SPEAKING THEIR LANGUAGE: COMMUNICATING TO THE DIFFERENT PERSPECTIVES OF AGRICULTURE

A Thesis

by

MEGAN MARIE HOMEYER

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Chair of Committee,	Billy McKim
Co-Chair of Committee,	Holli Leggette
Committee Members,	Jeff Ripley
	Mark Troy
Head of Department,	Jack Elliot

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ABSTRACT

A communication gap exists between the general public and the agricultural industry. To begin bridging the communication gap, agricultural communicators need to understand the different types of audiences and perspectives of agriculture that exist. The overall purpose of this study was to begin to understand the public's perspectives of agriculture and develop better methods of understanding perspectives. Therefore, this study was split into two aims, and each aim was reported separately. The first aim was a mixed-methods study to develop agricultural personas and used three methods of data collection: qualitative interviews, Q sorts, and quantitative questionnaire. The second aim was a methodology study to develop Q sort syntax for SPSS® that reported results equivalent to PQMethod, a popular Q sort analysis software. The sample consisted of 13 purposively selected individuals from the Millennial generation in Central Texas and remained the same throughout the study. The participants were selected based on opinions and thoughts about agriculture.

The Q sort analysis produced four factors that were developed into agricultural personas by combing the data from all three methods. The four personas gave a basic understanding of agricultural perspectives and how individuals relate to each other in relation to their opinions and thoughts toward agriculture. Communicators and marketers can use these personas to better understand their target audience and tailor information to them. These personas are the foundation of agricultural personas and need to be researched further before they can be generalized to a larger audience.

The Q sort syntax developed for SPSS® was successful and produced results that were equivalent to PQMethod analysis with no statistical differences. Social science researchers interested in perspectives and types of people can use the syntax to analyze Q data in SPSS®.

DEDICATION

The past two and a half years have been a roller coaster and it feels surreal that I am about to submit my thesis. My research has been an extremely large part of my life since I started this project in the spring of 2014 and it is almost difficult to think about being done.

This thesis is dedicated to my loving parents, Craig and Rhonda Homeyer. They were the steady presence and solid rock that I needed during one of the most stressful times of my life, and never doubted that I would emerge successful. No matter how many times I called or came home on the verge of a breakdown, they were there to calm me down and set things straight for me. They are the reason that I have been able to pursue my dreams and accomplish my goals.

I would also like to dedicate this thesis to my grandma, Lottie Drgac. My fondest memories of her are sitting on her porch and talking about the cattle and weather. It was my love for her stories and way of talking that started my interest in listening and writing, and I know that she would proud of where I am today.

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As I am sitting here making the last edits to my thesis, memories of the past two years keep flashing through my head — the highs and the lows. Yet, when I think about them, the highs would not have been as exciting, nor the lows as bearable without the amazing group of people that have surrounded me throughout this process.

First and foremost, I would like to thank my amazing parents who have supported and encouraged me to follow my dreams and commit completely to anything that I set my mind to. Your strength, resolve, and love has shaped me into the person that I am today. I love you both more than I can put into words.

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NOMENCLATURE

SCT	Social Cognitive Theory
ELM	Elaboration Likelihood Model
SJT	Social Judgment Theory
PCA	Participatory Component Analysis
EFA	Exploratory Factor Analysis
CFA	Centroid Factor Analysis
DMRDL	Digital Media Research and Development Laboratory

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CHAPTER I

INTRODUCTION AND OVERVIEW

A gap exists between the growing public and shrinking population of people directly involved in production agriculture. According to The World Bank (2016), only 2% of the adult population in the United States was employed in agriculture. Because of this vast difference in urban and rural populations, it is critical for the agricultural industry to establish and maintain a connection on societal, economic, and political levels (Frick, Birkenholz, & Machtmes, 1995). To establish this connection, communicators must develop a systematic approach to understanding types of people they want to reach (audience and voters). Communicators must also understand how each type of people perceive agriculture, how to reach those groups of people, what to include in messages targeted at types of people, and the connection between agriculture and types of people. To do this, personas were developed that explain each audience (type) of people, how those groups receive information, and how to effectively communicate and connect to the audience. Cooper (1999) suggested personas are useful for identifying and understanding audiences. Agricultural communicators can use personas to "simplify communication and project decision making" (Junior & Filgueiras, 2005, p. 277) and tailor messages to the group of people in a diverse population. This is a large and lofty goal that cannot be completed in one research paper. Therefore, the overall aim of this study was to begin to understand the elements and connections of the communication system and to lay the foundation for future research related to

perspectives of agriculture. This study was split into two aims to better understand the audiences:

Aim 1: To understand types of people, their views about agriculture, and how they receive and interpret messages related to agriculture.

Aim 2: To improve the methods of understanding the different types of people by developing syntax for analyzing Q data in IBM® SPSS® version 23.

Thesis Outline

This thesis is organized into chapters:

- Chapter 1 – Introduction of the problem and a summary of the study
- Chapter 2 – Introduction, literature review, and theoretical and conceptual frameworks for Aim 1: Perspectives of agriculture
- Chapter 3 – Introduction, literature review, and conceptual frameworks for Aim 2: methods of analyzing communication
- Chapter 4 – Methods of data collection and analyses used to answer research questions for Aim 1
- Chapter 5 – Methods of data collection and analyses used to answer research questions for Aim 2
- Chapter 6 – Results and discussion of the data outputs for Aim 1
- Chapter 7 – Results and discussion of the data outputs for Aim 2
- Chapter 8 – Recommendations for practice, research, and theory for Aim 1
- Chapter 9 – Recommendations for practice, research, and theory for Aim 2

CHAPTER II

INTRODUCTION AND LITERATURE REVIEW: AIM I

Communications About Agriculture

Communication between the agricultural community and the general public is cluttered with jargon, outdated ideals, and one-sided commentary (e.g., use of the "hypodermic needle" model of communicating (Evans, 1985) that injects information one direction). There seems to be an ever-widening gap between people engaged in agriculture and its constituents (Frick et al., 1995). This gap between producers and consumers has partially led to differing views about agricultural practices and policies, which could be correlated with an individual's background in agriculture (Goodwin, Chiarelli, & Irani, 2011). For many reasons, including the gravitation of populations to urban areas, the agriculture industry has become separated from consumers of agricultural products, and communication between the parties has suffered. As methods of communication and language have evolved, it has left miscommunication in its wake.

Considering growth of metropolitan populations and reduced rural populations, it makes sense that the agricultural industry employs less than 2% of the working-age population in the United States (The World Bank, 2016; Mather, Pollard, Jacobsen, & The Population Reference Bureau 2011). A 2011 report by The Population Reference Bureau noted a decline in the rural population, from 20% in 2000 to 16% in 2010. According to Mather et al. (2011), 51% of the U.S. population lives in suburban areas; whereas, nearly two-thirds of the nation's farming-dependent counties have experienced

reduced populations during the past decade. The trend of fewer U.S. farmers and ranchers, as well as a decrease in the number of farms and ranches, has continued for nearly a century, resulting in most Americans being at least one or more generations removed from the farm or ranch (Dimitri, Effland, & Conklin, 2005).

As direct involvement in agriculture decreases, public support of the agriculture industry becomes more important (Frick et al., 1995). Because more than one-half of the population resides in suburban settings, it is crucial that agriculture gains the support of the majority so policies that could potentially benefit agriculture can be passed (Frick et al., 1995). With different organizations and groups opposing conventional agriculture, positive communication is essential for the agricultural industry to gain confidence from and approval of the public. It is important to foster a positive rapport with the public because communication is partially shaped by the nature of the relationship of the parties involved (Leeuwis, 2004), and so making sure the relationship is a positive one is beneficial.

To communicate effectively and gain the approval of the public, agricultural communicators must be able to identify differing groups and their views, opinions, and thoughts about agriculture. Once agricultural communicators have a better idea of who the different groups are and what those groups believe to be true about agriculture, agricultural information and communication can be tailored to each unique group of people for maximum efficiency of messages (Verbeke, 2005). Instead of simply developing a general message, communicators should diligently keep the audience in mind when crafting messages (Hawkins, Kreuter, Resnicow, Fishbein, & Dijkstra, 2008)

to build a greater connection between the producer and the consumer. Strong relationships and positive experiences allow for more effective communication between groups because, if there is animosity, people are less likely to listen to each other (Leeuwis, 2004).

Tailoring Communication

Instead of sending out broad, general messages intended to educate or sway the opinion of the public, more emphasis should be placed on trying to engage the public with agriculture through conversation (Anderson, 2000). For example, the health industry has experienced success in engaging specific audiences through customized messaging (Hawkins et al., 2008; Kreuter, Strecher, & Glassman, 1999; Noar, Benac, & Harris, 2007). Custom messages enhance the relevance of the information to the audience, which in turn generates a response to communication (Hawkins et al., 2008). Solomon (2002) noted that it is important to group like consumers when devising strategies of communication so that messages can be created to appeal to groups' personalities, beliefs, and opinions; these characteristics cannot be objectively measured, yet may be important in influencing choices. Other variables to consider when tailoring messages are "culture, pre-existing knowledge, goals, aspirations and interests" (p. 120) because people make selections based on these variables and others when creating, receiving, and interpreting messages (Leeuwis, 2004).

By personalizing messages to groups based on beliefs and opinions, communicators have a better chance of effectively and efficiently reaching people and engaging them in conversation (Hawkins et al., 2008). Therefore, the message itself will

have a greater impact. If the audience believes the message relates to them, they may be more likely to actively and thoughtfully process the information (Kreuter et al., 1999), which leads to a lasting behavior change. Creating relatable messages will allow communicators to send positive messages of agriculture to encourage audiences to consume and think about agricultural messages and issues.

Agricultural literacy studies have investigated agricultural messages and phrases. In a study conducted by Goodwin et al. (2011), individuals participated in focus groups where the facilitators sought to determine how consumers perceived certain agricultural messages by showing a phrase or word and asking the group to respond. Rumble, Holt, and Irani (2013) studied how individuals perceive individual words commonly used in agricultural communications. "As communicators, it is important to understand how individuals perceive certain words and if these perceptions influence their attitudes toward the agricultural industry" (Rumble et al., 2013, p. 23). The audiences for these studies were selected through demographics, and no processes were addressed to establish what differing views of agriculture existed (Goodwin et al., 2011; Rumble et al., 2013) instead of focusing on the characteristics and opinions of the consumer. By understanding consumers' perspectives about a topic, it can help in understanding how they perceive words and phrases, and how they interact with messages.

Limiting Research

Currently, a limited amount of research has been conducted on the different types of audiences and their beliefs and opinions about agriculture, and most is limited to Nigeria (Adekunle, Onyibe, Ogunyinka, Omenesa, Auta, & Kuyello, 2002) and India

(Shingi & Mody, 1976). Studies have been conducted concerning consumer perceptions of organic versus conventionally grown foods in Canada (Yiridoe, Bonti-Ankomah, & Martin, 2005) and perceptions of meat production in Europe (McEachern & Seaman, 2005; Ngapo, Dransfield, Martin, Magnusson, Bredahl, & Nute, 2003). There is also a lack of information regarding if the different types of audiences will help communicators become more efficient in delivering messages to specific groups. Because these studies were not conducted in the United States, their findings might not be comparable to perspectives that exist in the U.S. Therefore, there is a lack of specific literature concerning perspectives of agriculture in the United States.

Identifying the Public

The public is a complex, difficult to understand concept. Holistically, the public can be conceptualized as a sphere composed of audiences that existing together in a social world (Habermas, 1991). Robbins (1993) suggested, the public is a *phantom* and is divided into spheres that are not visible to one another; they do not have the same ideals, thoughts, and/or purposes. The public sphere is a place where individuals converge to talk about their affairs and experiences; it is a place that is more for debate than production (Robbins, 1993). Each audience, or sphere, does not understand the other, which is why trying to understand the different audiences is so important for communicating between each other. Metaphorically, spheres can be conceptualized as unique theaters—each with different agendas, languages, and ideals. People occupying each theater (sphere) can communicate effectively within their own theater, but they

likely have a difficult time accurately translating their messages to the occupants of other theaters.

Theoretical and Conceptual Frameworks

To better understand how people receive and interpret messages, this study drew on three knowledge bases: social cognitive theory (SCT), social judgment theory (SJT), and the elaboration likelihood model (ELM). These theories helped in understanding how a person acts and thinks in a certain environment (SCT), how personal opinions affect the acceptance or rejection of a message (SJT), and how a person's motivation and ability to process information affects behavior change (ELM). In addition to these knowledge bases, this study also drew on multiple methods of understanding, including persona development and Q analyses, to further comprehend how to develop messages for different groups of people.

Social Cognitive Theory

Bandura's (1986) social cognitive theory was used to better understand individual beliefs and opinions of agriculture and to create specific groups of audiences. SCT encompasses three determinants: personal, behavioral, and environmental, which form a triadic, reciprocal model (see Figure 1) that can be used to investigate and interpret how an individual or groups of individuals receive information (Bandura, 1986).

Personal determinants include an individual's opinions, attitudes, and perspectives, which includes how an individual thinks (cognition) and feels (affection). Environmental determinants can consist of how an individual functions, thinks, and

exists. An individual's environment is more than a geographical location and can be influenced by many things, such as culture, setting, mindset, and background (Bandura, 1986). Behavioral determinants can best be explained by the outward expression of what an individual is thinking and surrounding environment. In summary, SCT is the behavior of an individual in a given environment based on their personality (Bandura, 1986).

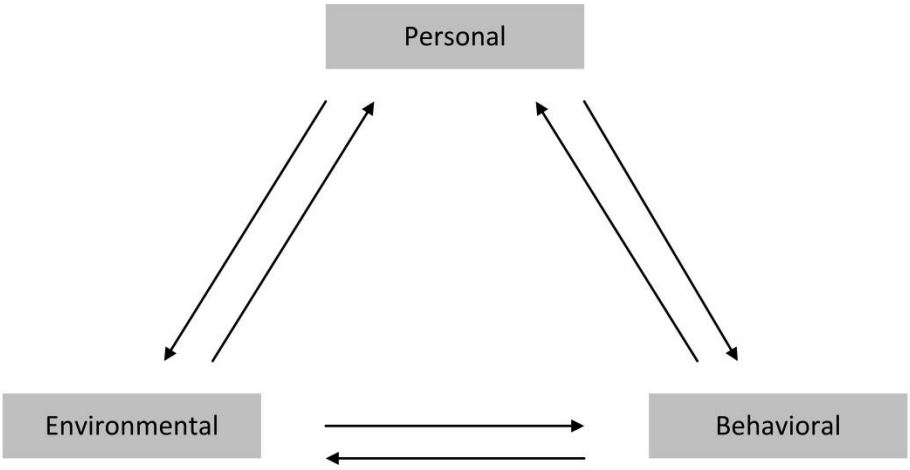

Figure 1. Social cognitive theory is comprised of three determinants that form a triadic, reciprocal model of a person's behavior in relation to personality and environment.

