

CONSUMER PERCEPTIONS OF FOOD WASTE  
ACROSS THE FOOD SUPPLY CHAIN:  
A Q METHODOLOGY STUDY

By

PEYTON ELISE HALEY

Bachelor of Science in Agricultural Communications  
Oklahoma State University  
Stillwater, Oklahoma  
2019

Bachelor of Science in Animal Science  
Oklahoma State University  
Stillwater, Oklahoma  
2019

Submitted to the Faculty of the  
Graduate College of the  
Oklahoma State University  
in partial fulfillment of  
the requirements for  
the Degree of  
MASTER OF SCIENCE  
May, 2021

CONSUMER PERCEPTIONS OF FOOD WASTE  
ACROSS THE FOOD SUPPLY CHAIN:  
A Q METHODOLOGY STUDY

Thesis Approved:

Dr. Angel Riggs

---

Thesis Adviser

Dr. Samantha Blackwell

---

Dr. Quisto Settle

---

## ACKNOWLEDGEMENTS

I'm so grateful for my time at Oklahoma State University, and it's hard to believe, six years later, my time as a student here has come to an end. Mom and Dad, I have to give you credit because I bet when you glued that orange and black bow to my head as a baby you had no idea just how much this college, town, and the people in it would shape me into the person I am today. Thank you.

I know I would have never made it to the end of this journey without the unwavering support of my family. Thank you for being my always-willing practice audience, my behind-the-scenes cheerleaders, and my inspiration to be better than I was yesterday.

Dr. Riggs, thank you for introducing me to this methodology I've found so fascinating. The time you've spent helping me grow academically—from teaching me as a kid who didn't know the difference between a press release and a news article, to Q class, to my thesis research—is so deeply appreciated.

Dr. Blackwell and Dr. Settle, thank you for keeping it real, the inadvertent life chats during class, and the encouragement. I'm so grateful for your support, expertise, and dedication to your students.

To my friends that have become like family, especially considering we're managing to navigate graduate school through a pandemic, each of you means more to me than you'll probably ever know. Post night class Zoom hangouts aren't something I'll soon forget.

For being the editor I know you never thought you would be, thank you, Chester. For being my sounding board, my shoulder to cry on, my “Hey, can you drive while I type?” chauffer, for everything else I'm not thinking of, thank you.

This page wouldn't be authentic without a nod to my dogs. It seems like they always knew what I needed before I did, nudging my leg when it was time to take a break and a walk around the neighborhood and reminding me when it was dinnertime.

I'll end this the only way I know how: Go Pokes!

Name: PEYTON ELISE HALEY

Date of Degree: MAY, 2021

Title of Study: CONSUMER PERCEPTIONS OF FOOD WASTE  
ACROSS THE FOOD SUPPLY CHAIN:  
A Q METHODOLOGY STUDY

Major Field: AGRICULTURAL COMMUNICATIONS

Abstract: In the United States, approximately 40% of all food produced is never eaten (“Food Waste FAQs,” n.d.). The issue of food waste has gained attention in the United States over the last decade (Collart & Interis, 2018; Neff et al., 2015). Much research exists regarding consumer beliefs about food waste in the latter half of the food supply chain—the retail and consumer sectors—but there is a gap in literature regarding consumer beliefs regarding the production, processing, and distribution sectors (Conrad & Blackstone, 2020; Roodhuyzen et al., 2017).

Previous studies have provided a broad overview of consumer beliefs, attitudes, and motivations relative to food waste, but the nuances of those perspectives have yet to be identified, making Q methodology an ideal choice for this study. The 36-statement Q set described ideas about food waste across the food supply chain and were developed through a hybrid approach, drawing from both naturalistic and theoretical sources. Twenty consumers completed Q sorts, directed by the condition of instruction: “What are your thoughts about food waste?”

The sorts were entered into the PQMethod software program. Principal components analysis and varimax rotation resulted in a three-factor solution. Data analysis, post-sort interviews, demographic questioning, and factor arrays were used to interpret the resulting factors. The factors were named the *Reformers*, the *Individualists*, and the *Helpers*.

The *Reformers* perspective operates in big picture ideals. They can see change and believe it is within their grasp. They believe their actions make a true difference and want other sectors of the food supply chain to feel that way as well. *Individualists* are not that concerned about food waste. They don’t see it affecting their lives and therefore don’t have much desire to act. They believe actions have consequences and that every sector is responsible for their own. *Helpers* worry about how food waste affects them, and the people they know, on a personal level. They sympathize with producers and are cautious when it comes to what they allow themselves to waste.

Keywords: Q methodology, food waste, consumer perspectives

## TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION.....	1
Statement of the Problem.....	3
Purpose and Significance of the Study .....	3
Research Question .....	3
Assumptions.....	4
Definitions of Terminology .....	4
II. REVIEW OF LITERATURE.....	6
The Food Supply Chain .....	6
Production.....	6
Processing.....	6
Distribution .....	7
Retail.....	8
Consumption.....	8
Complexity of the Food Waste Issue.....	9
Inconsistencies Surrounding the Definition of Food Waste .....	9
Issues Associates with Food Waste .....	10
Economic Impacts.....	11
Environmental Issues .....	11
Social Factors.....	12
Generational Tendencies.....	12
Awareness to Incite Change.....	13
Limitations of Previous Research.....	14
III. METHODOLOGY .....	16
Rationale for Q Methodology .....	16
Instrument Development.....	17
Development of Concourse.....	17
Development of Q Set.....	18
Condition of Instruction.....	20

Chapter	Page
III. METHODOLOGY .....	16
Development of Form Board and Demographic Questionnaire .....	20
Validity and Reliability .....	20
IRB Approval .....	21
Participants .....	21
Data Collection .....	22
Materials .....	22
Q Sorting .....	22
Post Sort Interviews .....	23
COVID-19 Implications .....	23
Data Analysis .....	24
IV. FINDINGS .....	25
Data Analysis .....	25
Interpretation of Factors .....	27
Factor One – The Reformers .....	27
Factor Two – The Individualists .....	30
Factor Three – The Helpers .....	33
Consensus Statements .....	36
Summary .....	38
V. CONCLUSION .....	39
Summary of the Study .....	39
Summary of Findings .....	40
Conclusions .....	41
Cost of Food Waste .....	41
Moral Obligations .....	42
Across the Food Supply Chain .....	42
Implications for Future Research .....	43
Implications for Future Practice .....	43
REFERENCES .....	45
APPENDICES .....	53

## LIST OF TABLES

Table	Page
1. <i>Defining Sorts in the Factor Matrix</i> .....	26
2. <i>Most Like and Most Unlike Statements for the Reformers</i> .....	28
3. <i>Most Like and Most Unlike statement for the Individualists</i> .....	31
4. <i>Most Like and Most Unlike Statements for the Helpers</i> .....	34
5. <i>Consensus Statements</i> .....	35

## CHAPTER I

### INTRODUCTION TO THE STUDY

In the United States, approximately 40% of all food produced is never eaten (“Food Waste FAQs,” n.d.). From farm to fork, 57% of fresh and processed vegetables, 53% of fresh and processed fruits, and 47% of all meat, fish, eggs and nuts in 2018, and 32.5% of all dairy products in 2017 were wasted (*Food Availability (Per Capita) Data System*, 2021). Highly perishable foods like produce and meat are most likely to be wasted (Conrad et al., 2018). In 2018, 63 million tons of food waste, or 21.6% of all municipal solid waste (trash), was disposed of in the United States (Environmental Protection Agency, 2021). The environmental impact of food waste in the United States is significant (Garnett, 2013) and has been deemed a global problem by state and federal legislature (Schultz & Horton, 2020) as well as producers, retailers, and consumers (Gunders & Bloom, 2017).

Food waste in the United States occurs at all stages of the food supply chain (Vogliano & Brown, 2016). The food supply chain (FSC) can be defined as a system through which “raw materials and inputs are turned into edible food products that are consumed by end users” (Neisham et al., 2015, p. 31). In developed countries like the United States, most wasted food occurs once it reaches the market (Vogliano & Brown, 2016). In most depictions of the FSC in the United States, consumers represent the endpoint of the total food waste produced in the United States,



approximately 30% is attributed to consumers as they interact with food both in their households and away from home (Schneeman & Oria, 2020). Research conducted at the consumer level to understand behavioral habits is plentiful but addresses only a surface-level understanding of the role of consumers regarding food waste (Block et al., 2016). As the Block et al. study states, “much of consumer food waste occurs for reasons that consumers may not be consciously aware of and that may not necessarily align with their explicit attitudes” (p. 294).

According to Yu and Jaenicke (2020), the average American household wastes 31.9% of the food they purchase. However, in a 2015 study by Neff et al., 56% of survey respondents said they discard only 10% of the food they buy. Because suspected food waste underreporting, it is likely consumers do not spend as much time considering their food waste behaviors as they might with a greater understanding of the magnitude of their contribution to the issue (Comber & Thieme, 2012; Neff et al., 2015). However, research has shown awareness does not necessarily lead to behavioral change in consumers (Hebrok & Boks, 2017; Neff et al., 2015), but revealing people’s attitudes, motivations, and reasons behind existing behavior helps create a deeper understanding which in turn affects behavioral change (La Babera et al., 2016; Parfitt et al., 2010).

There are several food waste reduction initiatives in the U.S., including those led by organizations such as the United States Department of Agriculture and the Environmental Protection Agency. These initiatives, such as the Environmental Protection Agency’s Net Zero Initiative are aimed at evaluating efforts to redirect food waste from landfills (Environmental Protection Agency, 2017), and are designed to increase food availability, conserve natural resources, and create economic gains (Buzby et al., 2014).

The problem of food waste has gained attention in the last decade, especially regarding consumer input (Neff et al, 2015; Quested et al, 2013; Roodhuyzen et al., 2017). Consumer behavior, from reducing household waste to voting for policymakers, has the greatest impact on the reduction of food waste (Alamar et al., 2017; Graham-Rowe et al., 2014). However, enticing

behavior change is multi-faceted, requiring an understanding of one's intentions and beliefs (Comber & Thieme, 2012). Much research has been completed regarding food waste at the consumer level, however due to the diverse nature of food waste along the food supply chain, more research is needed regarding the other levels of the FSC (Van Bommel & Parizeau, 2020).

The definition of food waste varies, often referred to as food waste in developed or "industrialized" countries and food waste and loss in developing countries (Alamar et al., 2017), which creates inconsistencies in literature. For the purpose of this study, food waste is defined as the loss of edible food, still fit for human consumption, somewhere along the food supply chain. This is based on the USDA definition: "...when an edible item goes unconsumed, such as food discarded by retailers due to blemishes or plate waste discarded by consumers" (Buzby et al., 2014, p. 1) and excludes waste from crops grown for animal feed, fuel, or other uses (ReFED, 2016).

The causes of food waste are not the same across the FSC. Behaviors that result in food waste often translate across multiple sectors of the FSC and cooperation among those sectors is key to successful food waste reduction (Göbel et al., 2015). Additionally, as efforts toward creating a more sustainable food supply chain grow, the interests of the different supply chain stakeholders must be considered (Govindan, 2018). Consumers are an important stakeholder in the FSC, it is important to consider their thoughts, beliefs, and opinions regarding food waste, which is a large part of the discussion surrounding food sustainability (Gunders & Bloom, 2017). As consumers are responsible for the majority of food waste in the U.S., discovering their perspectives across the FSC might allow deeper insight into the values they hold surrounding food waste reduction and therefore allow for better targeting of reduction methods.

### **Statement of the Problem**

Although initial research has shown consumers to be aware of the problems associated with food waste (Neff et al., 2015), research regarding the nuances of behavioral motivation of American consumers toward food waste is a relatively new topic (Block et al., 2016). Ample

literature exists to describe the FSC and food waste on an empirical level, but little to explore consumer values and motivations in the U.S. Consequently, there is a need in literature to explore the consumer perspective toward food waste across the food supply chain.

### **Purpose and Significance of the Study**

The purpose of this study is to explore consumer opinions regarding food waste in the United States. This study aims to provide a better understanding of consumer perspectives toward food waste along the supply chain.

### **Research Question**

This study was guided by the research objective of exploring consumer perceptions of food waste along the entirety of the food supply chain. The condition of instruction for this study was, “What are your thoughts about food waste?” In Q methodology, the research question or objective is aligned with the condition of instruction, which tells participants what to consider when sorting statements (Watts & Stenner, 2012).

### **Assumptions**

The following assumptions were made during this study:

1. Participants encounter food waste in some form in their lives.
2. Participants sorted statements to represent their authentic opinions.

### **Definitions of Terminology**

The following terms were identified as relevant to this study:

*Concourse*: A comprehensive collection of facts, opinions, ideas and beliefs surrounding a concept, from which Q samples are drawn (Stephenson, 1986).

*Condition of Instruction*: The basis on which participants are directed to complete Q sorts, meant to ensure sorters consider the statements in the same way (Brown, 1980).

