research. Research questions tend to be less specific than hypotheses, which limits the findings only to pre-set hypotheses only to limit further how the data can be interpreted (Rubin & Rubin, 2005). The questionnaire used in this research includes many questions and instruments, both quantitative and qualitative, and the use of specific hypotheses is not possible due to the number of quantitative variables that can be tested with numerous other variables, and due to the use of thematic and sentiment analyses. The goal of thematic analysis is to interpret the data through the understanding of participants, which hypotheses would limit such understanding (Bryman & Bell, 2016; Fereday & Muir-Cochrane, 2006; Proudfoot, 2023;

Rubin & Rubin, 2005). While deductive reasoning is used through conducting a literature review leading to possible anticipations of quantitative and qualitative results, inductive reasoning is also used to interpret what participants are trying to say in this specific data set (see Bryman & Bell, 2016; Fereday & Muir-Cochrane, 2006; Proudfoot, 2023).

The main research question is: What are Kamloops Regional Farmers Market (KRFM) consumer perceptions of food? Part one of this study, the quantitative consumer survey questions, asks specifically: How do perceptions of different food categories, specifically plant-based (PB) foods and animal-based (AB) foods, differ within KRFM sociodemographic groups? Part two of this study, the qualitative aspect of the survey, aims to answer the following sub-question: What are KRFM consumer perceptions of different food categories, specifically plant-based (PB) foods, animal-based (AB) foods, and lab-grown (LG) meats? Overall, it is anticipated that KRFM consumers will likely perceive AB foods most positively, PB foods negatively, and be unsure about LG meats (based on Bryant & Sanctorum, 2021; Deliens et al., 2022; Onwezen et al., 2021).[25]

Objectives and Goals

The main objective of this study is to determine the perceptions of foods amongst farmers market consumers in Kamloops, BC. More specifically, the aim is to determine the relative acceptance of alternative foods of consumers at farmers markets. Acceptance of PB foods, in general, is typically low (Arango et al., 2023; Onwezen et al., 2021).[26] If the perception of risk can be lowered via marketing communications, it is possible to have higher acceptance levels of alternative foods, including both PB foods and LG meats (Arango et al., 2023). The goals of this research are to provide recommendations for raising acceptance levels of alternative foods at both micro- and macro-levels, including consumers and stakeholders throughout the life cycle of food production. Another goal is to help build a body of knowledge in the literature on farmers market consumers and food acceptance, and to communicate this to non-academic audiences as well.

Chapter one of this thesis began with an introduction of the topic and an overview of the literature related to the social scientific approach to researching PB foods and

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[25] Deliens et al. (2022) compiled data from Belgium.
[26] Arango et al. (2023) utilized data from the United States.

sustainability. Chapter two includes part one of this study, which presents the quantitative analysis of a farmers market consumer questionnaire on PB foods and sustainability. Chapter three provides part two of this study, which includes a qualitative analysis of the same questionnaire. Chapter four provides concluding remarks and implications for future research.

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CHAPTER 2. CONSUMER DEMOGRAPHICS AND PERCEPTIONS OF PLANT-BASED FOODS

Introduction

Climate change is a pressing issue, and Canada, along with 196 countries, has signed the Paris Agreement intending to limit global warming temperatures to 1.5°C, and reduce greenhouse gas (GHG) emissions by 45% by 2030 and to net-zero by 2050 (Government of Canada, 2023b; United Nations, n.d.-b; United Nations Framework Convention on Climate Change, n.d.). Consumer dietary 'choices'[27] impact climate change, and one way to help mitigate the effects of climate change is by 'choosing' sustainable foods and systems at both the micro- and macro-levels. While there are several sustainable food options beyond those that are PB or AB, including Indigenous food practices, sustainable farming, lab-grown foods, and insects, this chapter will focus solely on PB and AB foods.

A substantial amount of global environmental impacts result from food production and agricultural practices (see Chapter 1 for more details) (Food and Agricultural Organization of the United Nations, 2018; Poore & Nemecek, 2019; Ritchie et al., 2022). Sustainable foods may help achieve United Nations sustainability goals. When considering overarching sustainability factors such as the environment, human health and justice, and animal ethics, PB diets tend to be more sustainable than omnivorous diets (see Poore & Nemecek, 2019; Van Kernebeek et al., 2014; Van Mierlo et al., 2017; Wickramasinghe et al., 2021). There are some exceptions, notably coffee, chocolate, tofu, bananas, palm oil, and some fruits and vegetables, that may worsen outcomes for each overarching sustainability factor (see Food Empowerment Project, n.d.-a, n.d.-b, 2022; Hartini et al., 2023; International Labour Organization, 2023; Poore & Nemecek, 2019; Rainforest Alliance, n.d.; Ritchie et al., 2022; Tullis, 2019). Omnivorous diets tend to have worse outcomes with each of these factors, notably specific AB foods including red and processed meats, as well as dairy (see Baroni et al., 2007; Clark & Tilman, 2017; Conrad et al., 2018; Halteman, 2011; Khmaissa et al., 2024; Kustar & Patino-Echeverri, 2021; Maier et al., 2023; Poore &

[27] This thesis acknowledges that there are systemic barriers (e.g., intersectional factors including socioeconomic status) in regard to individual decisions on food, and that this is not always a free choice.

Nemecek, 2019; Richi et al., 2015; Scherhaufer et al., 2018; Sievert et al., 2022; Smit & Heederik, 2017; Van Kernebeek et al., 2014; Van Mierlo et al., 2017; Wickramasinghe et al., 2021; World Health Organization, 2023).

This research aims to explore farmers market consumer perceptions of food. The goal is to determine how farmers market consumers view different foods, including AB (e.g., dairy, meat, and fish) and PB foods (e.g., milk alternatives, meat alternatives, and tofu). This quantitative section is particularly interested in how varying sociodemographic factors play into farmers market consumer food decisions and dietary patterns, as well as what this means in terms of moving forward toward the consumption and promotion of sustainable foods, including some PB foods.

Methods

This study used a survey questionnaire with both quantitative and qualitative sections. A survey method, rather than an interview method, was used to respect respondents' time as consumers at a farmers market and farmers market vendor sales. Bryman and Bell (2016), and de Leeuw (2008) argue that the use of survey questionnaires, rather than interviews, may help obtain a larger sample size in a lesser amount of time, minimize interviewer effects as respondents read questions themselves in the same order, and reduce the social desirability bias while increasing genuine responses. Surveys were, however, administered in person with the researcher present, but the researcher could not see participant responses. As a convenience sample was used, the researcher utilized a reflexivity journal to reduce sampling bias and to ensure the selection of a diverse respondent sample.

The quantitative portion of the questionnaire aims to be reliable and valid. Reliability over time and across respondents was maintained by providing what Bryman & Bell (2016) consider a nominal definition to describe what the terms within a question mean. Internal consistency was maintained using pre-existing questions and instruments. Inter/intra-rater reliability was maintained by using one rater to administer the survey, and by having a committee member vet questions and the coding of open-ended responses for consistency. Face validity was achieved by having committee members review the questions and pilot testing. This project received clearance from the Thompson Rivers University Research Ethics Board (TRU-REB, file no. 103033). See Appendix A for the brief consent form and Appendix B for the full-length consent form.

Materials and Procedure

Including both qualitative (section one) and quantitative (section two) survey sections, the survey comprised of 25 questions and took on average 13 minutes to complete (see Appendix A). Consumers walking around the KRFM were invited to participate, and a verbal script explaining the research was utilized to establish intra-rater reliability. The survey was administered on a portable electronic tablet with Survey Monkey. After reading the virtual consent form, the first question asked for informed consent to participate in the survey using a yes or no question. Zero participants selected "no," which would have sent them directly to the concluding resources page. Those who selected "yes" continued to the survey.

The first question in the quantitative section asked participants to self-report their dietary pattern. Respondents were given multiple choice options of vegan, vegetarian, flexitarian, pescatarian, and other (open text box). Faber et al.'s (2020) survey had a similar question, apart from using the term 'plantarian,' rather than 'flexitarian.' Definitions for each dietary pattern based on Faber et al. (2020) were provided. The breadth of selection for consumer self-reported dietary patterns was included to capture the values that may be laden within various dietary patterns.[28] Dietary pattern was broken down into two categories of "omnivore" and "non-omnivore," where the latter includes vegans, vegetarians, flexitarians, pescatarians, and other. Participants were asked to rate on a five-point scale how often they consume specific food product categories (never, less than once per week, 1 to 2 times per week, 3 to 4 times per week, 5 to 7 times per week). Lea et al. (2006) had a similar question asking about daily servings but on specific food items.

A question to help assess internal consistency with questions on perceived benefits and challenges of a PB diet (see next paragraph) asked respondents to select all factors they consider when making decisions on food. The following question prompted respondents to rate on a three-point scale (no influence, some influence, no influence) and provide more detail in an open-ended text box about how much cultural influences their food decisions.

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[28] It is acknowledged that dietary pattern may not be the result of moral 'choices,' as accessibility to different food products may vary based upon sociodemographic factors.

Respondents were then asked to rate on a five-point scale (extremely unlikely, unlikely, neutral, likely, extremely likely) how likely they are to purchase different alternative foods.

The questions assessing the degree of perceived challenges and benefits of a PB diet were adapted from Lea et al. (2006) and Faber et al. (2020). An adapted version by Faber et al. (2020) demonstrated a high Cronbach's alpha (0.816) on their attitudes scale based on both the challenges and benefits of a PB diet. Lea et al.'s (2006) instrument consisted of 27 perceived PB diet barriers and 24 perceived PB diet benefits. The adapted Likert scale questions (strongly disagree, disagree, not sure, agree, strongly agree) used in this study included a total of 17 perceived challenges and 17 perceived benefits with minor edits to the wording of statements. The changes of question items were made via inter-rater consistency (colleagues reviewing the survey) and pilot testing, ensuring face validity of the entire questionnaire.

Participants and Site

Participants (n = 94) were recruited via convenience sampling. Two participant surveys were removed, one of which was insufficiently complete for data analysis, and the other, the participant did not appear to understand the questions being asked. To reduce sampling bias, the researcher used a reflexivity journal. Criteria for participating in the questionnaire included being over the age of 18 and a farmers market consumer at the Kamloops Regional Farmers Market (KRFM) during the Summer 2022 season. Participants were surveyed at both the Wednesday and Saturday markets. Before beginning the survey, participants were asked if they were over the age of 18. No compensation was provided to survey respondents.

The final section of the survey collected participant demographics. Age was collected in 5-year intervals, with some exceptions (18-19, 20-24, 25-29…75-79, 80-84, 85+), similar to the age presentation from Statistics Canada. Gender was collected with an open-ended text box to be inclusive and prevent the potential of 'othering' (e.g., a respondent not feeling represented by the multiple-choice options). Gender was defined in accordance with Conerly et al. (2021). Due to the small sample size, gender was dichotomized into male and female, which resulted in two cases being excluded from the analysis where gender was a variable of relevance. The highest achieved level of education was collected similarly using Statistics Canada categories. Respondents were provided with multiple-choice options and an open-

ended text option for 'other.' Approximate yearly household income was collected in $10,000 intervals, with some exceptions (less than $10,000, $10,000 to $19,999…$90,000 to $99,999, $100,000 to $149,000, more than $150,000, prefer not to answer), similar to the data presentation in Statistics Canada.

Open-ended text boxes were provided for respondents to enter how many people live in their household, and how many children (<18 years old) they are a parent or guardian to live in the household. The next question (yes/no) asked participants if they are in an intimate partner relationship. Respondents were asked if they are their household's primary grocery shopper and/or food preparer (both, only shopper, only preparer, no). The next question assessed if any household members have work experience in the meat industry. A definition of meat industry was provided. Participants were then asked to describe their political orientation using a sliding scale (progressive/left, neutral/moderate, conservative/right), and they were provided with definitions. There was an error in validating the neutral/moderate responses and missing data, and neutral/moderate could not be distinguished, meaning political orientation was not used in the presentation of sociodemographics or in data analysis. The last question asked participants to enter their Canadian postal code with instructions for those visiting from outside of the country.

Overall, 56.4% of the sample was between the ages of 25 and 39 (M = 5.2, range = 1 [18-19] to 12 [70-74]). Females represented 66.0% (n = 62) and males 30.9% (29); 3.3% (n = 3) identified as non-binary, "don't know," or did not answer the question.[29] Omnivores comprised 69.1% (n = 65) of the sample; non-omnivores (vegans, vegetarians, flexitarians, pescatarians, and other) were 30.9% (n = 29). For highest achieved education level, 63.8% had either some college or university experience, or a completed bachelor's degree (M = 4.3, range = 1 [some high school] to 7 [doctorate degree]). Regarding location, 67.0% reside within Kamloops city-bounds (n = 63), while 17.0% reside outside city-bounds (n = 16).[30]

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[29] Using a reflexivity journal, the researcher attempted to obtain a diverse sample, including in terms of gender. However, more women than men consented to taking the survey. This may be due to gender norms surrounding food and diet, especially when considering toxic masculinity and the consumption of meat (Carson & Gleig, n.d.; Michel et al., 2021; Modlinska et al., 2020; Onwezen et al., 2021).

[30] Kamloops city-bounds were determined by using respondent postal codes.

For approximate yearly pre-tax household income, 37.2% made between $50,000 and $99,999 (*n* = 35), 30.8% made $100,000 and over (*n* = 29), and 22.4% made $49,999 and under (*n* = 21). Overall, 54.2% of the sample had between one or two members in their household (*M* = 2.5, range = 1 [one member] to 4 [four or more]); 66.0% had no children in their household (*M* = 0.5, range = 0 [none] to 2 [two or more]). In terms of intimate partner relationship, 58.5% selected 'yes' (*n* = 55, range = 0 [no] to 1 [yes]). Most respondents were primary shoppers (84.0%, *n* = 79)) and preparers (84.0%, *n* = 79) of food in their household; 88.3% of households do not have any work experience in the meat industry (*n* = 83). For extent of influence of cultural practice on food decisions, most respondents (55.3%, *n* = 52) stated that there was no influence, while 44.6% (*n* = 42) perceived there to be some or strong influence. See Table 2.1 for Kamloops Regional Farmers Market (KRFM) summer 2022 season consumer sociodemographic characteristics.

Table 2.1

Sociodemographic Characteristics of KRFM Consumers

Characteristic	Full sample		Characteristic	Full sample		Characteristic	Full sample	
	n	%		*n*	%		*n*	%
Age	94	100.0%	Gender	93	100.0%	Household	93	100.0%
18-19	2	2.1%	Female	62	66.0%	1	18	19.1%
20-24	8	8.5%	Male	29	30.9%	2	33	35.1%
25-29	22	23.4%	Non-binary	1	1.1%	3	21	22.3%
30-34	16	17.0%	Don't know	1	1.1%	4 or more	21	22.3%
35-39	15	16.0%	Missing	1	1.1%	Missing	1	1.1%
40-44	9	9.6%	Household Income	85	100.0%	Children	91	100.0%
45-49	6	6.4%	Under $10,000	3	3.2%	0	62	66.0%
50-54	1	1.1%	$10,000 to $19,999	4	4.3%	1	11	11.7%
55-59	4	4.3%	$20,000 to $29,999	3	3.2%	2 or more	18	19.1%
60-64	2	2.1%	$30,000 to $39,999	5	5.3%	Missing	3	3.2%
65-69	4	4.3%	$40,000 to $49,999	6	6.4%	Primary Shopper	94	100.0%
70-74	5	5.3%	$50,000 to $59,999	7	7.4%	No	15	16.0%
Education	94	100.0%	$60,000 to $69,999	14	14.9%	Yes	79	84.0%
Some high school	2	2.1%	$70,000 to $79,999	3	3.2%	Primary Preparer	94	100.0%
High school or equivalent	11	11.7%	$80,000 to $89,999	4	4.3%	No	15	16.0%
Postsecondary	9	9.6%	$90,000 to $99,999	7	7.4%	Yes	79	84.0%
Some college or university	22	23.4%	$100,000 to $149,999	13	13.8%	Meat Industry	94	100.0%
Bachelor's degree	38	40.4%	$150,000 and over	16	17.0%	No	83	88.3%
Master's degree	11	11.7%	Prefer not to answer	9	9.6%	Yes	11	11.7%
Doctorate degree	1	1.1%	Location	79	100.0%	Cultural Practice	94	100.0%
Dietary Pattern	94	100.0%	Outside city-bounds	16	17.0%	No influence	52	55.3%
Vegan	4	4.3%	City-bounds	63	67.0%	Some Influence	35	37.2%
Vegetarian	5	5.3%	Missing	15	15.9%	Strong Influence	7	7.4%
Flexitarian	12	12.8%	Relationship	93	100.0%			
Pescatarian	3	3.2%	No	38	40.4%			
Omnivore	65	69.1%	Yes	55	58.5%			
Other	5	5.3%	Missing	1	1.1%			

Note. Kamloops Regional Farmers Market (KRFM) summer 2022 season consumer sociodemographic characteristics (questionnaire respondents; $n = 94$).

Objectives and Research Questions

The main research question is: What are Kamloops Regional Farmers Market (KRFM) consumer perceptions of food? The sub-research question is: How do perceptions of different food categories, specifically plant-based (PB) foods and animal-based (AB) foods, differ within KRFM sociodemographic groups?

The main objective of this study is to determine the perceptions of foods amongst farmers market consumers. More specifically, the aim is to determine the relative acceptance of alternative foods of consumers at farmers markets. Among general consumers, acceptance of plant-based (PB) foods tends to be relatively low (Arango et al., 2023; Onwezen et al., 2021). If the perception of risk can be lowered via marketing communications, it is possible to then have higher acceptance levels of alternative foods (Arango et al., 2023). The goals associated with this research are to provide recommendations for raising acceptance levels of alternative foods amongst consumers at both micro- and macro-levels.

Existing literature has found that urban, young, educated, female, and liberal consumers are most likely to accept PB foods (Bryant & Sanctorum, 2021; Deliens et al., 2022; Onwezen et al., 2021). McInnes et al. (2023), from a small qualitative sample of persons aged 18 to 24 (n = 21), found that some young persons perceived that those of higher income might be more likely to adopt a PB diet. However, farmers market consumers tend to be more conscious of their food decisions, be more environmentally conscious and critical of industrial-scale food production and consume more fruits and vegetables (Cicia et al., 2021; Jilcott Pitts et al., 2015). There may be challenges regarding the decision to consume sustainable foods, which include accessibility and personal beliefs (Faber et al., 2020; Grasso et al., 2019; Lea et al., 2006; Michel et al., 2021; Polleau & Biermann, 2021) It is anticipated that those KRFM consumers with similar sociodemographic characteristics will likely be more acceptance of PB foods. Onwezen et al. (2021) included various factors to measure alternative food acceptance, including consumer purchase behaviours and understandings of protein alternatives; more specifically, food product factors, individual factors, and environmental factors. General hypotheses and predictions are based on existing literature and used as guidelines for statistical analysis (see Table 2.2).

Table 2.2
General Predictions on Acceptance of PB Foods and AB Foods

General Hypothesis	Predictions	Variables Included	Tests Used
There is a relationship between age and PB/AB food acceptance.	(a) There is a negative relationship between age and acceptance of PB foods. (b) There is a positive relationship between age and acceptance of AB foods.	Summed Scales, Mean Scales, Individual items if scale significant	Spearman's
There is a relationship between education and PB/AB food acceptance.	(a) There is a positive relationship between education level and acceptance of PB foods. (b) There is a negative relationship between age and acceptance of AB foods.	Summed Scales, Mean Scales, Individual items if scale significant	Spearman's
There is a relationship between income and PB/AB food acceptance.	(a) There is a positive relationship between income and acceptance of PB foods. (b) There is a negative relationship between income and acceptance of AB foods.	Summed Scales, Mean Scales, Individual items if scale significant	Spearman's
There is a difference in PB/AB food acceptance based on diet.	(a) Non-omnivores are more likely to be acceptant of PB foods. (b) Omnivores are more likely to be acceptant of AB foods.	Summed Scales, Mean Scales, Individual items if scale significant	Mann Whitney *U*, *t*-Tests
There is a difference in PB/AB food acceptance based on gender.	(a) Women are more likely to be acceptant of PB foods. (b) Men are more likely to be acceptant of AB foods.	Summed Scales, Mean Scales, Individual items if scale significant	Mann Whitney *U*, *t*-Tests

Note. Table demonstrating general hypotheses and predictions on the acceptance of PB foods and AB foods. Variables and tests used to test hypotheses included.

Acceptance of PB foods was measured via relationships or differences in summed and mean scales, including the number of PB foods consumed weekly, average weekly consumption frequency of PB foods, number of PB foods likely to be purchased, and number of perceived benefits to a PB diet, as well as individual scale items/variables with demographic variables. Acceptance of AB foods was measured via relationships or differences in summed and mean scales, including the number of AB foods consumed weekly, average weekly consumption frequency of AB foods, and number of perceived challenges to a PB diet, as well as individual scale items/variables with demographic variables. See Table 2.3 for a list of summed and mean scale variables, definitions and included items.

Survey responses are presented below utilizing a participant sociodemographic table and various tables for statistical analyses. IBM SPSS Statistics (Version 29.0.0.0 [241]) was used. Statistical analyses included Spearman's rho correlations, Mann Whitney *U* Tests, and *t*-Tests to determine relationships and differences between demographic variables and dependent variables. Both open-ended and closed-ended questions were quantified to create testable variables. Where possible, and by using Jeong's (2016) recommendations on variable

transformations, summed and mean scales were created by combining related question items (see Appendix C). See Table 2.3 for a list of summed and mean scale variables, definitions and included items.

Table 2.3
Summed and Mean Scale Variable Details

Scales	Summed Scale Definition (# of *x*)[c]	Mean Scale Definition (Average *x*)[d]	Items	# of Items
Decision Factors	Number of factors considered when making food decisions.	-[e]	Animal Welfare, Environment, Health, Human Justice, Culture, Time, Product Availability, Cost, Taste, Store Distance, Food Location, Organic/Non-GMO, Natural	13
Consumption/Frequency				
AB Food Consumption[a]	Number of AB foods consumed weekly.	Average weekly consumption frequency of AB foods.	Meat, Fish/Seafood, Dairy	3
PB Food Consumption	Number of PB foods consumed weekly.	Average weekly consumption frequency of PB foods.	PB Meat, PB Milk, Other PB Foods, Tofu	4
Purchase Likeliness				
PB Purchase Likeliness	Number of PB foods likely to be purchased.	Average purchase likeliness of PB foods.	PB Meat, PB Milk, Other PB Foods, Tofu	4
Alternative Purchase Likeliness[b]	Number of alternative foods likely to be purchased.	Average purchase likeliness of alternative foods.	PB Meat, PB Milk, Other PB Foods, Tofu, LG Meat	5
Challenges/Benefits				
Perceived Challenges	Number of perceived challenges of a PB diet.	Average degree of perceived challenges of a PB diet.	Need information, Habits, Family/partner barrier, Dining choices, Someone else decides, Cost, Strange food, Not filling, Health concerns, Inconvenient, Preparation, Protein/vitamins/nutrients, Taste, Meant to eat meat, Store availability, Time, Appear strange/hippy	17
Perceived Benefits	Number of perceived benefits to a PB diet.	Average degree of perceived benefits of a PB diet.	Natural, Vitamins/nutrients, Weight, Variety, Be fit, Quality of life, Energy, Taste, Food poisoning, Environment, Animals, Food production efficiency, World hunger, Cost, Time, Appear trendy	17

Note. List of summed and mean scale variables, definitions, and items (variables) included in each scale.
[a]Not normally distributed and not used in *t*-tests as a result (See Appendix D).
[b]Lack of meaningful and significant results, as well as predictions due to lack of evidence in the literature on sociodemographic factors and perceptions of LG meats (See Appendix D). See Appendix C for definitions and variable transformation processes for alternative purchase likeliness variables.
[c]Number of combined scale items.
[d]Average of combined scale items.
[e]Decision factors cannot be transformed into a mean scale as the variables are dichotomous.

Results

Mann Whitney *U* Tests, *T*-tests, and Spearman's Rho correlations were conducted with demographic variables and summed and mean scales (see Table 2.3), depending on test assumptions. Summed scales included the number of decision factors, number of PB foods consumed weekly, number of AB foods consumed weekly, number of PB foods likely to be purchased, number of perceived challenges to a PB diet, and number of perceived benefits to a PB diet. Mean scales included the average weekly consumption of PB foods, average weekly consumption of AB foods, average degree of purchase likeliness of PB foods, average degree of perceived challenges to a PB diet, and average degree of perceived benefits to a PB diet. Both summed and mean scales for purchase likeliness of alternative foods and LG meats are not included here due to a lack of meaningful or significant results (see Appendix D).

Demographic variables included in analyses were age, highest achieved education level, dietary pattern, gender, household income, location, and having children. The analysis excludes the number of household members, having children, and relationship status due to a lack of meaningful predictions. Primary household grocery shopper, primary household food preparer, and meat industry employment were excluded in the results section as no tests were significant (see Appendix D). The political orientation scale was not included due to an error validating neutral/moderate responses. For gender, two cases were excluded from analyses (non-binary and don't know) as this did not meet test assumptions for dichotomous independent variables in Mann Whitney *U* Tests and *T*-tests. Gender could not be used in Spearman's Rho correlations as the level of measurement is nominal. Any significant results were further analyzed via the same initial testing method. There was one exception for *t*-tests where the summed scale for the number of AB foods consumed is not normally distributed. Further analysis of significant relationships for AB food scale items was included to fill a gap in analyzing AB food consumption.