Other studies have examined how SCT affects communication (Bandura, 2001), influences media consumption (Pajares, Prestin, Chen, & Nabi, 2009), and assists in development of perspectives (Bosse, 2015; Hill, 2016; Mobly, 2016). Bandura (2001) stated that by understanding how people intake models and communication, one can get people to behave differently, show emotion, select different food and drinks, and to change their habits. With this understanding, and with the ability to use SCT to form perspectives of audiences, SCT helped develop an understanding of how people interact

and engage with messages in relation to their background, current environment, and personality.

Social Judgment Theory

SJT (Doherty & Kurz, 1996) was used as a guide to understand the environmental determinants. Environmental determinants can be hard to analyze and understand because of their causal ambiguity—the factors are so entangled amongst each other that it becomes difficult to determine which variables cause or are the result of others (Hammond, Stewart, Brehmer, & Steinmann, 1975). Hammond et al. (1975) stated an individual, or organism,

> in its normal intercourse with its environment must cope with *numerous, interdependent, multiformal relations* among variables which are *partly relevant* and *partly irrelevant* to its purpose, which carry only a *limited amount of dependability,* and which are *organized in a variety of ways.* (p. 272)

Based on the tenets of SJT, the effectiveness of communication depends heavily on how a message transmits to a recipient and how the recipient perceives the message in relation to personal issues (Sherif & Hovland, 1961). A conceptual diagram of how a message is received and the corresponding effect through SJT is presented in Figure 2.

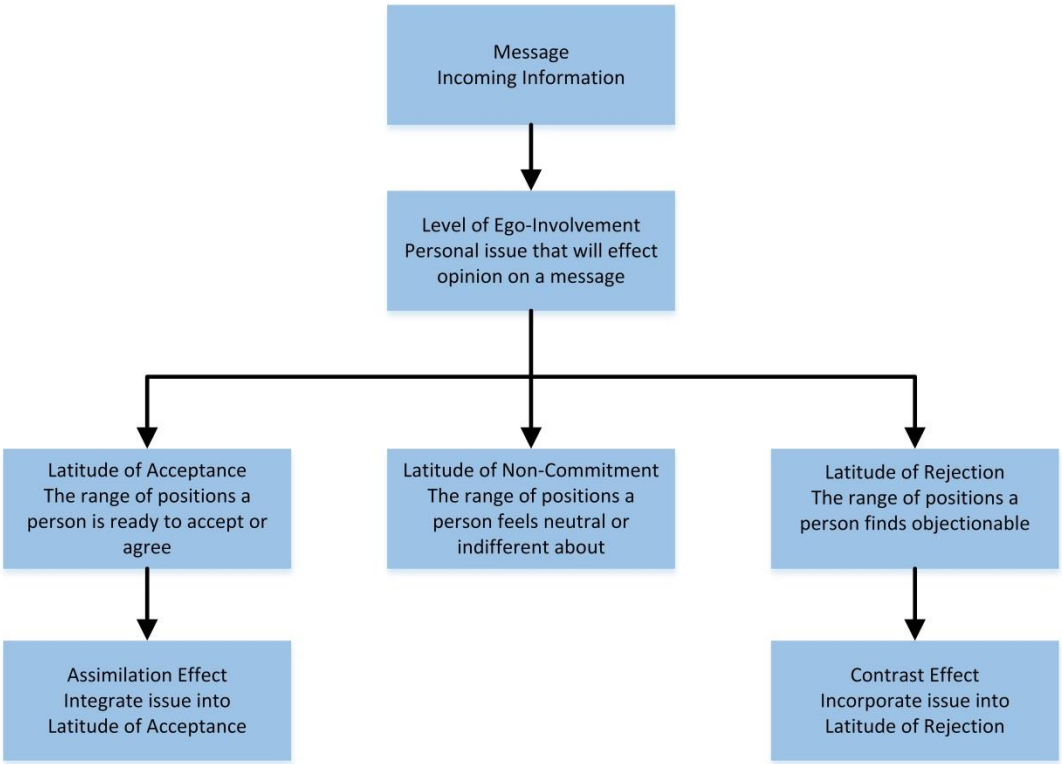

Figure 2. This diagram illustrates how a message is accepted or rejected dependent upon a person's personal issues within SJT.

Elaboration Likelihood Model

ELM (Petty & Cacioppo, 1986) was used to better understand the behavioral and personal determinants of SCT. Within ELM, there are two levels of communication, high-level (central route) and low-level (peripheral route), which are illustrated in Figure 3. The two levels of communication are processed differently, depending on if the message is processed cognitively or affectively. ELM was used to interpret levels of communication and how these levels can shift an individual's behavior. High levels of communication are more likely to shift an individual's behavior, but low levels of communication will produce more of a temporary attitude change.

ELM assisted in understanding how different levels of communication affected each perspectives' route to message interpretation and change in either attitude or behavior. Mobly (2016) used ELM to investigate logical and emotional appeals used by animal rights and animal use organizations. Verbeke (2005) used ELM to understand consumer needs for information and how communicators sending out too-detailed information resulted in loss of confidence in the food industry. People do not react equally or predictably to information, but ELM helps communicators understand the differences in how people process messages depending on active information searches (central) and external cues (peripheral) surrounding the message (Verbeke, 2005). By analyzing which perspective responds to certain levels helped in understanding how to tailor messages. Therefore, ELM was used to understand how a person's attitudes, motivation, and ability to process a message affect their level of message involvement and behavior change.

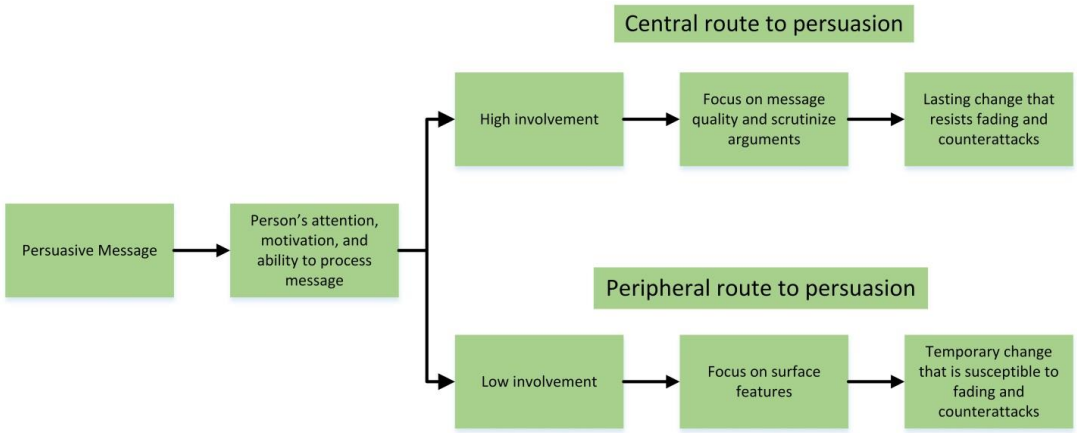

Figure 3. There are two different routes to message persuasion within ELM and how each route leads to change in behavior and attitude.

Personas

In this study, personas were developed to better describe the types of people and their perspectives of agriculture. Junior and Filgueiras (2005) noted, “personas are fictitious user representations created to embody behaviors and motivations that a group of real users might express” (p. 277) and that allow communicators to create messages for a specific group. Cooper (1999) with introduced the term persona as an aid in providing a common template for communicators to use when tailoring information to a specific audience (Pruitt & Grudin, 2003). Because multiple audiences do not understand all of the facets of the social world (Robbins, 1993), personas were developed from this study to help communicators understand a public sphere of opinion. I used SCT, SJT, and ELM to guide the development of personas by allowing me to view the data through lenses of the different theories in terms of environment, behavior, personal beliefs, and how people receive information (see Figure 4).

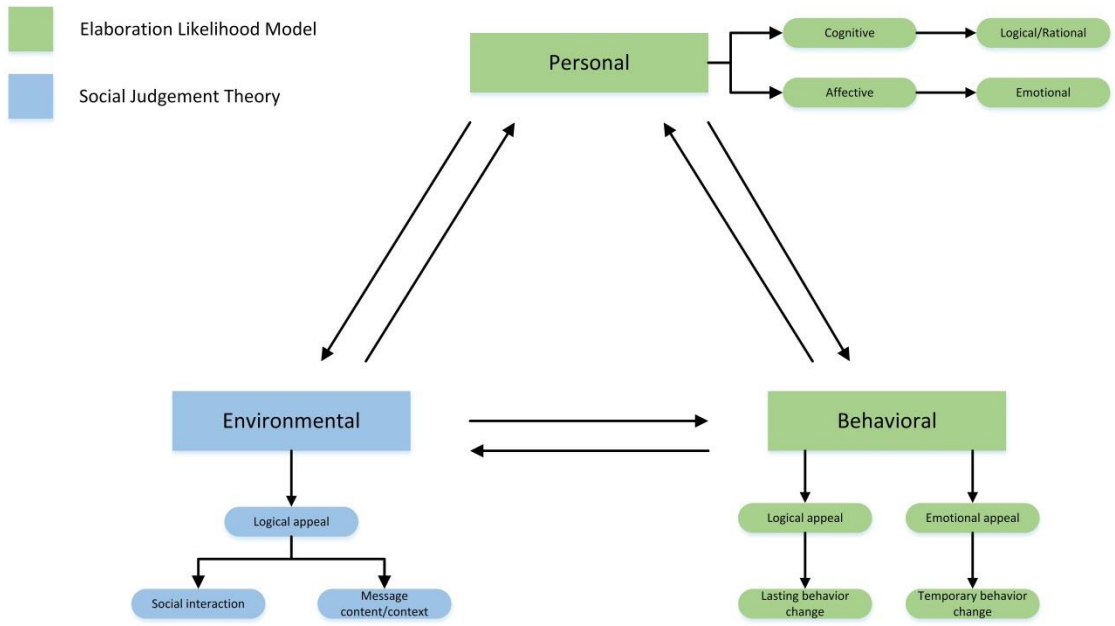

Figure 4. Within SCT, ELM, and SJT were used to further understand the three triadic, reciprocal determinants and how it can predict audience behaviors, as well as help tailor messages.

Individuals can be described individually or as groups based on demographics, attitudes, and/or beliefs (personal determinants); places where they interact, modes of communication, and mediums in which individuals receive messages (environmental determinants); and interactions between and among individuals, outward expression of thoughts and beliefs, habits, and reactions to stimuli (behavioral determinants). Personas enable communicators to selectively-tailor messages at the individual or group level to best suit their specifications and budgets. Once developed, communicators can reference personas before and while creating messages so the information is relevant and applicable to the recipient of the message (Kreuter & Wray, 2003).

Persona creation and development can be likened to the life stages of human development. Personas should be changed and evolve, and "each stage builds on the next" (Adlin & Pruitt, 2010, p. 7). Adlin and Pruitt (2010) proposed five phases of persona life stages: family planning, conception and gestation, birth and maturation, adulthood, and lifetime achievement and retirement. The first two stages can be compared to the process of identifying data sources and collecting them, much like parents would go to family planning and begin the process of conception. The third phase, birth and maturation, is the phase that "create[s] a persona campaign and introduce[s] the personas" (Adlin & Pruitt, 2010, p. 7) to communicators and agricultural organizations. Because the development of personas is such a large task with many stages, this study only took the persona development process to the birth and maturation stage. Researchers can use the results of this study to develop adulthood personas.

In the family planning stage, identifying the necessary sources of data is critical and is essential for the development of personas. The conception and gestation phase is when the personas are actually created and developed (Adlin & Pruitt, 2010). It is during this phase that data, assumptions, and understandings are combined to form a set of personas. Because people are always changing and developing, permanent personas cannot be assigned to groups. They are always developing along with people, which is why working hypotheses are generated to understand the people as they currently are. To help develop personas, this study drew on multiple knowledge bases to understand how people receive and interpret messages.

Researchers should use theoretical guidance before, during, and after persona development. Before personas are developed, researchers should use theory to guide the process of determining which data should be included and/or excluded to accurately describe and/or predict audience behavior. After personas are developed, researchers should use theory to predict audience behavior, based on specific audience characteristics included in each persona. Examples of predictive audience behavior in relation to the three theories are:

- SCT – People with X beliefs are more likely to have Y behavior when in Z environment.
- SJT – People with X experiences are more likely to accept/reject Y messages.
- ELM – People with X motivation are more likely to have Y persuasion changes.

Summary

The public sphere, theoretical and conceptual theories, and persona development come together to form the framework for this study. I used the concept of the public sphere to understand how multiple audiences interact with one another, and how different audiences affect message development. Further, I used theories (SCT, SJT, and ELM) and personas as tools to help identify the different audiences for this particular study and assist in targeting them with tailored information. Researchers have suggested customizing messages to a specific audience is more effective than a single generic message (i.e., one-size-fits-all) being distributed to the masses (Hawkins et al., 2008; Kreuter et al., 1999). Creating unique messages for specific audiences requires a deeper knowledge of the target population and the different types of individuals in the

population. A clear understanding of types of agricultural audiences was not overtly evident in my review of the literature. Therefore, determining the perspectives of agriculture was the next step toward understanding how to effectively tailor messages for unique audiences.

CHAPTER III

INTRODUCTION AND LITERATURE REVIEW: AIM II

Developing personas requires vast amounts of data from numerous sources. Adlin and Pruitt (2010) recommended that personas should include quantitative and qualitative data to make them robust. Using personas offers a way of showing a broad range of qualitative and quantitative data and offers a unique method that gives attention to aspects and characteristics of message design and use (McGinn & Kotamraju, 2008; Pruitt & Grudin, 2003). Navigating so much information and data can be difficult and overwhelming, so it is important to sort and condense the data into a manageable and usable form. Agricultural companies and other interested organizations attempting to reach diverse audiences, as well as any land-grant university and Extension service disseminating agricultural information, can use these personas.