*Factor array*: A composite Q sort representing the viewpoint of a particular factor, which forms the basis of factor interpretations (Watts & Stenner, 2012).

*Factor loading:* A factor loading serves as a correlation coefficient, indicating how similar each Q sort is to its respective factor array (McKeown & Thomas, 2013).

*Food supply chain:* A complex system through which food travels before being discarded (Göbel et al, 2015; Nesheim et al., 2015). For the purpose of this study, researchers simplified the FSC to being composed of the following sectors: production, processing, distribution, retail, and consumption.

*Food waste:* All edible goods intended for human consumption that are not consumed (Buzby et al., 2014).

*P set:* The participant sample which takes part in the study (Brown, 1993).

*Q methodology:* Q methodology was developed by William Stephenson in 1935 to explore human subjectivity (Brown, 1980).

*Q set:* A broadly representative set of statements selected from the concourse to be sorted by participants (Watts & Stenner, 2012).

*Q sort:* The process by which data are collected; a participant's rank-ordering of the Q set (Brown, 1993).

## CHAPTER II

### REVIEW OF LITERATURE

The purpose of this study is to explore consumer opinions regarding food waste in the United States. This chapter examines previous research related to the food supply chain and complexities related to the greater issue of food waste.

#### **The Food Supply Chain**

According to Alamar et al. (2017), “a supply chain can be defined as a network that integrates growers, processors, manufacturers, wholesalers, retailers (and consumers) coordinating the flow of products, information and money between actors in production and consumption” (p. 8). The food supply chain (FSC) is a complex network of systems that food passes through, from the earliest stages of agricultural production to its final destination: consumers (Göbel et al, 2015; Nesheim et al., 2015). For the purpose of this study, researchers considered the FSC as being composed of the following systems: production, processing, distribution, retail, and consumption.

#### **Production**

In this stage of the FSC, raw products are produced, and while little food waste from production makes it to the landfill, about 16% of total food waste is related to this stage of the FSC (ReFED, 2016). Food loss during the production stage is often attributed to labor shortages, pest and animal foraging and drought, flood, or other unfavorable weather conditions (Vogliano

& Brown, 2016). Strict cosmetic guidelines regarding what food is sellable in the United States, can lead to crops being left in fields (Gunders & Bloom, 2017). Additionally, producers are subject to predicting consumer demand, so over-planting may result in a surplus of food being produced (Vogliano & Brown, 2016). Seafood bycatch, when unintended species are caught during fishing, is another major cause of food waste during production (Gunders & Bloom, 2017).

### **Processing**

Most raw products go through some form of processing or manufacturing before they reach the consumer (Nesheim et al., 2015). Processing is a broad term, encompassing all aspects of milling, cleaning, packaging, cutting, cooking, and labeling (Gunders & Bloom, 2017). In this stage of the FSC, facilities cull crops that do not meet the United States Department of Agriculture grades or standards (U.S. Department of Agriculture, n.d.; Vogliano & Brown, 2016).

Processing waste is primarily produced during the culling of produce and followed by the processing of animal products (Vogliano & Brown, 2016), due in part to the trimming of “edible, but undesirable parts” of meat (Gunders & Bloom, 2017, p. 7). Additional factors contributing to food waste during processing might include equipment malfunction or miscommunication among workers and supervisors regarding how products are to be packaged (Gunders & Bloom, 2017). Processing accounts for an estimated 2% of food waste throughout the FSC (ReFed, 2016).

### **Distribution**

The distribution stage of the FSC includes storage, transportation, and transit of foods before it reaches the retail market (Gunders & Bloom, 2017; Zhong et al., 2017). Major causes of food waste during distribution include improper handling, food expiration, and rejected shipments (Gunders & Bloom, 2017). Food safety is a major concern in the U.S (Collart & Interis, 2018), and safe food is often linked to perceived freshness (Conrad & Blackstone, 2020). All three causes mentioned above shorten the shelf life of perishable foods and some foods expire before they reach their destination (Gunders & Bloom, 2017; Zhong et al., 2017).

## **Retail**

The retail section of the FSC refers to establishments including, but not limited to, grocery stores, farmer's markets, and restaurants. According to the 2016 ReFED report, the retail sector of the FSC accounts for about 28% of food waste. The primary sources of wasted food in retail are overstocking of perishables such as bread, fruits and vegetables, damaged products, and seasonal items (Vogliano & Brown, 2016). In this situation, seasonal describes food that becomes more popular at certain times of the year, like turkeys around Thanksgiving (Gunders, 2017).

Supermarkets are the main source of food for most Americans, with outlets like farmers' markets becoming more popular (Schneeman & Oria, 2020). The emergency food sector, including charities, food banks, soup kitchens, and food pantries, of which donations make up the greatest percentage of their inventory, are not often considered in food waste estimates (Coleman-Jensen et al., 2019; Schneeman & Oria, 2020), though they play a role in redirecting potential food waste. ReFed's 2016 breakdown of food waste categorizes the above FSC sector, distribution, and grocery stores together and reports their contribution to total food waste at about 13%. Restaurants and other food service entities involved in the retail sector are responsible for approximately 26% of food waste (ReFed, 2016).

## **Consumption**

Consumers are individuals who purchase food and/or eat in food service establishments such as restaurants (Nesheim et al., 2015). Consumers make purchasing decisions and must also make the choice of how to dispose of food in their household (Quested et al., 2013). This sector is frequently referred to as household waste (Graham-Rowe et al., 2014; Hebrok & Boks, 2017).

Consumers self-report a fair awareness of the significance of food waste in the United States and their behaviors tend to correspond with the level of food waste they perceive themselves to create (Neff et al., 2015). However, consumers may not be actively aware of some behaviors they engage in (Hebrok & Boks, 2017), bringing the accuracy of their self-reporting into question (Hebrok & Boks, 2017; Neff et al., 2015). In 2019, an International Food

Information Council Foundation study consisting of 1,000 interviews of American adults provided insight into consumer behaviors and perceptions of food waste. The study found consumers are more likely to waste leftovers and fresh produce, food waste is not often considered when eating out, younger generations care more about food waste, and money was a top concern when consumers think about food waste. Household food waste accounts for the largest share among the sectors of the FSC, estimated to be around 43% (ReFed, 2016).

### **Complexity of the Food Waste Issue**

Roodhuyzen et al. (2017) stated “the variety of approaches, categories, measuring methods and ways of presentation make clear that the food waste domain is highly heterogeneous and ambiguous” (p. 40). While some factors regarding food waste have been thoroughly explored, others have been excluded (Roodhuyzen et al., 2017). There are many studies on food waste at retail and consumer/household levels (Buzby et al., 2014; Brancoli et al., 2017; de Moraes et al., 2020; Graham-Rowe et al., 2014; Hebrok & Boks, 2017; Neff et al., 2015), but the earlier stages of the FSC, especially consumer perceptions of food waste at those earlier stages, are largely understudied (Xue et al., 2017).

Literature suggests “food is wasted in households because of how it is valued” (Hebrok & Boks, 2017, p. 385). Previous qualitative and quantitative research has uncovered values consumers hold regarding food waste, though interpretation and reasoning behind those values has been not been adequately explored (Conrad & Blackstone, 2020; Quedsted et al., 2013), including factors such as money, guilt, environmental concerns, and nutrition (Neff et al., 2015; Quedsted et al., 2013).

### **Inconsistencies Surrounding the Definition of Food Waste**

A discord exists surrounding the definition of food waste. While the USDA includes food loss in its definition of food waste (Buzby et al., 2014), the Food and Agriculture Organization of the United Nations argues that a distinction should be made (FAO, 2013). This leads to varying interpretations of food waste across the literature and might also lead to consumer confusion



when discussing personal attitudes and beliefs surrounding the topic (Conrad & Blackstone, 2020; Roodhuyzen et al., 2017). Generally, food loss refers to the initial stages of the FSC, production, processing, and distribution, while food waste is used in reference to the later stages of the FSC, retail and consumption (Beausang et al., 2017; Chaboud & Daviron, 2017)

Chaboud and Daviron (2017) described these inconsistencies in-depth, proposing a six-part framework to analyze the similarities and differences among the many definitions of food losses and waste (FLW):

With regard to (1) timing and (2) scope, existing definitions are similar: (1) FLW is only taken into account from the moment crops are ready for harvest or after harvest... (2) Only agricultural products originally and directly intended for human consumption are considered...The definitions diverge, however, when it comes to the (3) terminology used, (4) criteria considered, (5) perspectives adopted, and (6) type of FLW considered... (3) For a given definition of FLW, the terminology used may differ (food waste, FLW, etc.) ... (4) FLW are interpreted in various ways based on three criteria: (4. A) the use and destination of food products, (4. B) the edible aspect of food products, and (4. C) the nutritional value of FLW... (5) In principle, it may be assumed that the different definitions of FLW reflect the different problems that stakeholders and/or institutions associate with FLW. (6) The definition may change depending on which type of FLW is considered, quantitative or qualitative. (p. 1-2)

Chaboud and Davrion (2017) argue that a definition might be chosen based on the target issue any researcher may choose to address, creating controversy regarding the validity of the food waste and loss debate.

### **Issues Associated with Food Waste**

There are several issues widely recognized by consumers considering food waste in the United States, including economic impacts, environmental impacts and a perceived moral

obligation to reduce food waste (Coleman-Jensen et al., 2020; Gunders & Bloom, 2017; Neff et al., 2015).

### **Economic Impacts**

According to Gunders and Bloom (2017), food waste in the U.S. costs approximately \$218 billion of the U.S. GDP. It is argued that the most effective method to reducing food waste is prevention, which reduces economic costs as well, since the costs associated with production, processing, handling, and disposal are never incurred (Buzby et al., 2014; Gunders & Bloom, 2017). It is argued that reducing food waste might ultimately lower the price of food and that diverting food waste to avenues such as animal feed will further reduce the economic footprint of food waste (Buzby et al., 2014).

Saving money often tops the list of consumer motivation to reduce their own food waste (Graham-Rowe et al., 2014; Neff et al., 2015). The average U.S. household throws away approximately \$1,500 worth of food each year (ReFED, 2016), though foods with high monetary value are less likely to be wasted (Hebrok & Boks, 2017).

### **Environmental Impacts**

It has been found that environmental impact is one of the main drivers of the call to reduce food waste in the U.S. (Gunders & Bloom, 2017). When food is wasted, so is the land, water, and natural resources used to produce it (*Why should we care about food waste?* n.d.). Food accounts for the largest percentage of volume in U.S. landfills, at about 24% (Environmental Protection Agency, 2021). Additionally, food waste produces about 16% of global greenhouse gas emissions (Conrad & Blackstone, 2021).

Consumer motivations to reduce food waste based on environmental concerns have been found to rank low compared to saving money and feeling guilty for wasting food. (Graham-Rowe et al., 2014; Hebrok & Boks, 2017; Neff et al., 2015). However, Quested and colleagues (2013) hypothesize that if consumers were more aware of the environmental impact of food waste across the supply chain and consumer strength to affect change, food waste behaviors would be reduced.

## **Social Factors**

In the U.S., 10.5% of people were food insecure at some point in 2019 (Coleman-Jensen et al., 2020). Feeding hungry people is the second most preferred method of food waste redirection on the U.S. Environmental Protection Agency's Food Recovery Hierarchy (U.S. EPA, 2017) and thought to be an attainable solution for retailers to reduce waste of perishable food items (Gunders & Bloom, 2017). Previous studies have shown that consumers consider it an ethical dilemma to waste food while others are going hungry (Hebrok & Boks, 2017). Considering the amount of food waste varies depending on a region's socioeconomic status—those with less money waste less food (Yetkin Özbük & Coşkun, 2020)...

Guilt is a major motivator when it comes to reduction of consumer food waste, though the reasons behind this guilt vary (Graham-Rowe et al., 2014; Neff et al., 2015). Additionally, confusion is a contributing factor to consumers' self-reported food waste behaviors, especially in regard to date labeling (Newsome et al., 2014). Food labels use a variety of terms, including “use before,” “sell by,” “expires on,” and more. Often, the “best if used by” label on perishable foods is mistaken for a food spoilage date, rather than an indicator of optimal quality, increasing the amount of food wasted in the U.S. (*Confused by date labels on packaged foods?*, 2019).

## **Generational Tendencies**

Ellison and Lusk (2017) found that younger consumers (ages 18-44) are likely to produce more food waste than their older counterparts. Generation Z consumers and Millennial consumers have a greater tendency to order groceries online and eat out (Zhang et al., 2020) and think about food waste during these activities (International Food Information Council Foundation, 2019). Generation Z consumers are those born from 1997 to 2012 while Millennial consumers are those born between 1981 and 1986 (Dimock, 2019). Additionally, both Generation Z and Millennials show high interest in and knowledge of sustainable foods but are less likely to cook for themselves (Su et al., 2019; Zhang et al., 2020) These generations are technology-driven with a strong sense of social responsibility, especially regarding environmental concerns (Kymäläinen et

al., 2021; Su et al., 2019), which seems to conflict with their actual food waste behaviors (Tucker & Farrelly, 2015).