Spearman's Rho: Demographics with Summed and Mean Scales

Spearman's rho was conducted to determine relationships between ordinal and interval demographic variables (age, education, and income) and summed scale variables (see Table 2.4). Tests were conducted with children and summed and mean scales but were not included due to a lack of meaningful results (see Appendix D). A negative relationship

was found between income and the number of food decision factors ($r(83) = -.28$, $p = .009$). This means that those with less income are more likely to consider a greater number of food decision factors than those with more income. A positive relationship was found between education and the number of PB foods consumed per week ($r(92) = .28$, $p = .007$), which means respondents with a higher education level are more likely to consume a greater number of PB foods in a week than those with a lower education level. There were no significant relationships among the remaining demographic and summed scale variables.

Table 2.4
Summed Scale Relationships with Age, Education, and Income

	Demographics		
Summed Scales (# of *x*)	Age	Education	Income
Decision Factors	-.05	.08	-.28*
AB Food Consumption	.12	-.10	.06
PB Food Consumption	.20	.28**	-.16
PB Purchase Likeliness	-.20	.08	-.16
Perceived Challenges	-.05	-.18	-.09
Perceived Benefits	-.09	.05	-.17

Note. Spearman's rho correlations for ordinal and interval level demographic variables (age, highest achieved level of education, and approximate yearly household income) and summed scale variables.
*$p < .05$. **$p < .01$.

Further analysis of significant relationships between demographics and summed scales was conducted with individual scale items to determine if there were any specific significant relationships. Positive relationships were found between education and both weekly consumption frequency of PB milk products ($r(92) = .31$, $p = .002$) and other PB foods ($r(90) = .26$, $p = .012$), in that increased education levels were significantly related to the more frequent consumption of PB foods. No significant relationship was found between education, and weekly consumption of PB meat and tofu. Due to violating test assumptions, income and specific food decision items (dichotomous variables) could not be analyzed further with Spearman's rho or Fisher's exact test.

Spearman's rho was conducted to determine relationships between ordinal and interval demographic variables (age, education, and income) and mean scale variables (see Table 2.5). Negative relationships were found between age and the average purchase likeliness of PB foods ($r(92) = -.26$, $p = .013$), meaning that older respondents were significantly less likely to purchase PB foods than younger respondents. Positive relationships were found between age and the average weekly consumption frequency of AB foods ($r(92) = .23$, $p = .026$), between education and the average weekly consumption

frequency of PB foods ($r(92) = .29$, $p = .005$), and between income and the average weekly consumption frequency of AB foods ($r(83) = .25$, $p = .024$). This means that older respondents were significantly more likely to purchase AB foods than younger respondents, respondents with a higher educational level were significantly more likely to consume PB foods more frequently than those with a lower education level, and respondents with more income were significantly more likely to consume more AB foods than those with less income. There were no significant relationships among rthe emaining demographic and mean scale variables.

Table 2.5
Mean Scale Relationships with Age, Education, and Income

	Demographics		
Mean Scales (Average *x*)	Age	Education	Income
AB Food Consumption	.23*	-.04	.25*
PB Food Consumption	-.16	.29**	-.08
PB Purchase Likeliness	-.26*	.11	-.18
Perceived Challenges	.01	-.02	-.02
Perceived Benefits	-.14	.03	-.14

Note. Spearman's rho correlations with ordinal and interval level demographic variables (age, highest achieved level of education, and approximate yearly household income) and mean scale variables.
*$p < .05$. **$p < .01$.

Further analysis of significant relationships between demographics and mean scales was conducted with individual scale items to determine if there were any specific significant relationships. A positive relationship was found between age and weekly consumption frequency of dairy ($r(92) = .32$, $p = .002$), meaning that those who are older are significantly more likely to consume dairy more frequently per week than those who are younger. No significant relationship was found between age and weekly consumption frequencies of either meat or fish. Specific relationships between age and purchase likeliness of PB foods, and education and consumption frequencies were concurrent with that of significant summed scale variables.[31] Such concurrent relationships with both mean and summed scales are indicators of internal consistency, demonstrating that both scale types have similar and relatively consistent results. A positive relationship was found between income and weekly

[31] Significant equivalent mean scale (average *x*) relationships concurrent with further testing of summed scales (number of *x*): Age: Negative relationship with tofu purchase likeliness. Education: Positive relationship with PB milk and other PB foods, and no relationship with consumption of PB meat and tofu.

consumption frequency of dairy ($r(83) = .25$, $p = .020$), meaning that those with higher income levels are significantly more likely to consume dairy more frequently per week than those with a lower income. No significant relationships were found between income and consumption frequencies of meat and fish.

Mann Whitney U: Demographics and Mean Scales

Mann Whitney *U* tests were conducted to determine differences in means between dichotomous demographic variables (dietary pattern [omnivore/non-omnivore], gender [men/women], children [yes/no], employment in the meat industry [yes/no] and location [city-bounds/outside]) and mean scale variables. Tests with mean scales and children, meat industry and location were insignificant and are not reported (see Appendix D). Mann Whitney *U* tests were used in place of *t*-tests as assumptions of *t*-tests, such as no outliers and normal distribution, were not met for all variables (see Appendix D). Test consistency was prioritized to allow for a clearer presentation of results and ease of result comparisons. *T*-tests were only used with summed scale variables to present more reliable results, and as test assumptions were met for all mean scales except for the number of AB foods consumed per week.

Dietary Pattern

Mann Whitney *U* tests were conducted to determine the mean differences between dietary patterns (omnivores and non-omnivores)[32] with mean scale variables (see Table 2.6). Compared to non-omnivores, omnivores consume, on a weekly average, AB foods more frequently ($z = -4.74$, $p < .001$) and PB foods less frequently ($z = -3.60$, $p < .001$). Compared to omnivores, non-omnivores are, on average, more likely to purchase PB foods ($z = -2.21$, $p = .027$). Omnivores are, on average, more likely to perceive a higher degree of challenges to a PB diet than non-omnivores ($z = -3.96$, $p < .001$). Non-omnivores are, on average, more likely to perceive a higher degree of benefits to a PB diet ($z = -3.25$, $p = .001$).

[32] Dietary patterns include non-omnivores (vegans, vegetarians, flexitarians, pescatarians, and other) and omnivores.

Table 2.6
Mean Scale Differences between Omnivores and Non-Omnivores

	Dietary Pattern				
	Omnivore	Non-Omnivore			
Mean Scales (Average *X*)	Mean Rank	Mean Rank	*Z*-value	*p*	Cohen's *d*
AB Food Consumption	56.35	27.67	-4.74	<.001	-.49
PB Food Consumption	40.76	62.60	-3.60	<.001	-.37
PB Purchase Likeliness	43.36	56.78	-2.21	.027	-.23
Perceived Challenges	54.95	30.81	-3.96	<.001	-.41
Perceived Benefits	41.39	61.19	-3.25	.001	-.34

Note. Mann Whitney *U* Tests determining mean rank differences of mean scales between omnivores and non-omnivores.

Further analysis of significant differences between dietary patterns with mean scales was conducted with individual scale items to determine if there were any specific significant differences (see Table 2.7). As expected, on a weekly average, omnivores consume meat (z = -5.88, $p < .001$), fish (z = -2.24, p = .025) and dairy (z = -2.97, p = .003) more frequently, while non-omnivores consume PB meat (z = -3.44, $p < .001$) and tofu (z = -3.86, $p < .001$) more frequently. When perceived challenges to a PB diet were analyzed, 13 of 17 challenges were significant for omnivores, while none were significant for non-omnivores. When perceived benefits of a PB diet were analyzed, 12 of 17 were significant for non-omnivores, while none were significant for omnivores. There were no significant differences among the remaining variables.

Table 2.7

Mean Rank Differences of Perceived Challenges and Benefits to a PB Diet between Omnivores and Non-Omnivores

	Dietary Pattern						Dietary Pattern				
	Omni[a]	Non-Omni[b]					Omni	Non-Omni			
Perceived Challenge	Mean Rank	Mean Rank	*Z*-value	*p*	Cohen's *d*	Perceived Benefit	Mean Rank	Mean Rank	*Z*-value	*p*	Cohen's *d*
Need more information	51.33	36.95	-2.47	.013	-.26	Prevent disease	43.86	55.66	-2.07	.038	-.21
Don't want to change habits	53.41	34.26	-3.32	<.001	-.34	More natural diet	42.82	58.00	-2.68	.007	-.28
Family/partner won't eat PB	49.71	42.55	-1.21	.227	NS	Many vitamins and nutrients	42.85	56.63	-2.41	.016	-.25
Not enough choice	44.43	54.38	-1.70	.089	NS	Control weight	43.15	57.24	-2.40	.016	-.25
Someone else decides	46.66	46.14	-.10	.923	NS	More food variety	42.98	57.64	-2.55	.011	-.26
Too expensive	53.02	35.12	-3.05	.002	-.31	Be fit	43.72	54.63	-1.90	.058	NS
Avoid strange foods	51.39	38.78	-2.21	.027	-.23	Better quality of life	40.85	61.29	-3.50	<.001	-.36
Not filling enough	53.69	33.62	-3.47	<.001	-.36	Lots of energy	40.41	61.55	-3.74	<.001	-.39
Health concerns	53.58	32.48	-3.72	<.001	-.39	Tasty diet	41.28	60.27	-3.37	<.001	-.35
Inconvenient	51.34	36.93	-2.46	.014	-.26	Less food poisoning	44.10	55.12	-1.87	.061	NS
Unsure how to prepare	54.77	31.21	-4.02	<.001	-.41	Help the environment	42.02	58.55	-2.93	.003	-.30
Not enough protein/vitamins/nutrients	55.67	29.19	-4.49	<.001	-.46	Help animal welfare/rights	43.97	55.41	-2.07	.038	-.21
Not tasty enough	53.97	33.00	-3.60	<.001	-.37	More efficient food production	43.13	57.29	-2.44	.015	-.25
Meant to eat meat	55.61	29.33	-4.44	<.001	-.46	Less world hunger	40.66	61.71	-3.66	<.001	-.38
Not available at shops	51.23	29.33	-2.34	.019	-.24	Save money	45.23	50.91	-.98	.326	NS
Takes too long to prepare	53.35	32.25	-3.71	<.001	-.39	Save time	45.44	50.63	-.90	.366	NS
Don't want to seem strange/hippy	48.70	44.81	-.75	.451	NS	Appear more trendy	49.44	40.10	-1.63	.104	NS

Note. Mann Whitney *U* Tests determining the mean rank differences of individual perceived challenges and benefits to a PB diet between omnivores and non-omnivores.

[a]Omnivore.

[b]Non-omnivore.

Gender

Mann Whitney *U* tests were conducted to determine differences in means between men and women with mean scale variables (see Table 2.8). Compared to men, women, on average, tend to consume more PB foods in a week (z = -2.76, p = .006), are more likely to purchase PB foods (z = -3.47, p < .001), and perceive a higher degree of perceived benefits to a PB diet (z = -2.20, p = .028). There were no significant gender differences in the average weekly consumption of AB foods and degree of perceived challenges to a plant-based diet.

Table 2.8
Mean Scale Differences between Men and Women

	Gender				
	Men	Women			
Mean Scales (Average *x*)	Mean Rank	Mean Rank	*Z*-value	*p*	Cohen's *d*
AB Food Consumption	50.17	44.05	-1.04	.300	NS
PB Food Consumption	34.86	51.21	-2.76	.006	-.29
PB Purchase Likeliness	32.02	52.54	-3.47	<.001	-.36
Perceived Challenges	50.24	44.02	-1.05	.295	NS
Perceived Benefits	37.12	50.15	-2.20	.028	-.23

Note. Mann Whitney *U* Tests determining mean rank differences of mean scales between men and women.

Further analysis was conducted with individual scale items to determine if there were any specific significant differences between genders. Compared to men, women, on a weekly average, consume more PB meat (z = -2.00, p = .046), PB milk (z = -2.10, p = .036), and tofu (z = -2.55, p = .011). Compared to men, women are, on average, more likely to purchase PB meat (z = -2.24, p = .025), and other PB alternatives (z = -2.09, p = .037), and tofu (z = -2.52, p = .012). When perceived challenges to a PB diet were analyzed, 1 of 17 challenges were significant for men, while none were significant for women. Specifically, men perceived the inconvenience of diet (z = 2.22, p = .027) as a challenge to a PB diet. When perceived benefits to a PB diet were analyzed, 3 of 17 benefits were significant for women, while none were significant for men. Specifically, women perceived a greater food variety (z = -2.61, p = .009), helping animal welfare (z = -2.06, p = .039), and decreasing world hunger (z = -2.45, p = .014) as benefits of a PB diet. There were no significant differences among the remaining variables.

Independent Samples T-Tests: Demographics with Summed Scales

Independent samples *T*-tests were conducted to determine differences in means between dichotomous demographic variables (dietary pattern [omnivore/non-omnivore], gender [male/female], children [yes/no], employment in the meat industry [yes/no] and

location [city-bounds/outside]) and summed scale variables. Tests with meat industry, children and location were insignificant and/or not meaningful, and results are not reported (see Appendix D). Two-tailed tests were used when the direction of the relationship could not be predicted, and one-tailed tests were used when the direction could be predicted. *T*-tests were utilized with summed scale variables to present more reliable results, and as test assumptions were met for all mean scales except for the number of AB foods consumed per week. See Appendix D for details on non-normally distributed dependent variables.

Dietary Pattern

Independent samples *t*-tests were conducted to determine differences in means between dietary patterns (omnivore and non-omnivore) and summed scale variables (see Table 2.9). Two-tailed tests determined insignificance in mean differences between dietary patterns with the number of food decision factors. The remaining significant tests are one-tailed. There was a significant difference in the weekly number of PB foods consumed, where non-omnivores ($M = 3.24$, $SD = 1.06$) consumed a greater number than omnivores ($M = 2.78$, $SD = 1.07$; $t(92) = 1.92$, $p = .029$). There was a significant difference in the number of PB foods likely to be purchased, where non-omnivores ($M = 2.76$, $SD = 1.38$) were likely to purchase a greater number than omnivores ($M = 2.29$, SD = 1.17; $t(92) = 1.69$, $p = .047$). There was a significant difference in the number of perceived challenges to a PB diet, where omnivores ($M = 4.17$, SD = 3.02) were likely to perceive a greater number than non-omnivores ($M = 2.38$, $SD = 2.47$; $t(92) = -2.79$, $p = .003$). There was a significant difference in the number of perceived benefits to a PB diet, where non-omnivores ($M = 11.17$, $SD = 4.18$) were likely to perceive a greater number than omnivores ($M = 8.46$, SD = 4.59; $t(92) = 2.72$, $p = .004$). There were no significant differences between dietary patterns with the number of food decision factors.

Table 2.9
Summed Scale Differences between Omnivores and Non-Omnivores

	Dietary Pattern						
	Omnivore		Non-Omnivore				
Summed Scales (# of *x*)	*M*	*SD*	*M*	*SD*	*t*(92)	*p*	Cohen's *d*
Decision Factors	6.86	2.52	7.10	2.70	.42[a]	.676	NS
PB Food Consumption	2.78	1.07	3.24	1.06	1.92[b]	.029	.43
PB Purchase Likeliness	2.29	1.17	2.76	1.38	1.69[b]	.047	.38
Perceived Challenges	4.17	3.02	2.38	2.47	-2.79[b]	.003	-.62
Perceived Benefits	8.46	4.59	11.17	4.18	2.72[b]	.004	.61

Note. T-Tests determining differences between dietary patterns (omnivore/non-omnivore) with summed scales. Equality of variances assumed for all tests.
[a]Two-tailed independent samples *t*-test.
[b]One-tailed independent samples *t*-test.

Further analysis between dietary patterns and individual scale items was conducted to determine if there were significant differences (see Table 2.10). For weekly food consumption frequency variables (including AB foods),[33] only meat, fish and tofu met the assumption of normality. One-tailed tests determined that there were significant differences in weekly consumption frequencies between dietary patterns, where omnivores ($M = 3.92$, $SD = .83$) consumed more meat than non-omnivores ($M = 2.14$, $SD = 1.18$); $t(39.38) = -7.23$, $p = <.001$, Cohen's $d = -1.88$), omnivores ($M = 2.56$, $SD = .75$) consumed more fish than non-omnivores ($M = 2.10$, $SD = .98$, $t(91) = -2.48$, $p = .008$, Cohen's $d = -.55$), and non-omnivores ($M = 2.72$, $SD = 1.25$) consumed more tofu than omnivores ($M = 1.70$, $SD = .68$; $t(35.78) = 4.13$, $p = <.001$, Cohen's $d = 1.14$). Six perceived challenges to a PB diet met the assumption of normality. Five out of six challenges were perceived as barriers to a PB diet by omnivores, and non-omnivores perceived none. Fifteen perceived benefits to a PB diet met the assumption of normality. Twelve out of fifteen benefits were perceived as benefits to a PB diet by non-omnivores, and one benefit out of fifteen was perceived by omnivores. There were no significant differences among the remaining variables.

[33] As the summed scale for the number of AB foods consumed did not meet the test assumption of normality, further testing was conducted with normally distributed scale items to determine differences in weekly AB food consumption frequencies between men and women.

Table 2.10
Differences in Means of Perceived Challenges and Benefits to a PB Diet between Omnivores and Non-Omnivores

	Dietary Pattern						
	Omnivore		Non-Omnivore				
Perceived Challenges and Benefits	*M*	*SD*	*M*	*SD*	*t*	*p*	Cohen's *d*
Challenges							
Don't want to change habits	2.78	1.04	2.03	1.02	-3.26[a]	<.001	-.73
Family/partner won't eat PB	2.85	1.29	2.48	1.18	-1.29[a]	.100	NS
Not filling enough	2.28	1.05	1.52	.83	-3.44[a]	<.001	-.77
Not tasty enough	2.46	1.21	1.62	1.08	-3.21[a]	<.001	-.72
Not available at shops	2.53	.96	2.06	1.22	-1.97[b]	.026	-.44
Takes too long to prepare	2.18	.81	1.54	.74	-3.64[b]	<.001	-.82
Benefits							
Prevent disease	3.62	.72	3.93	1.07	1.68[a]	.048	.38
More natural diet	3.57	.93	4.07	1.07	2.29[a]	.012	.51
Many vitamins and nutrients	3.77	.79	4.18	.90	2.20[b]	.015	.50
Control weight	3.25	1.00	3.79	1.11	2.36[a]	.010	.53
More food variety	3.48	.89	4.00	.93	2.61[a]	.005	.58
Be fit	3.35	.87	3.75	.93	1.97[b]	.026	.45
Better quality of life	3.37	.94	4.14	.93	3.64[b]	<.001	.82
Lots of energy	3.27	.88	4.00	.89	3.73[b]	<.001	.83
Tasty diet	3.52	.83	4.18	.86	3.45[b]	<.001	.78
Less food poisoning	3.25	1.19	3.72	1.25	1.78[a]	.040	.40
More efficient food production	3.49	1.05	4.03	.98	2.36[a]	.010	.53
Less world hunger	3.29	.95	4.11	.83	3.94[b]	<.001	.89
Save money	2.83	1.00	3.03	1.05	.91[b]	.183	NS
Save time	2.91	.82	3.07	1.12	.786[b]	.217	NS
Appear more trendy	2.30	1.20	1.86	.99	1.72[c]	.044	-.39

Note. One-tailed independent samples *t*-tests determining the differences in means of perceived challenges and benefits to a PB diet between omnivores and non-omnivores. Equality of variances assumed for all tests.
[a]*df* = 92
[b]*df* = 91
[c]*df* = 90

Gender

Independent samples *t*-tests were conducted to determine mean differences between genders (men and women) and summed scale variables (see Table 2.11). All significant tests are one-tailed. There was a significant difference in the weekly number of PB foods consumed, where women (M = 3.11, SD = .99) consumed a greater number than men (M = 2.28, SD = 1.18; $t(89) = 2.65$, $p = .005$). There was a significant difference in the number of PB foods likely to be purchased, where women (M = 2.82, SD = 1.15) were likely to purchase a greater number than men (M = 1.66, SD = 1.11; $t(89) = 4.55$, $p < .001$). There was a significant difference in the number of perceived benefits to a PB diet, where women (M = 9.92, SD = 4.79) were likely to perceive a greater number than men (M = 7.79, SD = 3.99; $t(89) = 2.08$, $p = .020$). There were no significant differences between genders with the number of food decision factors and number of perceived challenges to a PB diet.

Table 2.11
Summed Scale Differences between Men and Women

	Gender						
	Men		Women				
Summed Scales (# of *x*)	*M*	*SD*	*M*	*SD*	*t*(89)	*p*	Cohen's *d*
Decision Factors	6.67	2.53	7.10	2.60	.76[a]	.448[a]	NS
PB Food Consumption	2.48	1.18	3.11	.99	2.65[b]	.005[b]	.60
PB Purchase Likeliness	1.66	1.11	2.82	1.15	4.55[b]	<.001[b]	1.02
Perceived Challenges	3.59	2.77	3.68	3.12	.134[b]	.444[b]	NS
Perceived Benefits	7.79	3.99	9.92	4.79	2.08[b]	.020[b]	.47

Note. T-Tests determining differences between genders (men/women) and summed scales. Equality of variances assumed for all tests.
[a]Two-tailed independent samples *t*-test.
[b]One-tailed independent samples *t*-test.

Further analysis was conducted with individual scale items to determine if there were any specific significant differences based on gender. For weekly food consumption frequency variables (including AB foods),[34] only meat, fish and tofu met the required assumption of normality for *t*-tests, meaning dairy, PB meat, PB milk, and other PB foods were not normally distributed and could not be analyzed further. One-tailed tests determined that there were significant differences in weekly consumption frequencies between genders, where men

[34] As the summed scale for the number of AB foods consumed did not meet the test assumption of normality, further testing was conducted with normally distributed scale items to determine differences in weekly AB food consumption frequencies between men and women.

(M = 3.75, SD = 1.00) consumed more meat than women (M = 3.22, SD = 1.35; t(69.37) = -2.07, p = .021, Cohen's d = -.43), and women (M = 2.21, SD = 1.09) consumed more tofu than men (M = 1.61, SD = .74; t(74.40) = 3.07, p = .001, Cohen's d = .61). There was no significant difference in fish consumption between men and women.

Fifteen perceived benefits to a PB diet met the assumption of normality. Four out of fifteen benefits were perceived as benefits to a PB diet by women, and none were perceived by men. Specifically, one-tailed tests determined that women (M = 3.85, SD = .76) perceived preventing disease as more of a benefit than men (M = 3.52, SD = .87; t(89) = 1.88, p = .032, Cohen's d = .42); women (M = 3.79, SD = .96) perceived a greater food variety as more of a benefit than men (M = 3.28, SD = .80; t(89) = 2.51, p = .007, Cohen's d = .56); women (M = 3.66, SD = 1.01) perceived decreasing world hunger as more of a benefit than men (M = 3.14, SD = .80; t(64.40) = 2.61, p = .006, Cohen's d = .55); and women (M = 3.00, SD = 1.00) perceived saving money as more of a benefit than men (M = 2.59, SD = .98; t(88) = 1.85, p = .034, Cohen's d = .42). There were no significant differences among remaining variables.

Discussion

There were mixed results in terms of perceptual factors used to determine relative acceptance of PB foods (PB purchase likeliness, PB food consumption, and perceived benefits and challenges to a PB diet) and AB foods (AB food consumption) amongst consumers based on sociodemographic characteristics. Some results were aligned with general predictions. KRFM consumers with less income tended to consider more factors when making decisions on food. Those with a higher level of education, are younger, are non-omnivores (vegan, vegetarian, flexitarian, pescatarian, and other), and are women tended to have a higher degree of acceptance toward PB foods. Consumers who have a lower level of education, are older, and are omnivores tended to have a higher degree of acceptance toward AB foods.

Consumers and Food Decision Factors

Farmers market consumers with a lower level of household income considered a greater number of food decision factors than those with a higher level of household income. This indicates that the cost of food may be a barrier to whether farmers market consumers consider certain sustainability-related food decision factors. However, while PB diets tend to

be the lowest in cost compared to other dietary styles, individuals and countries with high income levels tend to be most likely to adopt PB diets (Hopwood & Bleidorn, 2019; McInnes et al., 2023). Some farmers markets do have vouchers available to low-income consumers, including the KRFM, helping make local and nutritious foods more accessible (see Kamloops Regional Farmers Market Society, 2023). Age, education level, gender, and dietary pattern were not related to the number of food decision factors. However, it is important to note that PB foods such as PB meats and PB milks may not be commonly sold at farmer's markets. Rather, other PB foods such as fruits, vegetables, and other unprocessed protein foods such as beans and legumes may be more common.