Methods of Analyzing Communication

Researchers use qualitative and quantitative methods to analyze communication. Some of these methods include focus groups, interviews, and surveys. Focus groups can be beneficial when investigating topics because they encourage conversation and dialogue between participants. According to Lindolf and Taylor (2010), an interview is a conversation "between equals who systematically and collaboratively explore topics of mutual interest" (p. 3). Both focus groups and interviews are qualitative methods. Survey research, however, which Bryman (2012) defined as "a cross-sectional design in relation to which data are collected predominantly by questionnaire or by structured interview"

(p. 60), is a quantitative method requiring statistical analysis. Deciding which analysis technique to use in quantitative research is essential to get the correct results for the types of questions asked.

Researchers can use many types of analysis techniques to study audiences and audience behavior. Behavioral science researchers seek to understand responses of individuals, which can be explained by "characteristics of the particular situation and the characteristics of the individuals" (Gorsuch, 2015, p. 16). When there has not been extensive research on a subject, or a researcher is not sure of how many factors to extract, researchers perform an exploratory factor analysis (EFA). This procedure is done "based upon the characteristics of the data itself rather than upon knowledge of the area or seat of hypotheses" (Gorsuch, 2015, p. 151). EFA develops concepts from data without limiting outcomes to a particular idea or hypothesis.

Researchers can use concepts developed from EFA in several ways, including thematic analyses, content analyses, cluster analyses, Chi-square analyses, and factor analysis. Factor analysis was chosen for this study because the data will be analyze as an exploratory data analysis that will cluster indicators (items) together for conceptualization of the different perspectives of agriculture (Bryman, 2012; Onwuegbuzie & Teddlie, 2003). The main aim of factor analysis is "to summarize the interrelationships among the variables in a concise but accurate manner as an aid in conceptualization" (Gorsuch, 2015, p. 2). Factor analysis can give rise to new constructs and hypotheses for future research, as well as test current hypotheses that do not have obvious distinctions (Gorsuch, 2015).

Researchers can approach collecting data for use in a factor analysis in numerous ways and from numerous sources, including surveys, data mining, secondary sources, and content analysis. It is also important for researchers to understand the different factor analysis techniques and their uses. Factor analysis is a procedure that analyzes two modes in correlation to each other (Gorsuch, 2015). In 1946, Cattell proposed a covariation chart to represent the possible relationships of techniques, which is now referred to as the *Basic Data Relation Matrix*. Researchers can refer to Cattell's (1966) *Basic Data Relation Matrix* to explain factor techniques and the relationships among factors. Within the Basic Data Relation Matrix there are three modes, or dimensions (occasions, individuals, and items), that provide "possible relations of choice in experimental studies" (VandenBosch, 2001). The three modes merge into vectors, which represent six techniques of factor analysis: O, P, Q, R, S, and T.

Pairs of factor analysis techniques are used describe the ways each pair is implemented. Techniques O and P are used to measure a single person, Q and R are used to measure a single occasion, and S and T are used to measure a single measure (Loehlin, 2004). VandenBosch (2001) noted another way to look at the different factor techniques in terms of what types of factors they are trying to identify. He stated that P and R techniques are used to identify states or traits, O and T are used to identify certain environments or situations, and S and Q are used to identify different types of people. While these groupings help researchers choose a type of technique, they are better grouped with the factor technique that is transposed to each other as far as variables being factored and across with correlations (Table 1).

Table 1

Different Techniques of Factor Analysis

Technique	What is being factored?	Correlation Across	Example
One person			
O	Occasions	Items	Individual psychological environment
P	Items	Occasions	Individual personality structure
One occasion			
Q	Persons	Items	Personality typology
R	Items	Persons	Basic personality traits
One measure			
S	Persons	Occasions	Anxious-person types
T	Occasions	Persons	Anxiety-arousing situations

Note. Adapted from *Latent variable models: An introduction to factor, path, and structural equation analysis*, Loehlin (2004).

O and P factor techniques factor occasion and item modes with the individual mode held constant. In these techniques, all of the data come from either one individual or an average of all individuals from each item and occasion. The O technique factors occasions across items and is used to identify similarities of individuals over time (Gorsuch, 1983). The P technique is the transposed technique of O and factors items across occasions. P is used to show individuals' score changes at different occasions and points in time (VandenBosch, 2001).

Q and R techniques are used to analyze people with measures or items. The R technique is the most common factor technique used by social science researchers. In traditional R technique, rows are represented by individuals and columns are represented by items, whereas in Q technique, the rows and columns are transposed. With R and Q techniques, the mode that stays consistent is the occasion. Typically, questionnaires are developed and analyzed with R technique. Individuals are asked a set of questions as

items, which are then entered into columns of the correlation matrix. Q technique also uses items and individuals as the modes, but puts the emphasis on the individual (column) with the items in rows. S and T techniques are rare types of factor analyses because they are only generalizable to one variable and researchers that want to study one variable may not be aware of these techniques (Gorsuch, 1983; VandenBosch, 2001).

From the six factor analysis techniques, the two techniques that are used to identify different types of people are S and Q techniques. But, because the purpose of this study is to develop personas for audience-types, the S technique would not be useful. Personas require vast amounts of information for development. The Q sort technique and Q analyses were chosen as the best fit for the method of this study because it measures human subjectivity and is geared toward developing personality typologies (Brown, 1993; McKeown & Thomas, 1988).

Q technique is intended to identify groups and classes of individuals (Gorsuch, 2015). Q technique differs from traditional typology because individuals can be related to more than one factor unless a structure is almost perfect (Gorsuch, 2015).

> Because factor-analytic theory is not concerned with how the rows and columns are defined, all factor theory applies to it and all the procedures apply to it. However, to gain stable measures of relationship, the data matrix should have a large number of columns (v) relative to the number of rows (n) before it is transposed. (Gorsuch, 2015, p. 332)

Q methodology is a mixed methods approach that factors people across measures, or items (Brown, 1993). It combines qualitative data through in-depth interviews and quantitative data through a forced-choice instrument. It explores issues of perspectives and "has the unique insights into the richness of human subjectivity" (Akhtar-Danesh, Baumann, & Cordingley, 2008, p. 760). It also allows researchers to investigate areas that overlap and discover numerous viewpoints (Akhtar-Danesh et al., 2008).

Popular Q Sort and Q Analyses Methods

Operant Subjectivity, a journal dedicated to Q methods, was analyzed for different methods of conducting Q sorts and Q analyses. The major forms of Q collection were Q sorts, Q Block (Talbott, 1963), and FlashQ (Hackert & Braehler, 2007). The commonly cited forms of Q analysis were PQMethod (Schmolck, 2002), PCQ for Windows (Stricklin & Almeida, 2001), and QUANAL (Van Tubergen, 1975). Several journal articles did not list their technique of analysis (Zenor, 2012) or only listed the form of analysis, including centroid factor analysis (CFA), principal component analysis (PCA), and/or varimax rotation.

Watts and Stenner (2005) stated that "the technique of the rotation employed is always going to be dependent on the nature of the data gathered and upon the aims of the investigator" (p. 81). In fact, some researchers argue that a computer should not decide how data should be interpreted when an infinite amount of point of views exist (Watts & Stenner, 2005). Although there are computer software programs specifically created to analyze Q data, there was not a specific program that fit the needs of this study.

Therefore, for the purposes of this study, PQMethod does not allow for flexibility in setting up for the analysis of data, nor is it easily understood how the program analyzes the data because it is a DOS-based application that is automated (Akhtar-Danesh et al., 2008; Watts & Stenner, 2005). Although PQMethod does not allow for flexibility, some researchers (Akhtar-Danesh et al., 2008) have suggested it is a user-friendly software that allows for any level of researcher to conduct a Q sort. PCQ for Windows was found to be unsuitable for this study because of financial restrictions. Due to these drawbacks and limitations, we created syntax to make analyzing a Q data analysis in SPSS® possible and easy to replicate. It is important to note that each time data is entered into a different platform there is an increased chance of transfer error. Although precautions were made to prevent this, error is to be expected. The process and method of Q sort will be explained in more detail in the methods section.

Conceptual Framework

To better understand the Q sort method and analyses, this study drew on multiple works of Q method, including journal articles and methodology books. Some of the most cited works are from Brown (1980) and Block (1961), but I drew heavily from Watts and Stenner (2012), van Exel and Graaf (2005), and McKewon & Thomas (1988) for guidance and understanding. I drew from the latter more because the information was in a format that was easier to digest, understand, and follow. They offered examples, insights, and information based on Brown (1980) and Block (1961) but in a way that a beginning researcher could replicate. These knowledge bases, although not theories, are

research studies and guides that helped in the understanding and development of the Q sort portion of this study.

These works guided the study by providing a template for conducting the study and by representing the acceptable and widely used methods for conducting a Q sort and the following analyses. Because the purpose of this aim was comparing two different methods of conducting analyses, this study was also guided by Field's (2009) and Gorsuch's (2015) statistical knowledge of factor analyses, principal component theory, and factor rotations. These books helped in developing syntax and procedures for Q sort analyses in SPSS®.

To better understand the different techniques of factor analysis and how they are collected and analyzed, Gorsuch (2015) was referenced. I followed many of the procedures described by Field (2009) when analyzing quantitative data in SPSS® and interpreting the outputs.

CHAPTER IV

METHODS: AIM I

Purpose, Research Aims, Questions, and Objectives

AIM 1: The purpose of this case study was to develop an understanding of the different beliefs and opinions the public holds about agriculture. At this stage in the research, the beliefs and opinions of agriculture were generally defined as perspectives of agriculture.

RQ1: What are the public's perspectives of agriculture?

RO1.1: Collect statements that demonstrate a variety of perspectives of agriculture.

RQ2: What are the determinants/factors that make up each perspective?

RO2.1: Describe the psychographic characteristics of each perspective.

RO2.2: Describe the communication mediums each perspective prefers to receive information about agriculture.

RO2.3: Describe the demographic characteristics of each perspective.

RQ3: What are the different personas of agriculture?

RO3.1: Develop personas that describe the different perspectives of agriculture.

RO3.2: Describe and explain the different personas about perspectives of agriculture.

Design

In this case study, I described Millennials' perspectives of agriculture. Researchers and others have defined Millennials in several ways. Nielson (2014) defined the Millennial generation as being born between the years 1977 and 1995, with the older Millennials ranging from ages 28 through 36 and the younger Millennials ranging from ages 18 through 27. Pew Research (2015) reported that the Millennial generation was born between 1981 and 1997, and Deloitte (2005) reported they are born between 1978 and 1995. For this study, Millennials, ranging in age 18 through 32, who reside in Central Texas were included. I chose Millennials in this age range because of their unique background. Individuals born between 1983 and 1997 grew up with emerging technology including the internet and they developed different methods of communicating because of it (Holliday & Li, 2004). The introduction of easily-accessible internet, cellular devices, and numerous other technological tools shaped the way Millennials in this age range interact with the world around them.

Aim 1 of this study was divided into four data collection components that will be explained in greater detail later in the chapter. These components do have overlap in sequence of collection, so they will only be presented as data inputs and outputs. This study described the types of people who share each perspective, and describe the mediums through which people receive information. To accomplish this task, this study is described by the people included in this study, the ways data were collected and analyzed, and the forms in which the results are presented. Four components resulted in data outputs that helped create personas (see Figure 5): Components A, B, C, and D.

- In Component A, individuals were asked media consumption questions that resulted in descriptive statistics data. This data helped in identifying the mediums that certain types of people receive their information through. These data also provided information on the days, times of days, and type of message to send.
- In Component B, individuals were asked demographic questions to determine the characteristics of people that group together.
- In Component C, psychographics of the types of people were described. Component C was broken down into three sub-components: C_1, C_2, and C_3.
    - C_1 provided qualitative data with examples and richer details of the types of people.
    - C_2 was the sorting of the statements collected in C_1 and the process of entering the data into an R configuration.
    - C_3 consisted of rotating the data from an R configuration to a Q configuration, as well as analyzing an EFA to determine the types of groups of people.
- In Component D, data outputs from components A, B, $C_{1,}$ and C_3 were combined to create the working hypotheses of perspectives of agriculture in the form of personas. C_2 was not used for the creation of personas because it did not create a usable output.

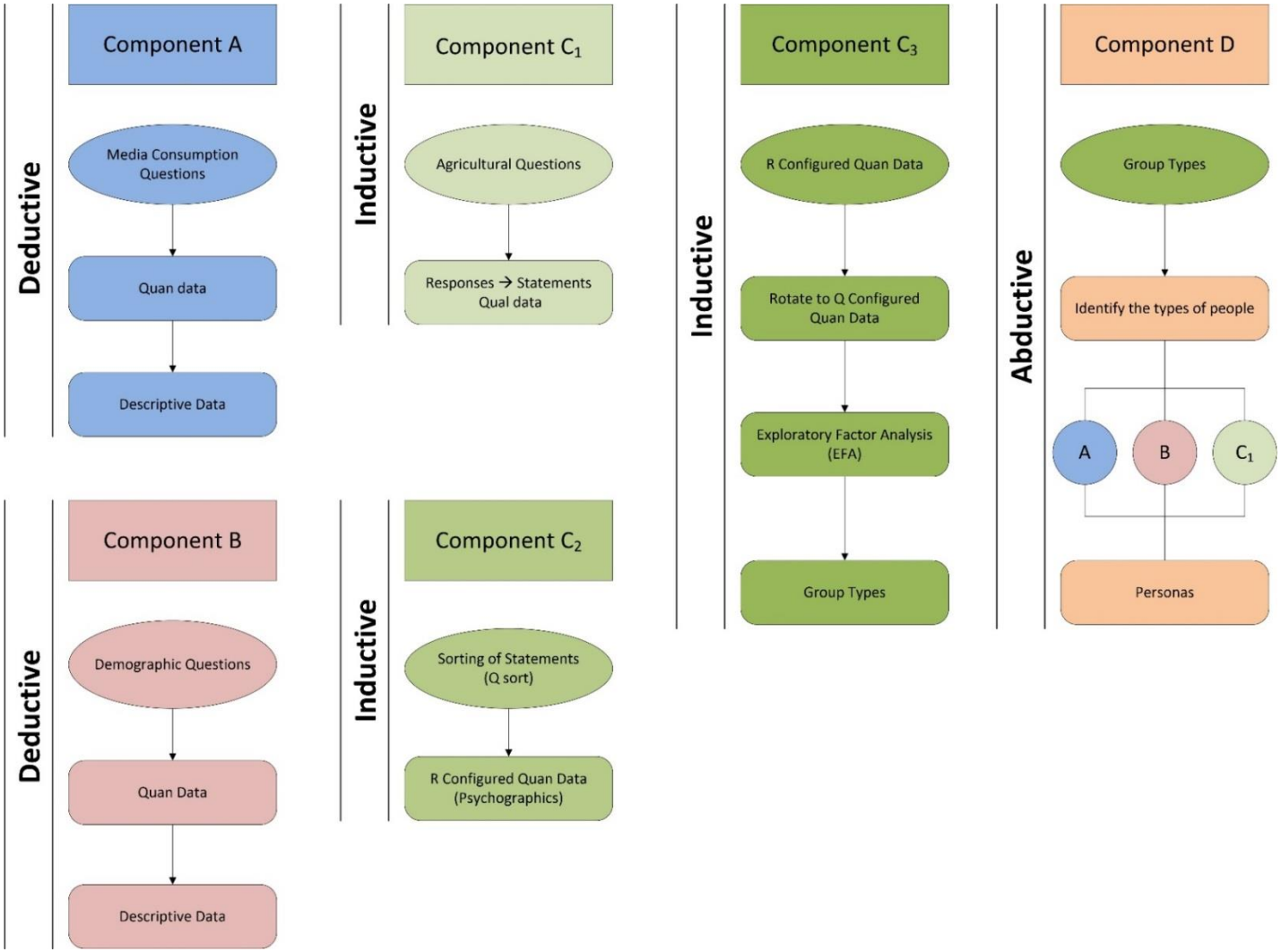

Figure 5. Each component of the study contributes a different output of data that will create the end goal: personas.