Those consumers who are 45-64 years old (Generation X and youngest Baby Boomers) are less likely to waste food at restaurants compared to younger consumers, and more likely to throw out food while cleaning, while at the same time spending less time thinking about food waste in general than younger consumers (International Food Information Council Foundation, 2019). As consumers get older, they are less likely to adopt new behaviors or implement lifestyle changes and become more financially stable and less worried about wasting money (Wiedmer, 2015).

According to Quested et al. (2013), people over 65 years of age (the Silent Generation and oldest half of Baby Boomers) contribute approximately 25% less food waste than their younger counterparts, though this seems to be due to moral and financial motivations, rather than worry for the environment (Hebrok & Boks, 2017). Tucker and Farrelly (2015) suggest the frugality of older generations, perhaps created by their experience of war times and the Great Depression, “makes lifelong impacts on their waste and recycling habits” (p. 689), and those age 65 and older tend to think about reducing waste on all levels, not food waste specifically (International Food Information Council Foundation, 2019).

### **Awareness to Incite Change**

Education and raising awareness are the main goals of most waste reduction tactics in the U.S. (Kim et al., 2020; Neff et al., 2015; Zamri et al., 2020). However, studies have revealed that raising awareness does not necessarily create behavior change (Hebrok & Boks, 2017; Neff et al., 2015). While awareness is an important part of the process of behavior change (Comber & Thieme, 2013; Graham-Rowe et al., 2014), the complexity of consumer motivations, attitudes, and opinions surrounding food waste creates a need to understand the correlations between those factors and consumer behavior (Roodhuyzen et al., 2017).

Differentiating between perspective groups allows for better targeting of intervention tactics (Roodhuyzen et al., 2017). For example, if a person is motivated by the potential to save money, campaigns targeted to address financial incentives behind food waste reduction are more likely to affect that consumer's behavior (Zamri et al., 2020). Kim et al., 2020 found consumers are more likely to engage with a campaign they identify with, further demonstrating the ineffectiveness of blanket communication campaigns (Pearson & Perera, 2018).

According to Rogers' Diffusion of Innovations theory, change can be promoted throughout a society by way of a domino effect (Rogers et al., 2019). Within these societal changes, there are five categories of adopters: innovators, early adopters, early majority, late majority, and laggards (Rogers, 1995). Each of these categories of adopters is influenced by several factors: the innovation, communication channels, time, and the social system, which must each be considered before change occurs (Rogers, 1995). Lunbland (2003) states "All diffusion occurs within a social system, whose members may be individuals, groups, organizations, or subsystems, but who share a common goal or objective that links them together as a social system." The food supply chain could be considered a social system (Göbel et al., 2015) through which stakeholders must make decisions about their food waste behaviors.

### **Limitations of Previous Research**

This study was developed to begin to explore the academic gap that exists regarding the perceptions about food waste consumers hold along the various stages of the FSC, using the previously defined FSC as a framework to develop a concourse. Across the board, studies generally focus on one specific aspect of the FSC (Yetkin Özbük & Coşkun, 2020) and rarely address consumer perspectives across the FSC. While much research has been done regarding how much food waste is produced as well as consumer behaviors surrounding food waste, other factors are still largely unexplored. Roodhuyzen et al. (2017) posited "...personal, product and societal factors have a less direct and sometimes unclear or unequivocal link with specific chain stages" (p. 46).

Initial research in the U.S. focused primarily behavioral factors contributing to food waste along the retail and consumer levels of the FSC (Conrad & Blackstone, 2021) as well as estimating the amount of food wasted within specific sectors, like universities and households. Additionally, the lack of a standardized definition of food waste, as well as inconsistencies between information from the same organizations, leads to confusion among studies and difficulty drawing comparisons (Chaboud & Daviron, 2016). Ample literature exists to describe the FSC and food waste on an empirical level, but existing research regarding the factors of consumer food waste is “characterized by fragmentation and lack of differentiation” (Roodhuyzen et al., 2017, p. 43), meaning studies lack a comprehensive view of the FSC. While the literature provides a broad view into consumer knowledge, attitudes, motivations, and behavior, “there is a knowledge gap when it comes to understanding individual consumers’ waste decisions” (Ellison & Lusk, 2018, p. 616).

## CHAPTER III

### METHODOLOGY

The purpose of this study is to explore consumer opinions regarding food waste in the United States. This chapter explains the rationale for using Q methodology for this study as well as a description of instrument development and data collection procedures.

#### **Rationale for Q Methodology**

Q methodology was developed by William Stephenson in 1935 as a way to explore human subjectivity (Brown, 1980). Q methodology is described as a “method by which an individual can model for himself what his attitude of mind is about complicated topics, issues, or situations” (Stephenson, 1967, p. 5). Participants sort statements based on their own personal understanding and inclinations, with no input from the researcher, making each sort inherently subjective (Brown, 1980; McKeown & Thomas, 2013). Q methodology is meant to reveal only existing viewpoints, not to develop new ones (Brown, 1980).

Q methodology follows a five-step procedure (McKeown & Thomas, 2013): (1) development of the concourse, (2) development of the Q-set, (3) determination of the P set, (4) Q sorting, and (5) factor analysis and interpretation. This study explored the thoughts of adult consumers relative to food waste. Q methodology is a method of factor analysis grounded in both philosophy and science, and relies on participants’ subjective, or self-referent, point of view to

determine perspectives relative to a topic (Brown 1993; Watts & Stenner, 2012). Brown (1980) stated, “a person’s subjectivity is merely his own point of view” (p. 46). The goal of this methodology is not to predict a person’s viewpoint but to discover the nuanced differences among viewpoints (Brown, 1980). Previous studies have used both qualitative and quantitative methods to provide a broad overview of consumer beliefs, attitudes, and motivations relative to food waste, but the nuances of those perspectives have yet to be identified, making Q methodology an ideal methodology for this study.

### **Instrument Development**

In Q methodology, the research instrument is the Q sort activity, during which participants rank-order a series of opinion statements, the Q set, according to those most like their opinions (Brown, 1996). This involves the development of a concourse of communication, selection of a Q set, development of a condition of instruction, and development of a form board and demographic questionnaire.

#### **Development of Concourse**

To begin a Q study, a concourse of communication must be developed (McKeown & Thomas, 2013). A concourse represents “the overall population of statements from which a final Q-set is sampled” (Watts & Stenner, 2012, p. 34). A concourse of more than 100 statements for this study was derived from casual conversations, media, including social media and television, and interactions with various sectors of the food supply chain, as well as literature surrounding food waste along the five previously defined sectors of the food supply chain: production, processing, distribution, retail, and consumption.

Statements may be derived from both naturalistic or theoretical conditions (McKeown & Thomas, 2013). Naturalistic statements are developed from naturally-occurring (i.e., conversational) conditions, while theoretical statements are based in literature (McKeown & Thomas, 2013). This study’s concourse was developed using a hybrid approach, through analyses



of previous research in the subject area, conversations among peers, advertisements, brochures, social media, and books related to food waste.

Naturalistic statements may stem from direct sources (e.g., conversations or observations) or indirect sources (e.g., blogs or television commercials; McKeown & Thomas, 2013). For example, statement 6, “If the government did more to regulate food waste by producers, it would be easier for me as a consumer” was developed after the reading a blog detailing other countries’ regulations systems surrounding food waste (Lemos, 2019). Statement 8, “I’m scared to death of food borne illnesses, so I probably toss more than necessary,” was developed after an interaction during which the researchers watched a family member throw leftover takeout away, stating “I’m not sure if this is still good, but I’d rather be safe than sorry.”

Theoretical statements, however, stem from literature surrounding the topic of interest (McKeown & Thomas, 2013). Statement 20, “Best by dates are purposefully confusing. They’re just meant to make consumers throw away food and buy more” was inspired by a study on date labeling of food (Newsome et al., 2014). Additionally, statement 27, “Kids in schools are being taught to throw away food without guilt when they’re told to ‘dump’ their trays” was developed from a study about plate waste in school cafeterias (Derqui et al., 2018) and statement 30, “Food waste doesn’t affect me. Why should I care?” was inspired by an analysis of barriers to minimize food waste by Graham-Rowe et al. (2014).

### **Development of Q set**

The Q set, or the final list of items participants are asked to sort, is sampled from the concourse (Watts & Stenner, 2012). The statements in the Q set must be both self-referent (i.e., a person must be able to apply them to his own life) and comprehensive (i.e., allowing as many as possible perspectives to be represented; McKeown & Thomas, 2013; Watts & Stenner, 2012). Effective Q sets must provide adequate coverage of the subject matter, as well as be balanced in that they will not guide participants to sort in a specific way (Watts & Stenner, 2012). They must

also be analyzed using the principles of homogeneity and heterogeneity to ensure statements within each subgroup address the topic comprehensively (Brown, 1980).

According to the principles of homogeneity and heterogeneity (Brown, 1980), highly similar statements from the concourse were combined, and statements that inherently said the same thing were culled. This resulted in a final Q set of 36 statements (Appendix E). In this study, the Q set statements were categorized according to the simplified version of the food supply chain used in this study: production, processing, distribution, retail, and consumption.

Examples of statements regarding the processing sector of the FSC include statement 6, “If the government did more to regulate food waste by producers, it would be easier for me as a consumer” and statement 13, “Buying locally produced food discourages industrial farming and reduces food waste caused by production.

Statements regarding the processing sector of the FSC include statement 1, “Resealable packaging is the key to keeping food fresher, longer” and statement 20, “Best by dates are purposefully confusing. They’re just meant to make consumers throw away food and buy more.”

Examples of statements relevant to the distribution sector of the FSC include statement 19, “Food goes bad too quickly because it spends too much time in transit” and statement 23, “I’d rather see the expansion of food distribution and storage infrastructure than an increase in food waste.”

Retail-related statements include statement 3, “Food marketing in the grocery store inspires me to create magazine-worthy meals and I often buy way more than I need” and statement 15, “It’s not my business what grocery stores and restaurants do with unsold food.”

Finally, statements regarding the consumer sector of the FSC include statement 12, “We live in a society where more = better, especially when it comes to food” and statement 25, “My actions as an individual won’t affect global food waste reduction efforts.”

### **Condition of Instruction**

A condition of instruction is the basis on which participants complete their sorts and ensures all sorters consider the statements in the same way (Brown, 1980). The condition of instruction for this study was “What are your thoughts about food waste?” Participants used this condition of instruction to rank-order statements from “Most Like Me” to “Most Unlike Me.”

### **Development of Form Board and Demographic Questionnaire**

In this study, the participants were asked to sort the statements on an 11-column, pyramid-shaped form board. The form board was developed based on a McKeown and Thomas (2013) example.

Demographic information is usually collected following a participant’s Q sort (Watts & Stenner, 2012). The demographic questionnaire should include questions that might influence the sorters’ ideas about the topic of the Q study (Watts & Stenner, 2012). For this study, participants were asked to complete the optional demographic instrument, which asked their gender, ethnicity, level of education, grocery shopping habits, diet and experience with agriculture (Appendix G). The demographic questionnaire also allowed participants to provide contact information for a potential follow-up interview.

### **Validity and Reliability**

These results represent only the perceptions held by the study participants at the time the data was collected (McKeown & Thomas, 2013). The concepts of validity and reliability are not equivalent when comparing Q methodology to R methodological factor analysis (Watts & Stenner, 2012). In Q methodology, it is argued that validity is not relevant, because as Brown (1980) states, “There is no outside criterion for a person's own point of view” (p. 4). However, Watts and Stenner (2012) argue validity is achieved on some level by instructing all participants to consider the same condition of instruction and that “Q methodology delivers what it claims to deliver. The method claims to capture the viewpoints, or perspectives of its participants in the form of their Q sorts” (p. 51).

In Q methodology, reliability can be explored, using test-retest assessment, considering if a participant sorted the same statements twice, the responses should be correlated (Brown, 1980). More often than not, reliability measures in Q methodology reveal more about the reliability of the person's viewpoint than of the Q studies themselves (Watts & Stenner, 2012).

### **IRB Approval**

The procedures, documents, and statements for this study were approved by the Oklahoma State University Institutional Review Board on November 10, 2020 (see Appendix A).

### **Participants**

Participants in this study, known in Q methodology as the P set, were adult consumers who are decision-makers regarding food purchasing in their household. A consumer is someone who makes purchasing decisions and interacts with food both inside and outside their household (Schneeman & Oria, 2020). This P set was chosen because of the wide range of consumer opinions regarding food waste in the United States. The researcher attempted to recruit participants from all living generations, based on previous literature detailing the differences in generational tendencies regarding food waste (Ellison & Lusk, 2017; Quested et al., 2013; Zhang et al., 2020).

During participant recruitment, or selection of the P set, it is important to consider who will provide relevant and meaningful viewpoints as pertaining to a study's subject matter (Watts & Stenner, 2012). As for how many participants should be included, Watts and Stenner (2012) recommend half as many participants as there are statements in the Q set. For the purpose of this study, 20 participants performed sorts and were recruited by means of convenience sampling. Recruitment and interviewing were completed by the researcher. All sorting sessions took place in person.