Consumer Perceptions of Plant-based Foods

Consumers seem to be somewhat open to PB foods. Generally, farmers market consumers who are more educated, younger, non-omnivores, and women tended to have some degree of acceptance toward PB foods. Consumers with a higher level of education were more likely to consume more PB foods (specifically PB milk and other PB foods), than those with a lower level of education. These findings are consistent with existing literature on education level and PB food acceptance, where those with a higher level of education tend to be more acceptant of PB foods than those with a lower level of education (Bryant & Sanctorum, 2021; Deliens et al., 2022; Onwezen et al., 2021). This indicates that perhaps those with a higher education level have been more exposed to knowledge of PB foods than those with a lower education level. However, the onus of accepting PB foods and consuming more sustainable food cannot be placed on the individual. There are systemic barriers, including that farmers market consumers tend to be privileged, indicating that accessibility may be limited to those of a lower socioeconomic status (Alkon & McCullen, 2011a; Rice, 2015). Future research will need to analyze exposure to knowledge on PB foods based on varying education levels, and if cost is a barrier to accessing such foods.

KRFM consumers who are younger were more likely to purchase PB foods than those who are older. These findings are consistent with existing literature (Bryant & Sanctorum, 2021; Deliens et al., 2022; Onwezen et al., 2021). Non-omnivores were more likely than omnivores to consume PB foods more frequently (specifically PB meat products and tofu), consume a greater number of PB foods per week (specifically tofu), purchase PB foods, purchase a greater number of PB foods, perceive fewer challenges to a PB diet, and perceive

more benefits to a PB diet. These findings are consistent with existing literature on dietary patterns and acceptance of PB foods, where those who are already PB tend to be more accepting than those who are not (Bryant & Sanctorum, 2021; Deliens et al., 2022; Onwezen et al., 2021). Women were more likely than men to consume PB foods more frequently (specifically PB meat products and tofu); to consume more PB foods per week (specifically tofu); to purchase PB foods (specifically PB meat products and other PB foods); to purchase a greater number of PB foods; and to perceive more benefits to a PB diet. These findings are consistent with existing literature on gender and PB food acceptance, where women tend to be more accepting than men (Bryant & Sanctorum, 2021; Deliens et al., 2022; Onwezen et al., 2021).

Overall, some sociodemographics provided some contradictions to the conclusions on the acceptance of PB foods above, where tests were insignificant but did not directly oppose predictions and existing literature. Household income was not related to the relative acceptance of PB foods amongst farmers market consumers. Age and household income were not related to the number of and average frequency of PB foods consumed per week, number of PB foods likely to be purchased, average degree of perceived challenges to a PB diet, and number of and average degree of perceived benefits to a PB diet. Education level and household income were not related to average degree of purchase likeliness of PB foods. Gender was not related to number of and average degree of perceived challenges of a PB diet.

Consumer Perceptions of Animal-based Foods

Generally, farmers market consumers who are less educated, older, and omnivores tended to have higher levels of acceptance toward AB foods. Consumers who are older consumed, on a weekly average, AB foods (specifically dairy) more frequently than those who are younger. This is consistent with a study by Grasso et al. (2019) who found that older consumers were more likely to be acceptant of dairy rather than other alternative foods. Consumers with a higher income level consumed, on a weekly average, AB foods (specifically dairy) more frequently than those with a lower income level. This finding is not surprising as PB diets tend to be less expensive than AB diets (see Springmann et al., 2021). Omnivores were more likely to, on a weekly average, consume AB foods more frequently (specifically meat, fish, and dairy products) than non-omnivores. This is consistent with the

finding on non-omnivores consuming more PB foods than omnivores, and with existing literature with similar findings (Bryant & Sanctorum, 2021; Deliens et al., 2022; Onwezen et al., 2021).

Overall, some sociodemographics provided some contradictions to the conclusions on acceptance of both PB and AB foods above, where tests were insignificant but did not directly oppose predictions and existing literature. More specifically, age and education level were not related to the number of, and frequency of AB foods consumed per week. Gender was not associated with the average weekly consumption frequency of AB foods.

Research Implications

As with any study, this research has some limitations. The sample size is relatively small for a quantitative questionnaire (n = 94). This means that the sample may not be generalizable or representative of farmers market populations, there is a risk of type I errors, and certain statistical analyses could not be conducted due to not meeting sample, case number or normality assumptions (e.g., chi square, regressions and Pearson's correlation; see Appendix D). The sample is also not generalizable to the greater population of Kamloops or other cities, as the sample only included farmers market consumers. Additionally, as there was a greater distribution of women (66.0%) than men (30.9%) within the sample, results could be skewed. However, this study could be used as a model or example for other farmers market studies assessing acceptance of alternative foods.

Future research has opportunities to examine the impact of culture and political orientation on food decisions and Indigenous food practices. Existing literature demonstrates that being left-leaning politically indicates a stronger likelihood of PB food acceptance (Bryant & Sanctorum, 2021; Deliens et al., 2022; Onwezen et al., 2021). There are also opportunities to investigate how consumers perceive LG meats, as well as other alternatives, including consuming local, organic or seasonal foods, urban agriculture, sustainable agriculture, and consuming insects. Future research may also examine the explicit and in-depth connection between food decisions and animal rights/welfare. However, the evidence on the sustainability of such options is limited and/or contradictory. Insects and LG meats may be sustainable options, but consumer acceptance remains low (Alhujaili et al., 2023; Onwezen et al., 2021; Żuk-Gołaszewska et al., 2022).

Unfortunately, the entirety of the quantitative data analysis could not be included in this thesis due to time and space constraints, as well as relevance. Excluded from the analyses are some sociodemographic variables (independent variables), different types of statistical tests, and certain variables on the perceptions of foods (dependent variables) (see Appendix D). This is not a limitation of the current study, as a large amount of data was produced as a result of this questionnaire. This provides future opportunities to share these findings in other avenues, including possible publications in academic journals.

There are some possibilities in which the acceptance of PB foods amongst consumers might be increased. Macro-level actors, including stakeholders in the food industry, educational institutions, governments that regulate food, non-governmental organizations that promote sustainable food, and researchers, can make an effort to better educate consumers on what sustainable food entails. Micro-level actors, meaning consumers, also have a role to play in food and sustainability. Consumers could 'choose' more sustainable food options, such as alternative foods, and to reduce their consumption of AB foods. In order to 'choose' more sustainable food options, consumers can also educate themselves on the impacts of food on sustainability (humans, animals, and the environment). However, the onus should not be placed on the individual, as barriers to sustainable foods, such as cost and socioeconomic status, may limit consumer abilities to make choices on the foods they would like to consume.

Some possible marketing opportunities for institutions based on the farmers market consumers' views include marketing PB food products to those with a higher level of education, who are younger, who are non-omnivores (vegan, vegetarian, flexitarian, pescatarian, and other), and who are women. Efforts to educate those with a lower level of PB food acceptance include consumers who have a lower level of education, who are older, and who are omnivores. Also, either lowering the price of food in general or subsidizing alternative foods would likely help consumers make decisions on food utilizing the factors they would like to consider (e.g., animal ethics, environmental sustainability and health), rather than worrying about the cost as a decision factor. Overall, this research creates opportunities for future research and implications on how to increase acceptance of PB foods.

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CHAPTER 3. CONSUMER FREE ASSOCIATIONS OF DIFFERENT FOOD CATEGORIES

Introduction

The production of food and agricultural farming are responsible, on a global scale, for 26% of GHG emissions, 50% of land use, and 70% of water use (Food and Agricultural Organization of the United Nations, 2018; Poore & Nemecek, 2019; Ritchie et al., 2022). To meet the sustainability goals of limiting global temperature increases to 1.5°C set out by the Paris Agreement, GHG emissions must be reduced by 45% by 2030, and to net-zero by 2050 (Government of Canada, 2023b; United Nations, n.d.-b; United Nations Framework Convention on Climate Change, n.d.). One way to help meet these sustainability goals is to reduce the consumption of unsustainable foods,[35] while increasing the consumption of sustainable foods. With some exceptions, PB foods tend to be more sustainable than AB foods (see Chapter 1 for more details).

PB foods tend to be better for human health and justice than AB foods, with some exceptions (see Chapter 1 for more details). Whether at the level of production or consumption, there are various potential health risks to humans, as well as issues surrounding worker ethics (see Cassidy et al., 2013; Fresán & Sabaté, 2019; González-García et al., 2018; Richi et al., 2015; Sievert et al., 2022; Smit & Heederik, 2017; World Health Organization, 2023). Compared to AB foods, PB foods are much lower in their generation of animal cruelty. Whether the approach is ethical or unethical from an animal welfare perspective, animals used for food are harmed regardless due to slaughter, with CAFOs being the least ethical (Anomaly, 2015; Halteman, 2011). The Western approach to AB food production is one of greed and commodity, and not all approaches are the same. For instance, Indigenous food and hunting practices are based on relationality, respect, and viewing nonhuman animals as living beings capable of feeling.

Another possible sustainable food option for reducing harm to animals, humans, and the environment is lab-grown (LG) meats. Due to the current small-scale and costly

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[35] Sustainable foods include three overarching factors with various sub-factors, including environmental, human, and animal justice (see Chapter 1 for more details).

production methods of LG meats, these products may be less sustainable than beef in terms of energy use and GHG emissions (Risner et al., 2023). However, other studies found that LG meats may use less land and water and produce less GHG emissions than beef (Penn, 2018; Roy et al., 2021). While there is contradictory evidence in the literature on the sustainability of LG meats in terms of the environment, cost, and human health (Penn, 2018; Risner et al., 2023; Roy et al., 2021), there is potential for such products to be viable options in the future. LG meats may also reduce cruelty to animals, as animals' lives are not lost, and fewer animals need to be used, as only animal cells are collected from a small number of animals (Chriki et al., 2022). However, the acceptance of LG meats remains low amongst consumers, particularly due to cost, lack of trust, and skepticism surrounding health, its artificial nature, and how it impacts animals (Bryant & Sanctorum, 2021; Chriki et al., 2022; Grasso et al., 2019).

This study strives to investigate farmers market consumer perceptions of PB foods, AB foods, and LG meats. Determining the reasons for consumer acceptance and apprehension of different food products may help with recommendations on sustainable foods, and how these can help mitigate climate change and injustices toward humans and animals. For example, there is potential for providing suggestions on increasing the acceptance of PB foods at the micro-level (e.g., consumers), and at the macro-level (e.g., stakeholders in the food business industry, non-governmental and governmental organizations, and educational institutions). This qualitative section is particularly interested in deriving thematic patterns from participant responses on their thoughts and feelings on different foods,[36] as well as how this plays into the consumption and promotion of sustainable foods, including some PB foods.

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[36] The origins and production methods of food items, whether PB, AB, or LG, are not provided for respondents in the questions. These are up for respondent interpretation to capture their initial thoughts and feelings on different food items. This allowed space for respondents to refer to Western food practices (e.g., CAFOs, local farms, etc.), Eastern food practices, and Indigenous food practices. However, responses reflected thoughts and feelings on Western food practices.

Methods

This study was conducted using a survey questionnaire with both quantitative and qualitative sections. Qualitative research aims to obtain *trustworthiness*[37] rather than reliability, validity, and objectivity (Bryman & Bell, 2016; Lincoln & Guba, 2013). While respondents could not review their free association responses due to surveys not collecting any personal information (e.g., email address), *credibility* was maintained by providing definitions of lesser-known terms (e.g., lab-grown meat) within the question, and by doing multiple rounds of coding. The goal of qualitative research is not to be generalizable, but *transferability* was maintained via providing a thick description (see Bryman & Bell, 2016; Geertz, 1973; Lincoln & Guba, 2013) of survey question concepts to respondents, using a pre-existing instrument (adapted from Possidónio et al., 2021), and coding data in a detailed manner. *Dependability* was maintained by recording all steps of the research process, having a committee member review data analyses (called auditing; see Bryman & Bell, 2016; Lincoln & Guba, 2013), and pilot testing the survey. *Confirmability* was maintained via a reflexivity journal to reduce biases and provide transparency (Bryman & Bell, 2016; Janesick, 2011; Lincoln & Guba, 2013; Rubin & Rubin, 2005). This project has received clearance from the Thompson Rivers University Research Ethics Board (TRU-REB, file no. 103033).

Participants, Site, and Materials

Participant demographics were collected as part of the survey but were not utilized for the qualitative analysis (see Tables 2.2 and 2.3 in Chapter 2 for participant sociodemographics and definitions). Participants (n = 94) were recruited via convenience sampling. Criteria for participating in the questionnaire included being over the age of 18 and a farmers market consumer at the Kamloops Regional Farmers Market (KRFM) Summer 2022 season. Participants were surveyed at both the Wednesday and Saturday markets.

The questionnaire included both qualitative (section one) and quantitative (section two) sections (see Appendix A). The first section of the survey was open-ended and based on

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[37] Trustworthiness is comprised of credibility (internal validity equivalent), transferability (external validity equivalent), dependability (reliability equivalent), and confirmability (objectivity equivalent; Bryman & Bell, 2016).

a free association instrument created by Possidónio et al. (2021). The adapted instrument included six free association questions, where participants reflected upon what they "think, feel or imagine" about meat, lab-grown (LG) meat, plant-based (PB) meat, tofu, dairy products, and plant-based (PB) milk products.

Respondents were provided with definitions of each individual food item (see Appendix A for questionnaire and definitions). Each question included two open text boxes, and participants were instructed to list the first two words or phrases that came to mind. Not all participants utilized both text boxes, and some included more than one idea per text box. The final analysis combined both textboxes and did not differentiate between the two levels as it was not meaningful to do so. The free association questions were included to assess how consumers perceive food and sustainability.

Procedure

Free associations were analyzed by thematic, content, and sentiment analyses using NVivo (Release 1.7.1 [4844]). According to Braun and Clarke (2006, 2021), the steps for conducting a thematic analysis are as follows: (1) Data familiarization and notes, (2) Coding, (3) Initial themes based on codes, (4) Reviewing themes, (5) Refining and defining themes, and (6) Reporting themes. Bryman and Bell (2016) provide quantitative content analysis guidelines, which include counting words, subjects, themes, and values, creating a case-by-case coding schedule based on the variables to be analyzed, and creating a coding manual for code definitions and interpretations. Qualitative content analysis guidelines include the use of semiotics, which comprises both denotative (manifest) and connotative (latent) meanings, in addition to polysemy semiotics[38] (Bryman & Bell, 2016). Liu (2012) provides an extensive and comprehensive guide on sentiment analysis, where guidelines are provided on analyzing dichotomies of regular/comparative and explicit/implicit references, and how to code conditional statements.

The analysis process was iterative and contained deductive aspects of considering pre-existing themes in the literature as a starting point, but inductive methods were primarily used to analyze the data. Initially, utilizing word clouds, all responses were read by the

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[38] According to Bryman and Bell (2016), "polysemy refers to the notion that signs can be interpreted in many ways" (p. 324).

researcher and notes were taken. Then, using a coding schedule of all cases and variables, a content analysis was conducted based on word frequency counts and coding of words or short phrases for the researcher to become familiarized with the manifest content of the data.

A thematic analysis was then conducted to provide latent context and meaning where concepts, words, ideas, and phrases were coded. A coding manual was created to maintain intra-coder reliability, where code definitions and interpretations were included. Themes and sentiments were then revised and refined. The coding scheme was exhaustive in that all cases were coded. Efforts to reduce overlap were made, but in some cases, some polysemantic phrases either involved ambiguous statements or included words that could be coded under more than one code. Polysemantic sentiments where both positive and negative feelings were present, sometimes in comparative statements, were coded as 'unsure/neutral' to capture the whole meaning of the sentiment. Analyses were then reviewed one final time for intra-rater reliability purposes.

Possidónio et al. (2021), whose free association instrument was adapted, utilized a similar qualitative analysis process with some similarities in content, sentiment, and thematic results. Similar results are discussed in each theme's results section. Thao and Thanh (2022) also conducted a similar study based on consumer perceptions of vegetarian foods, where they utilized a sentiment analysis comprised of positive, negative, and neutral on various aspects (themes). Most results indicated positive sentiments in relation to the variables of packaging, shipment, price, brand, and quality of PB products (Thao & Thanh, 2022).

Overarching themes (*Ethics, Feelings*, and *Food and Health*) are presented in concept map figures depicting how subsequent themes, sentiments, and possible sub-themes/sentiments are aggregated. Each individual theme (aggregated to its respective overarching theme) was analyzed by grouped variables (AB foods, PB foods, and LG meat). Tables in each theme demonstrate how the variables were grouped by reference counts and for theme and sentiment definitions, respective reference representations, and subsequent examples. Reference counts are broken down by grouped variable. Representations include concepts representative of specific examples. Examples are verbatim from participant free association responses to each singular food item variable. Examples are noted by grouped variable, and further detail is provided in the table notes for any meaningful examples. Not all examples are included. Examples have been selected as they are common within and

between grouped variables. Meaningful examples are defined as examples where further details are required for context, such as noting the individual variable, or food item (meat, dairy, PB milk, PB meat, tofu, and LG meat), in which the example is in reference to. Sunburst figures in each theme present a visualization of reference proportions broken down by grouped variable per each theme and sentiment.

Research Questions

The main research question is: What are Kamloops Regional Farmers Market (KRFM) consumer perceptions of food? The sub-research question is: What are KRFM consumer perceptions of different food categories, specifically plant-based (PB) foods, animal-based (AB) foods, and lab-grown (LG) meats?

The main objective of this study is to determine the perceptions of PB foods (e.g., milk alternatives, meat alternatives, and tofu), AB foods (e.g., meat and dairy), and LG meats amongst farmers market consumers. The goal is to determine consumers' acceptance of alternative foods at farmers markets. PB food and LG meat acceptance is typically low amongst general consumers (Arango et al., 2023; Onwezen et al., 2021). If the perceived risks of sustainable alternative foods can be lowered (e.g., via stakeholder marketing, government policies, and non-governmental organization promotions), it is possible to have higher acceptance levels of such foods (Arango et al., 2023). This research aims to provide recommendations for raising acceptance levels of alternative foods amongst consumers at both micro- and macro-levels. Based on the high percentage of omnivorous respondents (69.1%; $n = 65$), it is anticipated that consumers will perceive AB foods more positively, PB foods more negatively, and LG meats in an unsure or neutral manner. Predictions are also based on existing literature on general consumer food perceptions (see Bryant & Sanctorum, 2021; Deliens et al., 2022; Onwezen et al., 2021). However, farmers market consumers may have different perceptions than general consumers, whether due to awareness of the impacts of food or privilege (see Alkon & McCullen, 2011a; Cicia et al., 2021; Jilcott Pitts et al., 2015; Rice, 2015).

Results

Three main overarching themes were found: (1) *Ethics*, (2) *Curiosity*, (3) *Food and Health*. Each overarching theme includes subsequent themes. The first theme, *Ethics*,

contains sub-themes of *Animal Ethics* and *Environmental Ethics*. Ethics also yielded the theme of *Farm Ethics,* which was not included due to limited salience in responses. The second theme, *Curiosity*, is a standalone theme. Initially, *Curiosity* was a theme included in the overarching theme of *Feelings* alongside the theme of *Other Feelings.* For the purpose of this thesis, *Curiosity* is the primary focus as a feeling due to prevalence and meaning. The third theme, *Food and Health*, includes sub-themes of *Taste and Texture, Illness, Allergies, and Intolerances,* and *Naturalness or Realness.* Initially, *Food and Health* included the themes *Vitamins and Nutrients* and *Other Health.* For the purpose of this thesis, *Taste and Texture, Illness, Allergies, and Intolerances,* and *Naturalness or Realness* are the primary focus due to being the most meaningful sub-themes. Most themes contain sentiments, generally comprising *Positive (+)*, *Negative (-)*, and *Unsure/Neutral (?)* sentiments, or a similar variation. This is further explained in each theme's respective section below, as themes contain varying types of sentiments.

Other excluded themes include an overarching food-related theme, broken down by themes of *Animal Products, Plant-based Products and Alternatives*, and *Other Food.* These were excluded as they were a mere count of each type of food and did not add any meaning to the thematic analysis. The theme *Other* was also excluded due to salience and limited appearance of responses, and it was initially included to ensure transparency via ensuring that all cases were coded. Due to the sample size (n = 94) and total number of references (1980 references)[39], thematic, content, and sentiment analyses are conducted with grouped variables, rather than individual variables (*Meat, Dairy, PB Meat, PB Milk, Tofu, and LG Meats*). The grouped variables include *Animal-based (AB) Foods*, *Plant-based (PB) Foods*, and *Lab-grown (LG) Meats* (see Table 3.1).

[39] Includes references for all themes, including those not reported in this thesis.

Table 3.1
Definitions of Individual and Grouped Variables

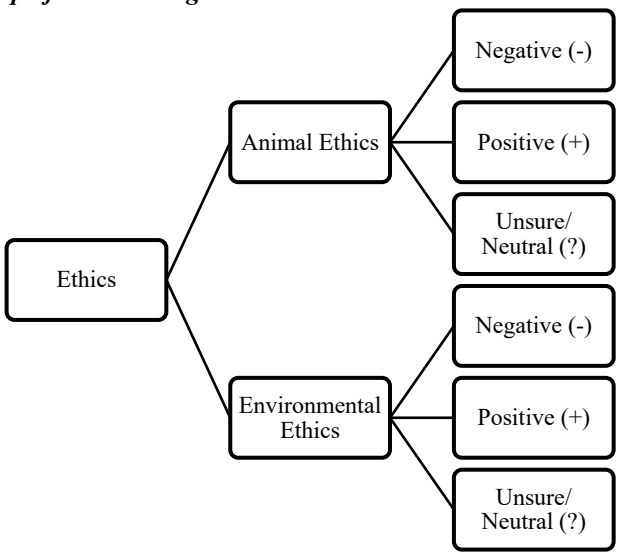
Variable	Definition
AB Foods	Grouped variable. Includes individual AB variables *Dairy* and *Meat*. Does not include LG Meats (see LG Meats definition for details).
Dairy	Individual variable. To do with thinking, feeling, or imagining consuming dairy products.
Meat	Individual variable. To do with thinking, feeling, or imagining consuming meat products. Meat products include white meat (e.g., chicken and turkey), red meat (e.g., beef and pork), and seafood (e.g., fish and other seafood).
PB Foods	Grouped variable. Includes PB variables *PB Meat*, *PB Milk* and *Tofu*.
PB Meat	Individual variable. To do with thinking, feeling, or imagining consuming PB meat products.
PB Milk	Individual variable. To do with thinking, feeling, or imagining consuming PB milk products.
Tofu	Individual variable. To do with thinking, feeling, or imagining consuming tofu.
LG Meats	Individual variable (standalone grouped variable). Not included in the grouped variable AB Foods as LG Meats solicited different responses from participants than Meat and Dairy, and LG Meats consist of a different creation process than Meat and Dairy. Not included under PB Foods as LG Meats are not plant-based. To do with thinking, feeling, or imagining consuming LG meat products.

Note. Table provides a breakdown of both grouped and included individual variables, and their respective definitions.

Theme One: Ethics

The *Ethics* theme is defined as words, thoughts, ideas, or items aggregated from the themes *Animal Ethics (AE)* and *Environmental Ethics (EE)*, and their respective sentiments. This excludes any references outside of the scope of the subsequent themes and sentiments. Figure 3.1 depicts how themes and sentiments were aggregated and visually represents how themes appeared together in the data. In this case, the sentiments negative, positive, and unsure/neutral are aggregated to their relevant themes, being AE and EE. Then, AE and EE are aggregated into the overarching theme of Ethics.

Figure 3.1
Aggregated Concept Map of Overarching Ethics Theme



Note. Concept map showcasing how the overarching Ethics theme, its subsequent themes of Animal Ethics and Environmental Ethics, and their respective sentiments are aggregated.

Animal Ethics

The theme of *Animal Ethics (AE)* is defined as words, thoughts, ideas, or items which have been aggregated from positive, negative, and unsure/neutral sentiments related to animal ethics (e.g., animals, animal cruelty, animal rights/welfare, pain/death, and animals as food). AE was also concurrently found in the thematic results of Possidónio et al. (2021). It excludes references to food production, farm animals (e.g., 'cattle'), and local food (included in *Environmental Ethics or Farm Ethics*). Such references are excluded as they do not directly reference animals or related ethics. AE is typically a factor in food decisions (Connell et al., 2008; Connell & British Columbia Association of Farmers Markets, 2012; Possidónio et al., 2021). Respondents seemed to imagine ideas related to animal ethics when prompted to reflect upon PB foods, AB foods and LG meats, indicating that there may be a connection between the thought of food and the source (in this case, animals). Existing literature on cognitive dissonance demonstrates that there is a connection between consuming animals and the love for animals, depicting tension held between two conflicting beliefs and behaviours (called the meat paradox or MRCD)[40] (Benningstad & Kunst, 2020; Bouwman et

[40] While this might be the case in Western methods of food production, including the commodification of animals, this is not the case across culture. Indigenous food practices emphasize respectful relations with nonhuman beings (Auerbach, 2018; Nadasdy, 2007).

al., 2022; Monteiro et al., 2017b, 2017a; Rothgerber, 2014, 2020; Rothgerber et al., 2022; Rothgerber & Rosenfeld, 2021). See Table 3.2 for grouped variable reference counts, theme and sentiment definitions, respective reference representations, subsequent examples, and expansions on meaningful examples of note for the theme of Animal Ethics. Following Table 3.2, further explanations of the analysis of AE are provided.