I approached this study abductively (see Figure 6), which is a cyclical mixture of inductive and deductive reasoning. Using inductive reasoning, individuals observe phenomena to describe what is happening. When using abductive reasoning, individuals observe and describe phenomena, and then devise a theory, or explain what is happening (Watts & Stenner, 2012). "Abduction is a logic designed for *discovery* and *theory generation*, not for testing and theory verification" (Watts & Stenner, 2012, p. 39). Q methodology has been described as an extension of abduction "as a way of generating hypotheses" (Watts & Stenner, 2012, p. 39) or wider explanatory theory.

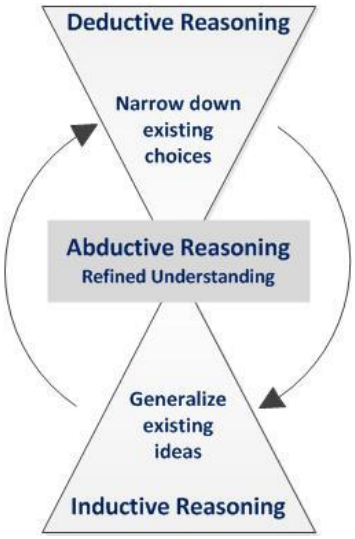

Figure 6. This diagram is an illustration of the circular method of abductive reasoning, which combines both deductive and inductive.

In addition to method of reasoning, epistemology, or how a researcher views the world, can be defined as "the assumptions and views about how research should be conducted" (p. 6) and asks the researcher to reflect upon issues of how the social world

should be studied (Bryman, 2012). There are two forms of epistemology—positivistic and naturalistic. Epistemology concerns are whether the researcher intervenes and manipulates to make things happen, or merely observes and documents. Because this study did not manipulate variables, it was approached from a naturalistic epistemology stance.

Along with epistemology concerns, ontology, or how research is approached, is an approach that is

> concerned with the nature of social entities and whether they can and should be considered objective entities that have a reality external to social actors or whether they can and should be considered social constructions built up from the perceptions and actions of social actors. (Bryman, 2012, p. 32)

There are two types of ontology—objectivist and constructivist. An objectivist researcher seeks to remove himself or herself from the study. He or she believes social phenomena and their meanings exist independent of social actors. A constructivist researcher is always building and refining the study because social phenomena are in a constant state of revision and are produced through social interaction (Bryman, 2012). I approached this study as a constructivist ontology because the procedures were developed and steps refined as the study progressed through social interaction.

Research Question 1: What Are the Public's Perspectives of Agriculture?

To answer RQ1 for Aim 1, semi-structured interviews were conducted to collect statements that included all of the possible views of agriculture that the public had.

In a pilot study conducted in the spring of 2014 (Walker, Walther, Homeyer, & Guerrero), student researchers conducted interviews and focus groups to understand the public's perspectives of agriculture. They reported five preliminary types of people, but those types were vague and not definitive or exhaustive. The preliminary types of people, or perspectives of agriculture found during the pilot study were traditionalist, opinionated learner, environmentalist, health-oriented, and indifferent. Walker et al. (2014) recommended more research be done to clear confusions, explore deeper understandings of the preliminary perspectives, and find clear distinctions between the perspectives. To further develop the initial perspectives, this study purposefully targeted participants that fit the characteristics of the initial perspectives to clarify and distinguish the groups from each other.

Sampling

Participants were purposively selected for a "structured sample of respondents who are theoretically relevant to the problem under consideration" (van Exel & de Graaf, 2005, p. 6). To narrow the sample and provide structure, the sample was limited to a geographical area within four cities in Texas: San Antonio, Austin, Dallas, and Houston. After the sample was chosen, it remained the same throughout the study for convenience, to allow deeper understanding to Q sort choices, and create well-rounded personas. Watts and Stenner (2012) recommended that participants be chosen strategically for their unique viewpoint that matters to the subject, so the sample was purposefully chosen based on certain characteristics and beliefs they demonstrated. Those characteristics were selected from the initial perspectives of agriculture reported

by Walker et al. (2014). Therefore, participants were selected from different industries and environments from within the geographical barrier, and that best fit the characteristics found from the initial perspectives. The participants were selected from the following areas:

- Traditionalist,
- health-oriented,
- organic believer,
- opinionated-learner, and
- indifferent.

Two to three people from each initial perspective were identified through a set of screening questions derived from the descriptions and examples presented in the pilot study (Walker et al., 2014). I asked participants to state if they agreed or disagreed with each statement. Out of a list of five screening questions, participants had to agree with at least three to be considered for the study. The screening questions are included in Appendix A.

Because this study required specific participants with particular views, organizations were contacted to help find participants that fit the initial perspectives. To find the traditional perspective, I contacted the Farm Bureau and the Texas A&M AgriLife Extension Service to find participants had positive views of agriculture and were involved in some aspect of conventional agriculture. For the health-oriented perspective, participants that consistently shopped at Whole Foods were contacted from a previous study. I reached out the potential participants with an email explaining my

research. Initially, I contacted the Sierra Club in Austin, TX to identify participants aged 18 to 32. After several attempts, no participants were identified. Alternatively, I contacted Johnson's Backyard Garden, an organic farm, to help find participants who may fit the environmentally friendly perspective. Individuals described as opinionated learners or indifferent by Walker et al. (2014) were not described in as great of detail as the types of people. Therefore, snowball sampling was used to identify individuals who may be considered as opinionated learners or indifferent.

After I received the contact information of the individuals referred by an organization or individual, I sent an email explaining the purpose of the study and requested to speak to each individual about the research by phone. During each phone call, I asked five screening questions to determine whether he or she possessed the initial perspective characteristics necessary to be included in the study. I asked each person if he or she was willing to meet with me twice: 1) once for an in-depth interview, and 2) once to complete a questionnaire and participate in a Q sort.

Following The American Psychological Association's recommendations, I reported major demographic characteristics (age, sex, ethnic and/or racial group, level of education, and socioeconomic status), which is included in Table 2 (APA, 2010).

Table 2

Demographic Characteristics for P-set (n = 13)

	n	%
Age (*M* = 26.46; *SD* = 4.89)		
20	3	23
21	1	8
25	1	8
26	1	8
27	1	8
28	1	8
30	1	8
31	2	15
32	1	8
33	1	8
Sex		
Male	7	54
Female	6	46
Race/Ethnicity		
Asian	2	15
White	8	62
Hispanic	3	23
Education (Highest Degree Completed)		
High School Graduation or GED	4	31
Associate's Degree or Equivalent	2	15
Bachelor's Degree	5	38
Master's or Doctorate Degree	2	15
Combined Annual Income		
< $30,000	4	31
$30,000 - $49,999	3	23
$50,000 - $99,999	5	39
> $250,000	1	8

Interviews

The purpose of conducting interviews was to gather statements from the sample to use for the Q sort. This data was the output for component C_1 and was the outcome for RO1.1, thus answering RQ1. The output (C_1) became the input for C_2 as statements for the Q sort. Because there was insufficient evidence to distinguish among the

perspectives of agriculture from the pilot study (Walker et al., 2014), additional interviews were needed for a more complete understanding. Therefore, two to three people who fit the initial perspectives were purposively selected as stated in the sample section.

To begin, I conducted in-depth interviews to gain a more definitive understanding of the similarities and differences between the types of individuals described by Walker et al. (2014). The interviews consisted of a mix between structured and semi-structured questions. The set of guiding questions allowed for free response and for the conversation to flow naturally (see Appendix B).

Because the large area of the geographical barrier caused problems for meeting participants in a timely manner, I gave participants the choice of participating in face-to-face or Skype interviews. Building rapport via Skype was suggested to be just as easy as it is with face-to-face (Deakin & Wakefield, 2014). The only condition for the Skype option was that the video function be operational so that nonverbal, as well as verbal cues, could be observed (Deakin & Wakefield, 2014). Of the 13 participants selected for the study, four chose the Skype option. For those who chose the face-to-face option, we met at neutral locations near each participant's residence.

Before interviews began, I asked participants to sign a consent form (Appendix C) and asked permission to audio-record the interview. All participants agreed to have their interviews audio-recorded. Interviews lasted between 30 and 60 minutes. Once interviews were completed, I transcribed and coded the audio-recordings in the order they were interviewed. The coding system was "Part" for participant, with a

corresponding number (e.g., Part_001). Because I met with each participant more than once, I condensed the initial interview codes into a single letter and two number combination (e.g., P01).

Analysis

The interview data (C_1) were used to create the statements for the next phase (C_2). The data were analyzed using the content analysis method, which means that continuous comparison determined similarities and differences in the data (Lincoln & Guba, 1985). "Content analysis classifies textual material, reducing it to more relevant manageable bits of data" (Weber, 1990, p. 5). I transcribed the interviews and divided them into individual units, which I then coded with the participant code so that statements could be traced back to their origin. A unit of data is a chunk of information, or meaning, that can stand by itself and not need any further information to be understandable (Lincoln & Guba, 1985). Each unit of data was compared with every other unit of data using content analysis until themes emerged. This process is called categorizing, which includes grouping units that have similar meaning or feeling together to create themes (Lincoln & Guba, 1985).

There were eight emergent themes—*personal, public/consumers, influences of food purchases, eating, defining agriculture, agricultural practices, impact of agriculture,* and *what needs to change.* Because the purpose of Q method is to identify beliefs and opinions (i.e., psychographics), only seven themes were used to develop statements. Because the personal theme had information dealing with participants'

backgrounds and facts, rather than belief-related statements, it was excluded from the development of statements.

Research Question 2: What Are the Determinants that Make Up Each Perspective?

Four components (A, B, C_2, and C_3) were used to answer Research Question 2, which was answered by three objectives. A questionnaire was designed as the collection instrument for components A and B, which corresponded to RO2.2 and RO2.3. To accomplish RO2.1 and meet the requirements for components C_2 and C_3, Q methodology was deemed the best fit.

Questionnaire

During the second meeting, all conducted face-to-face, I asked participants to complete a brief questionnaire that contained media consumption and demographic questions. Information "add[ed] to the richness of [the] Q study and… assist[ed] in our understanding and interpretation of a study's factors" (Watts & Stenner, 2012, p. 74). I developed the questionnaire on Qualtrics™ and downloaded it on to an iPad using the offline mode for ease of answering questions. By using the offline application, participants could easily fill out the questionnaire regardless of location and availability of Wi-Fi.

Demographic and media consumption questions were used to address RO2.2 and RO2.3, and were the data outputs for components A and B. The questions were developed by researchers in the Digital Media Research and Development Laboratory (DMRDL), and is included in Appendix D. Further, questions were developed to align with monthly and quarterly reports published by Nielsen Audio, demographic and media

consumption reports by Nielsen (2013, 2014), Pew (Pew Research Center, 2010), and empirical research reported by Pendergast (2010). DMRDL researchers conducted several pilot tests with revisions to refine questions (Bishop & Piwonka, 2015; Bosse, 2015; Curbello, 2015; Froebel, 2015; Mobly & Hill, 2014; Svatek, 2015). Final estimates of temporal stability (test-retest) were reported, ranging from .79 to .96 (Bishop & Piwonka, 2015; Bosse, 2015; Curbello, 2015; Froebel, 2015; Svatek, 2015).

The questions developed by the DRMDL researchers were considered valid because they were created using communications industry-standard metrics. Additionally, Field (2009) stated that .80 is the acceptable threshold of metric adequacy for estimates of reliability. Therefore, because the coefficients of temporal stability reported by DMRDL researchers for this questionnaire were approaching or exceeding the .80 acceptability measure, the questions were considered to be reliable. The responses were used as confirmatory and corroboratory data for the Q sort and Q analyses. Frequency and descriptive statistics tests were analyzed by factors after the Q analysis to further investigate each factor's media consumption characteristics and demographics.

Q Method

To further develop the initial perspectives, this study used Q sort technique. A Q sort is a mixed methods approach because of its qualitative and quantitative collection of data, which include qualitative interviews and the quantitative sorting of statements. This mixed methods approach allows for the collection of different types of data that has the ability to strengthen a study (Greene & Caracelli, 1997). Mixed methods provide variety

to the study through different data, but it also helps the researcher understand the data better and gain deeper insights (Greene & Caracelli, 1997).

Reliability and trustworthiness

Because Q methodology observes the respondent's perspectives and internal thoughts, validity and reliability tests are unessential, which is contrasting to the traditional R method (McKeown & Thomas, 1988). Brown (1980) stated "there is no outside criterion for a person's own point of view" (p. 4), so the measure of attitude is not within the items themselves but what a person chooses to do with the items. A satisfactory method to ensure reliability within Q methodology is a test-retest because it measures how consistent a person is with himself/herself (Brown, 1980). In Q methodology, participants are expected to have a positive and high correlation with himself/herself, as well as sort near identical at any given time (Brown, 1980). Additionally, the end product of each step and component helped develop and modify the next step in the process. Each step was built from the previous step and provided a deeper interpretation of the findings. Therefore, trustworthiness was reached through triangulation, prolonged engagement, thick rich description, and the keeping of an audit trail (Lincoln & Guba, 1985).

Q set development

Once I identified the themes, I drew statements from each theme (excluding personal because of its demographical nature) that represented differing viewpoints. Once all important statements were identified, statements that were similar were put together and condensed into a manageable set of statements to be used for the sorting.