Participants were asked to complete an optional demographic survey, which can be found in Appendix G. Fourteen participants reported being female and six male. All participants indicated their ethnicity to be white. Four participants reported a high school diploma being their

highest level of completed education, two reported an associate's degree being their highest level of completed education, nine reported a bachelor's degree being their highest level of completed education, and five reported a graduate degree being their highest level of completed education.

All participants were involved in shopping for their household's food. Thirteen participants reported single-person households, two reported being married, and two married with elementary-aged children. Two participants reported some form of diet concern. Eighteen participants reported exposure to agricultural production, one reported no previous experience, and one did not answer.

### **Data Collection**

For this study, all sorts took place in person at locations convenient to the sorter. All university COVID-19 protocols were followed, including the use of masks and social distancing.

### **Materials**

Six sets of statement cards, 20 form boards and demographic sheets, and multiple copies of Participant Information Forms were printed prior to data collection. Each sorter received their own form board and demographic survey to ensure data were kept separate, as the Q sorts were conducted confidentially. The cards were cut and placed into individual envelopes for organization. Recruitment flyers were distributed to potential sorters within the P set, and sorters received a recruitment flyer to pass along through means of snowball recruitment after their sort was complete. All materials can be found in Appendices B through G.

### **Q Sorting**

Before sorting, each participant was asked to read a Participant Information Form explaining the study and consent process. Participants were then supplied with a blank form board, demographic survey and set of statement cards. Each participant was given detailed, step-by-step instructions adapted from Watts & Stenner (2012) for completing a Q sort. Participants were instructed to read all statements thoroughly and sort them into three piles based on the condition of instruction "What are your thoughts about food waste?" The pile to their right was to

be statements “Most Like” their opinions, the pile to their left “Most Unlike” their opinions, and the pile in the middle those statements they had no strong feelings about.

Participants were then asked to sort statements onto the 11-column forced-choice form board (Appendix F). They began by placing the one “Most Like” statement in column 11, then the “Most Unlike” statement in column one, continuing back and forth between “Most Like” and “Most Unlike” until only six statements remained. Those six statements were placed into the middle column, column 0. During the sorting process, field notes were kept regarding sorter comments and body language to aid interpretation.

Once all cards were placed, sorters had the opportunity to rearrange any statements so the sort best fit their opinion. When the participant deemed the sort complete, participants wrote the statement number in the form board square in which it was placed. Participants were then asked to complete an optional demographic survey (Appendix G).

### **Post-Sort Interviews**

After factors were identified, five post-sort interviews were conducted with the exemplar sorters, those who load high on their respective factor and low on the others (Watts & Stenner, 2013), on each of the three factors. According to Brown (1993), factor loadings indicate the “extent to which each Q sort is associated with each factor” (p. 111). For this study, all exemplar sorters voluntarily provided contact information during sorted, and were available for interviews. Post-sort interviews are meant to supply supporting information for interpretation of each perspective (Watts & Stenner, 2013). The post-sort interview script can be found in Appendix H.

### **COVID-19 Implications**

Due to the ongoing COVID-19 pandemic in the United States, safety measures were implemented during Q sorting, including social distancing, the use of hand sanitizer and the wearing of CDC-approved masks by both the researcher and the participant. All sorters were given the option to conduct their sort over Zoom, though all elected to move forward with in-person data collection.

No sorter mentioned the pandemic affecting their opinions during either data collection or post-sort interviews, but COVID-19 likely affected sorters' food shopping and purchasing behaviors at some point (Roe et al., 2020). However, the COVID-19 pandemic was not within the scope of this research, so no further exploration was pursued.

### **Data Analysis**

Twenty sorts were collected and entered into Schmolck's (2014) PQ Method software. The sorts were correlated to each other, resulting in a correlation matrix. After attempting centroid analysis, it was determined the most defined solution was through principal components factor analysis with varimax rotation resulting in a three-factor solution. Factor arrays, field notes collected during Q sorting, demographic information, and post-sort interview data was used to interpret the factors.

## CHAPTER IV

### FINDINGS

The purpose of this study was to explore consumer perceptions regarding food waste in the United States. This chapter details the findings of the research, specifically regarding participant demographics and factor interpretations.

#### **Data Analysis**

Twenty sorts were entered into Peter Schmolck's (2014) PQMethod, a data analysis program for Q methodology. After attempting centroid analysis, the researchers determined a three-factor solution using principal components factor analysis with a significance level of 0.43 and varimax rotation. The significance level was calculated using the formula  $1/\sqrt{n} * 2.58$ , where  $n$  is the number of statements in the Q set (Brown, 1980). Of the 20 sorts, 17 reached a significant loading on only one of the three factors. Two sorts were confounded, which means they achieved significance on at least two factors, and one was non-significant, which means it did not meet the significance level on any factor. Table 1 shows each participant's loading on each factor, with defining sorts, those sorts that reach significance on only one factor, in bold.



**Table 1***Defining Sorts in the Factor Matrix*

<b>Sorter</b>	<b>Factor 1</b>	<b>Factor 2</b>	<b>Factor 3</b>
FB1	<b>0.7082X</b>	0.2657	0.2115
FB3	<b>0.5599X</b>	-0.2022	0.2540
FB4	<b>0.7198X</b>	-0.0580	0.3096
MB1	<b>0.6452X</b>	0.3603	0.3797
FG1	<b>0.6602X</b>	-0.1804	0.2813
FH1	<b>0.8097X*</b>	-0.0767	-0.1418
FG2	<b>0.8134X*</b>	-0.0940	-0.0464
FH3	<b>0.6817X</b>	-0.0292	0.1017
FB5	0.2765	<b>-0.6377X</b>	0.2580
MB2	-0.0421	<b>0.6489X</b>	0.2165
MH1	0.0585	<b>0.7820X*</b>	-0.0171
FB2	0.3930	-0.1630	<b>0.6243X</b>
FB4	0.1464	-0.0354	<b>0.4348X</b>
MA1	0.0313	0.2614	<b>0.6662X*</b>
FG3	0.0913	-0.2807	<b>0.6510X*</b>
FG4	0.4143	0.0647	<b>0.5392X</b>
FH2	0.2562	0.3698	<b>0.6608X</b>
MG1	0.4268	0.0063	0.5394
FA1	0.5283	0.0578	0.4920
MB3	-0.0981	0.0137	0.4176

*Note.* Bold font and X indicate a defining sort for the factor; \* indicates an exemplar sort.

Factor scores for each statement were calculated within each factor, representing a standardized score for a statement's ranking within factors (Watts & Stenner, 2012). The rankings were then used to create an array, or composite sort, for each factor. Those arrays, demographic data, field notes, and post-sort interviews aided the researchers in interpreting each factor.

## Interpretation of Factors

The three factors identified in this study included 17 of the 20 sorts. The first factor included nine sorters, the second included three sorters, and the third included six sorters. Upon completion of data analysis using PQMethod, five post-sort interviews were conducted with the exemplar sorters of each factor (i.e., those whose loadings were both highest on their respective factor and relatively low loading on the other factors) to further develop the researcher's understanding of each factor. In addition to data analysis and post-sort interviews, observations and notes taken during sorting were used in factor interpretation. The three factors were named the *Reformers*, the *Individualists*, and the *Helpers*.

### Factor One – The Reformers

Nine sorters defined the *Reformers* perspective. Of those sorters, one reported their gender was male and eight were female. Sorters reported a variety of educational backgrounds: Two completed high school diplomas, five completed bachelor's degrees, and two completed graduate degrees. All sorters on this perspective reported doing the grocery shopping for their household. Sorters' reported household size varied, as seven reported single-person households, one reported being married, and one married with one elementary-aged child. One sorter reported having certain food allergies, but no other special diets were reported. Seven sorters reported having some exposure to agricultural production, while one sorter reported having two college degrees related to agriculture with no previous experience, and one supporter did not answer the demographic question.

The following themes were identified to support this perspective: idealistic, deliberate, and determined. These themes led to the naming of this factor as the *Reformers*. The “Most Like” and “Most Unlike” statements for the *Reformers* are detailed in Table 2.

**Table 2***Most Like and Most Unlike Statements for the Reformers*

No.	Statement	Array Position	Z-Score
4	I want to invest my hard-earned dollars back into my community.	5	1.357
<b>5</b>	<b>It would be so much easier to prevent waste at restaurants if they didn't serve us double what we need.</b>	<b>4</b>	<b>1.319</b>
7	I always have the best intentions when I take things home from the fresh section of the grocery store, even if I don't end up using it all.*	4	1.307
<b>24</b>	<b>Food I throw away is natural and biodegradable – so wasting it isn't really an environmental issue.</b>	<b>-4</b>	<b>-1.487</b>
25	My actions as an individual won't affect global food waste reduction efforts.	-4	-1.681
<b>30</b>	<b>Food waste doesn't affect me. Why should I care?</b>	<b>-5</b>	<b>-2.384</b>

*Note.* Bold indicates distinguishing statements. \* indicates consensus statements.

***Idealistic***

The first theme to support the perspective of the *Reformers* is their tendency to think in ideals. They think the issue of food waste is one that can be solved and solved easily. They do not necessarily think of food waste as a consumer-only issue but one that can and should be addressed by manufacturers and retailers (statement 4, array position 5, z-score 1.357; statement 5, array position 4, z-score 1.319). They have big picture goals and can envision the fruition of those goals. *Reformers* want to see the improvement of a whole system (statement 29, array position 2, z-score 0.848; statement 5, array position 4, z-score 1.319; statement 11, array position 2, z-score 0.780), not just change on one level. After sorting, sorter 6 said, “It doesn't seem that

hard. If everyone would step up and take initiative, we wouldn't even be having this conversation.”

*Reformers* try to put themselves in other peoples' shoes to understand issues on a greater scale (statement 16, array position 3, z-score 1.209; statement 31, array position -2, z-score -0.975). Sorters in this perspective value policy and believe it is a key to food waste reduction, especially on local and community levels, but that federal policy may not be effective until change is happening (statement 6, array position 0, z-score -0.059; statement 15, array position -2, z-score -0.839). Sorter 4 said in a post-sort interview, “When I vote, I try to figure out who is going to implement change in my town, and that's who I vote for.”

### ***Deliberate***

The *Reformers* are intentional in their actions regarding food waste. They do not let outside influences factor into their food-buying decisions – they don't believe they are influenced by marketing to buy more than they need (statement 3, array position -3, z-score -1.167; statement 4, array position 5, z-score 1.357). *Reformers* recognize the value of food (statement 36, array position 2, z-score -.1653), but are not likely to make decisions regarding their food waste based on monetary concerns (statements 28, array position -3, z-score -1.270).

*Reformers* feel like they are doing a good job managing the food waste in their home (statement 7, array position 4, z-score 1.307) and want everyone else to step up to the plate (statement 5, array position 4, z-score 1.319; statement 10, array position 3, z-score 1.157). They value taking time to fully consider their actions regarding food waste and do not see that as an imposition (statement 2, array position -1, z-score -0.810). If *Reformers* do not act, they feel guilty (statement 26, array position 3, z-score 1.224) because they understand the implications of ignoring the issue of food waste (statement 17, array position 1, z-score 0.508; statement 30, array position -5, z-score -2.384). Sorter 4 said in a post sort interview that they are not happy with themselves until they feel like they are “doing enough.”

### ***Determined***

*Reformers* are quick to take responsibility, not only for their own actions, but also for the betterment of the world they live in. They see food waste as a relevant issue and want to do their part to fix it (statement 25, array position -4, z-score -1.681). They take the stance “you do your part, I’ll do mine,” (sorter 4, post sort interview) regarding food waste (statement 4, array position 5, z-score 1.357; statement 35, array position -2, z-score -0.854). *Reformers* approach food waste in their household with a “my mess, my problem” belief (sorter 4, post sort interview) and are not afraid to voice their opinions about food waste as an issue all consumers should work to improve (statement 35, array position -2, z-score -0.854).

Environmental concerns (statement 24, array position -4, z-score -1.487) are at the forefront of the *Reformers*’ minds and they are worried about food waste’s role in the big picture. They take their contribution to reducing food waste quite seriously (statement 25, array position -4, z-score -1.681); one sorter in this group reported having a countertop composter in their home.

Another aspect of the *Reformers*’ determined theme is the responsibility they feel to incite change (statement 31, array position -2, z-score -0.975). They want other sectors of the FSC to take food waste as seriously as they do (statement 15, array position -2, z-score -0.839; statement 23, array position 1, z-score 0.671) and cite “cooperation among all the moving parts” (sorter 4, post sort interview) as paramount to solving the food waste issue.

### **Factor Two – The Individualists**

Three sorters defined the *Individualists* perspective, though one sort had a negative loading on this factor, which is referred to as bipolar. A bipolar sort means the sorter would agree with the mirror image of this group’s composite array (Watts & Stenner, 2012). Two sorters reported their gender as male and one was female. Reported educational backgrounds included two bachelor's degrees and one high school diploma. All sorters in this perspective reported doing the grocery shopping for their household, and all reported single-person households. No special

diets were reported. All sorters reported exposure to agricultural production at some point in their lives.