Table 3.2
Thematic, Content, and Sentiment Analyses of Animal Ethics

Theme or Sentiment	Variable AB	PB	LG	Definition	Representation	Examples
Animal Ethics	43	15	7	Theme. Any (+), (-), or (?) items related to animal ethics.[a] Excludes production and local.[b]	-[e]	-[e]
Negative	32	1	2	Sentiment. Any (-) animal ethics references. Includes animals without context.[c]	Animal cruelty	"Animal abuse,"[f] "Animal suffering,"[f] "Torturing animals,"[f] "Animal cruelty,"[f] "Inhumane,"[h] "I would probably view it similarly to farmed meat because it still involves a live animal."[h]
					Animals	"Animals,"[f] "Cows."[f]
					Pain/death	"Pain,"[f] "Harmful,"[f] "Violence,"[f] "Death,"[f] "Killing Animals,"[f] "Slaughter of animals,"[f]
					Food	"I'm not a calf, why would I drink from it's *[sic]* mom."[g]
Positive	6	14	1	Sentiment. Any (+) animal ethics references.	Ethical treatment	"Good. Consider ethical treatment of animals,"[f] "Not as bad as meat consumption,"[f] "Animal friends,"[f] "Ethical,"[g] "Better than milk,"[g] "Happy that I'm not hurting animals."[g]
					Helping	"Helping our fur friends,"[h] "helping out the little guys,"[g] "Helping the planet and our environment in regards to the pollution created by using animals."[g]
					Values/ connection	"I can be compassionate and act on my values,"[g] "Connected,"[g] "Kindness."[g] "Like a good person LOL."[g]
Unsure or Neutral	5	0	4	Sentiment. Any (?) animal ethics references. Includes conflicting (+) and (-) sentiments.[d]	Questioning Selective	"Is it humane,"[f] "Consider source r *[sic]* animals treated fairly."[f] "Conscious of where it came from,selective *[sic]*," [f] "Needs to be organic and free range."[f]
					Unsure/ conflicted	"Seems unnecessary but I mean the less of two evils,"[h] "Curious if this involves animal cruelty,"[h] "I don't know if I would feel morally wrong eating it...I think it is a *[sic]* really cool to be able to source these cells without harm to animals."[h]

Note. Table includes reference counts by grouped for the theme Animal Ethics and its respective sentiments. Representations include words or phrases to summarize the references within a given sentiment. Examples of references included.
[a]May be overlap with Animal Ethics for references that fit both themes (e.g., "Ethical.").
[b]Included in Environmental Ethics and Farm Ethics themes.
[c]May indicate cognitive dissonance (e.g., simultanously picturing animals and reflecting on the animal product, such as stating "Animals," or "Cows.").
[d]Not included as a standalone (-) or (+) reference to capture the full meaning of the sentiment.
[e]No representations or examples for Animal Ethics theme itself. Sentiments merely aggregated to theme for total reference counts.
[f]Refers to AB Foods. Meaningful reference: "Not as bad as meat consumption" refers to dairy.
[g]Refers to PB Foods. Meaningful reference: "Better than milk" refer to PB milk.
[h]Refers to LG Meats.

An analysis of AE reference frequency counts demonstrates that 66.2% of references included in the theme AE were in relation to AB foods (43 of 65 total animal ethics references), with 74.4% of AB food references being associated with negative feelings (32 of 43 AB food sentiment references). General negative sentiments (not only in reference to AB foods) included representations such as animal cruelty, mentioning animals, pain and death, and animals as food. Some examples of negative AB food sentiments: "Animal abuse," "Cows," and "Killing Animals." Specifically, dairy was perceived more positively than meat (e.g., "Not as bad as meat consumption").[41]

Regarding PB foods, 93.3% of references were associated with positive feelings surrounding AE (14 of 15 PB food sentiment references). General positive sentiments (not only in reference to PB foods) included representations such as the ethical treatment of animals, helping animals, and values/connection. Some examples of positive PB food sentiments: "happy I'm not hurting animals," "Helping out the little guys," and "Like a good person LOL." Specifically, PB milk was perceived as "Better than [dairy] milk."

In terms of LG meats, 57.1% of references were unsure/neutral (4 of 7 LG meat sentiment references), indicating consumers seemed uncertain about whether LG meats cause harm to animals. Unsure/neutral sentiments in general, not only for LG meats, included questioning, being selective and being unsure/conflicted.[42] Some examples of unsure/neutral LG meat sentiments: "Seems unnecessary but I mean the less of two evils," and "Curious if this involves animal cruelty,"

When referring to AE, KRFM consumers seemed to view AB foods more negatively and PB foods more positively, meaning that AB foods were generally perceived as being crueller to animals than PB foods. Consumers seemed unsure about animal ethics and LG meats. Overall, KRFM consumers appear to consider PB foods as most beneficial when considering harm to animals within the food industry. See Figure 3.2 for a visualization of AE reference proportions broken down by grouped variable to demonstrate relative sentiment scopes.

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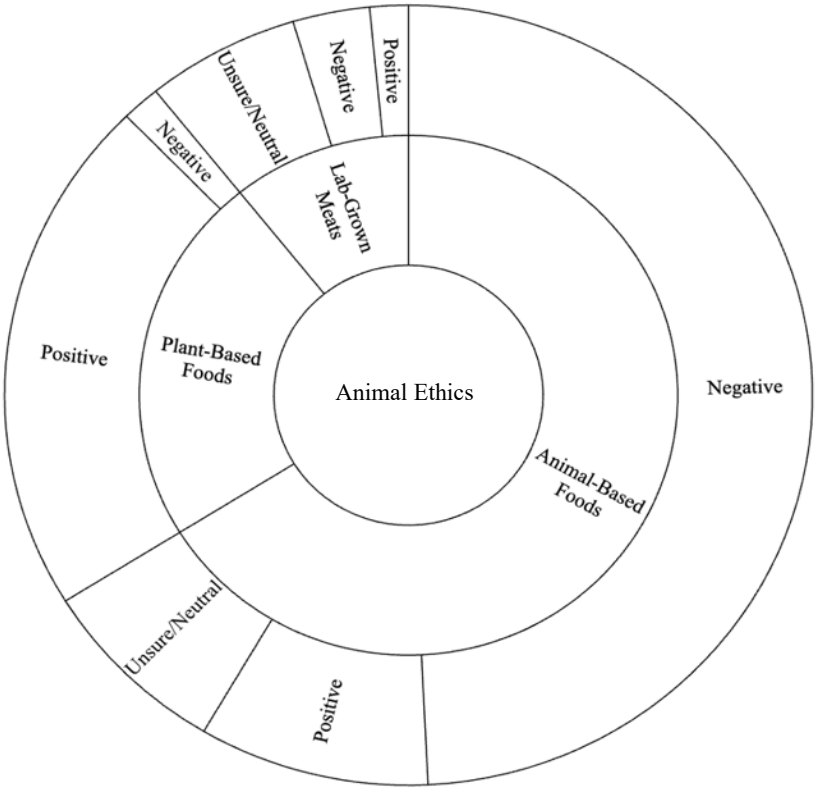
[41]Note that these references are vague and could be interpreted in terms of sustainability, health, or taste, in addition to animal ethics. Vague references are included under all potentially relevant themes.

[42] Conflicting feelings not included as standalone negative or positive references to include the full meaning of the sentiment.

Sunburst figures can be interpreted by first looking at the circle in the centre, which refers to the presented theme. In this case, it is *Animal Ethics (AE)*. The second outermost layer of the expanding circle represents the grouped variables (PB foods, AB foods, and LG meats) and the proportion of the theme's references (in this case, AE) for each grouped variable. The outermost layer of the expanding circle represents the proportion of sentiment references (typically, positive (+), negative (-), and unsure/neutral (?)) in relation to each grouped variable (PB foods, AB foods, and LG meats) for the given theme (in this case, AE). Subsequent sunburst figures can be interpreted using the same logic.

Figure 3.2
Proportionate Sunburst Illustration of Animal Ethics Theme



Note. Proportionate sunburst illustration of the theme Animal Ethics partitioned by grouped variable (AB foods, PB Foods, and LG Meats) and their respective sentiments.

Environmental Ethics

The theme of *Environmental Ethics (EE)* is defined as words, thoughts, ideas, or items aggregated from positive, negative, and unsure/neutral sentiments related to sustainability and ethics (e.g., sustainability, environmental ethics, local food, and water usage). Possidónio et al. (2021) did not find a theme related directly to the environment but did find a theme related to the reduction of AB food consumption. EE is a typical factor in

food decisions (Cicia et al., 2021; Connell et al., 2008; Connell & British Columbia Association of Farmers Markets, 2012). Respondents seemed to think about the environment and sustainability, and how they feel about these, when prompted to reflect upon PB foods, and LG meats, indicates that there is likely a connection between the thought of food and its effects on the environment. See Table 3.3 for grouped variable reference counts, theme and sentiment definitions, respective reference representations, subsequent examples, and expansions on meaningful examples of note for the theme EE.

Table 3.3

Thematic, Content, and Sentiment Analysis of Environmental Ethics

Theme or Sentiment	Variable[a] AB	PB	LG	Definition	Representation	Examples
Environmental Ethics	17	25	9	Theme. Any (+), (-), or (?) items related to sustainability and ethics.[b]	-[e]	-[e]
Negative	7	3	2	Sentiment. Any (-) EE references.	Unsustainable	"Unsustainable,"[f,h] "Waste,"[f] "Factory farming,"[f] "Almond milk causes for *[sic]* damage to the earth than cow *[sic]* milk,"[g] "Bad for environment,"[g] "Water intensive."[g]
Positive	5	18	6	Sentiment. Any EE references.	Sustainability and ethics	"Green,"[g] "Sustainable,"[g,h] "Ethical,"[g] "Eco conscious,"[g] "Environment friendly,"[g,h] "Helping the planet and our environment in regards to the pollution created by using animals,"[g] "Good alternative we should all do our part for sustainability."[h]
					Local	"I grow my own meat so feel very good about not supporting feed lots,"[f] "Fine…I support our local dairy,"[f] "Local is fine."[f]
					Water usage	"Love it and conscious of water waste,"[g] "Less water."[g]
					Personal values	"I can be compassionate and act on my values,"[g] "Like a good person LOL."[g]
Unsure or Neutral	5	4	1	Sentiment. Any (?) EE references. Includes unclear and conflicting (+) and (-) sentiments.[c] Includes local or sustainability references without context.[d]	Sustainability	"Environment,"[f] "Sustainability,"[f,g] "Production process/ resources used."[g]
					Unsure/ conflicted	"I consume dairy but prefer local suppliers when available,"[f] "Only local,"[f] "Not sure about how it's made or what kind of impact this has on environment or workers,"[g] "Seems unnecessary but I mean the less of two evils."[h]

Note. Table includes reference counts by grouped for the theme Environmental Ethics and its respective sentiments. Representations include words or phrases to summarize the references within a given sentiment. Examples of references included.

[b]May be overlap with Animal Ethics for references that fit both themes (e.g., "Ethical.").

[c]Not included as a standalone (-) or (+) reference to capture the full meaning of the sentiment.

[d]May indicate having conflicting or unclear feelings about the food item itself where the food product is only consumed under specific circumstances (e.g., "Only local."). Does not include positive framing of specfic circumstances of food items.

[e]No representations or examples for overarching theme. Sentiments merely aggregated to theme for total reference count.

[f]Refers to AB Foods.

[g]Refers to PB Foods.

[h]Refers to LG Meats.

An analysis of EE reference frequency counts demonstrates that 49.0% of references on EE were in relation to PB foods (25 of 51 total EE references), with 72.0% of PB food references being associated with positive feelings (18 of 25 PB food EE sentiment references). Regarding LG meats, 66.7% of EE references were framed positively (6 of 9 LG meat EE sentiment references). In general, positive EE sentiments (not only in reference to PB foods) included representations such as positively framed EE references, references to local food and production, water usage, and personal values. Some examples of positive PB food and/or LG meat EE sentiments: "Green," "Sustainable," "Environment friendly," "Less water," and "I can be compassionate and act on my values."[43]

In terms of AB foods, references were spread out across EE sentiments relatively equally. However, compared to PB foods and LG meats, AB foods had the most negative EE references (58.3%; 7 of 12 negative EE references). In general, negative EE sentiments (not only in reference to AB foods) included the representation of being unsustainable. Some examples of negative AB EE food sentiments are "Unsustainable," "Waste," and "Factory farming." AB foods also had more unsure/neutral EE references (50.0%; 5 unsure/neutral EE references). Generally, unsure/neutral EE sentiments (not only in reference to AB foods) included representations of mentioning sustainability without context[44] and feeling unsure/conflicted.[45] Some examples of unsure/neutral AB food EE sentiments: "Environment," "Sustainability," "I consume dairy but prefer local suppliers when available," and "Only local."

When referring to EE, KRFM consumers seemed to view PB foods and LG meats more positively than AB foods, indicating that PB foods and LG meats may be perceived as more sustainable. Consumers seemed unsure about AB foods but leaned toward viewing them in both a negative and unsure/neutral manner. See Figure 3.3 for a visualization of EE

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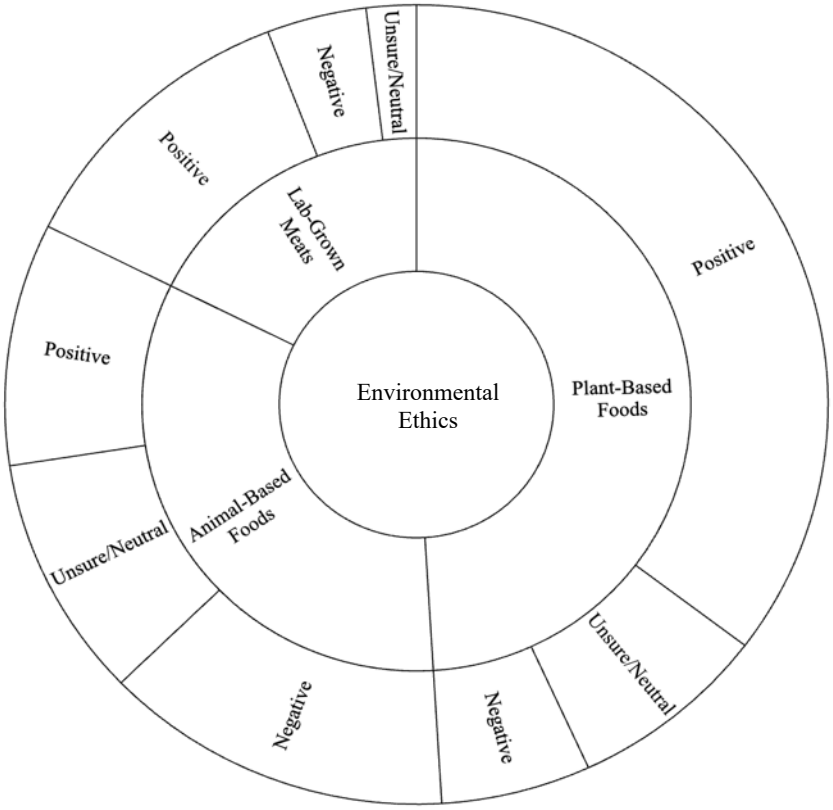
[43] Note that these references are vague and could be interpreted in terms of animal ethics and/or sustainability. Vague references are included under all potentially relevant themes.

[44] No context in terms of sustainability (e.g., "Environment") is likely not indicative of either a positive or negative sentiment. It has been interpreted as unsure/neutral.

[45] If the food product is only consumed under specific circumstances (e.g., "Only local."), this may indicate having conflicting or unclear feelings about the specific food item being referred to. Conflicting feelings not included as standalone negative or positive references to include the full meaning of the sentiment.

reference proportions broken down by grouped variable to demonstrate relative sentiment scopes.

Figure 3.3
Proportionate Sunburst Illustration of Environmental Ethics Theme



Note. Proportionate sunburst illustration of the theme Environmental Ethics partitioned by grouped variable (AB Foods, PB Foods, and LG Meats) and their respective sentiments.

Theme Two: Curiosity

The theme of *Curiosity (CU)* is defined as words, thoughts, ideas, or items which have been aggregated from skeptical (-) or open (+) sentiments relating to feelings of curiosity. It does not contain references outside the scope of the themes or sentiments. CU was also concurrently found in the thematic results of Possidónio et al. (2021), as were unfamiliarity and thoughts of future alternatives. This excludes the standalone unsure/neutral (?) sentiment as skeptical (-) includes being unsure or questioning. References focused on comparisons are not included (included in *Animal Products*, and *Plant-based Products and Alternatives*). CU may provide insight into the degree of openness toward AB food, PB food, and LG meats. Respondents seemed to be both curious and apprehensive toward all three food categories. It is possible that having more information on such foods may help

consumers feel more comfortable and open toward certain foods. See Table 3.4 for grouped variable reference counts, theme and sentiment definitions, respective reference representations, subsequent examples, and expansions on meaningful examples of note for the theme CU.

Table 3.4

Thematic, Content, and Sentiment Analyses of Curiosity

Theme or Sentiment	Variable AB	PB	LG	Definition	Representation	Examples
Curiosity	25	92	77	Theme. Any (-) or (+) items related to CU. Excludes (?) sentiment.[a]	-[e]	-[e]
Skeptical	17	45	46	Sentiment. Any (-) CU references. Includes resistance and questioning.[b] Excludes food item comparisons.[c]	Concern/fear/ disinterest	"Concerned,"[f,g,h] "Fear,"[f] "Problematic,"[f] "Avoid the thought of where meat comes from,"[f] Not interested,"[g,h] "Anti soy,"[g] "Never consume this,"[g] "Skeptical,"[g,h] "Risky,"[h] "Scared,"[h] "Nervous,"[h] "Really freaked out,"[h] "Kinda sketchy."[h]
					Conflicted	"Conflict,"[f] "Slightly bad but grew up with it,"[f] "Complication,"[f] "Seems unnecessary but I mean the less of two evils,"[h] "Compromise."[h]
					Selective	"Selective,"[f] "Limiting,"[f] "I try to limit."[f]
					Questioning	"Why make plants taste like meat,"[g] "Is it good,"[g] "Is it necessary,"[g] "Curious if this involves animal cruelty,"[h] "Why."[h]
					Unsure/ confused	"Unsure,"[g,h] Uncertainty,"[g] "Undecided,"[g] "Confused,"[g,h] Hesitant,"[h] "Many unknowns,"[h] "Don't know about the hygiene factor."[h]
					Change	"Change,"[g] "Different."[g]
					Prep difficult	"Hard to cook,"[g] "Lots of prep,"[g] "Need to know what you're doing."[g]
Open	8	47	31	Sentiment. Any (+) CU references. Includes curiosity.[d] Excludes food item comparisons.[c]	Comfort/ familiarity	"Tradition,"[f] "familiar,"[f] "Comfort,"[f,g] "History of millions eating and producing tofu,"[g] "Safe meat alternative."[g]
					Open/interest	"I'm ok with it,"[f] Easy availability,"[f] "Curious,"[g,h] "Open minded,"[g] "Interest,"[g,h] "Fascinated,"[h] "Intrigued,"[h] "I'm all for it,"[h] "Cool."[h]
					Want to try/learn	"It's something I would like to eat,"[g] "Interested in learning how to cook it,"[g] "I want to try,"[g,h] "Would be worth trying."[h]
					Creative/novel	"Creative,"[g] "So many fun ways to use it,"[g] "New,"[g] "Good to change it up."[g]
					Science/ progress	"The future is here,"[h] "Trail blazing,"[h] "Amazed by science,"[h] "Futuristic,"[h] "Progress,"[h] "Innovative,"[h] "A possible solution."[h]

Note. Table includes reference counts by grouped for the theme Curiosity and its respective sentiments. Representations include words or phrases to summarize the references within a given sentiment. Examples of references included.

[a]Does not include unsure/neutral sentiment as Skeptical includes being unsure or questioning.

[b]Includes words of change, as these indicate a degree of skepticism or resistance to change.

[c]Included in Animal Products and Plant-based Products and Alternatives.

[d]Includes words of history, familiarity, the future and comfort, as these may indicate a degree of openness.

[e]No representations or examples for theme. Sentiments merely aggregated to theme for total reference count.

[f]Refers to AB Foods.

[g]Refers to PB Foods.

[h]Refers to LG Meats.

An analysis of CU frequency counts demonstrates that 47.4% of references included in the theme CU were in relation to PB foods (92 of 194 total CU references), with 51.1% being associated with openness (47 of 92 PB food CU sentiment references). In general, open CU sentiments (not only in reference to PB foods) include representations such as feelings of comfort and/or familiarity, being open and/or interested in the product, wanting to try or learn about the product, viewing the product as creative and/or novel, and thinking of science and/or progress. Some examples of open PB food CU sentiments are "Comfort," "History of millions eating and producing tofu," "Safe meat alternative," "Curious," "Open minded," "Interest," "Interested in learning how to cook it," "I want to try," "Creative," and "So many fun ways to use it." PB foods had the most references to openness (47 of 86 open CU references).

Demonstrating a similar count of both open and skeptical CU references to PB foods, 48.9% of these were associated with skepticism (45 of 92 PB food CU sentiment references). General skeptical CU sentiments (not only in reference to PB foods) included representations such as feelings of concern, fear and/or disinterest, feeling conflicted, being selective, questioning the product, feeling unsure and/or confused, references to change without context,[46] and finding the preparation of the product difficult. Some examples of skeptical CU PB food sentiments are "Concerned," "Not interested," "Anti soy," "Why make plants taste like meat," "Is it good," "Unsure," "Confused," "Change," and "Hard to cook."

In terms of AB foods, 68.0% of CU references were associated with skeptical feelings (17 of 25 AB food CU sentiment references). Some examples of skeptical AB food CU references: "Concerned," "Fear," "Problematic," "Avoid the thought of where meat comes from," "Conflict," "Slightly biased but grew up with it," "Selective," and "I try to limit." Regarding LG meats, 59.7% of CU references were associated with skeptical feelings (46 of 77 LG meat sentiment references). Some examples of skeptical LG meat CU references are "Concerned," "Not interested," "Skeptical," Risky," "Scared," "Nervous," "Kinda *[sic]* sketchy," "Seems unnecessary but the less of two evils," "Compromise," "Curious if this involves animal cruelty," "Why," "Unsure," "Confused," "Hesitant," and "Many unknowns."

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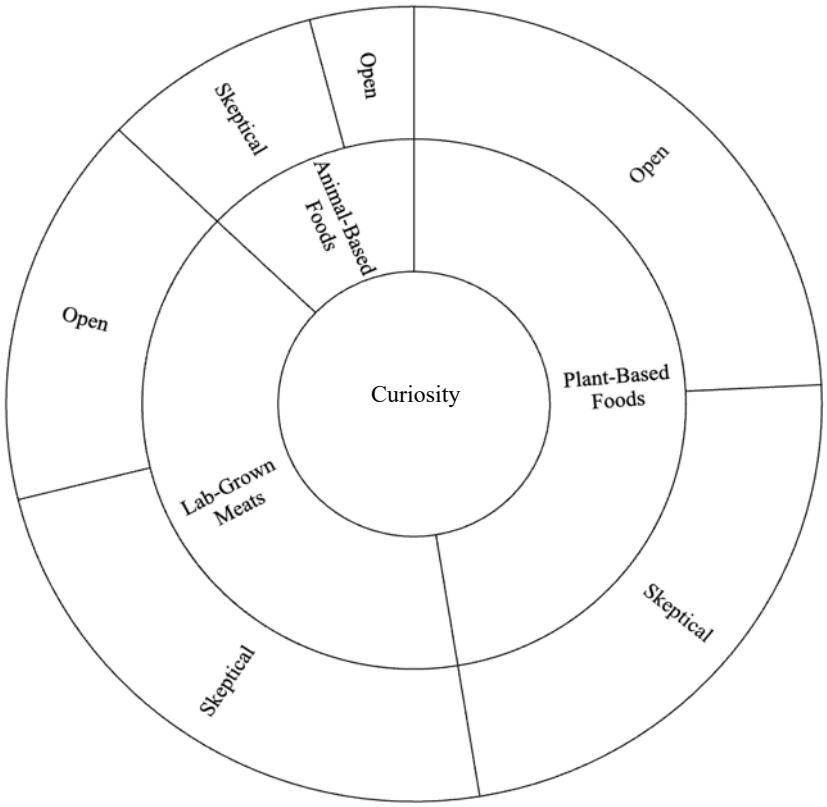
[46] Change without context is included under skepticism.

Both PB foods (45 of 109 skeptical CU references) and LG meats (46 of 109 skeptical CU references) had the most references to skepticism.

When referring to CU, KRFM consumers seemed to be equally open and skeptical about PB foods, meaning that there is likely a degree of openness to trying, but perhaps consumers need more information and knowledge on PB foods. Consumers seemed mostly skeptical about AB foods and LG meats. Overall, KRFM consumers might be open to PB foods if provided with more information on benefits to their health, the environment, and animal welfare. Perhaps due to LG meats being relatively new and not yet being available on the market, consumers seem to be skeptical of the product as they lack any direct experience with such products. This may also be due to preferences for natural foods. Overall, most KRFM consumers were skeptical of AB foods. See Figure 3.4 for a visualization of CU reference proportions broken down by grouped variable to demonstrate relative sentiment scopes.