Each statement identified a unique viewpoint that showed representativeness of the whole theme so that every agricultural perspective from the interviews was present (Brown, 1980). The statements I identified became the Q set, which is a set of stimulus items pertaining to the topic in question and are given to the participants to rank (Watts & Stenner, 2012). I developed five to 15 statements from each theme (see Table 3).

Table 3

The Seven Themes from the Content Analysis Used to Develop the Q Set.

Theme	Theme	Statements from theme
A	The public/consumers	10
B	Influences of food purchases	15
C	Eating	5
D	Defining agriculture	8
E	Agricultural practices	11
F	Impact of agriculture	10
G	What needs to change?	5

A total of 64 statements comprised the Q set (see Table 4). The range of statements from each theme depended on the amount of viewpoints in each theme and how much information was available. The themes participants spent the most time talking about during interviews and had the most variety of opinions about were influences of their food purchases (B) and current agricultural practices (E). In contrast, the topics participants talked about the least, or had the least amount of viewpoints, were opinions about eating (C) and what agriculture needs to change (G). Statements included a wide range of psychographic opinions of agriculture that represented all possible

perspectives of agriculture so participants could place and rate the statements based on their personal beliefs, opinions, and thoughts about agriculture.

Table 4

Q Set Statements

Statement #	Statement
1	People should be more educated about agriculture
2	People are becoming more aware of agricultural issues
3	I am aware of where my food comes from
4	I am aware of how my food is produced
5	I worry that I don't know what is in my food
6	Outbreaks are why people have a negative view of agriculture
7	PETA is why there are negative perceptions of agriculture
8	The agriculture industry has taken away our choices at the store
9	I like a variety of options when purchasing food
10	I like to spend my money locally
11	It is rewarding to know where my food comes from
12	The organic movement doesn't matter to me
13	Eating organic is better for me
14	Purchasing fresh food is important to me
15	I am only interested in buying what is necessary
16	Processed foods are not good for me
17	I don't care about what I eat
18	I like anything with meat in it
19	Eating only vegetarian food is important to me
20	Cooking my own food is important to me
21	I eat out more than I cook
22	Agriculture helps in the growth of the economy
23	Agriculture is a way of life
24	Agriculture is hard work
25	Traditional farming is outdated
26	Agriculture is extremely important
27	Production is efficient so nothing needs to change right now
28	Agriculture should find and implement better management methods
29	The government is too involved in the operation of agriculture
30	Government officials should be more involved with agriculture production
31	Only organic compound pesticides should be used
32	I believe in the use of pesticides
33	GMOs make the plant better

Table 4 Continued

Statement #	Statement
34	GMOs should be tested more to make sure they are safe for consumption
35	PETA does not know about agriculture
36	Monsanto is an evil corporation
37	What agriculture does now is scary
38	I have hope for the future of agriculture
39	I am concerned with the current health of the land
40	I am concerned with the treatment of animals
41	Animals are treated and handled fairly
42	Animals have certain rights that are mishandled
43	I support the mass production of food
44	People should limit how much meat they consume
45	Agriculture is destroying the land by mishandling resources and taking shortcuts
46	I trust that the people growing our food wouldn't hurt us
47	I believe in growing food with respect to the greater ecosystem
48	The food we eat now is not real
49	Growing things and seeing the results of my work is beautiful
50	Producers should stop prioritizing money over the health of people and animals
51	Producers take the time to make sure they do things correctly
52	Price is important to me when purchasing food
53	I am willing to spend more money on food to make sure I get what I want
54	Agriculture is what keeps me fed
55	Agriculture develops youth and teaches responsibility
56	Chemical companies should not be involved with agriculture
57	There needs to be a balance in production
58	I rarely think about agriculture
59	I think about agriculture frequently
60	What I eat affects more than my health
61	Healthy food is a priority for me
62	Convenience is important to me when I purchase food
63	Taste is important to me when I purchase food
64	Quality is important to me when I purchase food

Form board development

After creating the Q set, I designed and formatted the form board. A form board is a two-dimensional matrix that enables participants to indicate which statements are

most (associated with positive values) or least (associated with negative values) important to them. In some cases, form boards can also be designed to enable individuals to indicate which statements are most like his or her beliefs or opinions (associated with positive values) or least like his or her beliefs or opinions (associated with negative values). The number of statements used for the Q sort determined the range of points on the form board (e.g., -6 to +6, with a zero as a center point). Watts and Stenner (2012) recommended that a Q sort with 40 or fewer statements should have a nine-point form board (-4 to +4, with a zero as a center point). If a sort had 40 to 60 statements, an 11-point form board (-5 to +5, with a zero as a center point) should be created, and if a sort had 60 statements or more, the form board should be a 13-point (-6 to +6, with a zero as a center point) instrument (Watts & Stenner, 2012).

The kurtosis, or level of slope, for the form board is also an important factor that must be considered. A complex topic, or a topic that participants are unfamiliar with, calls for a steeper distribution, or higher kurtosis, and a shallower distribution for topics that participants are familiar with (Watts & Stenner, 2012). Because the sample was purposively selected based on participants' knowledge and opinion, I chose to create a form board with a shallower distribution and a kurtosis closer to zero. This is because "more straightforward topics or topics in relation to which the participant group are likely to be expert or knowledgeable" (Watts & Stenner, 2012, p. 80) should have a form board with a shallower distribution. To create a form board that closely follows the recommendations that Watts and Stenner (2012) proposed, I created a form board with 17 points (-8 to +8, with a zero as a center point) and a shallow distribution (Figure 7).

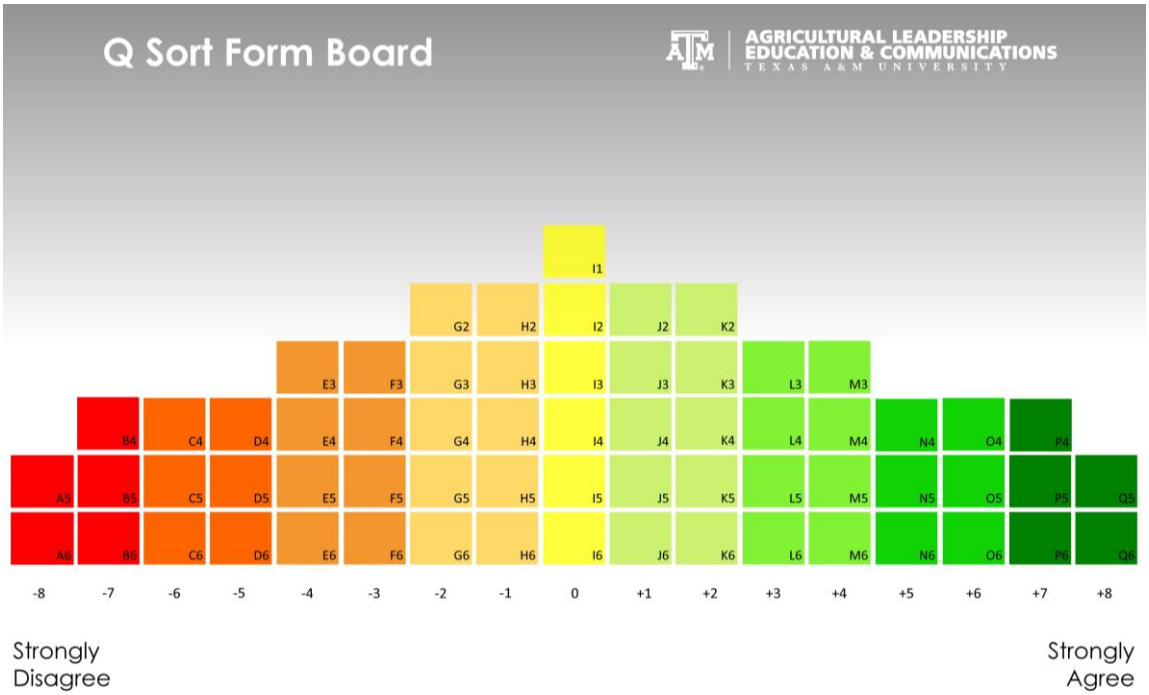

Figure 7. A Q sort form board that contains 64 statements, 17 points, and a shallow distribution was used for the sorting of the Q set.

I printed the statements on note cards with their corresponding numbers. For ease of sorting and to keep the cards from wear and tear, I laminated the cards and attached Velcro to both the cards and form board. This helped keep the cards in place when I met the participants outside or in an area without a flat surface.

Q sorting process

For each sort, I shuffled the statements and presented them to the participants in a plastic container. I then read them the condition statement, which is a set of instructions that specified the "context under which the participant [is] to interpret and react to the Q statements" (Tuler, Webler, & Finson, 2006, p. 251). I asked each participants to read through the statements at least once before placing the cards on the board and to divide

the cards into three piles (agree, neutral, and disagree). They were asked to read each statement and respond while thinking about their personal views and opinions of agriculture. Once the piles were created, I asked them to rank and place the statements on the form board until every cell was filled with one of the statements.

During the sorting of the Q set, I took notes to describe the process participants implemented and their thoughts while sorting the statements. These notes were coded with the letter Q and the last two numbers that corresponded with their participant number (e.g., Q01). I encouraged participants to explain how and why they were sorting statements, and to talk through their thought process. I also asked them to discuss which statements elicited strong reactions, both negative and positive. After the sorting of the Q set, I asked him or her to clarify his or her decisions, if needed. These notes were taken into account during analyses and helped in the identification and description of personas.

Q analyses

After the Q sorts, I entered the data into Microsoft Excel® in an R configuration setup. I copied the statement numbers onto a digital form board and transcribed the numbers into columns of data within Excel®. Each block on the form board corresponded to a cell in Excel® so that data could be analyzed. After the data were cleaned up, it was ready to be entered into SPSS®.

SPSS® analysis

I manually copied the statement numbers from each participant's Q sort onto sheets of paper with a blank form board. I also took pictures of the completed sorts for archival and to check that I copied the answers correctly. Using the hand-written notes

and pictures as references, I entered the statement numbers into Excel® as R data by matching the statement number with the cell number it was sorted into (e.g., if statement 36 was sorted into column A, row 6 [A6]), it was entered into the corresponding cell in Excel® (see Figure 8). After data were entered into Excel as R configured data, I imported the data into IBM® SPSS®, version 23.

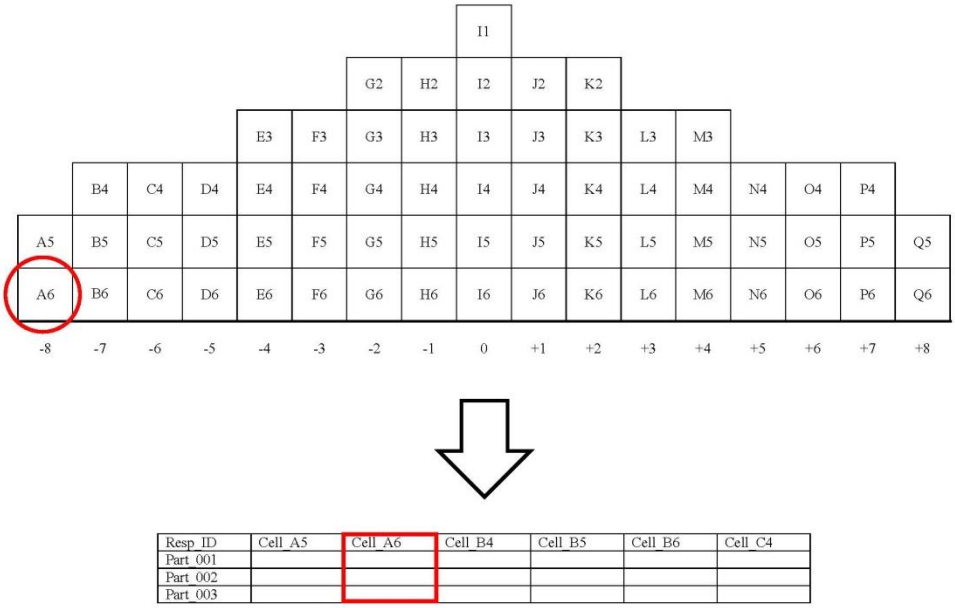

Figure 8. Statements sorted into Cell A6 were transcribed into the corresponding cell in Excel.

In SPSS®, I analyzed data by using PCA (Principal Component Analysis) with a varimax rotation, which has been a satisfactory method of analyzing Q data (Brown, 1980; McKeown & Thomas, 1988). Field (2009) noted that "principal component analysis merely decomposes the original data into a set of linear variates" (p. 638) and

deciphers how variables contribute to the final factor. Tabachnick and Fidell (2013) stated factor rotations are not used "to improve the quality of the mathematical fit between the observed and reproduced correlation matrices because all orthogonally rotated solutions are mathematically equivalent to one another and to the solution before rotation" (p. 642). I chose varimax as the method of factor rotation because it attempts to create clusters that are easier to interpret by loading "a smaller number of variables highly onto each factor" (Field, 2009, p. 644). Using PCA and varimax rotation, I created a correlation table to show the correlation between each sort. These correlation coefficients represent how similar or dissimilar each participant's sort was to the others (see Appendix X).

Typically, Kasier-Meyer-Olkin reports the value used to verify sampling adequacy (Field, 2009). The KMO value ranges from 0 to 1 and is the "ratio of the squared correlation between variables to the squared partial correlation between variables" (Field, 2009, p. 647). Even though Q methodology is not a method based on sampling adequacy, for the sake of statistical analyses, I deemed the KMO value important. As the KMO value approaches one, the patterns of correlation become more compact, so analysis should produce reliable factors (Field, 2009). The KMO value for this study was 0.77, which was acceptable (Field, 2009; Hutcheson & Sofroniou, 1999). Bartlett's test of sphericity, which tests the overall significance of all the correlations within the correlation matrix, was significant (χ^2 (78) = 321.63, $p < 0.01$).

After rotation, SPSS® extracted four factors. The rotated component matrix showed that, while the four factors were distinct, there was some overlap with three of

the loadings. Part_012, Part_005, and Part_007 each double loaded and became confounding sorts. Double loadings can be considered to be confounded sorts they "possess[ed] a significant factor loading in relation to more than one of the study factors" (p. 129) and were removed from the construction of factor estimates (Watts & Stenner, 2012). The 10 remaining sorts were used for the factor estimates and persona development (Table 5).