The following themes were identified to support this perspective: pragmatic, suspicious, and independent. These themes led to the naming of this factor as the *Individualists*. The “Most Like” and “Most Unlike” statements for the *Individualists* are detailed in Table 3.

**Table 3**

*Most Like and Most Unlike statement for the Individualists*

No.	Statement	Array Position	Z-Score
<b>20</b>	<b>Best by dates are purposefully confusing. They’re just meant to make consumers throw away food and buy more.</b>	<b>5</b>	<b>2.288</b>
<b>33</b>	<b>Worrying too much about germs leads to an increase in food waste.</b>	<b>4</b>	<b>1.902</b>
7	I always have the best intentions when I take things home from the fresh section of the grocery store, even if I don’t end up using it all.*	4	1.509
<b>10</b>	<b>The thoughts of community gardens and food pantries makes me excited.</b>	<b>-4</b>	<b>-1.594</b>
8	I’m scared to death of food born illnesses, so I probably toss more than necessary.*	-4	-1.648
<b>36</b>	<b>Food is too valuable to simply throw away.</b>	<b>-5</b>	<b>-1.653</b>

*Note.* Bold indicates distinguishing statements. \* indicates consensus statements.

***Pragmatic***

*Individualists* are primarily concerned with what can be fixed immediately, not theoretically (statement 25, array position 2, z-score -1.028). They do not consider food waste as the most pressing issue because it does not change how they live their lives (statement 30, array

position 3, z-score 1.497). For this group, food is not something they worry about because it is cheap and available (statement 36, array position -5, z-score -1.653, statement 28, array position 3, z-score 1.098).

They think about the underlying reasons one might waste food, such as a concern for food safety, and are able to justify them, even if they might not share that concern (statement 8, array position -4, z-score -1.648; statement 33, array position 4, z-score 1.902). As sorter 20 said during a post sort interview, “I get why other people care so much about reducing food waste, but I think there are other factors that need to be considered before we can do much about it.”

*Individualists* value convenience over all else (statement 14, array position -3, z-score -1.603). If a behavior is not something already part of their day-to-day lives, they will not spend the time or effort to implement it (statement 18, array position 1, z-score 0.393; statement 34, array position -3, z-score -1.057). Sorter 16 said during sorting, “If I have to go out of my way to do this, it’s not going to happen.” *Individualists* are not concerned about cost (statement 36 array position -5, z-score -1.653) and may likely be influenced by marketing to purchase more than they intended (statement 3, array position 2, z-score 0.688).

### ***Skeptical***

*Individualists* are wary of government involvement and policy as a step to reducing food waste (statement 6, array position -3, z-score -1.376). Sorter 20 said during the sorting process, “I should be allowed to make my own choices about what happens in my household.

*Individualists* do not appreciate being told where to stand on the issue of food waste and prefer to draw their own conclusions (statement 21, array position 2, z-score 0.780).

To *Individualists*, the issue of food waste might be part of some agenda (statement 20, array position 5, z-score 2.288). That distrust carries and makes them cautious to believe everything they are told about food waste (statement 22, array position 1, z-score 0.611; statement 32, array position -1, z-score -0.405). Sorter 16 said during sorting, “I understand that food gets wasted, but is it really as big of a deal as the media makes it out to be?” *Individualists*

want to be in control of their own choices and would rather others not have the power to limit those choices (statement 29, array position -2, z-score -0.573).

### ***Independent***

The third theme to support the perspective of the *Individualists* is their independence. They march to the beat of their own drum and think people (and businesses) are entitled to make their own choices but must then deal with any consequences that arise due to those choices (statement 35, array position 0, z-score 0.145; statement 15, array position 2, z-score 0.653; statement 31, array position 3, z-score 1.051).

*Individualists* are not worried about taking care of other people when it comes to doing something about food waste (statement 10, array position -4, z-score -1.594; statement 16, array position 0, z-score -0.272). They value freedom of choice and feel no guilt when letting food go to waste (statement 28, array position 3, z-score 1.098; statement 26, array position 1, z-score 0.573) because once they have paid for food, it becomes their choice what to do next. Sorter 20 said in a post-sort interview, “I don’t understand why other people feel like it’s their job to care about what I do with my food.”

*Individualists* acknowledge food waste as an issue but do not feel personally affected by it, nor do they want to (statement 23, array position -1, z-score -0.537). They view their actions as relatively insignificant in the grand scheme of food waste (statement 13, array position 0, z-score -0.272; statement 25, array position -2, z-score -1.028) and food waste in general as a problem to worry about once it is a bigger issue (statement 24, array position 1, z-score 0.260).

### **Factor Three – The Helpers**

Five sorters defined the *Helpers* perspective. One sorter reported their gender was male and four were female. Sorters reported a variety of educational backgrounds: one completed a high school diploma, one completed an associate degree, one completed a bachelor’s degree, and two completed graduate degrees. Four reported being primarily responsible for the grocery shopping for their household, while one shared responsibility with their spouse. Reported



household size varied: three sorters were single, one sorter was married with no children, and one sorter was married with two small children. One sorter reported a low-carbohydrate diet, but no other special diets were reported. All sorters in this group reported some tie to agriculture in their lives.

The following themes were identified to support this perspective: traditional, cost-conscious, and empathetic. These themes led to the naming of this factor, the *Helpers*. The “Most Like” and “Most Unlike” statements for the *Helpers* are detailed in Table 4.

**Table 4**

*Most Like and Most Unlike Statements for the Helpers*

No.	Statement	Array Position	Z-Score
<b>18</b>	<b>Food that can be repurposed should be. Who says I can't make a sandwich using a hamburger bun?</b>	<b>5</b>	<b>2.287</b>
7	I always have the best intentions when I take things home from the fresh section of the grocery store, even if I don't end up using it all.*	4	1.909
<b>1</b>	<b>Resealable packaging is the key to keeping food fresher, longer.</b>	<b>4</b>	<b>1.859</b>
8	I'm scared to death of food born illnesses, so I probably toss more than necessary.*	-4	-1.410
6	If the government did more to regulate food waste by producers, it would be easier for me as a consumer.	-4	-1.456
<b>28</b>	<b>Food is so cheap – that's why I don't worry about forgetting a carton of strawberries in the back of my fridge.</b>	<b>-5</b>	<b>-2.277</b>

*Note.* Bold indicates distinguishing statements. \* indicates consensus statements.

### ***Traditional***

*Helpers* tend to mimic the traditional values of their parents and grandparents regarding food waste (statement 8, array position -4, z-score -1.410). Sorter 2 said in a post-sort interview, “My mom always saved leftovers, so I feel like that’s something I’m supposed to do.” *Helpers* trust what they are told by authority figures (statement 20, array position -1, z-score -0.424; statement 22, array position -1, z-score -0.538) but do not let others influence their beliefs (statement 34, array position -3, z-score -0.821).

They appreciate the values their parents instilled in them, and do not mind being considered an “old soul” (sorter 2, post sort interview). Because of those values, *Helpers* feel aware of their food waste behaviors (statement 16, array position -2, z-score -0.753) but tend to feel responsible for mitigating shortcomings of other sectors when they can, recognizing they will not be the defining piece of food waste reduction (statement 5, array position 0, z-score -0.398; statement 25, array position 0, z-score 0.060).

### ***Cost-Conscious***

To the *Helpers*, wasted food is wasted money (statement 36, array position 3, z-score 0.958). To this perspective, it makes no sense to purchase food, let it go to waste, then purchase more to replace what was wasted (statement 1, array position 4, z-score 1.859; statement 28, array position -5, z-score -2.277). *Helpers* are not influenced to buy more than they can use by marketing (statement 3, array position -2, z-score -0.819; statement 4, array position 2, z-score 0.893) but instead tend to focus on how to get the most out of the food they buy (statement 1, array position 4, z-score 1.859; statement 18, array position 5, z-score 2.287). *Helpers* recognize the usability of leftovers when they go out to eat (statement 26, array position 0, z-score -0.000) and those leftovers are likely to get eaten, not thrown away because as sorter 18 said during sorting, “Why wouldn’t you eat something you paid for?” Growing up, food might have been treated as a precious resource in their home (statement 28, array position -5, z-score -2.277;

statement 36, array position 3, z-score 0.958) and *Helpers* are concerned children are not being taught to value food (statement 27, array position 2, z-score 0.442).

### ***Empathic***

*Helpers* are interested in the personal benefits they may gain from reduced food waste behaviors, while also remaining cognizant of the affect they might have on those less fortunate than themselves (statement 9, array position -3, z-score -1.406; statement 10, array position 3, z-score 1.429). Sorters in this group describe being very aware there were people who did not have enough to eat growing up (sorter 2, post sort interview; sorter 18, field notes) and have kept that awareness into adulthood (statement 16, array position -2, z-score -0.753).

While no sorter reported being food-insecure at any point in their life, three mentioned during sorting being close to someone who has experienced food insecurity or hunger. *Helpers* do not like the thought of someone going hungry when others waste so much food (statement 10, array position 3, z-score 1.429).

Because of their experience with agriculture in some way, *Helpers* do not think producers should be responsible for reducing food waste on a large scale (statement 6, array position -4, z-score -1.456; statement 13, array position -1, z-score -0.506). As a consumer themselves, they believe the scale on which consumers waste food accurately corresponds to the responsibility of that section of the FSC to change the way it behaves (statement 35, array position 1, z-score 0.392). They believe society is at least partly at fault for the lack of concern about food waste and the issues it might cause (statement 12, array position 3, z-score 0.963). They see food waste as an issue primarily out of consumers' hands (statement 23, array position 2, z-score 0.750; statement 29, array position 1, z-score 0.321), at least for the time being. Sorter 1 said in a post sort interview, "Until reform is enforceable, I don't think we'll see much improvement."

### **Consensus Statements**

Consensus statements are those statements sorted similarly across factors. Though statements may be sorted similarly, this does not mean all perspectives have a common

interpretation of said statements (Brown, 1980). Table 5 shows the consensus statements as well as array positions and z-scores for each perspective.

**Table 5**

*Consensus Statements*

No.	Statement	Reformers		Individualists		Helpers	
		Array	z-score	Array	z-score	Array	z-score
7	I always have the best intentions when I take things home from the fresh section of the grocery store, even if I don't end up using it all.	4	1.307	4	1.509	4	1.909
8	I'm scared to death of food borne illnesses, so I probably toss more than necessary.	-3	-1.057	-4	-1.648	-4	-1.410
9	Donating food is too difficult and inaccessible for me right now.	-2	-0.816	-2	-0.617	-3	-1.406
12	We live in a society where more = better, especially when it comes to food.	1	0.724	2	0.960	3	0.963
14	Deciding if composting is worth the effort is so hard to navigate. I never know what's allowed and what's not.	-1	-0.671	-3	-1.063	-3	-0.842
21	Campaigns that shame people for food waste are just another example of government overreach.	0	0.083	2	0.780	0	0.056

Statement 7 is related to intentions regarding fresh food and all three factors sorted it high, in array position 4. The *Reformers'* best intentions stem from their sense of determination. They will take the food home and put it to good use, and if some gets wasted, they did their best to prevent it (statement 4, array position 5, z-score 1.357; statement 26, array position 3, z-score 1.224). *Individualists* can logically justify the reason the food went to waste—they had good intentions, after all (statement 28, array position -3, z-score 1.098; statement 33, array position 4, z-score 1.902). For the *Helpers*, the amount of food they perceive as going to waste in this

situation is small, as they likely used most of it before the food was no longer usable (statement 5, array position 0, z-score -0.398; statement 36, array position 3, z-score 0.958).

On the other side of the array, in array positions -3 and -4, statement 8 was sorted similarly across all three perspectives. *Reformers* are not worried about food borne illnesses, because they know how to store food safely (statement 8, array position -3, z-score -1.057). *Individualists* are not particularly concerned about food waste to begin with and are willing to let food go that might be toeing the line between good and bad (statement 30, array position 3, z-score 1.497). Oppositely, *Helpers* will have used or preserved perishables before they get to the point that foodborne illnesses might become a concern (statement 1, array position 4, z-score 1.859).

### **Summary**

This chapter presented data collected from 17 sorters who loaded significantly on one of three factors. The study identified three perspectives of consumers related to food waste: the *Reformers*, the *Individualists*, and the *Helpers*. Additionally, this chapter identified and analyzed consensus statements among the three factors.

## CHAPTER V

### SUMMARY, CONCLUSIONS, AND IMPLICATIONS

The purpose of this study was to explore consumer perceptions regarding food waste across the food supply chain in the United States. This chapter includes a summary of the study and a discussion of findings and potential ideas for future research and practical applications.