Figure 3.4
Proportionate Sunburst Illustration of Curiosity Theme



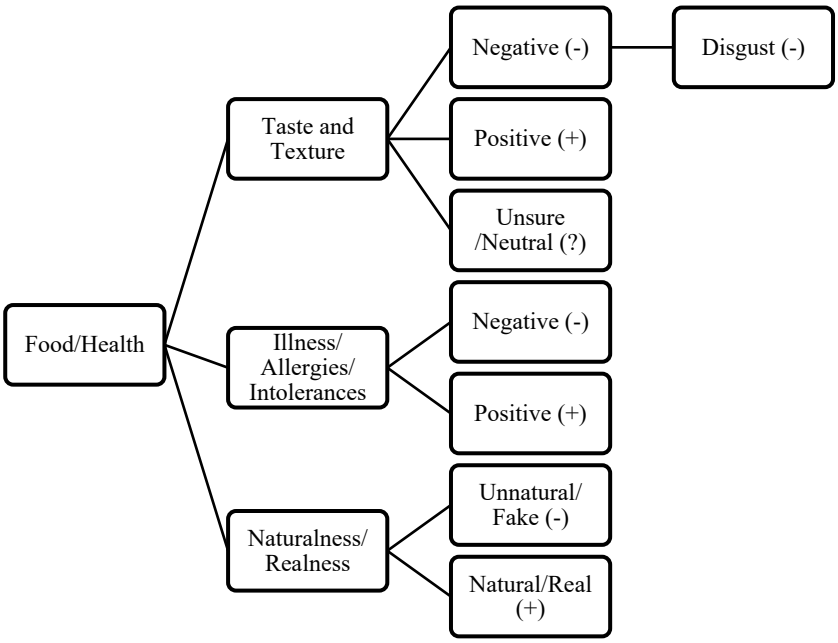
Note. Proportionate sunburst illustration of the theme Curiosity partitioned by grouped variable (AB Foods, PB Foods, and LG Meats) and their respective sentiments.

Theme Three: Food and Health

The overarching *Food and Health* theme is defined as any words, thoughts, ideas, or items which have been aggregated from the themes *Taste and Texture (TT)*, *Illness, Allergies, and Intolerances (IAI)* and *Naturalness or Realness (NR),* and their respective sentiments and sub-themes/sentiments. Figure 3.5 depicts how themes and sentiments were aggregated and visually represents how themes appeared together in the data. In this case, the sentiments negative, positive, and unsure/neutral are aggregated to their relevant themes, being TT, IAI, and NR. Then, such themes are aggregated into the overarching theme of Food and Health.

Figure 3.5

Aggregated Concept Map of Overarching Food and Health Theme



Note. Concept map showcasing how the overarching Health theme, its subsequent themes of Taste and Texture, Illness, Allergies and Intolerances and Naturalness or Realness, and their respective sentiments and sub-themes/sentiments are aggregated.

Taste and Texture

The theme of *Taste and Texture (TT)* is defined as words, thoughts, ideas, or items which have been aggregated from positive, negative, and unsure/neutral sentiments related to the taste and texture of food. The sub-theme and sub-sentiment of *Disgust* (-) is aggregated into negative sentiments. Taste, texture, flavour, freshness, lightness, and disgust were also concurrently found in the thematic results of Possidónio et al. (2021). TT is relevant to the research question as it is directly related to food, and human perceptions of food regarding taste and texture tend to influence whether they choose to consume a food or not (see Michel

et al., 2021; North et al., 2021). See Table 3.5 for grouped variable reference counts, theme and sentiment definitions, respective reference representations, subsequent examples, and expansions on meaningful examples of note for the theme TT.

Table 3.5

Thematic, Content, and Sentiment Analyses of Taste and Texture

Theme or Sentiment	Variable AB	PB	LG	Definition	Representation	Examples
Taste and Texture	34	89	29	Theme. Any (+), (-) or (?) items related to TT.	-[d]	-[d]
Negative	15	34	27	Sentiment. Any (-) TT references. Includes sub-theme of Disgust.[a]	Not tasty	"Bland,"[f] "Not always flavourful,"[f] "Not great tasting,"[f] "Chewy,"[f] "Rubbery,"[f,g] "Less enjoyable flavour and texture,"[f] "Tasteless,"[g] "Not appetizing,"[g] "Mushy."[g]
Disgust	15	10	20	Sub-theme and negative sentiment. Any (-) items related to disgust.	Disgust	"Dirty,"[e,g] "Disgust,"[e,g] "Weird,"[e] "Yuck,"[e,f,g] "Ew,"[e] "Gross,"[e,f,g] "Infected,"[g] "Don't know about the hygiene factor,"[g] "Icky."[g]
Positive	16	42	0	Sentiment. Any (+) TT references.	Tasty Versatile	"Tasty,"[e,f] "Yum,"[e,f] "Delicious,"[e,f] "It tastes good."[f] "Lots of diversity,"[f] "Versatile,"[f] "You can flavour it a million different ways,"[f] "I enjoy it in many forms, savoury and sweet."f
Unsure or Neutral	3	13	2	Sentiment. Any (?) TT references. Includes unclear and conflicting (+) and (-) sentiments.[b] Includes lack of context.[c]	Taste/texture Questioning/ unsure Conflict	"Bbq,"[e] "Grilled,"[e] "Taste,"[e] "Sweet,"[f] "Umami,"[f] "Texture."[g] "Does it taste as good as animal meat,"[f] "If it's good taste-wise…then sure,"[f] "Apprehension about flavour,"[f] "Oat ok almond milk too watery,"[f] "Doesn't taste good unless mixed,"[f] "Plant based milk doesn't always have the exact flavour I want but I'm happy they exist and oat milk is my favourite."[f]

Note. Table includes reference counts by grouped for the theme Taste and Texture, its respective sentiments and sub-theme (Disgust). Representations include words or phrases to summarize the references within a given sentiment. Examples of references included.

[a]Sub-theme of Disgust aggregated to (-) sentiment.

[b]Not included as a standalone (-) or (+) reference to capture the full meaning of the sentiment.

[c]Challenging to interpret as (+) or (-) as each person may have a differing subjective view on different flavours and textures (e.g., "Sweet," "Umami.").

[d]No representations or examples for theme. Sentiments merely aggregated to theme for total reference count.

[e]Refers to AB Foods.

[f]Refers to PB Foods. Meaningful examples: "Lots of diversity" and "Doesn't taste good unless mixed" refer to PB milk. Remaining three Versatile examples refer to tofu.

[g]Refers to LG Meats.

An analysis of TT reference frequency counts demonstrates that 58.6% of references included in the theme TT were in relation to PB foods (89 of 152 total TT references), with 47.12% being associated with positive feelings toward the food product (42 of 89 PB food sentiment references). Compared to AB foods and LG meats, PB foods also had the most positive sentiments (72.5%; 42 of 58 positive sentiment references). In general, positive sentiments (not only in reference to PB foods) include representations such as tasty and versatile. Some examples of positive PB food sentiments: "Tasty," "Yum," "Delicious," "Lots of diversity,"[47] "Versatile," "You can flavour it a million different ways," and "I enjoy it in many forms, savoury and sweet."[48] In terms of AB foods, 47.1% of AB food sentiment references were viewed as positive (16 of 34 AB food sentiment references). Some examples are "Tasty," "Yum," and "Delicious."

Regarding LG meats, sentiments were predominantly negative (93.1%; 27 of 29 LG meat sentiment references). Generally, negative sentiments (not only in reference to LG meats) include representations such as not tasty and Disgust (sub-theme/sentiment). Some examples of LG meats being referred to as not tasty: "Rubbery," "Tasteless," "Not appetizing," and "Mushy." LG meats had the most references (44.4%) to the sub-theme/sentiment of Disgust (20 of 45 references to Disgust). Examples include "Dirty," "Disgust," "Yuck," "Gross," "Infected," "Don't know about the hygiene factor," and "Icky." In terms of AB foods, 44.1% of AB food sentiment references were viewed as negative (15 of 34 AB food sentiment references), and all 15 references fell under the sub-theme/sentiment of Disgust. Some examples: "Dirty," "Disgust," "Weird," "Yuck," "Ew," and "Gross." Compared to AB foods and LG meats, most negative sentiment references (44.7%) were in terms of PB foods (34 of 76 negative sentiment references). Some examples are "Bland," "Not always flavourful," "Not great tasting," "Chewy," "Rubbery, "Less enjoyable taste and texture," "Yuck," and "Gross."

Compared to AB foods and LG meats, 72.2% of unsure/neutral references were in terms of PB foods (13 of 18 unsure/neutral references). General unsure/neutral sentiments

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[47] Specifically in reference to the diversity of PB milks, likely in terms of different types of PB milks (e.g., oat, soy, almond, etc.).

[48] "Versatile," "You can flavour it a million different ways," and "I enjoy it in many forms, savoury and sweet," are in reference to tofu and its versatility in cooking.

include representations such as mentions of taste or texture without context,[49] questioning or feeling unsure, and feeling conflicted.[50] Some examples of unsure/neutral PB food references: “Sweet,” “Umami,” “Does it taste as good as animal meat,” “Apprehension about flavour,” “Oat ok almond milk too watery,” and “Plant based milk doesn’t always have the exact flavour I want but I’m happy they exist and oat milk is my favourite.”

When referring to TT, KRFM consumers seemed to feel primarily positive about PB foods. Both PB milks and tofu were referred to as diverse and versatile, demonstrating the potential for both products to be able to perhaps match a person’s subjective view of ‘tasty.’ Some consumers had mixed feelings about different types of PB milks, where some (e.g., almond milk) were viewed as less tasty than others (e.g., oat milk). Consumers felt mostly negative and disgusted about LG meats and, had conflicted views on AB foods, as references were predominantly both negative and positive. This is consistent with the theme of curiosity, where consumers felt skeptical (-) toward LG meats. Perhaps due to LG meats being relatively new, not being ‘natural,’ and typically not yet being on the market, consumers seem apprehensive of the product since they do not have any experience with it. See Figure 3.6 for a visualization of TT reference proportions broken down by grouped variable to demonstrate relative sentiment scopes.

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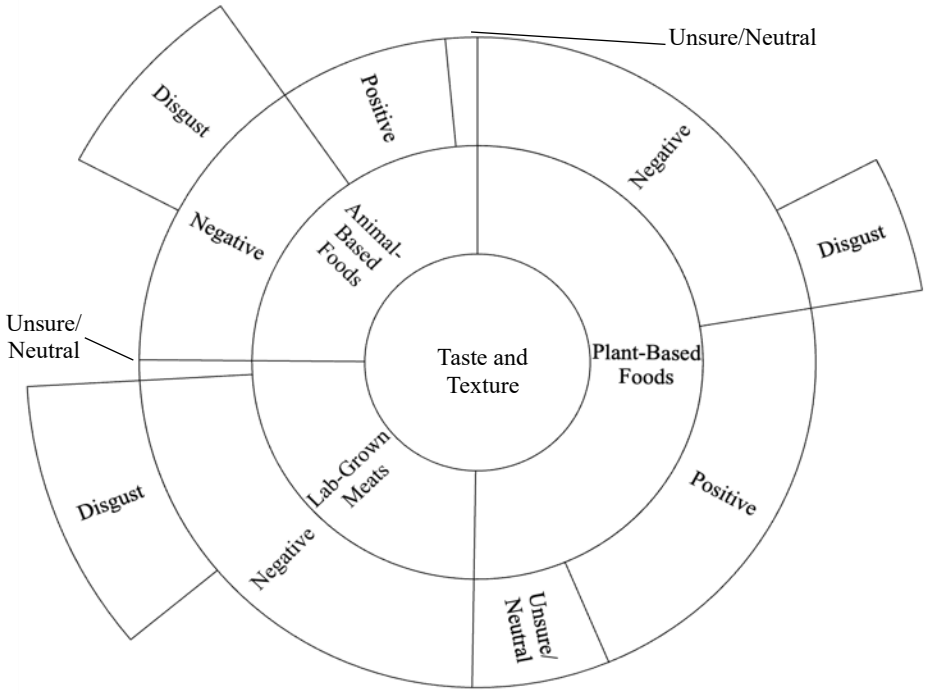
[49] References to taste and texture without context cannot be interpreted as positive or negative, as different respondents may have different subjective preferences (e.g., “Taste,” “Sweet,” and “Texture.”).

[50] Feeling conflicted about a food product, where both positive and negative references are concurrent, is categorized under unsure or neutral to capture the full meaning of the sentiment.

Figure 3.6
Proportionate Sunburst Illustration of Taste and Texture Theme



Note. Proportionate sunburst illustration of the theme Taste and Texture partitioned by grouped variable (AB Foods, PB Foods, and LG Meats), their respective sentiments and the sub-theme of Disgust. This sunburst is to be read in the same manner as other sunburst figures, with the exception of the sub-theme of disgust being presented in the fourth outermost layer of the expanding circle in terms of its proportion of references within each sentiment in the third outermost layer.

Illness, Allergies, and Intolerances

The theme of *Illness, Allergies, and Intolerances (IAI)* is defined as words, thoughts, ideas, or items which have been aggregated from positive and negative sentiments[51] related to illness, allergies, or intolerances. Well-being and disease were also concurrently found in the thematic results of Possidónio et al. (2021). This excludes references to being full, as this is not necessarily related to a positive or negative sentiment nor digestive issues (included in *Other Food*). IAI is a relevant theme as it could be a limiting factor in food decisions, which may even be outside of one's control. See Table 3.6 for grouped variable reference counts, theme and sentiment definitions, respective reference representations, subsequent examples, and expansions on meaningful examples of note for the theme IAI.

[51] No unsure or neutral sentiments, as the framing of IAI was either negative or positive, positive indicating the absence of such issues.

Table 3.6

Thematic, Content, and Sentiment Analyses of Illness, Allergies, and Intolerances

Theme or Sentiment	Variable AB	PB	LG	Definition	Representation	Examples
Illness, Allergies and Intolerances	43	20	3	Theme. Any (-) or (+) items related to IAI.[a] Excludes being full.[b]	-[c]	-[c]
Negative	42	4	3	Sentiment. Any (-) IAI references.	Upset stomach	"Bloated,"[d] "Indigestion,"[d] "Tummy aches,"[d] "Stomach issues,"[d] "Gas and bloating,"[d] "Nauseous,"[d,f] "Fart,"[d] "Stomach ache,"[e] "Constipation,"[e] "Still indigestible."[f]
					Illness	"Ill,"[d] "Sick,"[d,f] "Feel unwell,"[d] "Mucous,"[d] "Congested,"[d] "Inflammation."[e]
					Intolerance	"Intolerant,"[d] "Lactose intolerant."[d]
					Allergies	"Allergic,"[d] "Allergies."[d,e]
Positive	1	16	0	Sentiment. Any (+) IAI references.	Comfortable stomach	"Feel my stomach *[sic]* comfortable,"[d] "No gout from too much red meat,"[e] "It makes me feel lighter in my stomach,"[e] "Less bloated,"[e] "My stomach better,"[e] "Settled tummy,"[e] "Stomach friendly,"[e] "Easiest to digest."[e]

Note. Table includes reference counts by grouped for the theme Ilness, Allergies and Intolerances, and its respective sentiments. Representations include words or phrases to summarize the references within a given sentiment. Examples of references included.

[a]Excludes unsure/neutral sentiments as none emerged.

[b]Not necessarily related to stomach issues. Included in Other Food.

[c]No representations or examples for theme. Sentiments merely aggregated to theme for total reference count.

[d]Refers to AB Foods. Meaningful references: Excluding "Indigestion," the remaining six examples refer to dairy (36 out of 42 total negative sentiments refer to dairy). All examples of the Intolerance and Allergies representations refer to dairy.

[e]Refers to PB Foods.

[f]Refers to LG Meats.

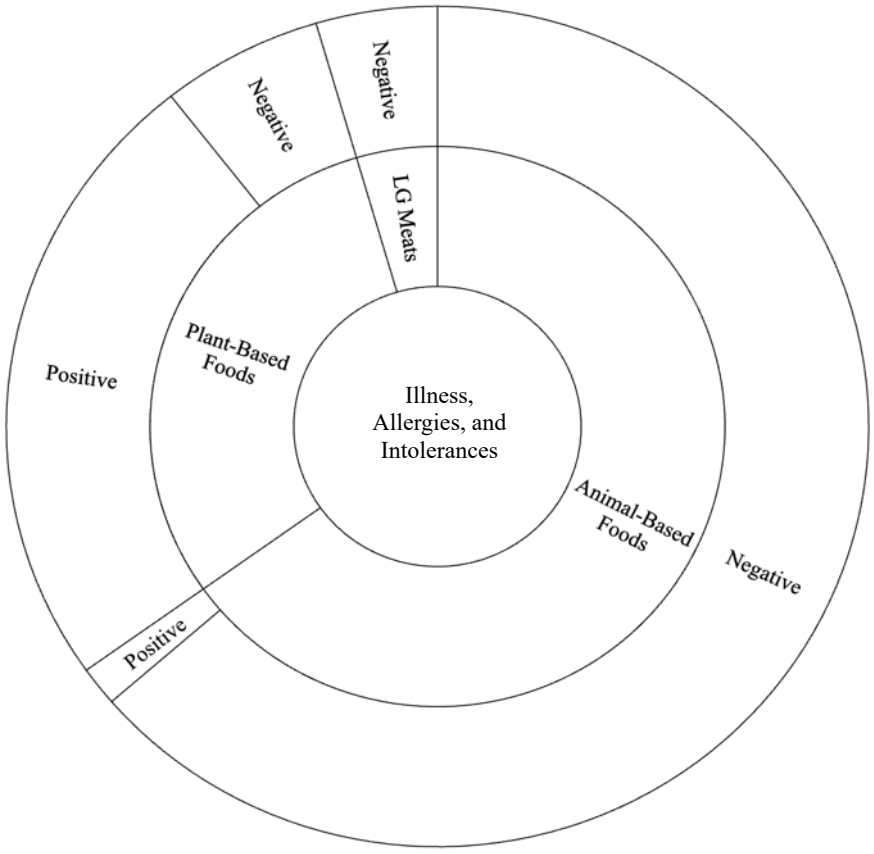
An analysis of IAI reference frequency counts demonstrates that 65.2% of IAI references were in relation to AB foods (43 of 66 IAI references), with 97.7% of AB food IAI references being associated with negative feelings (42 of 43 AB food IAI sentiment references). In general, negative IAI sentiments (not only in reference to AB foods) included representations such as having an upset stomach, illness in general, food intolerances, and food allergies. Some examples of negative AB food IAI sentiments are "Bloated," "Indigestion," "Tummy aches," "stomach issues," "Gas and bloating," "Nauseous," "Fart," "Ill," "Sick," Feel unwell," "Intolerant," "Lactose intolerant," and "Allergic." Dairy was perceived more negatively than meat, where 85.7% of negative sentiment references were about dairy (36 of 42 total negative AB food IAI sentiment references). All examples of intolerances and allergies were in reference to dairy, meaning lactose intolerance may be viewed as a barrier to dairy consumption. In terms of LG meats, 100% of IAI references were associated with negative feelings (3 of 3 LG meat sentiment references). All LG meat IAI reference examples: "Still indigestible," "Nauseous," and "Sick."

Regarding PB foods, 80.0% of IAI references were associated with positive feelings surrounding the absence of illness, allergies and/or intolerances (16 of 20 PB food IAI sentiment references). In general, positive IAI sentiments (not only in reference to PB foods) included the representation of having a comfortable stomach. Some examples of positive PB food IAI sentiments: "No gout from too much red meat," "It makes me feel lighter in my stomach," "Less bloated," "My stomach better," "Settled tummy," "Stomach friendly," and "Easiest to digest." These examples may be representative of PB foods being perceived as easier on one's stomach than AB foods (specifically dairy).

When referring to IAI, KRFM consumers seemed to view AB foods more negatively and PB foods more positively. Dairy was most associated with negative sentiments, where lactose intolerance was commonly referred to. The frequent mention of lactose intolerance leaves a possibility for the consumption of PB milk alternatives instead of dairy. There were limited references to LG meats, but all references were negative. It is possible that the lack of knowledge on LG meats led to limited references within this theme, especially since it likely has not been consumed by most due to the lack of market availability. Overall, KRFM consumers appear to consider PB foods as more beneficial than AB foods when considering

reducing digestive issues. See Figure 3.7 for a visualization of IAI reference proportions broken down by grouped variable to demonstrate relative sentiment scopes.

Figure 3.7
Proportionate Sunburst Illustration of Illness, Allergies, and Intolerances Theme



Note. Proportionate sunburst illustration of the theme Illness, Allergies, and Intolerances partitioned by grouped variable (AB Foods, PB Foods, and LG Meats) and their respective sentiments.

Naturalness or Realness

The theme of *Naturalness or Realness (NR)* is defined as words, thoughts, ideas, or items which have been aggregated from natural/real (+) and unnatural/fake (-) sentiments[52] related to the food product being viewed as either natural/real or unnatural/fake. Artificial was also concurrently found in the thematic results of Possidónio et al. (2021). NR could be a limiting factor in food decisions if foods are not considered to be 'natural.' See Table 3.7 for grouped variable reference counts, theme and sentiment definitions, respective reference

[52] No unsure or neutral sentiments. The framing in terms of naturalness or realness was either negative or positive, where the food product being perceived as unnatural or fake was framed negatively and where natural/real was framed positively.

representations, subsequent examples, and expansions on meaningful examples of note for the theme NR.

Table 3.7

Thematic, Content, and Sentiment Analyses of Naturalness or Realness

Theme or Sentiment	Variable			Definition	Representation	Examples
	AB	PB	LG			
Naturalness or Realness	7	41	18	Theme. Any (-) or (+) items related to NR.[a]	-[b]	-[b]
Unnatural or Fake	6	31	18	Sentiment. Any (-) framing of the item being referred to, in the context of being unnatural/fake.	Unnatural/fake	"Tricked,"[d] "Concerned about authenticity,"[d] "Fake beef burgers,"[d] "Fake,"[d,e] "Wish this was real meat,"[d] "Not real,"[d] "Unnatural,"[e] "Not natural,"[e] "Would rather have natural grown meat,"[e] "Opposite of natural food,"[e] "False nature,"[e] "Petrie dish,"[e] "Lab coats,"[e] "Artificial."[e]
					Chemicals	"Chemicals,"[d] "Chemicals affecting our babies,"[c] "Cows *[sic]* milk seems chemically,"[c] "Additives,"[d] "Consuming more chemicals then *[sic]* natural products."[d]
					Processed	"Overprocessed,"[c] "How likely is it more processed vs. Natural,"[d] "Processed,"[d] "Worry about the processed nature,"[d] "Super processed."[d]
					Needs to be organic	"How much better the organic tastes,"[c] "Needs to be organic,"[c] "Better organic."[d]
Natural or Real	1	10	0	Sentiment. Any (+) framing of the item being referred to, in the context of being natural/real.	Natural/real	I would probably eat that before lab grown meat,"[d] "Regular,"[c] "Same as regular milk products,"[d] "Clean,"[d] "More pure,"[d] "Tofu is simple,"[d] "More natural."[d]

Note. Table includes reference counts by grouped for the theme Naturalness or Realness, and its respective sentiments. Representations include words or phrases to summarize the references within a given sentiment. Examples of references included.

[a]Excludes unsure/neutral sentiments as none emerged. Unnatural/fake is classified as negative and natural/real as positive as participant responses seemed to indicate such feelings.

[b]No representations or examples for theme. Sentiments merely aggregated to theme for total reference count.

[c]Refers to AB Foods.

[d]Refers to PB Foods.

[e]Refers to LG Meats.

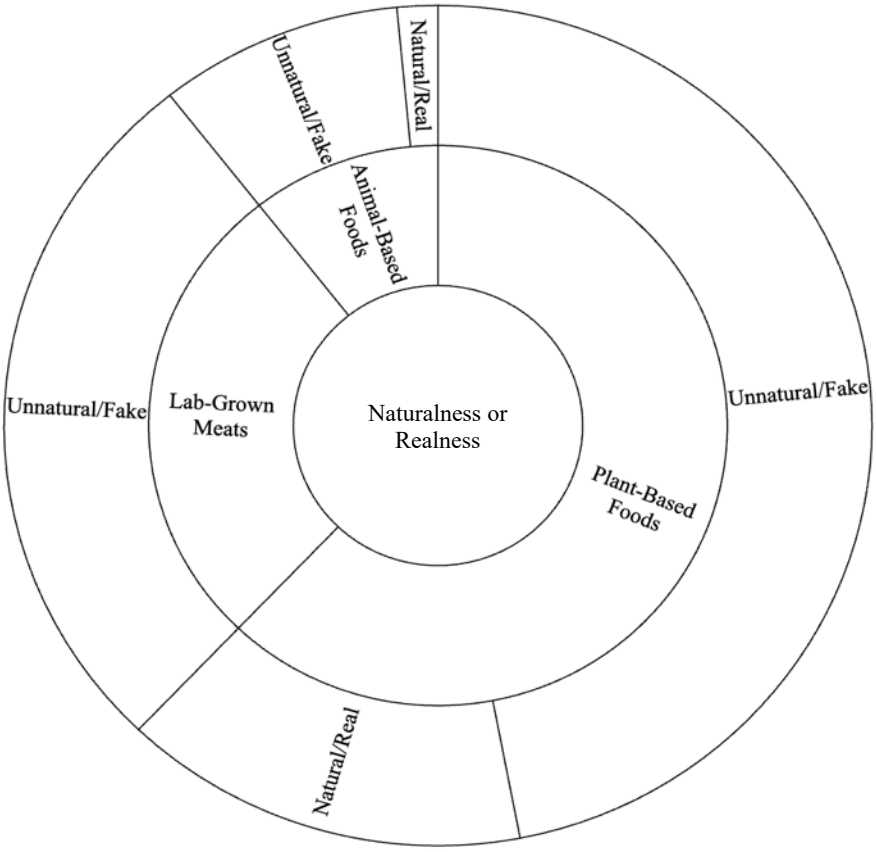
An analysis of NR reference frequency counts demonstrates that 59.1% of NR references were in relation to PB foods (39 of 66 total animal ethics references), with 75.6% of PB food NR references being associated with negative (unnatural/fake) feelings (31 of 41 PB food sentiment NR references). Compared with AB foods and LG meats, PB foods also had the most NR references to unnatural/fake (56.4%; 31 of 55 negative sentiment references). In general, negative NR sentiments (not only in reference to PB foods) included representations such as the food product being perceived as unnatural/fake in general, referring to chemicals, perceiving the food as processed, and how the food product should be organic. Some examples of negative PB food NR sentiments: "Tricked," "Concerned about authenticity," "Fake beef burgers," "Fake," "Wish this was real meat," "not real," "Chemicals," "Additives," "Consuming more chemicals then *[sic]* natural products," "How likely is it more processed vs. Natural," "Worry about the processed nature," and "Better organic."