Table 5

Rotated Component Matrix with Factor Loadings

	Factor			
	1	2	3	4
Part_001			0.832	
Part_002	0.893			
Part_003	0.796			
Part_004	0.849			
Part_005		0.521	0.471	
Part_006		0.835		
Part_007		0.526		0.631
Part_008		0.751		
Part_009			0.712	
Part_010		0.694		
Part_011		0.721		
Part_012	0.620			0.530
Part_013				0.836

The four factors became the dependent variables and group types used to begin persona development. Table 6 lists the eigenvalues, percentage of variance, and cumulative percentage for each factor group.

Table 6

Number of Items, Eigenvalues, Percentage of Variance, and Cumulative Percentages for Groups in SPSS®

Group	*n*	Eigenvalue	% of Variance	Cumulative %
1	3	4.06	31.20	31.20
2	4	2.72	20.90	52.10
3	2	1.18	9.11	61.21
4	1	1.09	8.34	69.58

The first factor was robust, with a high eigenvalue of 4.06, and accounted for 31.2% of the total variance. Factor two had an eigenvalue of 2.72 and accounted for a further 20.9% of the variance. More than one half of the variance (52.1%) can be explained by the first two factors. The eigenvalues for factors three and four were 1.18 and 1.09 respectively, together accounting for a further 17.45% of the variance. All four factors accounted for 69.6% of the total variance and became the starting point for persona development.

Research Question 3: What Are the Different Personas of Agriculture?

To answer Research Question 3, which had two driving objectives, data from the previous research questions were condensed and brought together to develop personas.

Persona Development

The purpose of persona development was to develop personas from the different perspectives of agriculture and to answer RO3.1. The group types that emerged from Q data analyses (RO2.1) were the starting point for persona development and were built further with data from the interviews and questionnaire. The data, from components A,

B, and C_1, added depth, examples, demographics, and media consumption characteristics to each persona (Figure 9).

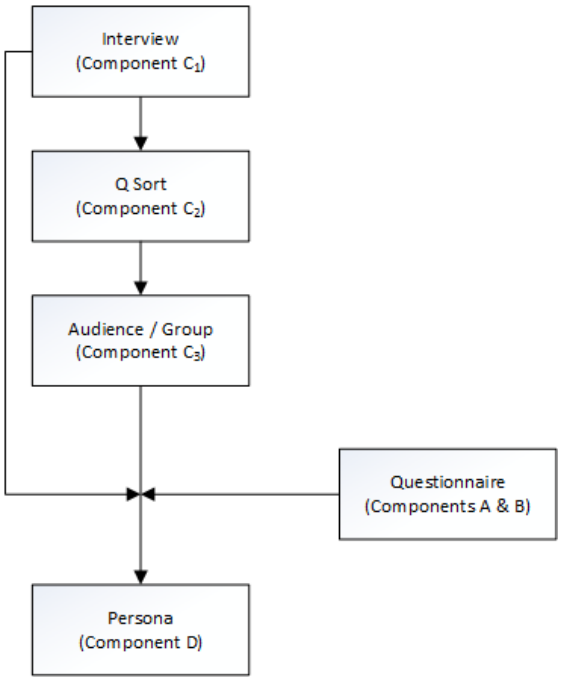

Figure 9. The data outputs from components A, B, and C_1 were used with the output from component C_3 in the persona development process.

Data collected to this point were used to "create engaging representations of individual users" (p. 20) as personas, which communicators can use to engage their audiences (Adlin & Pruitt, 2010). With the four factors as the starting point, interview notes, notes from the Q sort, media consumption, and demographical information were added to the groups to expand the knowledge about them. Because persona development is a large and time-consuming task, the outcome of this study was to developed personas from the birth to maturation phase of Adlin and Pruitt's (2010) Persona Lifecycle.

I observed the extreme statements of each factor and evaluated them in detail to find the most distinguishing characteristics for each based on the Q sort as the starting point of persona development. In addition to the extreme statements, I took the middle-ground statements into account as well, because they can occasionally "act as a fulcrum for the whole viewpoint being expressed" (Watts & Stenner, 2012, p. 155), but the majority of the time, statements that gravitate toward the middle are not significant (Watts & Stenner, 2012). All statements were listed in unique factor arrays for each factor so that I could see how the statements ranked in a table. The factor arrays were an important tool for factor interpretation because they made it easier to see emergent patterns that created distinct characteristics for each group. Once these characteristics were identified from the factors, the additional data was included. The results were initial descriptive personas.

The initial descriptive personas that were created can be related to the beginning of the birth and maturation phase of the Persona Lifecycle (Adlin & Pruitt, 2010). This stage of the Persona Lifecycle was the stage that begins the transition from persona creation to persona use. At this point, personas have an identity and basic characteristics and the initial information can be sent to interested companies and organizations. Persona development for this study ended at the beginning of the birth and maturation stage.

CHAPTER V

METHODS: AIM II

Purpose, Research Aims, Questions, and Objectives

AIM 2: The purpose of this research activity was to create syntax to analyze Q data in SPSS®. The most common software used in Q sort methods, PQMethod, does not allow the researcher to adjust the settings of the analysis because it is DOS-based (Akhtar-Danesh et al., 2008). Therefore, syntax sheets and a researcher's guide were developed to conduct statistical analyses with Q data.

RQ1: Are the results of an SPSS® Q analysis equivalent to the results generated by PQMethod?

RO1.1: Create and develop syntax to allow for the analysis of a Q sort to be conducted in SPSS® software.

RO1.2: Create a step-by-step procedure of conducting a Q sort and analyzing the data in SPSS®.

RO1.3: Compare results between the Q analysis conducted in PQMethod and SPSS®.

RO1.4: Compare the advantages and disadvantages of conducting a Q analysis in PQMethod and SPSS®.

For Aim 2 of this study, two methods of analyzing results of Q sorts were compared: IBM® SPSS® version 23 and PQMethod version 23.5. The two separate analyses were discussed in Chapter IV in the data analysis section. The two methods

were compared for difficulty of steps, ease of use, and differences in data outputs and factor loadings. I evaluated, analyzed, and compared factors, eigenvalues, *z*-scores, categories, and overall structure of the outputs between the two software packages to determine if there was a benefit of analyzing Q data in SPSS®.

Research Question 1: Are The Results of an SPSS® Q Analysis Equivalent to the Results Generated by PQMethod?

SPSS® Q Sort Syntax

To answer RQ1, which was guided by four objectives, I first created and implemented syntax in SPSS® (Appendix E). I modeled the Q sort syntax after other software programs by observing and learning about the other programs and methods of analyzing Q data, which were discussed in the introduction and literature review (Chapter 2). I created the syntax to provide researchers with another Q analysis option that could potentially allow freedom in choosing statistical analyses. Creating the syntax was the object of RO1.1, and was a trial-and-error phase with adaptations occurring throughout the process. The research process created situations where statistical choices had to be made in accordance with factor analysis and current Q analysis methods, but the process was documented as precisely and concisely as possible. I analyzed data collected from component C with the new syntax and analyzed it in PQMethod to test the accuracy of the SPSS® syntax, which also allowed for comparison of the two methods.

Step 1: Entering the data

To begin, the data had to be imported and formatted. I imported data into SPSS® from the R configured MS Excel® sheet. After I entered the data, variables were recoded. Figure 10 is a syntax excerpt showing how I recoded the data for SPSS®.

```
RECODE RESP_ID (ELSE=COPY) INTO RID.
RECODE CELL_A5 (ELSE=COPY) INTO CELL_A5.
RECODE CELL_A6 (ELSE=COPY) INTO CELL_A6.
```

Figure 10. Excerpt from syntax showing recodes from Excel to SPSS variables.

This syntax was expanded to include all 64 statements. I began data entry on the left side of the form board (column A, value -8), and worked toward the right side (column Q, value +8), from top to bottom. After I coded the variable, I added formats and levels to each statement. The labels for this study were "Cell" and the corresponding block (e.g., Cell A5), formats were set to F2.0, and the variable level was set to scale (Figure 11).

```
VARIABLE LEVEL RESP_ID (SCALE).
VARIABLE LEVEL CELL_A5 to CELL_Q6 (SCALE).

FORMATS RESP_ID (F2.0).
FORMATS CELL_A5 to CELL_Q6 (F2.0).
```

Figure 11. Variable levels were set to scale data and formats set to F2.0 to ready the data for analyses.

Step 2: Adding values to statements

The next step was to compute values for each cell based on the statement that sorted into it. Syntax was needed to add values to the sorts for analyzing the datasets in as similar a way as possible to PQMethod analysis. Because the data were imported in an R configured format with statement numbers in their corresponding cells, values had to be assigned to each cell. To do this, I created multiple if-then statements in the syntax (see Figure 12).

```
COMPUTE STATEMENT_1=$SYSMIS.
IF (CELL_A5 = 1) STATEMENT_1 = -8.
IF (CELL_A6 = 1) STATEMENT_1 = -8.
IF (CELL_B4 = 1) STATEMENT_1 = -7.
IF (CELL_B5 = 1) STATEMENT_1 = -7.
IF (CELL_B6 = 1) STATEMENT_1 = -7.
***continue pattern with middle cells (C4 thru O6)***
IF (CELL_P4 = 1) STATEMENT_1 = 7.
IF (CELL_P5 = 1) STATEMENT_1 = 7.
IF (CELL_P6 = 1) STATEMENT_1 = 7.
IF (CELL_Q5 = 1) STATEMENT_1 = 8.
IF (CELL_Q6 = 1) STATEMENT_1 = 8.
EXECUTE.
FORMATS STATEMENT_1 (F3.0).
VARIABLE LEVEL STATEMENT_2 (SCALE).
```

Figure 12. Computing statement values excerpt from syntax.

The 68-line syntax block in Figure 12 computed the value for Statement 1 across the sorts in whichever cell Statement 1 was sorted into. The computing commands were repeated for each statement in the Q set (STATEMENT_1 thru STATEMENT_64). Computing the values changed the statement number on the Q sort to the value of the column (e.g., if Statement 25 sorted into column A, then the computing syntax changed the number from 25 to -8).

Step 3: Flipping the dataset (from R to Q configuration)

Once the statement numbers transitioned to their respective values, I transposed the data so that participants became the variables being analyzed. By flipping the data, it rotated the dataset by 90°, switching the columns and rows. This process allowed variables to be analyzed as Q data instead of R data—effectively factoring participants across measures (Gorsuch, 2015). After transposing the data, I recoded variables into their respective respondent identification codes (i.e., Part_001). I also labeled, formatted to F2.0, and changed the data to scale (Figure 13).

```
FLIP VARIABLES= STATEMENT_1 TO STATEMENT_64.
```

Figure 13. Syntax of data flipped from R configuration to Q configuration.

Step 4: Running the analyses

Once the configuration was rotated from R to Q, data were ready for analyses. I wrote the syntax to perform a PCA with a varimax rotation (see Figure 14). Varimax rotation is highly accepted as the method of rotation in *Operant Subjectivity* and other Q

sort analyses. Kaiser (1958) created the varimax rotation to maximize the interpretability of the factor matrix. Rotation does not change the data and subject matter but rather places data under proverbial microscopes to investigate them in detail rather than in general (Watts & Stenner, 2012). I followed the procedures for performing a PCA using Field (2009). All participants were included in the factor analysis (Part_001 to Part_013) and for this study, the criteria for factor extraction was a minimum eigenvalue of 1.00, with 40 possible iterations. I chose a minimum eigenvalue of 1.00 for the extraction criteria based on statistical recommendations from Field (2009) and methodological recommendations from Watts and Stenner (2012). Using eigenvalues as the criteria for extraction is common in PQMethod as well.

```
FACTOR
  /VARIABLES PART_001 TO PART_013 /MISSING LISTWISE
  /PRINT cor INITIAL EXTRACTION ROTATION FSCORE
  /CRITERIA MINEIGEN(1) ITERATE(40)
  /EXTRACTION PC
  /CRITERIA ITERATE(40)
  /ROTATION VARIMAX
  /PLOT EIGEN ROTATION (1 2)(1 3)(1 4)(2 3)(2 4)(3 4)
  /SAVE REG(ALL F).
```

Figure 14. Principal component analysis with varimax rotation.

Additionally, *z*-scores were computed from the factor analysis but were not included in the output. Instead of becoming an output table in SPSS®, they were

computed into new variables in the existing dataset. By becoming new variables, the *z*-scores were used for further analyses. Next, I renamed the factors to make more sense to me and for easier comparison between SPSS® and PQMethod *z*-scores later (see Figure 15). I separately performed *z*-score rankings for each group so each SPSS® factor's rankings could be analyzed with the PQMethod output.

```
RENAME VARIABLES (F1=A)(F2=B)(F3=C)(F4=D).
RANK VARIABLES=A.
RENAME VARIABLES (RA=A_RANK).
FORMATS A_RANK (F2.0).
```

Figure 15. Variables were renamed and each factor was ranked by *z*-score.

Step 5: Assigning participants to factors

From the PCA with varimiax rotation, I identified four factors with 10 significant loadings. To analyze the demographic and media consumption data by factors, participants were assigned to the factors they loaded to. At this point, I moved back to the R configured dataset to analyze tests on the questionnaire data with the filters. Based on the rotated component matrix, each participant was assigned to the factor they loaded on (see Figure 16). Participants who double-loaded, or had a factor loading of ±0.40 on more than one factor, were assigned to their own group. I labeled the new filter variables "Groups – Varimax Rotation", formatted them to (F2.0), and changed them to nominal data.

```
COMPUTE ROTATED_GROUPS=$SYSMIS.

IF RESP_ID (PART_002 OR PART_004 OR PART_003) ROTATED_GROUPS=1.

IF RESP_ID (PART_006 OR PART_008 OR PART_011 OR PART_010)
ROTATED_GROUPS=2.

IF RESP_ID (PART_001 OR PART_009) ROTATED_GROUPS=3.

IF RESP_ID (PART_013) ROTATED_GROUPS=4.

IF RESP_ID (PART_012) ROTATED_GROUPS=5.

IF RESP_ID (PART_005) ROTATED_GROUPS=6.

IF RESP_ID (PART_007) ROTATED_GROUPS=7.
```

Figure 16. The participants were computed into their new factors to create filters.

To keep the variables organized and easy to read, I gave them new values (see Figure 17). I labeled the rotated groups depending on which factor participants loaded to keep organized and make sure that there was no confusion when using the filters. Participants that double loaded were labeled separately with both groups because they did not fall into a specific factor, but overlapped.

```
VALUE LABELS ROTATED_GROUPS 1 'ROTATED GROUP 1' 2 'ROTATED GROUP 2' 3
'ROTATED GROUP 3' 4 'ROTATED GROUP 4' 5 'ROTATED GROUPS 1 AND 4'

 6 'ROTATED GROUPS 2 AND 3' 7 'ROTATED GROUPS 2 AND 4'.
```

Figure 17. The new variables were given new values to keep them organized.