#### **Summary of the Study**

In the United States, approximately 40% of all food produced is never eaten (“Food Waste FAQs,” n.d.). The issue of food waste has gained attention in the United States over the last decade (Collart & Interis, 2018; Neff et al., 2015). Food waste occurs at all stages of the food supply chain (Vogliano & Brown, 2016), with approximately 30% attributed to consumers (Schneeman & Oria, 2020). As Block et al. (2016) states, “much of consumer food waste occurs for reasons that consumers may not be consciously aware of and that may not necessarily align with their explicit attitudes” (p.294). Much research exists regarding consumer beliefs about food waste in the latter half of the food supply chain, the retail and consumer sectors, but there is a gap in literature regarding consumer beliefs regarding the production, processing, and distribution sectors (Conrad & Blackstone, 2021; Roodhuyzen et al., 2017)

This study used Q methodology to explore consumer perceptions of food waste in the United States across the food supply chain. The study was developed around the sectors of food supply chain: production, processing, distribution, retail, and consumer. A 36-statement Q set was derived from a larger concourse which described various attitudes, opinions, and beliefs regarding food waste across the food supply chain. A form board was developed to record sorts and a demographic questionnaire accompanied the form board. The P set for this study was adult consumers in the United States. Institutional Review Board approval was given for this study, and the study followed the requirements of Q methodology.

Twenty participants performed a Q sort activity according to the condition of instruction “What are your thoughts about food waste?” Each sort was entered into PQ Method software for data analysis. Factor analysis resulted in a three-factor solution, with 17 of the 20 sorts reaching significance on only one factor. Factor arrays, field notes, demographic information, and post sort interview data was used to interpret the factors.

### **Summary of Findings**

This study uncovered three distinct perspectives of American consumers toward food waste across the food supply chain. Those three perspectives were named the *Reformers*, the *Individualists*, and the *Helpers*.

The *Reformers* perspective, defined by nine sorts, is supported by three themes: idealistic, deliberate, and determined. Members of the *Reformers* perspective believe the issue of food waste is solvable and all sectors of the FSC have a part to play. After sorting, sorter 6 said, “It doesn’t seem that hard. If everyone would step up and take initiative, we wouldn’t even be having this conversation.” *Reformers* feel guilty when they do not perceive themselves as “doing enough” (sorter 4, post sort interview) and find themselves attempting to pick up the slack created by other sectors of the FSC to compensate. *Reformers* aren’t radical. Rather, they lead by example, implementing changes to their own behavior in order to improve the food waste issue as a whole.

The *Individualists* perspective, defined by three sorts, is supported by three themes: pragmatic, suspicious, and independent. Those of the *Individualists* perspective do not spend much time worrying about food waste. They have more important things on their minds, and since they do not feel affected by food waste, they tend to let it go. *Individualists* are driven by convenience, and, as sorter 16 said during sorting, “If I have to go out of my way to do this, it’s not going to happen.” *Individualists* do not want to be controlled, and feel the same about other sectors of the FSC. It should be up to the individual or business owner to decide what is best for them.

The *Helpers* perspective, defined by five sorts, is supported by three themes: traditional, cost-conscious, and empathetic. Members of the *Helpers* perspective are concerned about being without, so they tend to use food in a way that maximizes their return and minimizes the risk of wasting their resources, because “Why wouldn’t you eat something you paid for?” (sorter 18, field notes). *Helpers* do not necessarily blame the other sectors of the FSC for the food waste issue but do recognize that consumers cannot solve the problem on their own. *Helpers* are primarily concerned about how reducing food waste can help them personally, but keep in mind reducing food waste would benefit people on a large scale, especially those who might be food-insecure.

These findings show a diverse set of beliefs, opinions, and motivations among consumers, and begins to explore the nuances behind the various consumer perspectives regarding food waste in the United States.

## **Conclusions**

The following discussion highlights the similarities and differences between beliefs, opinions, and motivations held by each perspective regarding food waste.

### **Cost of Food Waste**

Neff et al. (2015) and Quested et al. (2013) found saving money was the greatest motivator of consumers when it came to reducing food waste. This research found while saving



money is a major concern for the *Helpers*, the *Reformers* are more concerned about doing what is right, and the *Individualists* do not consider food valuable enough to worry about. The findings of this study show that while the majority of participants care about saving money at least on some scale, others do not. This falls in line with the claim made by Zamri et al. (2020) that people's motivations affect their beliefs and therefore their behaviors.

### **Moral Obligations**

Another finding across perspectives was the participants' concern for other people, or lack thereof. While *Reformers* tend to think about the big picture, that is, humanity as a whole, *Helpers* are more focused on those less fortunate than themselves. The exception is the *Individualists*. They are not worried about fixing the issue of food waste for themselves, as they do not feel affected by it, and certainly will not alter their behavior for other people. This is not to say they do not care about other people, but that they do not tend to prioritize others in the context of food waste. *Individualists* believe everyone is responsible for the consequences of their actions, and therefore feels no responsibility to change for the benefit of others.

Additionally, guilt is a concern of the *Reformers* and the *Helpers*. For the *Reformers*, though, their guilt stems from a desire to be a change-maker. *Helpers*, however, feel guilty when they waste food because they think about others who might not have enough.

### **Across the Food Supply Chain**

Consistent with other research in this area (Conrad & Blackstone, 2021; Quested et al., 2013), this study found the *Helpers* and *Reformers* most identified with statements related to the retail and consumer segments of the food supply chain. This is likely because these are the areas they are most familiar with and perceive themselves to be most knowledgeable about (Neff et al., 2015). However, this study also found sorters in each perspective to have strong opinions about regulation of producer food waste (*Helpers*, statement 6, array position -4, z-score -1.456) and food packaging options (*Reformers*, statement 4, array position 5, z-score 1.357) as well as food

labeling (*Individualists*, statement 20, array position 5, z-score 2.288), the latter both dealing in the processing sector of the FSC.

Specifically, the *Reformers*' belief that all sectors of the FSC are responsible for working together to incite change illustrates the importance of revealing consumer beliefs as described by Parfitt et al. (2010) and La Babera et al. (2016). The findings of this research suggest consumers do consider other stages of the FSC important players in the issue of food waste, underpinning the need for further research in this area.

### **Implications for Future Research**

This study identified three different perspectives relative to food waste across the FSC. The lack of previous literature, as well as the findings of this study, demonstrates a need to explore further into consumer beliefs about each stage of the FSC. This research found consumers to hold varying beliefs about the differing sectors of the FSC and their role in contributing to the food waste issue. Understanding consumer perspectives is paramount to learning what might compel one to reduce their personal food waste or spend more energy helping to find a solution (Collart and Interis, 2018).

Additional studies should be completed to broaden the depth of understanding about perspectives regarding food waste across the FSC. Due to the relationships of various sectors of the FSC and the role food waste plays in each, similar Q studies could be conducted at each stage of the FSC, allowing for more intensive exploration of the views and perspectives of stakeholders all along the FSC. Additionally, explorations of perspectives toward food waste along generational lines should be conducted. It has been found that discrepancies exist among beliefs across generations (Zhang et al., 2020), but those discrepancies have not been thoroughly explored.

### **Implications for Future Practice**

This study supports the idea consumers have opinions about food waste across the food supply chain. The differences among the perspectives in this study make clear that consumers are

considering more than just money or the environment when it comes to food waste. In the future, food waste throughout the various stages of the food supply chain should be more frequently addressed.

Graham-Rowe et al. (2014) suggests that for food waste reduction initiatives to be successful, it is necessary to “target the potential ‘waste concerns’ some people might have by highlighting the benefits of reducing household food waste” (p. 21). The results of this study align with the literature to posit it may be more impactful if those messages are targeted to address the various perspectives held by consumers about food waste (Graham-Rowe et al., 2014; Zamri et al., 2020).

Future food waste reduction campaigns should consider the nuances among their target markets as messaging is developed. Consumers make food waste decisions based on their beliefs. As more information about consumer beliefs about food waste across the FSC becomes available, more accurate message targeting may become possible. An effort should be made to be more inclusive when creating food waste reduction campaigns, keeping in mind that not everyone may feel the same way about an issue.

## REFERENCES

- Alamar, M. del, Falagán, N., Aktas, E., & Terry, L. A. (2017). Minimising food waste: A call for multidisciplinary research. *Journal of the Science of Food and Agriculture*, 98(1), 8–11.  
<https://doi.org/10.1002/jsfa.8708>
- Beausang, C., Hall, C., & Toma, L. (2017). Food waste and losses in primary production: Qualitative insights from horticulture. *Resources, Conservation and Recycling*, 126, 177–185.  
<https://doi.org/10.1016/j.resconrec.2017.07.042>
- Block, L. G., Keller, P. A., Vallen, B., Williamson, S., Birau, M. M., Grinstein, A., ... Tangari, A. H. (2016). The Squander Sequence: Understanding Food Waste at Each Stage of the Consumer Decision-Making Process. *Journal of Public Policy & Marketing*, 35(2), 292–304.  
<https://doi.org/10.1509/jppm.15.132>
- Brancoli, P., Rousta, K., & Bolton, K. (2017). Life cycle assessment of supermarket food waste. *Resources, Conservation and Recycling*, 118, 39–46.  
<https://doi.org/10.1016/j.resconrec.2016.11.024>
- Brown, S.R. (1980). *Political subjectivity: Applications of Q methodology in political science*. New Haven: Yale University Press.
- Brown, S.R. (1993). A primer on Q methodology. *Operant Subjectivity*, 18(3-4), 91–138. Retrieved from [https://www.researchgate.net/publication/244998835\\_A\\_Primer\\_on\\_Q\\_Methodology](https://www.researchgate.net/publication/244998835_A_Primer_on_Q_Methodology)
- Brown, S.R. (1996). Q methodology and qualitative research. *Qualitative Health Research*, 6(4), 561-567. <https://doi.org/10.1177/104973239600600408>

- Buzby, J. C., Farah-Wells, H., & Hyman, J. (2014). The Estimated Amount, Value, and Calories of Postharvest Food Losses at the Retail and Consumer Levels in the United States. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2501659>
- Chaboud, G., & Daviron, B. (2017). Food losses and waste: Navigating the inconsistencies. *Global Food Security*, *12*, 1–7. <https://doi.org/10.1016/j.gfs.2016.11.004>
- Coleman-Jensen, A., Rabbitt, M., Gregory, C.A., & Singh, A. 2019. *Household Food Security in the United States in 2018*, Washington, DC: U.S. Department of Agriculture, Economic Research Service
- Collart, A., & Interis, M. (2018). Consumer Imperfect Information in the Market for Expired and Nearly Expired Foods and Implications for Reducing Food Waste. *Sustainability*, *10*(11), 3835–3852. <https://doi.org/10.3390/su10113835>
- Comber, R., & Thieme, A. (2012). Designing beyond habit: opening space for improved recycling and food waste behaviors through processes of persuasion, social influence and aversive affect. *Personal and Ubiquitous Computing*, *17*(6), 1197–1210. <https://doi.org/10.1007/s00779-012-0587-1>
- Confused by date labels on packaged foods?* (May 23, 2019). U.S. Food and Drug Administration. <https://www.fda.gov/consumers/consumer-updates/confused-date-labels-packaged-foods>
- Conrad, Z., & Blackstone, N. T. (2021). Identifying the links between consumer food waste, nutrition, and environmental sustainability: a narrative review. *Nutrition Reviews*, *79*(3), 301–314. <https://doi.org/10.1093/nutrit/nuaa035>
- Conrad, Z., Niles, M. T., Neher, D. A., Roy, E. D., Tichenor, N. E., & Jahns, L. (2018). Relationship between food waste, diet quality, and environmental sustainability. *PLOS ONE*, *13*(4). <https://doi.org/10.1371/journal.pone.0195405>
- de Moraes, C. C., de Oliveira Costa, F. H., Roberta Pereira, C., da Silva, A. L., & Delai, I. (2020). Retail food waste: mapping causes and reduction practices. *Journal of Cleaner Production*, *256*(120-124). <https://doi.org/10.1016/j.jclepro.2020.120124>