Both AB foods and LG meats also mostly had negative NR sentiments comprising perceptions of the food product being unnatural/fake. In terms of AB foods, 85.7% of NR references were associated with negative feelings (6 of 7 AB food NR sentiment references). Some examples of negative AB food NR sentiments are "Chemicals affecting our babies," "Cows *[sic]* milk seems chemically," "Overprocessed," "How much better the organic tastes," and "Needs to be organic." In terms of LG meats, all NR references (100%) were associated with negative feelings (18 of 18 LG meat food sentiment references). Some examples of negative LG meat NR sentiments: "Fake," "Unnatural," "Would rather have natural grown meat," "Opposite of natural food," "False nature," "Petrie dish," "Lab coats," and "Artificial."

Compared to AB foods and LG meats, PB foods had the most positive NR sentiments comprising perceptions of the food product being natural/real (90.9%; 10 of 11 positive sentiment references). Generally, positive NR sentiments (not only in reference to PB foods) included the representation of being perceived as natural/real in general. Examples of positive PB food NR examples include: "I would probably eat that before lab grown meat," "Same as regular milk products," "Clean," "More pure," "Tofu is simple," and "More natural."

When referring to NR, KRFM consumers seemed to view all three groups (AB foods, PB foods, and LG meats) as mostly negative (unnatural/fake), which may be indicative of farmers market consumers being aware of processed foods in general, or considering naturalness in food purchasing decisions (Connell et al., 2008). PB foods did have the most positive sentiments (natural/real) when compared to both AB foods and LG meats, perhaps indicating a slight view toward PB foods being the most natural/real choice, even if it is not predominantly perceived as so. Some references would support such a claim, where PB foods were framed as being better than LG meats. LG meats were also referenced as being less natural than AB foods (meat). Overall, KRFM consumers appear to view food in general as unnatural/fake. See Figure 3.8 for a visualization of NR reference proportions broken down by grouped variable to demonstrate relative sentiment scopes.

Figure 3.8
Proportionate Sunburst Illustration of Naturalness or Realness Theme



Note. Proportionate sunburst illustration of the theme Naturalness or Realness partitioned by grouped variable (AB Foods, PB Foods, and LG Meats) and their respective sentiments.

Discussion

The three main overarching themes included in this chapter are *Ethics*, *Curiosity*, and *Food and Health*. The two themes aggregated to *Ethics* were *Animal Ethics* and *Environmental Ethics*. Generally, AB foods were perceived as less ethical than alternative food options. *Curiosity* is a standalone theme, and consumers were skeptical of PB foods, AB foods, and LG meats, but were most open to PB foods. The three themes aggregated to *Food and Health* were *Taste and Texture*, *Illness, Allergies, and Intolerances*, and *Naturalness or Realness*. Consumers generally viewed PB foods most positively regarding food and health, LG meats most negatively, and seemed unsure about AB foods. Across themes, PB foods seemed to be framed as the most positive, while AB foods and LG meats were framed in an unsure manner. Based on the general predictions of this study, the findings on AB foods and PB foods were unexpected, but the results on LG meats are aligned with predictions. More specifically, some of the negative and unsure attitudes toward AB foods were unexpected due to most of the KRFM sample being omnivores (69.1%; $n = 65$).

Theme One: Ethics

Animal Ethics is a common factor in consumer food decisions (see Connell et al., 2008; Connell & British Columbia Association of Farmers Markets, 2012; Possidónio et al., 2021). Regarding *Animal Ethics*, AB foods tended to be viewed by KRFM consumers as negative (specifically with dairy being viewed more positively than meat), while PB foods were generally viewed as positive (specifically with PB milk being viewed more positively than dairy milk). This means that AB foods seemed to be perceived as crueller to animals than PB foods, which may be an unexpected finding as most survey respondents identified as omnivores. However, consumers perceiving AB foods as cruel while mostly being omnivorous may point toward what Bastian & Loughnan (2017) refer to as the meat paradox or MRCD, in which an individual holds two contradictory beliefs and actions (called cognitive dissonance) of both consuming animals while valuing animal welfare (Benningstad & Kunst, 2020; Bouwman et al., 2022; Monteiro et al., 2017; Rothgerber, 2014, 2020; Rothgerber et al., 2022; Rothgerber & Rosenfeld, 2021). However, MCRD is a Westernized conceptualization of animal consumption. For instance, many Indigenous practices in relation to hunting emphasize the respectful connection to the animal as a being that is capable of feeling (Auerbach, 2018; Nadasdy, 2007). Consumers seemed unsure about the implications

of animal ethics regarding LG meats. This finding is not surprising, as limited information is currently available on LG meats.

The environment is a common factor in consumer food decisions (Cicia et al., 2021; Connell et al., 2008; Connell & British Columbia Association of Farmers Markets, 2012). In terms of *Environmental Ethics*, AB foods were viewed most negatively, while PB foods were perceived most positively, followed by LG meats. This indicates that PB foods and LG meats may be perceived as more sustainable than AB foods, which may be an unexpected finding since most survey respondents identified as omnivores. It is possible that consumers may have cognitive dissonance with the foods they consume (see Bastian & Loughnan, 2017; Benningstad & Kunst, 2020; Bouwman et al., 2022), while holding the belief that AB foods are less environmentally friendly (rather than cruel to animals), and still choosing to consume them. Some motivations to continue to consume AB foods, despite understanding the damages to sustainability, might include taste, texture, habit, cost, and social norms (Bryant & Sanctorum, 2021; Hopwood & Bleidorn, 2019; Michel et al., 2021).

Theme Two: Curiosity

Curiosity is a predominant theme within respondent free associations and was also found in Possidónio et al.'s (2021) study on consumer food perceptions. PB foods tended to be perceived by farmers market consumers in both open/positive and skeptical/negative manners. This means that consumers may be open to trying PB foods, but that some may need more knowledge on PB foods. AB foods and LG meats were both mainly perceived in a skeptical/negative manner. Perhaps LG meats are viewed in a skeptical or apprehensive manner due to being relatively new and due to a perceived artificialness. It is an unexpected finding that AB foods were viewed in a skeptical or negative manner, as most survey respondents were omnivores. It is possible that consumers merely consume AB foods due to social norms (Hopwood & Bleidorn, 2019; Michel et al., 2021), and perhaps omnivorous habits.

Theme Three: Food and Health

In terms of *Taste and Texture*, PB foods were perceived most positively amongst farmers market consumers, which is inconsistent with findings in existing literature, given that most respondents are omnivores (see Michel et al., 2021; Onwezen et al., 2021; Pointke et al., 2022). Specifically, PB milk and tofu were viewed as diverse and versatile. This may

indicate possibilities for increased acceptance of both PB milk and tofu, if consumers are open to trying them, where the curiosity theme suggests there is a degree of openness to trying PB foods. However, Michel et al. (2021) hypothesize that some consumers may have had previous bad experiences with tofu, which may play a role in apprehension toward PB foods. Many respondents also negatively viewed PB foods, mainly citing feelings of disgust, which is consistent with the literature (Michel et al., 2021; Onwezen et al., 2021; Pointke et al., 2022). Perhaps consumers trying different kinds of PB milks, such as oat milk (cited more positively by respondents than almond milk), or trying tofu prepared in different ways may help with negative perceptions of taste and texture. Feelings of disgust concerning sensory perceptions of PB foods are consistent with existing literature, and it has been hypothesized that if PB foods are more similar in taste and texture to their AB counterparts, there may be more acceptance (Michel et al., 2021; Onwezen et al., 2021; Pointke et al., 2022).

LG meats were viewed as primarily negative in taste and texture, where consumers mainly cited feeling disgusted. This is not unexpected, considering findings in the literature (see Arango et al., 2023; Grasso et al., 2019; Onwezen et al., 2021), and that LG meat is new and not yet available on the market. These findings are consistent with the skepticism toward LG meats found in the curiosity theme. AB foods were viewed as both positive and negative, indicating conflicting feelings, possibly indicating yet another form of the meat paradox or cognitive dissonance (Bastian & Loughnan, 2017; Benningstad & Kunst, 2020; Bouwman et al., 2022), where consumers may enjoy the taste of AB foods while understanding the potential damages to sustainability. However, the findings on AB foods may be unexpected, as most respondents were omnivores.

Illness, Allergies, and Intolerances is a common theme found within respondent free associations, consistent with the themes of well-being and disease found in Possidónio et al.'s (2021) study. Respondents perceived AB foods as mostly negative, while PB foods were perceived as primarily positive. Specifically, dairy was viewed most negatively, with many respondents citing issues with lactose intolerance. This indicates that lactose intolerance is a possible barrier to dairy consumption, meaning there may be more acceptance toward wanting to try PB milks. Globally, about two-thirds of the population likely has a lactose intolerance (Storhaug et al., 2017), which is consistent with the frequent mentioning of

lactose intolerance in this study. While LG meats were barely referred to within this theme, all references were negative sentiments. A lack of knowledge and market availability on LG meats may play a role in the limited number of references and negative perceptions. It might be an unexpected finding that most respondents viewed PB foods more positively than AB foods regarding stomach issues, as most self-reported being omnivores. Factors such as enjoying the taste of AB foods may play a role in consumers still consuming such products, despite citing gastrointestinal problems.

In terms of *Naturalness or Realness*, consumers viewed AB foods, PB foods, and LG meats as predominantly unnatural/fake/negative. This may be due to farmers market consumers being more aware of the decisions on food, including choosing more natural foods (see Connell et al., 2008). However, PB foods were viewed as more natural/real/positive than AB foods. This may indicate consumers viewing PB foods as the most positive, natural, or authentic option among the three food groups. However, these findings on naturalness are inconsistent with existing literature that found that AB meat was perceived as the most natural (Michel et al., 2021; Possidónio et al., 2021).

LG meats were also viewed as more unnatural/fake/negative than AB foods (specifically meat). This is not an unexpected finding considering the lack of information, market availability, and consumer skepticism in the curiosity theme. The findings on concerns surrounding LG meats not being natural are consistent with existing literature (Bryant & Sanctorum, 2021; Possidónio et al., 2021). Overall, farmers market consumers seemed to view food in general as unnatural, fake, or negative, which may be an unexpected finding considering most survey respondents are omnivores. Considering that food is generally viewed as unnatural, perhaps this indicates a larger systematic issue of food and health in North America. The Western diet is heavily based on the consumption of both AB foods and processed foods, which have negative impacts on human health, and this could be playing a role in consumer perceptions of food in general (see Clemente-Suarez et al., 2023; Rakhra et al., 2020).

Research Implications

As with any study, this research has some limitations. The farmers market sample is not generalizable to the greater population of Kamloops or other cities, as the sample only included farmers market consumers. However, this study could be used as a model or

example for other farmers market studies assessing acceptance of alternative foods. Themes were not connected back to individual cases based on sociodemographic factors, which limits the understanding of the data in context. Due to a small sample size, individual variables (meat, dairy, PB milk, PB meat, other PB foods, tofu, and LG meats[53]) were combined. While some main findings are highlighted if a specific food item was prevalent in a theme, it is not possible to know the thematic and sentiment findings for particular food items. Participants were also not asked to reflect on other foods, including fish and seafood, eggs, and other lab-grown foods (e.g., dairy, fish and seafood, and eggs).

Unfortunately, not all themes could be included in this thesis due to lack of space, time constraints, and for reasons of prioritizing the most prevalent and relevant themes. The themes that were not included are (1) *Ethics: Farm Ethics*; (2) *Feelings: Other Feelings*; (3) *Food and Health: Other Health, Animal Products, Plant-based Products and Alternatives* and *Other Food*; and (4) *Other.* This is not a limitation, as this research produced a substantial amount of data and knowledge. This provides opportunities for sharing the findings from the thesis in other avenues, including in future publications.

Future research has opportunities to examine the perceptions of LG meats, and how to increase its acceptance amongst consumers. LG meats may be sustainable options, but consumer acceptance remains low (Alhujaili et al., 2023; Onwezen et al., 2021; Żuk-Gołaszewska et al., 2022). There are also possibilities for research to investigate the impacts of LG meats on animals in terms of ethics, its environmental impacts, and impacts on human health. Existing literature on LG meats and sustainability impacts is limited and contradictory (see Penn, 2018; Risner et al., 2023; Roy et al., 2021). Connecting free association themes to sociodemographic factors is another potential direction for future research. As there were contradictory findings in terms of the sample being mostly omnivorous while viewing AB foods in a negative light regarding animal ethics and environmental ethics, this indicates the possibility of cognitive dissonance (see Bastian & Loughnan, 2017; Benningstad & Kunst, 2020; Bouwman et al., 2022), and future research should aim to investigate this further.

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[53] LG meats is the only variable in which remained the same and was not grouped.

As lactose intolerance was frequently cited, future studies could also look into the percentage of farmers market consumers who are lactose intolerant, while analyzing their perspectives of both AB and PB foods, and their motivations and interests in terms of alternative options. An analysis of specific food items (meat, dairy, PB milk, PB meat, other PB foods, tofu, and LG meats) without aggregating them to grouped variables (PB foods, AB foods, and LG meats) would provide more insight into how farmers market consumers view individual food items. Including food items such as fish and seafood, eggs, LG fish and seafood, LG milk, LG eggs, and consumable insects in free associations could be a potential future research direction.

There are some possibilities in which the acceptance of PB foods amongst consumers might be increased. Macro-level actors, including stakeholders in the food industry, educational institutions, governments that regulate food, non-governmental organizations that promote sustainable food, and researchers, can make an effort to better educate consumers on what sustainable food entails. Micro-level actors, meaning consumers, also have a role to play in food and sustainability. Consumers could choose more sustainable food options, such as alternative foods, and reduce their consumption of AB foods. In order to choose more sustainable food options, consumers must also educate themselves on the impacts of food on sustainability (humans, animals, and the environment). The research implications of the current research are explored in depth in chapter four.

Some possible marketing opportunities for institutions based on the farmers market consumers' views include promoting: (1) PB milk as more ethical toward animals than dairy milk; (2) the reduction of meat consumption based on animal and environmental ethics; (3) LG meat in general to gain more information on it and to reduce skepticism, including the implications on animal ethics; and (4) PB foods in general for educational purposes to also reduce feelings of skepticism. However, as local farmers frequent farmers markets as vendors, there may be difficulties surrounding promoting PB milk and meat options, including considering the financial well-being of local farmers. Overall, this research creates opportunities for future studies to delve deeper into the topic of PB foods and for implications on how to increase the acceptance of PB foods.

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CHAPTER 4. RESEARCH CONCLUSIONS, IMPLICATIONS AND FUTURE DIRECTIONS

Key Findings

For the quantitative part of the study discussed in chapter two, there were mixed results in terms of perceptual factors used to determine relative acceptance of PB foods (PB purchase likeliness, PB food consumption and frequency, and perceived benefits and challenges to a PB diet), and AB foods (AB food consumption and frequency) amongst consumers based on sociodemographic characteristics. Some results were consistent with existing literature and general predictions– being more educated, young, plant-based, and a woman are predictive of consumer PB food acceptance (see Bryant & Sanctorum, 2021; Deliens et al., 2022; Onwezen et al., 2021). AB food acceptance, particularly dairy, was highest amongst those who are older (see Grasso et al., 2019), have a lower educational level, and are omnivores. Those consumers with less income tended to consider more factors when making decisions on food than those with a higher income level. However, some tests did not yield significant results, and did not directly contradict existing literature on PB and AB food acceptance (see Chapter 2). A specific finding on consumers who are more educated consuming more PB foods leads to the possibility of future research determining if there is a relationship between exposure to knowledge of PB foods, a higher education level and PB food acceptance.

For the qualitative section of this study described in chapter three, KRFM consumers perceived PB foods positively while feeling unsure of AB foods and LG meats. The three main themes are *Ethics*, *Curiosity*, and *Food and Health*. *Animal Ethics* and *Environmental Ethics* were themes aggregated to the main theme of *Ethics,* and similar to some themes and findings found in the literature (see Cicia et al., 2021; Connell et al., 2008; Connell & British Columbia Association of Farmers Markets, 2012; Possidónio et al., 2021). Generally, AB foods were perceived as less ethical than both PB foods and LG meats in terms of both *Animal Ethics* and *Environment Ethics*, which is an unexpected finding given that most respondents were omnivores. *Curiosity* is a standalone theme (also found in Possidónio et al., 2021), and consumers were skeptical of all three food groups (PB foods, AB foods, and LG meats). However, they were most open to PB foods, which is an unexpected finding with a predominantly omnivorous sample. Future research could assess the possible relationship

between cognitive dissonance and the motivations behind consuming AB foods. More specifically, looking at what is called the meat paradox or MRCD, which can be defined as holding the belief of caring for animal welfare, the environment, and human health –and knowing that AB foods tend to worsen outcomes in these areas—while still consuming AB foods (Benningstad & Kunst, 2020; Bouwman et al., 2022; Monteiro et al., 2017a; Rothgerber, 2014, 2020; Rothgerber et al., 2022; Rothgerber & Rosenfeld, 2021).

There are also possibilities for future research to assess other factors in skepticism toward various food products, including through lack of consumer trust in food and other perceived risks. There may be lack of trust and a high degree of perceived risk in consuming AB foods due to concerns surrounding food safety, foodborne illnesses, and animal disease outbreaks, including Bovine Spongiform Encephalopathy and Chronic Wasting Disease (see Berg, 2004; Carolan, 2006; Cohen, 2007; Muringai & Goddard, 2018). Another possibility resulting in a lack of consumer trust is the debate surrounding the zoonotic origins of COVID-19, including live market exposure (e.g., Wuhan market exposure in 2019 and the sales of raccoons, snakes, and bats) (Abd El-Wahab et al., 2020; Brüssow, 2023; Ray, 2023). Consumers may also lack trust and perceive risks in consuming GMO foods, foods containing preservatives and other additives (including monosodium glutamate), and irradiated foods (D'Souza et al., 2021; Kim et al., 2022; Lang & Hallman, 2005; Parrella et al., 2023; Rihn et al., 2021; S. Wang & Adikari, 2018).

Taste and Texture, *Illness, Allergies, and Intolerances*, and *Naturalness or Realness* were aggregated to the main theme of *Food and Health,* and some similar themes were found in Possidónio et al. (2021). Consumers generally viewed PB foods most positively regarding food and health, LG meats most negatively, and they seemed unsure about AB foods. More specifically, PB foods were viewed most positively in terms of *Taste and Texture*, which is inconsistent with existing literature (see Michel et al., 2021; Onwezen et al., 2021; Pointke et al., 2022). LG meats were viewed negatively and as disgusting in terms of *Taste and Texture*, which is consistent with existing literature (see Arango et al., 2023; Grasso et al., 2019; Onwezen et al., 2021). Future research should be conducted to determine if consumers tend to view alternatives positively or negatively, and how such products' perceived taste and texture can be improved.

In terms of *Illness, Allergies, and Intolerances*, AB foods were viewed negatively, while PB foods were viewed positively. Lactose intolerance was frequently mentioned, and future research could assess the relationship between consuming dairy milk and alternatives and being lactose intolerant. More specifically, future research could collect statistics on the frequency of lactose intolerance and its relation to various sociodemographic factors, including age (e.g., possibilities for generational differences). Other possibilities include investigating how consumers realized they are lactose intolerant, whether they avoid dairy, take precautions (e.g., taking lactase enzyme supplements before consuming dairy), or still choose to consume dairy, if they consumed dairy as a child, if all or only specific dairy foods are aggravators (e.g., yogurt, milk, ice cream), if they choose lactose-free or PB milk products (e.g., oat, almond), and if consumed, where the dairy products are from (e.g., North America, Europe, organic farms, large-scale farms).

In terms of *Naturalness or Realness*, consumers viewed AB foods, PB foods, and LG meats as predominantly unnatural/fake/negative, with a slightly more positive view of PB foods. Future research could assess the relationship between perceptions of food quality in North America (NA) and food decisions. In general, the EU has stricter regulations on food than Canada and the United States (e.g., beef hormones, GMO foods, animal feed antibiotics) (Agri-Food Analytics Lab, n.d.; European Commission, n.d.; The Council of Canadians, 2016; Thomas, 2014; Vogel, 2012), which could lead to different food decisions based on food quality and safety (e.g., GMO foods, foodborne illness, labelling regulations), accessibility (e.g., to organic foods based on availability and cost premiums), and perceived naturalness (e.g., additives in pre-packaged foods, hormones and antibiotics in agricultural practices) Overall, KRFM consumers seem somewhat open to PB food alternatives, and there is potential to increase acceptance of PB foods through suggestions at both macro- and micro-levels.

Implications

There are possibilities for increasing alternative food acceptance by educating consumers and stakeholders on their benefits. Both macro- and micro-level actors play a role in securing a sustainable future, and various approaches can be taken through sustainable food options and systems s. This section first discusses what macro-level actors (e.g., stakeholders, non-governmental and governmental organizations, and educational

institutions) can do in terms of promoting sustainable food systems, policy implications in terms of the environment, human health, and animal cruelty, and some challenges surrounding the enforcement of sustainability goals. Next, what micro-level actors (e.g., consumers) can do toward efforts to consume more sustainable foods is discussed.

Macro-Level Implications

There are some means by which the acceptance of PB foods amongst consumers may be increased. Macro-levels actors, including stakeholders in the food industry, non-governmental and governmental organizations, educational institutions and researchers, should make an effort to better educate consumers on what sustainable food entails. However, some challenges exist in leaving the onus entirely on macro-level actors. Power relations may play a role where institutional actors may have the power to help resolve or worsen sustainability outcomes (Brisman, 2014; Lynch & Stretsky, 2003). Some examples of worsening outcomes for humans, animals, and the environment include harm (e.g., situating Concentrated Animal Feeding Operations near marginalized communities, which negatively impacts quality of life) (see Hribar & Schultz, 2010), crime (e.g., violation of environmental and animal welfare regulations), and greenwashing (e.g., misleading food packaging labels and certifications, claims on human, animal and environmental welfare).

Stakeholders who produce or sell food could promote the sustainability aspects—human, animal, and environmental welfare—of PB foods, while being transparent about the damages of AB foods on humans, animals, and the environment. However, organizations may not be entirely truthful in their claims of being ‘green,’ which can occur in terms of both AB and PB foods. Governments could provide clearer guidelines on what healthy and sustainable foods look like. Canada’s Food Guide has already made some changes, in which they promote PB proteins as the top protein choice and provide guidelines on sustainable food options (Government of Canada, 2023a). However, Canadian food legislation lacks transparency and accountability for providing consumers with the ability to make informed decisions on the foods they consume. The Consumer Packaging and Labelling Act (1985, s.3(3); CLPA) in Canada:

> Requires that prepackaged non-food consumer products bear accurate and meaningful labelling information to help consumers make informed purchasing decisions. The CPLA prohibits the making of false or misleading representations and sets out specifications for mandatory label information such as the product's name, net

> quantity and dealer identity. All information on a package, whether in symbols or words, must be neither false nor misleading to consumers (Competition Bureau Canada, 2021, n.p.).

The Competition Act (1985) states that any misleading or false claims on products are prohibited (Competition Bureau Canada, 2021). The Food and Drugs Act (1985) states the following in s. 5(1):

> No person shall label, package, treat, process, sell or advertise any food in a manner that is false, misleading or deceptive or is likely to create an erroneous impression regarding its character, value, quantity, composition, merit or safety (p. 8).

Additionally, the Government of Canada (2022a; 2022b) provides accessible checklists for stakeholders to follow regarding food labelling requirements.