Step 6: Creating the filters

Once all of the labels, levels, and formats were in place for the new variables, I created syntax to analyze the groups with the questionnaire data. Before descriptive

statistics could be calculated, I created filters so the outputs would only reflect the answers of the factor being analyzed (see Figure 18). I put the filters in place before analyzing the descriptive statistics analyses for each factor.

```
USE ALL.
COMPUTE FILTER_$ROTATED_GROUP1=(ROTATED_GROUPS = 1).
VARIABLE LABELS FILTER_$ROTATED_GROUP1 'ROTATED_GROUPS = 1
(FILTER)'.
VALUE LABELS FILTER_$ROTATED_GROUP1 0 'NOT SELECTED' 1
'SELECTED'.
FORMATS FILTER_$ROTATED_GROUP1 (F1.0).
FILTER BY FILTER_$ROTATED_GROUP1.
EXECUTE.
```

Figure 18. Syntax was written to create filters that separated out factor data for analyses.

Step 7: Computing descriptive statistics

With the filter in place, the only participants in this part of the analyses were included into Rotated_Group1 (Part_002, Part_003, and Part_004). Frequencies can be helpful for "assessing properties of the distribution of scores" (Field, 2009, p. 18), so they were calculated to describe the characteristics of each factor. Along with frequencies, I reported descriptive statistics to provide more insight to respondents' answers, on average, and how participants ranged from question to question. An example of the descriptive statistics syntax is in Figure 19.

```
********Social Media*******

DESCRIPTIVES VARIABLES=Q2.1_1 Q2.1_2 Q2.1_3 Q2.1_4 Q2.1_5
Q2.2_X1 Q2.2_X2 Q2.2_X3 Q2.2_X4

  Q2.2_X5

 /STATISTICS=MEAN STDDEV MIN MAX.
```

Figure 19. An example of the descriptive statistics syntax for social media variables.

Because the descriptive statistics analysis did not show the frequencies of each answer in the factor, I also calculated frequencies. An excerpt from the syntax shows the syntax for frequencies (see Figure 20).

```
********Social Media*******

FREQUENCIES VARIABLES=Q2.1_1 Q2.1_2 Q2.1_3 Q2.1_4 Q2.1_5
Q2.2_X1 Q2.2_X2 Q2.2_X3 Q2.2_X4

  Q2.2_X5

 /ORDER=ANALYSIS.
```

Figure 20. Syntax was used to analyze the social media statistics for each factor.

Analyses of SPSS® and PQMethod Outputs

I analyzed the Q data using two software packages: SPSS® and PQMethod. Analyzing data in both packages allowed for testing of the advantages and disadvantages of each, as well comparing the results for differences. After completion of the Q sort analyses in both packages, I compared the results between SPSS® and PQMethod, starting by entering and analyzing the Q sort data in the PQMethod software package.

PQMethod analysis

After analyzing the data in SPSS®, data were analyzed using PQMethod 2.35, which was downloaded from qmethod.org/resources. I used Watts and Stenner (2012) and the online *PQMethod Manual* from schmolck.userweb.mwn.de/qmethod/pqmanual as process guides for analyzing data in PQMethod. Because PQMethod only has the capability to analyze 13-column Q sorts, I had to rearrange the cells and their corresponding statements. Therefore, to change the cells with the least amount of effect, I collapsed the middle columns and left the extreme statements alone. I moved columns H and J to the middle column, changing their values from -1 and +1 to 0 respectively. I also moved columns F and G inward, appointing them a -1 value, and columns K and L were appointed a +1 value. The rest of the columns were not collapsed, but received the next value, which is shown in Figure 21.

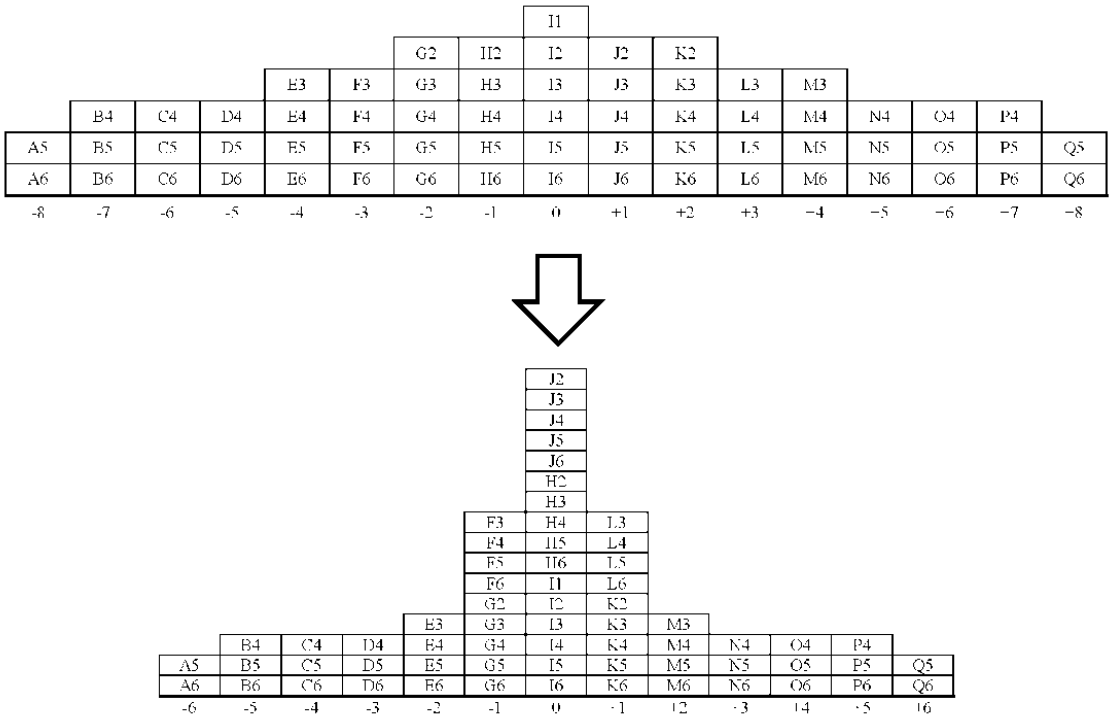

Figure 21. An illustration of the changed cell values from SPSS® sort to PQMethod

To describe differences of the two distributions, I reported the distribution values. The SPSS® distribution was *M* = 0.00, *SD* = 2.80, *Skew* = 0.00, and *Kurt* = 0.00. The PQMethod distribution was *M* = 0.00, *SD* = 4.30, *Skew* = 0.00, and *Kurt* = -0.85.

After data input, I created a correlation matrix between sorts that represented similarities between sorts (Appendix G). With the correlation matrix, eigenvalues were also presented in this step of the analysis. Eigenvalues, which are a factor's significance "estimated by the sum of its squared factor loadings" (p. 51), are considered significant when values are greater than 1.00 (McKeown & Thomas, 1988). Factors 1, 2, 3, and 4 all had an eigenvalue greater than 1.00 and were considered significant (Table 7). Therefore, four factors were extracted in the varimax rotation process.

Table 7

Eigenvalues, Percentage of Variance, and Cumulative Percentages for Groups in PQMethod

Factor	Eigenvalue	% Variance	Cumulative %
1	3.95	0.30	0.30
2	2.62	0.20	0.50
3	1.30	0.10	0.60
4	1.06	0.08	0.68

After factor rotation, participants loaded onto the factors in a similar way to the SPSS® method. Table 8 shows the participant factor loadings from PQMethod. Loadings that were less than 0.40 were not shown because they were suppressed in the SPSS® analysis and for comparison, results were kept as similar as possible. Factor extraction showed the same three double loadings, or confounding variables, as SPSS®.

Table 8

Factor Loadings by Participant in PQMethod

	Factor			
	1	2	3	4
Part_001			0.834	
Part_002	0.867			
Part_003	0.783			
Part_004	0.851			
Part_005		0.501	0.497	
Part_006		0.825		
Part_007		0.618		0.493
Part_008		0.719		
Part_009			0.674	
Part_010		0.705		
Part_011		0.691		
Part_012	0.626			0.504
Part_013				0.825

The *z*-scores from the PQMethod output and the SPSS® *z*-score variables were both copied to a separate Excel sheet, making sure that the *z*-scores matched up with their respective statement number. I confirmed that the variables were labeled according to their origin and corresponding factor (e.g., SPSS_A, *z*-score_01, etc.), and then imported the dataset to SPSS for analyses. Because the methods were highly dependent upon the *z*-scores of the individual statements, I analyzed comparative *t*-tests and pairwise comparisons to determine if there were any significant differences between the two methods.

A *t*-test is a statistical analysis to determine if two group means are different (Field, 2009). In cases where the conditions were analyzed by the same participants, a dependent-means, or paired-samples *t*-test should be used. Therefore, I analyzed paired-samples *t*-tests on each pair of groups' *z*-scores. When conducting multiple *t*-tests, the risk of Type I errors occurring increases (Field, 2009). The most popular way to control this error is to divide alpha (normally .05) by the number of comparisons, which is known as the Bonferroni correction (Field, 2009). It is important to note that *t*-tests assume that the sampling distribution is normal (Field, 2009). Because the two conditions being analyzed in the *t*-tests were the same statements and normally distributed *z*-scores, the *t*-test was good fit for this analysis. Figure 22 shows the syntax for analyzing a *t*-test for the *z*-scores of the first factor. The syntax was repeated for the three remaining factors.

```
***Group 1****

T-TEST PAIRS=Z_SCORE_01 WITH SPSS_A (PAIRED)
  /CRITERIA=CI(.9500)
  /MISSING=ANALYSIS.
```

Figure 22. An example of a *t*-test syntax for group 1 *z*-scores.

In addition to the paired samples *t*-test, I also implemented pairwise comparisons. Pairwise comparisons are "designed to compare all different combinations of the treatment groups" (Field, 2009, p. 372) and are another type of mean comparison. In the case of this study, the treatment groups analyzed were the two different methods consisting of the same participants. Essentially, it was similar to taking all of the pairs of groups and performing a *t*-test on the individual groups. Figure 23 shows the syntax for analyzing a pairwise correlation comparison for the *z-scores* of the factors. I analyzed all of the *z*-scores together in this analysis, which was different from the *t*-tests that analyzed groups separately.

```
CORRELATIONS
  /VARIABLES=Z_SCORE_01 Z_SCORE_02 Z_SCORE_03 Z_SCORE_04
SPSS_A SPSS_B SPSS_C SPSS_D
  /PRINT=TWOTAIL NOSIG
  /MISSING=PAIRWISE.
```

Figure 23. The nonpairwise correlation syntax using two-tailed for *z*-scores.

For good measure, I conducted another pairwise comparison that analyzed the ranks between the SPSS® statement output and PQMethod output. I analyzed each of the statement ranks in the same test again. Figure 24 shows the syntax for this test.

```
NONPAR CORR
  /VARIABLES=RANK_01 RANK_02 RANK_03 RANK_04 SPSS_A_RANK
SPSS_B_RANK SPSS_C_RANK SPSS_D_RANK
  /PRINT=SPEARMAN TWOTAIL NOSIG
  /MISSING=PAIRWISE.
```

Figure 24. The nonpairwise correlation syntax using Spearman's for ranks.

CHAPTER VI

RESULTS AND DISCUSSION: AIM I

Research Question 1: What Are the Public's Perspectives of Agriculture?

To achieve RQ1, I conducted 13 semi-structured interviews to understand the public's perspectives of agriculture and to create the Q set for RO2.1 The analysis resulted in eight themes describing perspectives of agriculture—*personal*, *the public/consumers, influences of food purchases, eating, defining agriculture, agricultural practices, impact of agriculture,* and *what needs to change*. I drew statements from these themes (except *personal* because it did not contain psychographic information) for the creation of the Q set. Interview notes from RQ1 were integrated with persona development and description in RQ3.

Research Question 2: What Are the Determinants that Make Up Each Perspective?

To accomplish RO2.1, describe the psychographic characteristics of each persona, 13 Q sorts were conducted using the Q set of statements created from RQ1. The analysis of the Q sorts revealed that there were four distinct group types of agricultural perspectives. Of the 13 Q sorts, only 10 were significant (±0.40) on a single factor. I extracted four factors from the Q sort analysis: *conventional agriculturalist, environmental protector, food-oriented consumer,* and *convenience-driven consumer.* These four factors represent the perspectives of agriculture for the P set of this study. For each perspective, I presented definitive statements, as well as statement number (SN), factor array (*FA*), and *z*-score (*z*).

Factor Interpretation

Factor scores (*z*-scores) were calculated through the SPSS® and PQMethod to create factor arrays. The groups were discussed using the results and outputs from the SPSS® analysis. A *z*-score, which calculates how far a statement is from the middle of a normal distribution (Field, 2009), helped in factor interpretation by creating a composite Q sort for each factor, known as a factor array (van Exel & Graaf, 2005). The *z*-scores pointed out the statements that best represent each factor. On the factor array, statements with the highest *z*-score were placed toward the right side of the distribution (+8), and statements with the lowest *z*-score were placed on the left side of the distribution (-8).

Because the sample remained the same throughout the study, interview and Q sort data were presented with different codes. Semi-structured, qualitative interviews (component C_1) were coded with a P and the corresponding participant number (e.g., interview for Part_001 was coded as P01). I coded notes taken during Q sorts (component C_2) with a Q and corresponding participant number (e.g., Q sort notes for Part_001 were coded as Q01).

Factor 1: Conventional agriculturalist

The first audience group, *conventional agriculturalists,* was comprised of three Q sorts and accounted for 31.2% of the total variance. The three Q sorts that loaded as a conventional agriculturalist were all from the initial group of "traditionalists." The conventional agriculturalists were more favorable of statements that supported agriculture and depicted a life engaged with agriculture. Participants with this view had an agricultural background and continued in the industry as adults (P02; P03; P04).

The core beliefs of conventional agriculturalists were that agriculture develops youth and teaches responsibility and that they thought about agriculture frequently (SN = 55, *FA* = 8, *z* = 1.65; SN = 59, *FA* = 8, *z* = 1.65). In addition, they believed that agriculture is a hard work (SN = 24, *FA* = 7, *z* = 1.56) and that PETA contributes to negative perceptions of agriculture (SN = 7, *FA* = 7, *z* = 1.61). Another interesting characteristic of conventional agriculturalists was that they enjoy eating meat (SN = 18, *FA* = 7, *z* = 1.54).