- Derqui, B., Fernandez, V., & Fayos, T. (2018). Towards more sustainable food systems. Addressing food waste at school canteens. *Appetite*, 129(1–11). <https://doi.org/10.1016/j.appet.2018.06.022>
- Ellison, B., & Lusk, J. L. (2018). Examining Household Food Waste Decisions: A Vignette Approach. *Applied Economic Perspectives and Policy*, 40(4), 613–631. <https://doi.org/10.1093/aep/px059>
- Environmental Protection Agency. (2017, June 19). *America's Food Waste Problem*. EPA. <https://www.epa.gov/sciencematters/americas-food-waste-problem>.
- Environmental Protection Agency. (2021, January 28). *National Overview: Facts and Figures on Materials, Wastes and Recycling*. EPA. <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/national-overview-facts-and-figures-materials>.
- FAO. (2013). *Food Wastage Footprint Impacts on Natural Resources*. *Food Availability (Per Capita) Data System*. (n.d.) USDA ERS - Food Availability (Per Capita) Data System. <https://www.ers.usda.gov/data-products/food-availability-per-capita-data-system/>.
- Food Waste FAQs*. (n.d.). Retrieved October 3, 2020, from <https://www.usda.gov/foodwaste/faqs>
- Garnett, T. (2013). Food sustainability: problems, perspectives and solutions. *Proceedings of the Nutrition Society*, 72(1), 29–39. <https://doi.org/10.1017/s0029665112002947>
- Göbel, C., Langen, N., Blumenthal, A., Teitscheid, P., & Ritter, G. (2015). Cutting Food Waste through Cooperation along the Food Supply Chain. *Sustainability*, 7(2), 1429–1445. <https://doi.org/10.3390/su7021429>
- Govindan, K. (2018). Sustainable consumption and production in the food supply chain: A conceptual framework. *International Journal of Production Economics*, 195, 419–431. <https://doi.org/10.1016/j.ijpe.2017.03.003>
- Graham-Rowe, E., Jessop, D. C., & Sparks, P. (2014). Identifying motivations and barriers to minimising household food waste. *Resources, Conservation and Recycling*, 84, 15–23. <https://doi.org/10.1016/j.resconrec.2013.12.005>

- Gunders, D., & Bloom, J. (2017). *Wasted: How America Is Losing Up to 40 Percent of Its Food From Farm to Fork to Landfill*. Retrieved from <https://www.nrdc.org/sites/default/files/wasted-2017-report.pdf>
- Hebrok, M., & Boks, C. (2017). Household food waste: Drivers and potential intervention points for design – An extensive review. *Journal of Cleaner Production*, *151*, 380–392.  
<https://doi.org/10.1016/j.jclepro.2017.03.069>
- International Food Information Council Foundation. (2019). A Survey of Consumer Behaviors and Perceptions of Food Waste. Food Insight. <https://foodinsight.org/wp-content/uploads/2019/09/IFIC-EPAL-Food-Waste-Deck-Final-9.16.19.pdf>
- Kim, J., Rundle-Thiele, S., Knox, K., Burke, K., & Bogomolova, S. (2020). Consumer perspectives on household food waste reduction campaigns. *Journal of Cleaner Production*, *243*(118608–118618). <https://doi.org/10.1016/j.jclepro.2019.118608>
- Kymäläinen, T., Seisto, A., & Malila, R. (2021). Generation Z Food Waste, Diet and Consumption Habits: A Finnish Social Design Study with Future Consumers. *Sustainability*, *13*(4), 2124–2138.  
<https://doi.org/10.3390/su13042124>
- La Babera, F., Rivero, R., & Verneau, F. (2016). Understanding beliefs underpinning food waste in the framework of the theory of planned behavior. *Quality – Access to Success*, *17*, 130-137.  
Retrieved from  
[https://www.researchgate.net/publication/300042730\\_Understanding\\_Beliefs\\_Underpinning\\_Food\\_Waste\\_in\\_the\\_Framework\\_of\\_the\\_Theory\\_of\\_Planned\\_Behavior](https://www.researchgate.net/publication/300042730_Understanding_Beliefs_Underpinning_Food_Waste_in_the_Framework_of_the_Theory_of_Planned_Behavior)
- Lemos, L. (2019, August 29). How governments around the world are encouraging food waste initiatives. <https://blog.winnowsolutions.com/how-governments-around-the-world-are-encouraging-food-waste-initiatives>.
- McKeown, B., & Thomas, D.B. (2013). *Q methodology*. London: SAGE Publications Ltd.

- Neff, R. A., Spiker, M. L., & Truant, P. L. (2015). Wasted Food: U.S. Consumers' Reported Awareness, Attitudes, and Behaviors. *PLOS ONE*, *10*(6), e0127881.  
<https://doi.org/10.1371/journal.pone.0127881>
- Nesheim, M. C., Oria, M., & Yih, P. T. (Eds.). (2015). *Framework for assessing effects of the food system*. National Academies Press.
- Newsome, R., Balestrini, C. G., Baum, M. D., Corby, J., Fisher, W., Goodburn, K., ... Yiannas, F. (2014). Applications and Perceptions of Date Labeling of Food. *Comprehensive Reviews in Food Science and Food Safety*, *13*(4), 745–769. <https://doi.org/10.1111/1541-4337.12086>
- Nikolaus, C. J., Nickols-Richardson, S. M., & Ellison, B. (2018). Wasted food: A qualitative study of U.S. young adults' perceptions, beliefs and behaviors. *Appetite*, *130*(70–78).  
<https://doi.org/10.1016/j.appet.2018.07.026>
- Parfitt, J., Barthel, M., & Macnaughton, S. (2010). Food waste within food supply chains: quantification and potential for change to 2050. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *365*(1554), 3065–3081. <https://doi.org/10.1098/rstb.2010.0126>
- Pearson, D., & Perera, A. (2018). Reducing Food Waste: A Practitioner Guide Identifying Requirements for an Integrated Social Marketing Communication Campaign. *Social Marketing Quarterly*, *24*(1), 45–57. <https://doi.org/10.1177/1524500417750830>
- Qi, D., & Roe, B. E. (2016). Household food Waste: Multivariate regression and principal components analyses of awareness and attitudes among U.S. consumers. *PLOS ONE*, *11*(7).  
<https://doi.org/10.1371/journal.pone.0159250>
- Quested, T. E., Marsh, E., Stunell, D., & Parry, A. D. (2013). Spaghetti soup: The complex world of food waste behaviours. *Resources, Conservation and Recycling*, *79*, 43–51.  
<https://doi.org/10.1016/j.resconrec.2013.04.011>
- ReFED. 2016. *A roadmap to reduce U.S. food waste by 20 percent*. Rockefeller Foundation.
- Roe, B. E., Bender, K., & Qi, D. (2020). The Impact of COVID-19 on Consumer Food Waste. *Applied Economic Perspectives and Policy*, *43*(1), 401–411. <https://doi.org/10.1002/aep.13079>



- Rogers, E. M. (1995). *Diffusion of Innovations, 4th Edition*. Free Press.
- Rogers, E. M., Singhal, A., & Quinlan, M. M. (2019). Diffusion of innovations. *An Integrated Approach to Communication Theory and Research*, 415-434.  
doi:10.4324/9780203710753-35
- Roodhuyzen, D. M. A., Luning, P. A., Fogliano, V., & Steenbekkers, L. P. A. (2017). Putting together the puzzle of consumer food waste: Towards an integral perspective. *Trends in Food Science & Technology*, 68, 37–50. <https://doi.org/10.1016/j.tifs.2017.07.009>
- Schneeman, B., & Oria, M. (2020). *A National Strategy to Reduce Food Waste at the Consumer Level*. National Academies Press.
- Schultz, J., & Horton, M. (2020, July 8). Fighting Food Waste.  
<https://www.ncsl.org/research/environment-and-natural-resources/fighting-food-waste.aspx>.
- Stephenson, W. (1967). *The play theory of mass communication*. Chicago: University of Chicago Press.
- Stephenson, W. (1986a). Protoconcurus: The concourse theory of communication. *Operant Subjectivity*, 9(2), 37-58. Retrieved from <http://www.operantsubjectivity.org/pub/309/>
- Su, C.H., Tsai, C.H., Chen, M.H., & Lv, W. Q. (2019). U.S. Sustainable Food Market Generation Z Consumer Segments. *Sustainability*, 11(13), 3607–3621. <https://doi.org/10.3390/su11133607>
- Thomas, D., & Baas, L. (1992). The issue of generalization in Q methodology: ‘Reliable schematics’ revisited. *Operant Subjectivity*, 16(1), 18-36.
- Tucker, C. A., & Farrelly, T. (2015). Household food waste: the implications of consumer choice in food from purchase to disposal. *Local Environment*, 21(6), 682–706.  
<https://doi.org/10.1080/13549839.2015.1015972>
- U.S. Department of Agriculture. (n.d.). Grades and Standards. Grades and Standards | USDA Agricultural Marketing Service. <https://www.ams.usda.gov/grades-standards>.

US EPA. (February 19 2017). Food Recovery Hierarchy Sustainable Management of Food US EPA.

[www.epa.gov/sustainable-management-food/food-recovery-hierarchy](http://www.epa.gov/sustainable-management-food/food-recovery-hierarchy).

Van Bommel, A., & Parizeau, K. (2019). Is it food or is it waste? The materiality and relational agency of food waste across the value chain. *Journal of Cultural Economy*, 13(2), 207–220.

<https://doi.org/10.1080/17530350.2019.1684339>

Vogliano, C., & Brown, K. (2016). The State of America's Wasted Food. The Academy of Nutrition and Dietetics. Retrieved from <https://eatrightfoundation.org/wp-content/uploads/2016/09/The-State-of-Americas-Food-Waste-Report.pdf>

Watts, S., & Stenner, P. (2012). *Doing Q methodology: Theory, method and interpretation*. Los Angeles: SAGE Publications Ltd.

Wiedmer, T. (2015). Generations do differ: Best practices in leading traditionalists, boomers, and generations X, Y, and Z. *Delta Kappa Gamma Bulletin, Austin*, 82(1), 51-58. Retrieved from <https://search.proquest.com/docview/1770514324/abstract/AB267660EB274E44PQ/1?accountid=4117>

*Why should we care about food waste?* (n.d.). United States Department of Agriculture. Retrieved from <https://www.usda.gov/foodlossandwaste/why>

Xue, L., Liu, G., Parfitt, J., Liu, X., Van Herpen, E., Stenmarck, Å., ... Cheng, S. (2017). Missing Food, Missing Data? A Critical Review of Global Food Losses and Food Waste Data. *Environmental Science & Technology*, 51, 6618–6633.

<https://doi.org/10.1021/acs.est.7b00401.s001>

Yetkin Özbük, R. M., & Coşkun, A. (2020). Factors affecting food waste at the downstream entities of the supply chain: A critical review. *Journal of Cleaner Production*, 244, 118628.

<https://doi.org/10.1016/j.jclepro.2019.118628>

Yu, Y., & Jaenicke, E. C. (2020). Estimating Food Waste as Household Production Inefficiency. *American Journal of Agricultural Economics*, 102(2), 525–547.

<https://doi.org/10.1002/ajae.12036>

- Zamri, G. B., Azizal, N. K., Nakamura, S., Okada, K., Nordin, N. H., Othman, N. Á., ... Hara, H. (2020). Delivery, impact and approach of household food waste reduction campaigns. *Journal of Cleaner Production*, 246, 118969–118985. <https://doi.org/10.1016/j.jclepro.2019.118969>
- Zhang, J., Ye, H., Bhatt, S., Jeong, H., Deutsch, J., Ayaz, H., & Suri, R. (2020). Addressing food waste: How to position upcycled foods to different generations. *Journal of Consumer Behaviour*, 20(2), 242–250. <https://doi.org/10.1002/cb.1844>
- Zhong, R., Xu, X., & Wang, L. (2017). Food supply chain management: systems, implementations, and future research. *Industrial Management & Data Systems*, 117(9), 2085–2114. <https://doi.org/10.1108/imds-09-2016-0391>

## APPENDICES

### Appendix A

### IRB Approval



#### Oklahoma State University Institutional Review Board

Date: 11/10/2020  
Application Number: IRB-20-491  
Proposal Title: Consumer perceptions of food waste across the food cycle: A Q methodology study

Principal Investigator: Peyton Haley  
Co-Investigator(s):  
Faculty Adviser: Angel Riggs  
Project Coordinator:  
Research Assistant(s):

Processed as: Exempt  
Exempt Category:

#### Status Recommended by Reviewer(s): Approved

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in 45CFR46.

**This study meets criteria in the Revised Common Rule, as well as, one or more of the circumstances for which continuing review is not required. As Principal Investigator of this research, you will be required to submit a status report to the IRB triennially.**

The final versions of any recruitment, consent and assent documents bearing the IRB approval stamp are available for download from IRBManager. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be approved by the IRB. Protocol modifications requiring approval may include changes to the title, PI, adviser, other research personnel, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms.
2. Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.
3. Report any unanticipated and/or adverse events to the IRB Office promptly.
4. Notify the IRB office when your research project is complete or when you are no longer affiliated with Oklahoma State University.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact the IRB Office at 405-744-3377 or irb@okstate.edu.

Sincerely,  
Oklahoma State University IRB

## Appendix B

### Participant Information Form



#### Agricultural Education, Communications and Leadership

### **PARTICIPANT INFORMATION FORM**

Consumer perceptions of food waste across the food cycle:  
A Q methodology study

#### **Background Information**

You are invited to be in a research study regarding consumer perceptions of food waste. We ask that you read this form and ask any questions you may have before agreeing to be in the study. Your participation in this research is voluntary. There is no penalty for refusal to participate, and you are free to withdraw your consent and participation in this project at any time. If you choose to provide contact information for a follow up interview and are contacted, you can skip any questions that make you uncomfortable and can stop the interview at any time.

**This study is being conducted by:** Peyton Haley, Department of Agricultural Education, Communications and Leadership, Oklahoma State University, under the direction of Dr. Angel Riggs, Department of Agricultural Education, Communications, and Leadership, Oklahoma State University.