Despite s. 5(1) of the Food and Drugs Act, greenwashing can still occur with food products sold in Canada. Greenwashing can occur via deceptiveness of claims (e.g., selective disclosure or omission, being vague or ambiguous, and lying), political spins (e.g., making claims of being green while supporting anti-green legislation), stating irrelevant information, making claims that cannot be verified (e.g., empty claims on justice, not having any reliable or accessible evidence, and using jargon that is not easily understandable), and executional greenwashing (e.g., using misleading symbols, colours, sounds, or certifications) (Competition Bureau Canada, 2022; de Freitas Netto et al., 2020; Nemes et al., 2022). Such claims may occur at either the entire organization's level or for a specific product or service (de Freitas Netto et al., 2020). The difficulty with the lack of transparency with food labelling is that consumers may not be sure where to get reliable information on the food products they are buying and consuming, which limits their ability to be an ethical consumer. Changes to existing policy could help build transparency by using a farm-to-table approach. This may help reduce instances of greenwashing, and to increase consumer acceptance of more sustainable food options.

Some provinces have already implemented ag-gag legislation, and Bill C-275 and Bill M-277 risk the passing of these laws both provincially in British Columbia and federally in Canada (Fiber-Ostrow & Lovell, 2016; House of Commons Canada, 2023; Legislative Assembly of British Columbia, 2019; Rouse, 2013). As ‘whistleblowers’ could be sanctioned, there are potential barriers to exposing animal cruelty, unsanitary farming practices, and the evasion of environmental laws and sustainability regulations (Fiber-Ostrow

& Lovell, 2016; Rouse, 2013). Abolishing ag-gag legislation would help ensure that policies and laws surrounding human health, the environment, and animal welfare are followed (Fiber-Ostrow & Lovell, 2016; Rouse, 2013).

While there are laws in place for the ethical treatment of animals in Canada, these laws risk not being followed behind closed doors of agricultural farming practices due to such legislation. For instance, the Criminal Code (RSC 1985, c C–- 46) states the following on animals, not including farm animals:

> Animals: Injuring or endangering other animals: 445(1) Every one commits an offence who, wilfully and without lawful excuse, (a) kills, maims, wounds, poisons or injures dogs, birds or animals that are kept for a lawful purpose; or (b) places poison in such a position that it may easily be consumed by dogs, birds or animals that are kept for a lawful purpose… Cruelty to Animals: Causing unnecessary suffering: 445.1 (1) Every one commits an offence who (a) wilfully causes or, being the owner, wilfully permits to be caused unnecessary pain, suffering or injury to an animal or a bird (n.p.).

These laws are ambiguous, and animals are considered ‘property’ and not ‘living beings’ under the Criminal Code in Canada. The National Farm Animal Care Council (n.d.) provides guidelines to create codes of practice for the welfare of farm animals, including specific guides for specific types of animals (e.g., cattle, chickens, goats, pigs, sheep, and other animals). These guidelines include codes of practice regarding shelter, space, feed, water, transport, health, safety, emergencies, and euthanasia (National Farm Animal Care Council, n.d.). However, these guidelines are not enforced legislation, which poses problems in terms of enforcing these codes of practice.

Legislation surrounding the welfare of farm animals in Canada tends to be under provincial and territorial jurisdiction (Government of Canada, 2022c). While British Columbia has legislation protecting farm animals, not all Canadian provinces and territories have this. In British Columbia, the Animal Care Codes of Practice provides codes of practice for commercial animals, the Regulation of the Prevention of Cruelty to Animals Act aims to protect farm animals (excludes regular farming practices), the Milk Industry Act and Milk Industry Standards Regulations provide regulations for handling livestock, and the Agricultural Produce Grading Act/Hatchery Regulation provides regulations for poultry housing (Government of Canada, 2022c).

While regulations and guidelines on the ethical treatment of farm animals exist in some parts of Canada, these nonetheless have the intention of using animals for human benefit, and typically for the purposes of consumption. Issues lie in the legal conceptualization of animals as property (Criminal Code, 1985), and therefore, they are viewed as objects that are not sentient nor sapient. Changing the legal status of animals in Canada to living beings, moving away from defining them as objects or property, and abolishing ag-gag legislation may help reshape Canadian legislation on animal cruelty to better support justice for agricultural animals. It is important to note that Indigenous hunting practices take a more relational approach to animals, understanding that animals are sentient and sapient beings worthy of respect (Auerbach, 2018; Nadasdy, 2007).

Canada has plans to achieve net-zero carbon emissions by 2050, meaning either no emissions or the ability to completely offset emissions (Government of Canada, 2023b). Canada, along with 196 other countries through the legally-binding Paris Agreement, has goals to limit global warming temperatures to 1.5°C and achieve a 45% reduction in GHG emissions by 2030 and zero-emissions by 2050, which is one of the goals of the United Nations Sustainability Development Goals (Government of Canada, 2023b; United Nations, n.d.-b; United Nations Framework Convention on Climate Change, n.d.). Canada has a Net-Zero Advisory Body which, "provides independent advice to the Minister of Environment and Climate Change that supports achieving Canada's net-zero target," and a Net-Zero Accelerator Fund "to help large emitters reduce their emissions" (Government of Canada, 2023b).

Some goals are to reduce the emissions from transport by land, air, and water (e.g., heavy-duty transport trucks, trains, boats, and planes), fund sustainable food systems (e.g., subsidies to fund cleaner agricultural processes and food-related businesses, and incentives for organizations to reduce food waste), and aims for food security (Environment and Climate Change Canada, 2020). Within the United Nations' and Canada's goals toward a sustainable future, there are no mentions of how switching to PB foods and reducing AB food consumption would help. A suggestion is for the United Nations and individual countries to

promote the climate benefits of eating more PB foods that are considered sustainable[54] via campaigns and subsidies. Additionally, enforcing sanctions for not abiding by the United Nations climate goals via international law poses some challenges. Using Nationally Determined Contributions, Okonkwo (2017) argues that the countries that are part of the Paris Agreement may be sanctioned for not abiding by their sustainability goals and commitments. If macro-level actors can recognize that PB foods play a substantial role in reducing the impacts of food on climate change, then they may take a different approach with food regulations, marketing, and product sales regarding more sustainable alternative food options.

Regardless of level (e.g., elementary, secondary, and postsecondary), educational institutions could take the time to educate students on sustainability and food. Examples of courses surrounding topics of food and sustainability include sustainable diets (e.g., PB diets) and food systems, healthy diets, cooking classes on how to cook sustainable meals, animal cruelty, ethical consumerism, and greenwashing. This poses some challenges, however, where consumers would have to take extra time to learn about the food products they are purchasing, whether on their own or through the education system. Researchers could also play a role in continuing to investigate greenwashing, Canadian legislation surrounding green claims (including ag-gag legislation and its lack of transparency in terms of human health, animal welfare, and environmental regulations), the impacts of various food products on humans, animals, and the environment, and consumer perceptions of different foods and dietary patterns. Consumer deskilling may be playing a role in the lack of education on food. Consumer deskilling can be defined as the lack of consumer knowledge on food, or lack of food literacy, and includes the lack of knowledge on sustainable foods, healthy foods, and food preparation (Jaffe & Gertler, 2006; Kornelsen, n.d.; Lyon et al., 2003). Overall, educating consumers may help increase food literacy, including the acceptance of healthier and more sustainable alternative food options. The educational approach begins at the macro-level, but then creates responsibility for individuals at the micro-level.

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[54] As previously discussed in chapter one, there are some exceptions to PB foods that are not sustainable.

Micro-Level Implications

Micro-level actors, meaning consumers, also have a role to play in food and sustainability. Consumers could 'choose' more sustainable food options, such as alternative foods, and decide to reduce their consumption of AB foods. In order to make decisions on more sustainable food options, consumers must also educate themselves on the impacts of food on sustainability (humans, animals, and the environment). However, due to issues regarding accessibility and those of lower socioeconomic status, it may not be possible to choose sustainable foods. Some other examples of educating oneself include learning about ethical consumerism, greenwashing and bluewashing[55] (see Becker-Olsen & Potucek, 2013; Berliner & Prakash, 2014; Jones, 2019). However, potential issues are finding reputable sources, as not everyone has access to peer-reviewed material nor the capacity to interpret it. Academics and researchers should aim to make their contributions to the knowledge of food and sustainability open-sourced and strive to explain their work in other media, including the popular press, blogs, etc.

Consumers may also choose to advocate for a switch toward PB foods via activist strategies (e.g., protesting and demonstrations), joining groups and clubs, word of mouth (e.g., discussions with peers and colleagues), engaging in conversations online (e.g., social media, blogs and sharing news), engaging in academic projects (e.g., papers, presentations and conferences), and other creative outlets (e.g., podcasts, radio, music, art, videos and posters). Overall, if there is a greater acceptance of PB foods amongst consumers at a micro-level, then there may be room for stakeholders to introduce more of these products both at farmers markets and perhaps beyond to any food-related organization within all levels of the LCA (e.g., grocery stores and restaurants, farming practices, packaging, transport, and food waste). In other words, within the profit-based capitalist market system, there is the possibility for stakeholders to respond to consumer demand in exchange for higher profits. The onus toward more sustainable options and systems falls more so on macro-level actors, but micro-level actors can attempt to make efforts where suitable.

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[55] Bluewashing refers to organizations utilizing the United Nations' sustainability guidelines without any legitimate grounding, misleading consumers into believing that the organization is socially and environmentally responsible, even if their actions are not representative of their sustainability claims (Berliner & Prakash, 2014).

Strengths, Limitations and Future Research

As with any study, this research has both strengths and limitations, but these can lead to future research. First, the methodology used had limitations. Compared to interviews, questionnaires may lack the ability to build rapport and acquire detailed responses (Rubin & Rubin, 2005). However, questionnaires were used to save time, obtain a larger sample, minimize interviewer effects, and reduce the social desirability bias (Bryman & Bell, 2016; de Leeuw, 2008). An outdated criticism of the limited ability of social science research states that such studies cannot remain objective and value-free. However, the quantitative portion of the survey demonstrates reliability and validity (see Chapter 2), and the qualitative portion demonstrates trustworthiness through credibility, transferability, dependability, and confirmability (see Chapter 3) (see Bryman & Bell, 2016; Geertz, 1973; Lincoln & Guba, 2013).

A limitation of this study is the inability to generalize the results. The sample size of the consumer questionnaire is relatively small (n = 94), and the sample is skewed towards being predominantly female (66.0%). This means that the sample may not be generalizable or representative of farmers market populations and certain statistical analyses could not be conducted due to not meeting minimum sample requirements or normality assumptions (see Appendix D). Future research could aim to recruit a larger and more representative sample to address these issues. The sample itself is also not generalizable to the greater population of Kamloops, other cities, or consumers in general, as the sample only included farmers market consumers recruited through convenience sampling. However, the goals of qualitative research are not supposed to be generalizable; instead, the goal is transferability (Bryman & Bell, 2016; Lincoln & Guba, 2013). Despite the researcher utilizing a reflexivity journal, future research could use other sampling methods to further reduce bias (e.g., a booth where participants approach the researcher themselves or online surveys). Future research could use this study as a model or example for other farmers markets or broader city population studies assessing acceptance of alternative foods.

There were some constraints in terms of both time and space allotted. For instance, not all statistical and qualitative results were included. Only the results most relevant to the research questions and with the most meaning were included, and justifications for exclusions are presented (see Chapters 2 and 3, and Appendix D). Only the quantitative

results in chapter two utilized sociodemographic characteristics within the analysis. The qualitative results in chapter three did not use sociodemographic characteristics in its analysis. Future research could aim to analyze free association relationships with consumer sociodemographics. The analysis of culture and its role in food perceptions was not included, and future research should aim to assess this. Both analyses included the grouping of variables (see Chapters 2 and 3, and Appendices C and D). As such, most results on specific food items (meat, dairy, PB meat, PB milk, other PB foods, and LG meats) within both sections were not presented, but meaningful results were presented on these individual variables where possible. Future research could look further into consumer perceptions of individual food items. This thesis initially intended to not only survey consumers, but also conduct interviews with stakeholders in the food industry on their perceptions of PB foods, sustainability, and the market. As such, only the food perceptions of consumers at a micro-level were assessed, and including the voices of stakeholders (e.g., farmers market vendors, restaurants, and coffee shops) in future research could be beneficial for a well-rounded understanding.

There were some other limitations with the demographic variables used in this thesis. In the quantitative section, there was an error in validating the political orientation scale, and this variable could not be used despite its prevalence in the literature on PB food acceptance (see Chapter 2 and Appendix D; see Bryant & Sanctorum, 2021; Deliens et al., 2022; Onwezen et al., 2021). Sample size limited the ability to determine the different food perceptions based on the urban-rural divide, which is frequently explored in the literature on food perceptions (see Bryant & Sanctorum, 2021; Deliens et al., 2022; Onwezen et al., 2021). Future research could include analyses of the relationships or differences in food perceptions between political orientations and the urban-rural divide.

Due to a lack of literature on certain related topics, there were some limitations with the data analysis. As there is limited literature on perceptions of LG meats, and since this study's results were limited on LG meats in the quantitative section, the results were not included (see Appendix D). Participants were also not asked to reflect on other foods, including fish and seafood (limited questions in the quantitative section), eggs, other LG foods (e.g., dairy, fish and seafood, and eggs), and other possibly sustainable food options (e.g., local, organic, seasonal, insects, and urban and sustainable agriculture). Further

research could be conducted on consumer perceptions of foods not included in this study. Additionally, the sustainability of alternative food options and systems do have contradictory findings, and more research would be helpful to determine impacts on humans, animals, and the environment (see Baroni et al., 2007; Clark & Tilman, 2017; Gorissen & Weijters, 2016; Gustavsen et al., 2022; Jahrl et al., 2022; Lewis & Mitchell, 2014; Macdiarmid, 2013; Penn, 2018; Polleau & Biermann, 2021; Poore & Nemecek, 2019; Risner et al., 2023; Ritchie, 2020; Roy et al., 2021; Sanyé-Mengual et al., 2016).

Overall, this thesis has various strengths in that it provides numerous opportunities for future research and subsequent implications for increasing the acceptance of PB foods at both micro- and macro-levels. One strength of this research is transparency. The researcher utilized a reflexivity journal to remain transparent throughout the research process. This not only helped reduce potential biases, but also helped provide the reader with the researcher's positionality. Acknowledging positionality helps readers understand how the research came about. Another strength is how the researcher used both quantitative and qualitative approaches to questionnaire data collection and analysis, providing a breadth of knowledge on the topic from more than one angle. As the survey asked numerous questions, many variables and themes resulted, meaning a high degree of knowledge production.

Knowledge production has occurred at both the levels of the general public and academia. As the data collection occurred at a farmers market, this allowed for informative conversations post-questionnaire with interested respondents to learn more on the topic. This research was also shared online, including on a blog, social media, and YouTube. At the academic level, guest lectures and showcase presentations provided students and professors with a greater understanding of the research conducted. In conducting research in Kamloops, BC and at the KRFM, knowledge on the topic of food and sustainability that had not yet been produced in the city and at the farmers market was created. This research helps start conversations in a city where PB foods are slowly becoming more prevalent in stores, restaurants and markets. This helps inform stakeholders about the potential success of selling sustainable foods (e.g., the farmers market and its vendors, and possibly other grocery stores and restaurants in Kamloops). Researchers may also build upon this research at the KRFM or in Kamloops in general. As the conversation was opened with farmers market consumers in Kamloops, word of mouth and discussions surrounding PB foods may help reduce any

stigmatization surrounding PB diets. Additionally, there is the potential to take action toward asking politicians and governments to improve their policies surrounding food and sustainability that affect human, animal, and environmental justice.

Final Remarks

This thesis was written with the ultimate goal of producing empathy and compassion for all living beings through the understanding of how food can affect all of us, whether positively or negatively. Perfection does not exist, but micro- and macro-level actors may challenge their assumptions and take the compassionate steps that work best for them toward reducing harm through food. Compassion through food decisions is not the only form of compassion. Consuming more sustainable foods, including some PB foods, is not always a moral 'choice.' While some who are privileged may be able to freely choose what they would like to purchase and consume, this is not the case for everyone. Compassion is also for those who are simply trying to survive and may be less fortunate, as their food decisions may or may not reflect their personal values and beliefs. Rather than creating a divide of who is the 'most ethical,' working together will help us take steps, no matter how small, toward a more equitable, sustainable world. We may also learn compassion from Indigenous hunting and food practices. Rather than viewing nonhuman living beings (e.g., plants, fungi, animals, insects, etc.) as a commodity, Indigenous practices may help us understand that there are ways to be more respectful in our food consumption. We may learn that a reciprocal relationship with nature, acknowledging the ability of nonhuman animals to think and feel, is much more ethical than the Westernized mass production of AB foods. Working together instead of against one another may help us gain an understanding of how we can have a balanced ecosystem for humans, animals, and the environment of both current and future generations.

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APPENDICES

Appendix A

Consumer Questionnaire

Plant-based Foods and Sustainability: Perceptions of Farmers Market Consumers in Kamloops, British Columbia[56]

CONSENT TO PARTICIPATE IN RESEARCH

Weytk! Thompson Rivers University campuses are located on the traditional lands of the Tk'emlúps te Secwépemc (Kamloops campus) and the T'exelc (Williams Lake campus) within Secwépemc'ulucw, the traditional and unceded territory of the Secwépemc. Territories of the St'át'imc, Nlaka'pamux, Tŝilhqot'in, Nuxalk, and Dakelh are also served by TRU's region. With this land acknowledgment comes utmost gratitude for the privilege to live, work and study in these beautiful regions.

You are invited to participate in survey research!

Title of Study: *Plant-based Foods and Sustainability: Perceptions of Consumers and Stakeholders in British Columbia*

Participant Requirements: Kamloops Regional Farmers Market (KRFM) consumers, 18+

Primary Investigator (PI): Serena Girard, MSc Environmental Science Candidate
Contact: girards12@mytru.ca

Project Supervisor: Dr. Michael Mehta, Professor, Department of Environment, Culture, and Society. Contact: mmehta@tru.ca or 250-852-7275.

Purpose of the Study:
(1) Explore KRFM consumers' perceptions and knowledge of plant-based foods (PBFs)
(2) Contribute to knowledge on the topic of PBFs and sustainability
(3) Determine relative market success of PBFs foods in Kamloops, BC

Procedures: If you volunteer to participate, you will be asked to complete a ~10-minute survey on a disinfected portable electronic tablet. Questions are regarding your opinion and knowledge on the topic of PBFs and sustainability.

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[56] Original title: "Plant-based Foods and Sustainability: Perceptions of Consumers and Stakeholders in British Columbia." Changed to reflect the current study scope of only having surveyed KRFM consumers in Kamloops, BC.

Potential Risks: Risks are minimal. Some minor discomfort may result from questions surrounding food. Low- cost/free food-related resources are offered via contact information on a business card or via hard copy.

Potential Benefits:
(1) Opportunity to anonymously share opinions on PBFs and sustainability in Kamloops
(2) Potential for bringing more PBF options into Kamloops.

Anonymity and Confidentiality: Identity and information known only by Serena Girard, the PI. Please refrain from using names in your answers. Pseudonyms will be used in disseminated data. Only if you reveal intention to harm yourself or others confidentiality will be breached.

Data Management and Storage: A password-protected TRU-licensed Survey Monkey account is used. Electronic data will be kept on a password-protected computer and destroyed after 5 years. Only Serena Girard, the PI, and Dr. Michael Mehta, her supervisor, have access to the files.

Participation and Withdrawal: Participation is completely voluntary. You may withdraw at any point and may skip questions you do not want to answer. You cannot withdraw once the survey has been submitted as no identifying information is collected. Incomplete surveys will be discarded.

Results of the Study: A summary of results will be made available. A business card and copy of the consent form with contact information are offered post-survey.

Data Usage:
(1) Utilized for Serena Girard's master's thesis
(2) May be presented at a future conference, used in academic projects and/or published in academic journals

Participant Rights: If you have questions regarding your rights as a research participant, please contact:
Research Ethics Board, Thompson Rivers University, Kamloops, BC, V2C 0C8
250-828-5000 or tru-reb@tru.ca

Electronic Signature of Participant: I understand the information provided above for the study Plant-based Foods and Sustainability: Perceptions of Consumers and Stakeholders in British Columbia. Any questions I have about the study have been answered, and I agree to participate. Consent form copies are available electronically or printed. By checking "Yes" electronically, you consent to participating in this survey.

*** 1. Do you consent to participating in this survey?**
☐ Yes, I consent to participating. *(Proceed to survey)*
☐ No, I do not consent to participating. *(Proceed to exit page)*

CONSUMER SURVEY

The following section will ask you to reflect on how each statement makes you think and/or feel. For each question, list the first TWO word(s)or phrase(s) that come to mind. This section is intended to be open for interpretation. Answer in any which way that makes sense to you.

For the purpose of this study (excluding questions 8 and 9), meat includes all animals, including white meat (e.g., chicken and turkey), red meat (e.g., beef and pork), and seafood (e.g., fish and other seafood).

2. Eating meat makes me think, feel or imagine...

3. Eating lab-grown, in-vitro or cultured meat makes me think, feel or imagine...

Lab-grown meat, also called in-vitro meat or cultured meat, is best described as meat that has been grown in a lab rather than on a farm. It uses real cells from animals and is not plant-based.

4. Eating plant-based meat makes me think, feel or imagine...

5. Eating tofu makes me think, feel or imagine...

6. Eating dairy products makes me think, feel or imagine...

7. Eating plant-based milk products makes me think, feel or imagine...

CONSUMER SURVEY

The following section will ask you questions about your diet, and your knowledge and perceptions of plant-based foods.

8. My diet is best described as...

As mentioned in the previous section, meat ONLY in questions 8 and 9 does NOT include fish.

☐ Vegan (no animal products)
☐ Vegetarian (no meat/fish, dairy/eggs OK)
☐ Flexitarian (mostly vegan, but not be as strict)
☐ Pescatarian (no meat, fish OK)
☐ Omnivore (no restrictions)

Other (please specify)

9. How frequently do you consume the following food products?

As mentioned in the previous section, meat ONLY in questions 8 and 9 does NOT include fish.

	Never	Less than once per week	1-2 times per week	3-4 times per week	5-7 times per week
Meat	☐	☐	☐	☐	☐
Fish and seafood	☐	☐	☐	☐	☐
Dairy products (e.g., cow's milk, cheese)	☐	☐	☐	☐	☐
Plant-based meat (e.g., 'burger' patties, 'chicken' strips)	☐	☐	☐	☐	☐
Plant-based milk products (e.g., almond milk, oat milk, soy cheese)	☐	☐	☐	☐	☐
Other plant-based products (e.g., grains, beans, legumes, nuts, seeds)	☐	☐	☐	☐	☐
Tofu	☐	☐	☐	☐	☐

10. When making decisions on food, I consider the following... (Select all that apply)

☐ Animal Welfare/Rights
☐ Environmental Sustainability
☐ My Health (e.g., nutrition, disease, fitness)
☐ Human Justice (e.g., global issues like exploitation, world hunger)
☐ Cultural Practice
☐ Time (e.g., to prepare, cook)
☐ Product Availability (e.g., in stores, restaurants)
☐ Cost
☐ Taste
☐ Distance to Store/Market
☐ Location (e.g., local food, importation, production)
☐ Organic/Non-GMO Foods (rather than 'conventional')
☐ Natural Foods (rather than processed)

Other (please specify)

11. To what extent, if any, does cultural practice impact your decisions on food?

☐ Strong Influence
☐ Some Influence
☐ No Influence

If you wish, you may provide detail in the textbox below on how *cultural practice* impacts your food choices.

12. How likely are you to purchase the following?

	Extremely Unlikely	Unlikely	Neutral	Likely	Extremely Likely
Plant-based meat (e.g., 'burger' patties, 'chicken' strips)	☐	☐	☐	☐	☐
Plant-based milk products (e.g., almond milk, oat milk, soy cheese)	☐	☐	☐	☐	☐
Other plant-based protein alternatives (e.g., grains, beans, legumes, nuts, seeds)	☐	☐	☐	☐	☐
Lab-grown meats (cultured cells or in- vitro)	☐	☐	☐	☐	☐
Tofu	☐	☐	☐	☐	☐

13. Some people believe that eating a plant-based diet has certain challenges. (Please select one answer for each statement.) Eating a plant-based diet is challenging for me because...

	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
I need more information about plant-based diets	☐	☐	☐	☐	☐
I don't want to change my eating habits	☐	☐	☐	☐	☐
My family/partner won't eat a plant-based diet	☐	☐	☐	☐	☐
There is not enough choice when I eat out	☐	☐	☐	☐	☐
Someone else decides on most of the food I eat	☐	☐	☐	☐	☐
It would be too expensive	☐	☐	☐	☐	☐
I don't want to eat 'strange' and 'unusual' foods	☐	☐	☐	☐	☐
It would not be filling enough	☐	☐	☐	☐	☐
I would be worried about my health	☐	☐	☐	☐	☐
It is inconvenient	☐	☐	☐	☐	☐
I don't know how to prepare plant-based meals	☐	☐	☐	☐	☐
I wouldn't get enough protein, vitamins and nutrients	☐	☐	☐	☐	☐
It would not be tasty enough	☐	☐	☐	☐	☐
I think humans are meant to eat meat	☐	☐	☐	☐	☐
The plant foods I would need aren't available where I shop	☐	☐	☐	☐	☐
It takes too long to prepare plant-based meals	☐	☐	☐	☐	☐
I don't want people to think I'm 'strange' or a 'hippy'	☐	☐	☐	☐	☐

14. Some people believe that eating a plant-based diet has certain benefits. (Please select one answer for each statement.) I believe eating a plant-based diet helps me to...