#### **Procedures**

**You may elect to participate in this study either in person or through a Zoom meeting with the researcher.**

Please note, if you do elect to participate through Zoom, you will still perform a hard-copy Q-sort. There is no option for online data collection.

**If you agree to be in this study, we would ask you to do the following things:** You will be asked to complete a Q-sort, which involves reading several statements and sorting them into categories based on the extent to which the statements reflect your opinions. You will then be asked to record your results on a Record Sheet and to complete a short survey that has demographic questions about you. The session should last about 30 minutes. If you choose to provide a first name (or code name) and phone number, you may be called for a follow up interview regarding study results from your perspective. The call will last about ten minutes.

**Participation in the study involves the following time commitment:** 30 minutes for initial Q-sort, and a potential 10-minute follow up interview

#### **Confidentiality**

The information you give in the study will be stored anonymously. This means that your name will not be collected or linked to the data in any way, unless you voluntarily provide your name for a potential follow up interview. This information will be stored in a locked file cabinet in a locked office and will be kept until publication of the results of this study. Information identifying you as a participant will not be published. Only the researchers will know that you have participated in the study. The researchers will not be able to remove your data from the dataset once your participation is complete.

#### **Contacts and Questions**

The Institutional Review Board (IRB) for the protection of human research participants at Oklahoma State University has reviewed and approved this study. If you have questions about the research study itself, please contact the Principal Investigator at 580-370-6322, peyton.haley@okstate.edu. If you have questions about your rights as a research volunteer or would simply like to speak with someone other than the research team about concerns regarding this study, please contact the IRB at (405) 744-3377 or [irb@okstate.edu](mailto:irb@okstate.edu). All reports or correspondence will be kept confidential.

#### **COVID-19 Risk Statement**

Researcher will wear a mask and maintain 6 feet of distance according to CDC guidelines and participants will be encouraged to do the same. Researchers and participants will have hand sanitizer containing at least 60% alcohol available during in-person data collection. When feasible, surfaces will be sanitized using approved disinfectants. Researcher will provide disposable masks and disinfectant for use as needed. A Zoom meeting option for the researcher to provide instruction will be available for participants who elect to avoid in-person interactions.

#### **Statement of Consent**

Your willingness to continue with the Q sorting process indicates your agreement to participate in this research.



Approved: 11/04/2020  
Protocol #: IRB-20-491

Appendix C  
Recruitment Flyer

**Research Study  
Food Waste  
2020**

Our research team is investigating the ideas about how consumers think about food waste. We would like to invite you to participate in our study which will require about 30 minutes of your time. You will be asked to read several statements and sort them according to how they reflect your opinions. Zoom participation is available for those who are not comfortable with in-person data collection.

**TO SIGN UP FOR THE STUDY, CONTACT**

**Peyton Haley:** [peyton.haley@okstate.edu](mailto:peyton.haley@okstate.edu); 580-370-6322  
**Dr. Angel Riggs:** [angel.riggs@okstate.edu](mailto:angel.riggs@okstate.edu); 405-744-5133

Consistent with previous research in this area, we will request your permission to find out descriptors of demographic information (e.g. age, gender, shopping habits, etc.). The information you submit can only be accessed by our research team and will remain private. All data collected in this study will remain strictly confidential and only group results will be reported. Risks associated with participating in this study are minimal.

---

**Questions?**

Peyton Haley: [peyton.haley@okstate.edu](mailto:peyton.haley@okstate.edu) 580-370-6322  
Dr. Angel Riggs: [angel.riggs@okstate.edu](mailto:angel.riggs@okstate.edu) 405-744-5133

## Appendix D

### Q Set

Q statements with array positions and z-score for each factor

No.	Statement	Factor 1		Factor 2		Factor 3	
		Array	z-score	Array	z-score	Array	z-score
1	Resealable packaging is the key to keeping food fresher, longer.	0	0.479	-2	-0.906	4	1.859
2	If I'm expected to worry about food waste, I need more time in a day.	-1	-0.810	-1	-0.381	0	-0.033
3	Food marketing in the grocery store inspires me to create magazine-worthy meals, and I often buy way more than I need.	-3	-1.167	2	0.688	-2	-0.819
4	Smaller packaging options allow me to buy only what I need and can use responsibly.	5	1.357	1	0.266	2	0.893
5	It would be so much easier to prevent food waste at restaurants if they didn't serve us double what they need.	4	1.319	0	-0.248	0	-0.398
6	If the government did more to regulate food waste by producers, it would be easier for me as a consumer.	0	-0.059	-3	-1.376	-4	-1.456
7	I always have the best intentions when I take things home from the fresh section of the grocery store, even if I don't end up using it all.	4	1.307	4	1.509	4	1.909
8	I'm scared to death of food borne illnesses, so I probably toss more than necessary.	-3	-1.057	-4	-1.648	-4	-1.410
9	Donating food is too difficult and inaccessible for me right now.	-2	-0.816	-2	-0.617	-3	-1.406
10	The thought of community gardens and food pantries make me excited.	3	1.157	-4	-1.594	3	1.429

11	Grocery stores are unaware of how willing consumers are to buy imperfect produce.	2	0.780	-1	-0.307	0	0.106
12	We live in a society where more = better, especially when it comes to food.	1	0.724	2	0.960	3	0.963
13	Buying locally-produced food discourages industrial farming and reduces food waste caused by production.	1	0.680	0	-0.272	-1	-0.506
14	Deciding if composting is worth the effort is so hard to navigate. I never know what's allowed and what's not.	-1	-0.671	-3	-1.063	-3	-0.842
15	It's not my business what grocery stores and restaurants do with unsold food.	-2	-0.839	2	0.653	1	0.393
16	If I knew what it was like to be hungry, I'd probably be a lot more aware of the food waste I create.	3	1.209	0	-0.272	-2	-0.753
17	Wasting food is an ethical issue.	1	0.508	0	-0.289	-1	-0.497
18	Food that can be repurposed should be. Who says I can't make a sandwich using a hamburger bun?	2	0.778	1	0.393	5	2.287
19	Food goes bad so quickly because it spends too much time in transit.	0	0.412	0	-0.030	-2	-0.643
20	Best by dates are purposefully confusing. They're just meant to make consumers throw away food and buy more.	1	0.530	5	2.288	-1	-0.424
21	Campaigns that shame people for food waste are just another example of government overreach.	0	0.083	2	0.780	0	0.056
22	I don't know who to trust when it comes to learning how to reduce food waste.	-1	-0.244	1	0.611	-1	-0.538



23	I'd rather see the expansion of food distribution and storage infrastructure than an increase in food waste.	1	0.671	-1	-0.537	2	0.750
24	Food I throw away is natural and biodegradable – so wasting it isn't really an environmental issue.	-4	-1.487	1	0.260	1	0.372
25	My actions as an individual won't affect global food waste reduction efforts.	-4	-1.681	-2	-1.028	0	0.060
26	I feel guilty if I have leftovers after eating in a restaurant and don't take them home.	3	1.224	1	0.573	0	-0.000
27	Kids in schools are being taught to throw away food without guilt when they're told to "dump" their trays.	-1	-0.279	-1	-0.416	2	0.442
28	Food is so cheap—that's why I don't worry about forgetting a carton of strawberries in the back of my fridge.	-3	-1.270	3	1.098	-5	-2.277
29	The issue of food waste is a symptom of a larger resource management problem.	2	0.848	-2	-0.573	1	0.321
30	Food waste doesn't affect me. Why should I care?	-5	-2.484	3	1.497	-2	-0.820
31	I'm not responsible for picking up the slack created by poor production practices.	-2	-0.975	3	1.051	-1	-0.400
32	Food waste reduction campaigns make an industry problem look like a consumer issue.	-1	-0.700	-1	-0.405	1	0.391
33	Worrying too much about germs leads to an increase in food waste.	0	0.141	4	1.902	2	0.536
34	I feel a lot of pressure to reduce food waste in my household.	0	0.214	-3	-1.057	-3	-0.821
35	Consumers are unfairly blamed for causing the majority of food waste.	-2	-0.854	0	0.145	1	0.392

36	Food is too valuable to simply throw away.	2	0.971	-5	-1.653	3	0.958
----	--	---	-------	----	--------	---	-------

## Appendix E

### Directions for Sorting

Attachment D

#### Researcher's Script: Directions for Sorting Q Statements

Thank you for agreeing to participate in this study. Please make sure you have the materials in front of you. You should have a Form Board and an envelope containing 36 cards, each with a statement printed on it describing ideas about food waste. You will need a pencil later.

Step 1: Please read through the statements and sort them into three (3) piles according to the question: **“What are your thoughts about food waste?”**

The pile on your right are those statements that are **most like** what you think about the question and the pile on your left are those statements that are **most unlike** what you think about the question. Put any cards that you don't have strong feelings about in a middle pile.

Step 2: Now that you have three piles of cards, start with the pile to your right, the “most like” pile and **select** the one (1) cards from this pile that is **most like** your response to the question and place them in the space at the far right of the Form Board in front of you in column 11.

Step 3: Next, from the pile to your left, the “most unlike” pile, **select** the one (1) card that is **most unlike** your response to the question and place it in the space at the far left of the Form Board in front of you in column 1.

Step 4: Now, go back to the “most like” pile on your right and select the two (2) cards from those remaining in your **most like** pile and place them into the two (2) open spaces in column 10. The order of the cards within the column – that is, the vertical positioning of the cards – does not matter.

Step 5: Now, go back to the “most unlike” pile on your right and select the two (2) cards from those remaining in your **most unlike** pile and place them into the two (2) open spaces in column 2.

Step 6: Working back and forth, continue placing cards onto the Form Board until all of the cards have been placed into all of the spaces.

Step 7: Once you have placed all the cards on the Form Board, feel free to rearrange the cards until the arrangement best represents your opinions.

Step 8: Record the number of the statement on the Record Sheet.

Finally, please complete the survey printed on the back of the Record Sheet and add any comments.

**Thank you for your participation!**

# Appendix F

## Record Sheet

What are your thoughts about food waste?

1 (-5) Most unlike Me	2 (-4)	3 (-3)	4 (-2)	5 (-1)	6 (0)	7 (1)	8 (2)	9 (3)	10 (4)	11 (5) Most Like Me

Appendix G  
Demographic Survey

**Demographic Survey**

1. With which gender do you most identify? \_\_\_\_\_
2. Please check the item that best describes your ethnicity. Check all that apply.  
 African American                       Asian American  
 Hispanic/Latino(a)                       American Indian  
 White                                       Other, please specify: \_\_\_\_\_
3. What is the highest level of education you have completed?  
 Did not finish high school                       Bachelor's degree  
 High school diploma/equivalent                       Graduate degree  
 Associate's degree
4. For whom do you purchase food? \_\_\_\_\_
5. Who does the food shopping in your household? \_\_\_\_\_
6. What is your experience with agricultural production? For example: "I grew up on a farm that produced soybeans and hogs." or "I have no previous experience."
7. Are you on any special diet? (e.g. vegetarian, low-sodium, low-fat, low-calorie, etc.)
8. What else would you like to say about the ideas on the statements you sorted?

A follow-up phone interview may be conducted to clarify results. If you would be willing to participate in a phone interview please write your first name (or a code name that you will know) and a telephone number at which you can be reached.

(CODE) NAME \_\_\_\_\_ PHONE \_\_\_\_\_

## Appendix H

### Post Sort Interview Script

#### **Post Sort Telephone Interview Script**

Someone at this number with a code name or first name of \_\_\_\_ recently participated in a research project sorting statements about shopping locally. May I talk to him/her?

Thank you for agreeing to participate in this study and for consenting to a follow up interview. This interview should only take about ten minutes, is this a good time for you?

One of the things that the aggregate results of the study has shown is that people who sorted like you \_\_\_\_\_.

What do you think of this?

(Repeat as necessary.)

Thank you again for your participation!

VITA

Peyton Elise Haley

Candidate for the Degree of

Master of Science

Thesis: CONSUMER PERCEPTIONS OF FOOD WASTE ACROSS THE FOOD SUPPLY CHAIN: A Q METHODOLOGY STUDY

Major Field: Agricultural Communications

Biographical:

Education:

Completed the requirements for the Master of Science in Agricultural Communications at Oklahoma State University, Stillwater, Oklahoma in May, 2021.

Completed the requirements for the Bachelor of Science in Agricultural Communications at Oklahoma State University, Stillwater, Oklahoma, 2019.

Completed the requirements for the Bachelor of Science in Animal Science at Oklahoma State University, Stillwater, Oklahoma, 2019.

Experience:

Graduate teaching assistant at Fire Protection Publications at Oklahoma State University Engineering Extension and graduate teaching assistant at the International Ground Source Heat Pump Association at Oklahoma State University Engineering Extension

Professional Memberships:

Agricultural Communicators of Tomorrow and the Oklahoma State University Agricultural Education, Communications, and Leadership Graduate Student Association