	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
Prevent disease in general (e.g., heart disease, cancer)	☐	☐	☐	☐	☐
Eat a more 'natural' diet	☐	☐	☐	☐	☐
Have lots of vitamins and nutrients	☐	☐	☐	☐	☐
Control my weight	☐	☐	☐	☐	☐
Eat a greater variety of foods	☐	☐	☐	☐	☐
Be fit	☐	☐	☐	☐	☐
Have a better quality of life	☐	☐	☐	☐	☐
Have plenty of energy	☐	☐	☐	☐	☐
Have a tasty diet	☐	☐	☐	☐	☐
Lower my chances of getting food poisoning	☐	☐	☐	☐	☐
Help the environment	☐	☐	☐	☐	☐
Help animal welfare/rights	☐	☐	☐	☐	☐
Increase efficiency of food production	☐	☐	☐	☐	☐
Decrease world hunger	☐	☐	☐	☐	☐
Save money	☐	☐	☐	☐	☐
Save time	☐	☐	☐	☐	☐
Appear more 'trendy' to my friends	☐	☐	☐	☐	☐

DEMOGRAPHICS

The following section will ask for some basic demographic information. This information will remain anonymous and confidential.

15. What is your age in years?

☐ 18-19
☐ 20-24
☐ 25-29
☐ 30-34
☐ 35-39
☐ 40-44
☐ 45-49
☐ 50-54
☐ 55-59
☐ 50-64
☐ 65-69
☐ 70-74
☐ 75-79
☐ 80-84
☐ 85+

16. How do you currently describe your gender identity?

Gender is "a term that refers to social or cultural distinctions of behavio[u]rs that are considered male or female,' while sex is "a term that denotes the presence of physical...differences between males and females" (Conerly et al., 2021, p. 356). Gender identity is defined as "a person's deeply held internal perception of one's gender" (ibid.), which may or may not conform to the male-female gender binary.

17. Which category best describes your current highest achieved level of education?

☐ Some high school
☐ High school diploma or equivalent
☐ Vocational training, postsecondary diploma or associate's degree (e.g., trades, ECE, AAS)
☐ Some college or university
☐ Bachelor's degree (e.g., BA, BSc, BBA, BEd, JD)
☐ Master's degree (e.g., MA, MBA, MSc, MEd)
☐ Doctorate degree (e.g., PhD, PsyD, MD)
☐ Post-doctoral studies

Other (please specify)

18. What is your approximate yearly pre-tax household income?

☐ Under $10,000
☐ $10,000 to $19,999
☐ $20,000 to $29,999
☐ $30,000 to $39,999
☐ $40,000 to $49,999
☐ $50,000 to $59,999
☐ $60,000 to $69,999
☐ $70,000 to $79,999
☐ $80,000 to $89,999
☐ $90,000 to $99,999
☐ $100,000 to $149,999
☐ $150,000 and over
☐ Prefer not to answer.

19. How many people currently live in your household?

20. How many children are you a parent or guardian to that currently live in your household (aged 18 or younger only)?

21. Are you currently in an intimate partner relationship?

☐ Yes ☐ No

22. Would you describe yourself as the primary grocery shopper and food preparer in your household?

If you shop and/or prepare along with another member of your household, please still select "yes".

☐ Yes, both shopper and preparer ☐ Yes, but only preparer

☐ Yes, but only shopper ☐ No, someone else does the shopping and preparing

23. Have you or any members of your household previously worked or currently work in the meat industry?

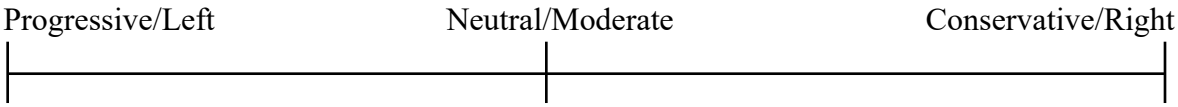
The meat industry refers to farming, butchering, slaughtering, packaging, distributing of animal products. Does NOT include retail (e.g., grocery stores) and the service industry (e.g., restaurants, bars).

☐ Yes ☐ No

24. How would you best describe your political orientation? (Please use the sliding scale to best indicate where your political orientation lies.)

Political orientation can be viewed on a "political spectrum as a scale with two opposite ends - the left and the right" (Unifrog, n.p., 2022).

- Progressive/Left: Equality attainable, higher taxes, welfare, more government intervention, social change
- Neutral/Moderate: Mixed or somewhere in the middle
- Conservative/Right: Equality unattainable, lower taxes, economy, less government intervention, tradition



25. What is your postal code? (e.g., X0X 0X0)

If you are VISTING from OUTSIDE OF CANADA, please enter "000 000".

Thank you for taking the time to participate in this survey!

LOW-COST AND FREE FOOD RESOURCES

Please note that this is NOT a comprehensive list of resources. These are just some services available in Kamloops, BC and at TRU. Ensure to check that services listed below are still available prior to accessing them.

Off-Campus Resources

Organization	Services	Website	Contact
BC211	Directory of services in BC	https://bc211.ca	info@bc211.ca Dial or text 2-1-1
Kamloops Food Bank	Food hampers	https://www.kamloopsfoodbank.org	171 Wilson St
Kamloops Reach	Meals and hampers	https://www.kamloopsreach.com/kamloops-reach	help@kamloopsreach.com
Salvation Army Kamloops	Food hampers	https://www.kamloopssalvationarmy.ca	344 Poplar St salvationarmykamloops @ gmail.com (250) 554-1611
Mount Paul Community Food Centre	Meals, hampers and food delivery	https://www.interiorcommunityservices.bc.ca/programs/food- security	140 Laburnum St (236) 421-1011
Hills of Peace Lutheran Church	Meals	https://www.hillsofpeace.com/young-adults/suppers/	695 Robson Drive office@hillsofpeace.com 250-828-2221
The Mustard Seed - Outreach Centre	Meals	https://www.theseed.ca	181 Victoria St W infokamloops@theseed.ca (250) 434-9898
Kamloops United Church - PIT Stop	Meals	https://kamloopsunited.ca/pit-stop/	421 St. Paul St pitstop@kamloopsunited.ca (250) 372-3020

On-Campus Resources

Organization	Services	Website	Contact
TRUSU Food Bank	Food hampers	https://trusu.ca/services/food-bank/	info@trusu.ca (250) 828-5289
TRUSU Emergency Bursary	Application required. For temporary financial emergencies.	https://trusu.ca/services/financial -aid/	studentawards@tru.ca (250) 828-5024

QUESTIONS AND CONTACT

If you have questions regarding this study, please contact either Serena Girard at girards12@mytru.ca, or Dr. Michael Mehta at either mmehta@tru.ca or 250-852-7275.
If you have questions regarding your rights as a research participant, please contact:
Research Ethics Board, Thompson Rivers University, Kamloops, BC, V2C 0C8
Telephone: 250-828-5000 Email: tru-reb@tru.ca

Paper copies of the consent form and resources are available if needed. A business card with online access to both of these forms, as well as to the results of the study, is also available.

Appendix B

Full-Length Consent Form

CONSENT TO PARTICIPATE IN RESEARCH

Weytk! Thompson Rivers University campuses are located on the traditional lands of the Tk'emlúps te Secwépemc (Kamloops campus) and the T'exelc (Williams Lake campus) within Secwépemc'ulucw, the traditional and unceded territory of the Secwépemc. Territories of the St'át'imc, Nlaka'pamux, Tŝilhqot'in, Nuxalk, and Dakelh are also served by TRU's region. With this land acknowledgment comes utmost gratitude for the privilege to live, work and study in these beautiful regions.

Title of Study: Plant-based Foods and Sustainability: Perceptions of Consumers and Stakeholders in British Columbia

You are invited to participate in a research study titled *Plant-based Foods and Sustainability: Perceptions of Consumers and Stakeholders in British Columbia*. You were invited to participate in this study because you are a consumer at the Kamloops Regional Farmers Market (KRFM). This study is being conducted by Serena Girard, a graduate student researcher completing a thesis as part of the Master of Science in Environmental Science. This project is supervised by Dr. Michael Mehta, Professor in the Department Environment, Culture, and Society at Thompson Rivers University (TRU). If you have questions regarding this study, please contact either Serena Girard at girards12@mytru.ca, or Dr. Michael Mehta at either mmehta@tru.ca or 250-852-7275.

PURPOSE OF THE STUDY
The purpose of the study is to explore consumers' perceptions and knowledge of plant-based foods. The aim of this research project is to utilize KRFM consumer survey responses to help build a body of knowledge on the topic of plant-based foods and sustainability. In surveying KRFM consumers and interviewing outside key informants of food companies, the goal is to determine the relative market success of plant-based foods in Kamloops, British Columbia.

PROCEDURES
If you agree to partake in this study, you will be asked to participate in a survey on a portable electronic tablet. It will be disinfected between uses. In the survey, you will be asked questions regarding your opinion and knowledge on the topic of food and sustainability. The survey should take about 10 minutes of your time.

POTENTIAL RISKS
Risks from participating in this survey research are minimal. There may be some minor discomfort from answering survey questions surrounding food and sustainability. Each participant will be provided with a list of contact information for low-cost and/or free food-related resources. The list will be available post-survey. Contact information for electronic copies is provided via business card. Paper copies are also available.

POTENTIAL BENEFITS
Survey respondents may directly benefit from having an opportunity to anonymously have their voices heard on the topic of food and sustainability in Kamloops, BC. As we gain more insight as to how KRFM consumers perceive plant-based foods, there may be an argument for bringing more plant-based foods options into Kamloops, BC. Phase 1 of this research, which you have been invited to participate in, helps provide a voice via a survey for consumers. Phase 2, interviews with key informants of food companies, will be informed via this initial phase. If stakeholders are aware of consumer preferences, there is a higher chance of such preferences becoming available. In sum, both current survey respondents and many other consumers and stakeholders may benefit directly or indirectly from this study.

CONFIDENTIALITY
The identity and information shared by the participants will only be known by Serena Girard, the primary investigator. In open-ended questions, we ask that you do not use names of people or places, as this will help maintain confidentiality. Only in the event that you reveal any intention to harm yourself or anyone else, then confidentiality will be breached. The data disseminated from the survey will not contain any identifying information. Pseudonyms will be used in the data dissemination and publications of this research to help maintain anonymity and confidentiality.
Survey Monkey is used for the surveys and a password-protected account is provided by TRU. Once the Survey Monkey license expires at the end of this research project (Summer 2023), any electronic data will be kept on a password-protected computer and subsequently destroyed after 5 years. Only Serena Girard, the primary investigator, and Dr. Michael Mehta, her supervisor, will have access to these files.

PARTICIPATION AND WITHDRAWAL
Participants will be adult consumers (18+) at the Kamloops Regional Farmers Market. Participation is completely voluntary. You may choose to withdraw at any given point and may also choose not to answer any questions you do not want to. Since the survey will not ask you for any identifying information, it will not be possible to withdraw your answers once they have been submitted. Incomplete surveys will be discarded. Your identity will remain anonymous to anyone who is not the primary investigator (Serena Girard).

RESULTS OF THE STUDY
A summary of the research findings will be made available. Please contact either Serena Girard at girards12@mytru.ca or Dr. Michael Mehta at mmehta@tru.ca for more information. You will be offered paper copies of the consent form and of business cards with this contact information.

SUBSEQUENT USE OF DATA
This data will be used for the thesis component of Serena Girard's graduate degree. Data may be presented at a future conference, used in other academic projects and/or published in an academic journal.

RIGHTS OF PARTICIPANTS

If you have questions regarding your rights as a research participant, please contact:
Research Ethics Board, Thompson Rivers University, Kamloops, BC, V2C 0C8
Telephone: 250-828-5000 Email: tru-reb@tru.ca

ELECTRONIC SIGNATURE OF PARTICIPANT

I understand the information provided above for the study *Plant-based Foods and Sustainability: Perceptions of Consumers and Stakeholders in British Columbia*. Any questions I have about the study have been answered, and I agree to participate. Consent form copies are available either electronically or by paper copy. By checking "Yes" below, you consent to participating in this survey.

Appendix C

Variable Transformations (Ch. 2)

Items (consumption frequency, purchase likeliness, perceived challenges, and perceived benefits variables) were initially coded as five-point scales and were transformed as both trichotomous and dichotomous variables (see Table C.1). Trichotomous variables were created based on Jeong's (2016) guidelines for variable transformations from five-point scale data to three-point scales, where scores one to two become zero (no), and scores four to five become one (yes). Demographic variables were also transformed to create versatility of use dependent upon various test assumptions. Variables were not on five-point scales, meaning demographic variable transformations did not follow Jeong's recommendations on variable transformations. Merged variables were created with combined data points from original variables, and dummy (dichotomized) variables were created from merged variables (see Table C.2). Gender is an exception, which was dichotomized via filtering out cases, and only including women and men due to the small number of cases for non-binary (n = 1) and not sure (n = 1).

Table C.1

Scale to Dummy Variable Transformations

Variable Group	Original (5-point)		Transformation Expression (Original to Tri)	New (Trichotomized)		Transformation Expression (Tri to Di)	New (Dichotomized)	
	Label	Value		Label	Value		Label	Value
Frequency[a]	Never	1	-[e]	-[e]	-[e]	(1 → 0)	No	0
	< 1	2				(2 to 5 → 1)[f]	Yes	1
	1 to 2	3						
	3 to 4	4						
	5 to 7	5						
Purchase Likeliness[b]	Extremely Unlikely	1	(1 to 2 → 1)	Extremely Unlikely or Unlikely	1	(1 to 2 → 0)	No/ Neutral	0
	Unlikely	2						
	Neutral	3	(3 → 2)	Neutral	2			
	Likely	4	(4 to 5 → 3)	Extremely Likely or Likely	3	(3 → 1)	Yes	1
	Extremely Likely	5						
Challenges[c]	Strongly Disagree	1	(1 to 2 → 1)	Strongly Disagree or Disagree	1	(1 to 2 → 0)	No/ Unsure	0
	Disagree	2						
	Not Sure	3	(3 → 2)	Not Sure	2			
	Agree	4	(4 to 5 → 3)	Strongly Agree or Agree	3	(3 → 1)	Yes	1
	Strongly Agree	5						
Benefits[d]	Strongly Disagree	1	(1 to 2 → 1)	Strongly Disagree or Disagree	1	(1 to 2 → 0)	No/ Unsure	0
	Disagree	2						
	Not Sure	3	(3 → 2)	Not Sure	2			
	Agree	4	(4 to 5 → 3)	Strongly Agree or Disagree	3	(3 → 1)	Yes	1
	Strongly Agree	5						

Note. Table of variable transformations from original five-point ordinal scale variables to trichotomized and dichotomized variables s presented via variable group. Transformation methods follow Jeong's (2016) guidelines and recommendations for variable transformations.

[a]Weekly consumption frequency of food item. All frequency variables included (see Table 2.3 in Chapter 2). Includes both AB and PB foods.

[b]Purchase likeliness of food item. All purchase likeliness variables included (see Table 2.3 in Chapter 2). Includes only PB foods and LG Meats. Alternative food purchase likeliness variables not included in analysis (See Appendix D).

[c]Perceived PB diet challenges. All challenges variables included (see Table 2.3 in Chapter 2).

[d]Perceived PB diet benefits. All benefits variables included (see Table 2.3 in Chapter 2).

[e]No trichotomized variable created for frequency variables as it would not be meaningful.

[f]Jeong's method was not utilized for frequency variables as only value 1 was representative of a negative response.

Table C.2
Demographic Variable Transformations

Variable	Original Variable		Transformation Expression	Merged Variable		Transformation Expression	Dummy Variable	
	Labels	Values		Labels	Values		Label	Values
Age	18-19, 20-24…80-84, 85+	1 to 15	(1 to 3 → 1), (4 to 5 → 2), (6 to 7 → 3), (8 to 15 → 4)	<29, 30-39, 40-49, 50+	1 to 4	-[a]	-[a]	-[a]
Education	Some high school, High school, Postsecondary, Some college or university, Bachelor's, Master's, Doctorate, Post-doc	1 to 8	(1 to 2 → 1), (3 to 4 → 2), (5 → 3), (6 to 8 → 4)	High school or below, Postsecondary, Bachelor's Postgraduate	1 to 4	-[a]	-[a]	-[a]
Income	< $10,000, $10,000 to $19,999…$90,000-$99,999, $100,000 to $149,999, $150,000+	1 to 12	(1 to 2 → 1), (3 to 4 → 2), (5 to 6 → 3), (7 to 8 → 4), (9 to 10 → 5), (11 → 6), (12 → 7)	<$19,999, $20,000 to $39,999…$80,000 to $99,999, $100,000 to $149,000, $150,000+	1 to 7	-[a]	-[a]	-[a]
Household	1 to 8	1 to 8	(1 → 1), (2 → 2), (3 → 3), (4 to 8 → 4)	1, 2, 3, 4+	1 to 4	(1 → 0), (2 to 4)	No, Yes	0, 1
Children	0 to 3	0 to 3	(0 → 0), (1 → 1), (2 to 3 → 2)	0, 1, 2+	0 to 2	(0 → 0), (1 to 2 → 1)	No, Yes	0, 1
Shopper and Preparer	No, Primary shopper and preparer, Only shopper, Only preparer	0 to 4	-[a]	-[a]	-[a]	Shopper (0 → 0), (1 to 2 → 1) Preparer (0 → 0), (1, 3 → 1)[c]	Shopper (No, Yes) Preparer (No, Yes)	0, 1
Dietary Pattern	Vegan, Vegetarian, Flexitarian, Pescatarian, Omnivore, Other	1 to 6	-[a]	-[a]	-[a]	(1 to 4, 6 → 0), (5 → 1)	Non-omnivore, Omnivore	0, 1
Gender	Female, Male, Non-binary, Don't know	0 to 3	-[a]	-[a]	-[a]	Select cases (Gender < 2)	Female, Male	0, 1
Location	City-bounds, Provincial-bounds, Country-bounds, Outside country	1 to 4	-[a]	-[a]	-[a]	(1 → 0), (2 to 4 → 1)	Outside, City-bounds	0, 1

Note. Table of demographic variable transformations to merged and dummy (dichotomized) variables. Variables were grouped together based on logic, as Jeong's method only applies to five-point scale data.

[a]Not meaningful to create a merged or dummy variable.

[c]Shopper and Preparer has been divided into two dummy variables, being primary shopper and primary preparer.

Appendix D

Excluded Variables and Tests (Ch. 2)

Demographic variables excluded from the analysis include being intimate partner relationship, the number of people in the household, whether the respondent has children in the household they are a parent or guardian to, whether the respondent is the primary grocery shopper in the household, whether they are the primary food preparer in the household, and whether themselves or a household member has work experience in the meat industry. Some variables were excluded from specific tests, such as a respondent's distance from the farmers market and their location, being within or outside of Kamloops city-bounds.

Relationship, Household Members, and Children

It is possible that Relationship and Household Members may have yielded meaningful results, perhaps related to peer pressure or challenges surrounding eating PB due to those around them not eating PB (e.g., if acceptance of PB foods was low in terms of those being in a relationship or those living with others), but it is not possible to know if that is what it means. While it could be anticipated that having children may lead to a lowered acceptance level of PB foods due to challenges surrounding existing habits and norms surrounding changing one's diet from the 'norm' of omnivorous diets. Spearman's correlations with Household and both summed and mean scales were all insignificant. Mann Whitney *U* tests with Relationship, Household Members (dichotomized), Children (dichotomized) and mean scales were insignificant. While t-tests were used as a more reliable test for summed scales, Mann Whitney *U* was nonetheless initially conducted, and Relationship, Household Members (dichotomized), and Children (dichotomized) were insignificant. *T*-tests with Relationship, Household Members (dichotomized), and Children (dichotomized) and summed scales were also all insignificant.

Primary Shopper and Primary Preparer

Primary Shopper and Primary Preparer may have yielded meaningful results in terms of those perhaps not being the primary shopper or preparer not making their own decisions on food and those being the primaries having more power over their food decisions, but it is not possible to know if that is what it means. Statistical analyses were not significant. Tests

conducted include Mann Whitney *U* tests with Primary Shopper and Primary Preparer and both mean and summed scales were all insignificant. *T*-tests with Primary Shopper and Primary Preparer and summed scales were also all insignificant.

Meat Industry

Meat Industry may have yielded meaningful results in terms of those having previously worked in the meat industry having different perceptions of PB foods than those who have not, whether it be more or less acceptance as a result of exposure to the process of making AB food products (e.g., farming, slaughter, butchering, etc.). However, it is not possible to know if that is absolutely what it means. Mann Whitney *U* Tests with Meat Industry and both summed and mean scales were all insignificant. *T*-tests with Meat Industry and summed scales were also all insignificant.

Distance from Market and Location

Specifically, Spearman's correlations with a variable derived from postal code (Distance from Market) were not meaningful, as it is difficult to interpret how a respondent's distance from the market influences their perceptions of food. Factors to consider beyond distance include mode of transportation (e.g., driving, cycling, walking, scooter, wheelchair) and distance then becomes difficult to interpret. Regardless, correlations were insignificant with Distance from Market, and both summed and mean scales. A Mann Whitney *U* test with Location, being inside or outside Kamloops city-bounds (variable dichotomized from Distance from Market), yielded no significant results with both mean and summed scales. This test would nonetheless be challenging to interpret as outside of Kamloops can mean anywhere else globally, where perceptions may differ largely from place to place depending upon factors such as country, province or state, city population, and culture. *T*-tests with Location and summed scales were also all insignificant.

Other Excluded Variables

Some variables were created for the purpose of creating other variables. Political Orientation was not used as a result of there being an error in data collection based on the inability to differentiate between City and Province were only used to create the variable of Location and were not used for any statistical analyses as there was not enough data per city or province to use these variables. Postal Code was not used as it was merely used to create

other subsequent variables of City and Province to then create Location, and to create Distance from Market. As there was no meaningful information to analyze, whether through operationalizing the variable for quantitative statistical analysis or via qualitative thematic analysis, the open-ended variables of Education (to elaborate on multiple choice selection of Education), Food Decisions (to elaborate on multiple choice selection of Food Decisions), and Extent of Cultural practice (to elaborate on the three-point scale of Extent of Cultural Practice) were not utilized. The open-ended Dietary Pattern variable was used to create the category of 'other' in the closed-ended Dietary Pattern variable based on multiple choice. Extent of Cultural Practice (closed-ended) was not used in the analysis, but future research should look at the relationship between culture and diet. Additionally, Cultural Practice was transformed from a trichotomized variable into a dichotomized variable initially where value one (no influence) becomes zero (no), and values two and three (some and strong influence) become one (yes influence).

Some non-normally distributed variables were attempted to be transformed as normal distributions, whether through selected cases or transformation. The following were still not normally distributed after transformations and were not used, as their sole purpose was to use them for parametric tests with the assumption of normality: Number of AB foods consumed per week (Summed Scale), Average degree of perceived benefits to a PB diet (Mean Scales), Household Members, Number of Children, and Distance from Market. Additionally, both summed and mean scales for alternative food purchase likeliness, and the individual variables of purchase likeliness of LG meats were not included due to lack of meaningful and significant results. There is a lack of evidence in the literature on sociodemographics and perceptions of LG meats, making predictions subsequently difficult.

Other Excluded Tests

T-tests were used for the reporting of summed scale variables in place of Mann Whitney *U* tests, as results from *t*-tests tend to be more reliable (reference). Kruskal-Wallis *H* tests were conducted but were not used as results are repeated from Spearman's on age, income, education, and children with mean scales. Spearman's is a more reliable test (reference). ANOVA and Welch, a more reliable test than Kruskal-Wallis *H* (reference), were excluded for the same reason as Kruskal-Wallis *H*. Fisher's and Chi 2x2 tests were run with food decision variables and demographics but yielded no significant results. The initial goal

of including Fisher's and Chi 2x2 was to elaborate on Spearman's and *t*-tests on the food decisions summed scale with individual decision factors variables and dichotomous demographic variables. The other goal was to explore relationships between dichotomous demographic variables, including those that were transformed.

All statistical tests ran (*t*-tests, Mann Whitney U, Spearman's, Kruskal-Wallis *H*, ANOVA, Welch, Fisher's, Chi 2x2) whether included or excluded in the main results section comprised of specific statistical analyses of the individual items on mean and summed scales with demographic variables that met each test's assumptions on levels of measurement. However, tests with individual variables were only reported in the results section if the overarching summed or mean scale to which the item belongs was significant.

Statistical tests that were not run included Chi Square, some ANOVA, some *t*-tests, Pearson's and Point-Biserial. For Chi Square, the minimum expected cell count of five was not met for the majority of tests. In place of Chi Square, Fisher's, and Chi 2x2 were used. For ANOVA, some *t*-tests, Pearson's, Point-Biserial, Linear Regression, and Multiple Regression, the assumption of normality was not always met. Variable transformations were not always possible due to most variables being ordinal. In place of ANOVA and regressions, Kruskal-Wallis *H* was used. Mann Whitney U was used in place of some *t*-tests. Spearman's was used in place of Pearson's and Point-Biserial.