Conventional agriculturalists also believed that agriculture is extremely important (SN = 26, *FA* = 6), it is a way of life (*z* = 1.38; SN = 23, *FA* = 6, *z* = 1.50), and people should be more educated about agriculture (SN = 1, *FA* = 6, *z* = 1.42). One participant said that agriculture is about the simple things and provides opportunities to learn about community, respect, and the life cycle (P02) and P04 echoed this by stating agriculture forms responsible adults.

Table 9 provides a representation of statements with array positions between 8 and 4, as well as -4 to -8, which include the top 15 statements (23.4%) for “strongly agree” and “strongly disagree” for Factor 1. The complete factor array for Factor 1 is included in Appendix H.

Table 9

Factor 1: Conventional Agriculturalists

No.	"Strongly Agree" Statements	Array Position	*z*-score
55	Agriculture develops youth and teaches responsibility	+8	1.65
59	I think about agriculture frequently	+8	1.65
7	PETA is why there are negative perceptions of agriculture	+7	1.61
24	Agriculture is hard work	+7	1.56
18	I like anything with meat in it	+7	1.54
23	Agriculture is a way of life	+6	1.50
1	People should be more educated about agriculture	+6	1.42
26	Agriculture is extremely important	+6	1.38
35	PETA does not know about agriculture	+5	1.34
32	I believe in the use of pesticides	+5	1.29
38	I have hope for the future of agriculture	+5	1.21
54	Agriculture is what keeps me fed	+4	1.07
4	I am aware of how my food is produced	+4	0.82
51	Producers take the time to make sure they do things correctly	+4	0.69
41	Animals are treated and handled fairly	+4	0.66
50	Producers should stop prioritizing money over the health of people and animals	-4	-0.93
45	Agriculture is destroying land by mishandling resources and taking shortcuts	-4	-0.95
12	The organic movement doesn't matter to me	-4	-1.06
5	I worry that I don't know what is in my food	-4	-1.08
40	I am concerned with the treatment of animals	-5	-1.12
42	Animals have certain rights that are mishandled	-5	-1.12
48	The food we eat now is not real	-5	-1.22
16	Processed foods are not good for me	-6	-1.24
44	People should limit how much meat they consume	-6	-1.26
56	Chemical companies should not be involved with agriculture	-6	-1.37
8	The agriculture industry has taken away our choices at the store	-7	-1.59
19	Eating only vegetarian food is important to me	-7	-1.62
37	What agriculture does now is scary	-7	-1.73
13	Eating organic is better for me	-8	-1.75
58	I rarely think about agriculture	-8	-2.02

Factor 2: Environmental protectors

The second audience group, *environmental protectors,* was comprised of four Q sorts and accounted for 20.9% of the total variance. Of the four Q sorts that loaded as environmental protectors, two were from the opinionated learner sample selection and two were from the organic believer sample selection. Environmental protectors believed agriculture should be held accountable and placed a great deal of importance on the health of the land, animals, and people. Participants with this view believed agricultural practices should be improved.

Environmental protectors were concerned with the current health of the land (SN = 39, *FA* = 8, *z* = 1.67) and believed in growing food with respect to the greater ecosystem (SN = 47, *FA* = 8, *z* = 1.67). In addition, they were concerned with the treatment of animals and believed people should limit how much meat they consume (SN = 40, *FA* = 7, *z* = 1.59; SN = 44, *FA* = 7, *z* = 1.38). Environmental protectors also viewed healthy food as a priority (SN = 61, *FA* = 7, *z* = 1.47).

Like conventional agriculturalists, environmental protectors also thought about agriculture frequently (SN = 59, *FA* = 6, *z* = 1.22) but for different reasons. The environmental protector thought about agriculture in terms of holding it accountable and making sure that the land, people, and animals are cared for and respected. They also believed that what they eat affects more than their health and often worried they do not know what is in their food (SN = 60, *FA* = 6, *z* = 1.27; SN = 5, *FA* = 6, *z* = 1.17).

The two opinionated learners that loaded in this factor were vegetarian and believed animals should not be consumed (P06; P08), but the two organic believers were

more neutral in their views about consuming animals (P10; P11). This split in views toward animal consumption should be noted but was the only split view this factor had. From the interviews, it was apparent participants had varying levels of negativity toward agriculture, but the main viewpoint of environmental protectors was making sure agricultural practices do not adversely affect land, people, or animals.

Table 10 provides a representation of statements with array positions between 8 and 4, as well as -4 to -8, which include the top 15 statements (23.4%) for “strongly agree” and “strongly disagree” for Factor 2. The complete factor array for Factor 2 is included in Appendix I.

Table 10

Factor 2: Environmental Protectors

No.	“Strongly Agree” Statements	Array Position	*z*-score
39	I am concerned with the current health of the land	+8	1.67
47	I believe in growing food with respect to the greater ecosystem	+8	1.67
40	I am concerned with the treatment of animals	+7	1.59
61	Healthy food is a priority for me	+7	1.47
44	People should limit how much meat they consume	+7	1.38
60	What I eat affects more than my health	+6	1.27
59	I think about agriculture frequently	+6	1.22
5	I worry that I don't know what is in my food	+6	1.17
64	Quality is important to me when I purchase food	+5	1.15
50	Producers should stop prioritizing money over the health of people and animals	+5	1.13
42	Animals have certain rights that are mishandled	+5	1.08
14	Purchasing fresh food is important to me	+4	1.07
26	Agriculture is extremely important	+4	1.04
49	Growing things and seeing the results of my work is beautiful	+4	0.94
24	Agriculture is hard work	+4	0.82

Table 10 Continued

No.	"Strongly Disagree" Statements	Array Position	*z*-score
43	I support the mass production of food	-4	-0.97
30	Government officials should be more involved with agriculture product	-4	-1.08
7	PETA is why there are negative perceptions of agriculture	-4	-1.11
32	I believe in the use of pesticides	-4	-1.17
33	GMOs make the plant better	-5	-1.28
25	Traditional farming is outdated	-5	-1.29
51	Producers take the time to make sure they do things correctly	-5	-1.30
12	The organic movement doesn't matter to me	-6	-1.32
6	Outbreaks are why people have a negative view of agriculture	-6	-1.42
21	I eat out more than I cook	-6	-1.53
27	Production is efficient so nothing needs to change right now	-7	-1.59
18	I like anything with meat in it	-7	-1.68
41	Animals are treated and handled fairly	-7	-1.68
58	I rarely think about agriculture	-8	-1.82
17	I don't care about what I eat	-8	-2.38

Factor 3: Food-oriented consumers

The third audience group, *food-oriented consumers,* was comprised of two Q sorts and accounted for 9.11% of the total variance. One individual was from the health-conscious sample, and the other individual was from the indifferent sample. Food-oriented consumers appreciated foods containing meat and believed that only organic compound pesticides should be used in production (SN = 18, *FA* = 8, *z* = 2.27; SN = 31, *FA* = 8, *z* = 1.75). In addition, they believed GMOs should be tested further to certify their safety for consumers, thought that processed foods were bad for them, and agreed what they eat affects more than their health (SN = 34, *FA* = 7, *z* = 1.73; SN = 16, *FA* = 7, *z* = 1.65; SN = 60, *FA* = 7, *z* = 1.37).

Further, food-oriented consumers believed agriculture is hard work, similar to the conventional agriculturalists (SN = 24, *FA* = 6, *z* = 1.25). They also believed chemical companies should not be involved with agriculture and often looked for convenient food options (SN = 56, *FA* = 6, *z* = 1.23; SN = 62, *FA* = 6, *z* = 1.19).

Table 11 provides a representation of statements with array positions between 8 and 4 as well as -4 to -8, which include the top 15 statements (23.4%) for "strongly agree" and "strongly disagree" for Factor 3. The complete factor array for Factor 3 is included in Appendix J.

Table 11

Factor 3: Food-Oriented Consumers

No.	"Strongly Agree" Statements	Array Position	*z*-score
18	I like anything with meat in it	+8	2.27
31	Only organic compound pesticides should be used	+8	1.75
34	GMOs should be tested more to make sure they are safe	+7	1.73
16	Processed foods are not good for me	+7	1.65
60	What I eat affects more than my health	+7	1.37
24	Agriculture is hard work	+6	1.25
56	Chemical companies should not be involved with agriculture	+6	1.23
62	Convenience is important to me when I purchase food	+6	1.19
58	I rarely think about agriculture	+5	0.98
17	I don't care about what I eat	+5	0.91
15	I am only interested in buying what is necessary	+5	0.80
61	Healthy food is a priority for me	+4	0.76
53	I am willing to spend more money on food to make sure I get what I want	+4	0.74
20	Cooking my own food is important to me	+4	0.71
64	Quality is important to me when I purchase food	+4	0.71

Table 11 Continued

No.	"Strongly Disagree" Statements	Array Position	*z*-score
39	I am concerned with the current health of the land	-4	-0.69
54	Agriculture is what keeps me fed	-4	-0.73
41	Animals are treated and handled fairly	-4	-0.75
9	I like a variety of options when purchasing food	-4	-1.03
5	I worry that I don't know what is in my food	-5	-1.06
4	I am aware of how my food is produced	-5	-1.13
51	Producers take the time to make sure they do things correctly	-5	-1.14
43	I support the mass production of food	-6	-1.17
46	I trust the people growing our food wouldn't hurt us	-6	-1.46
45	Agriculture is destroying land by mishandling resources and taking shortcuts	-6	-1.47
8	The agriculture industry has taken away our choices at the store	-7	-1.59
33	GMOs make the plant better	-7	-1.86
32	I believe in the use of pesticides	-7	-2.00
44	People should limit how much meat they consume	-8	-2.08
19	Eating only vegetarian food is important to me	-8	-2.49

Factor 4: Convenience-driven consumers

The fourth audience group, *convenience-driven consumers,* was comprised of one Q sort and accounted for 8.37% of the total variance. The individual that loaded to factor 4 was from the sample selection of indifferent. Convenience-driven consumers supported the mass production of food but were concerned with the current health of the land (SN = 43, *FA* = 8, *z* = 1.84; SN = 39, *FA* = 8, *z* = 1.49). From the initial interviews, P13 expressed concern about how much area agriculture needs and how the environment has to change to accommodate for it, but understood that it was not the only industry hurting the land.

Additionally, P13 believed that producers should stop prioritizing money over the health of the land and people but did not believe in the organic movement (SN = 50,

FA = 7, *z* = 1.40; SN = 52, *FA* = 7, *z* = 1.34). Although he might have had issues with the negative effects agriculture might have, he believed that agriculture is what kept him fed so he appreciated it (SN = 54, *FA* = 6, *z* = 1.29; P13). The convenience-driven consumer ate out more than he cooked (SN = 21, *FA* = 6, *z* = 1.30) and was concerned with price, convenience, and taste when purchasing food (SN = 52, *FA* = 7, *z* = 1.34; SN = 62, *FA* = 6, *z* = 1.25; SN = 63, *FA* = 5, *z* = 1.21).

Table 12 provides a representation of statements with array positions between 8 and 4 as well as -4 to -8, which includes the top 15 statements (23.4%) for "strongly agree" and "strongly disagree" for Factor 4. The complete factor array for Factor 4 is included in Appendix K.

Table 12

Factor 4: Convenience-Driven Consumers

No.	"Strongly Agree" Statements	Array Position	*z*-score
43	I support the mass production of food	+8	1.84
39	I am concerned with the current health of the land	+8	1.49
50	Producers should stop prioritizing money over the health of people and animals	+7	1.40
52	Price is important to me when purchasing food	+7	1.34
12	The organic movement doesn't matter to me	+7	1.32
21	I eat out more than I cook	+6	1.30
54	Agriculture is what keeps me fed	+6	1.29
62	Convenience is important to me when I purchase food	+6	1.25
63	Taste is important to me when I purchase food	+5	1.21
22	Agriculture helps in the growth of the economy	+5	1.12
47	I believe in growing food with respect to the greater ecosystem	+5	1.11
40	I am concerned with the treatment of animals	+4	1.10
58	I rarely think about agriculture	+4	1.05
24	Agriculture is hard work	+4	0.95
57	There needs to be a balance in production	+4	0.93

Table 12 Continued

No.	"Strongly Disagree" Statements	Array Position	*z*-score
14	Purchasing fresh food is important to me	-4	-0.84
27	Production is efficient so nothing needs to change right now	-4	-0.84
11	It is rewarding to know where my food comes from	-4	-0.87
4	I am aware of how my food is produced	-4	-0.89
15	I am only interested in buying what is necessary	-5	-0.89
35	PETA does not know about agriculture	-5	-1.13
13	Eating organic is better for me	-5	-1.25
56	Chemical companies should not be involved with agriculture	-6	-1.27
3	I am aware of where my food comes from	-6	-1.44
31	Only organic compound pesticides should be used	-6	-1.54
61	Healthy food is a priority for me	-7	-1.57
41	Animals are treated and handled fairly	-7	-1.73
20	Cooking my own food is important to me	-7	-1.82
48	The food we eat now is not real	-8	-1.94
59	I think about agriculture frequently	-8	-1.97

Media Consumption

Additionally, participants completed a questionnaire (n = 13) to accomplish RO2.2, describe the communication mediums each persona prefers to receive information about agriculture. Because there were only 10 significant Q sorts, only the 10 questionnaires were used for analysis of media consumption and demographics.

Conventional agriculturalists were most familiar with Facebook (n = 3, M = 2.00, SD = 0.00) followed by Snapchat (n = 2, M = 2.00, SD = 0.00). They watched television daily (n = 3, M = 2.00, SD = 0.00) and listened to the radio (n = 3, M = 2.33, SD = 0.58) and/or Pandora® (n = 3, M = 2.33, SD = 0.58) at least once per week. In addition to the questionnaire information, participants in this group mentioned receiving information through agricultural applications on their phone (P04), Farm Bureau (P03),

and academia (P02). Because these were such specific ways of receiving information, they were not included in the questionnaire.

Environmental protectors were most familiar with Facebook (n = 3, M = 2, SD = 0.00) and Instagram (n = 3, M = 3.33, SD = 1.53) and were extremely familiar with radio (n = 4, M = 2.50, SD = 1.00), YouTube (n = 4, M = 2.50, SD = 0.58), and Netflix (n = 4, M = 2.50, SD = 0.58). This group was visual, liking photo-driven applications such as Instagram and other media outlets that specialize in videos (e.g., YouTube and Netflix).

Food-oriented consumers used Facebook (n = 2, M = 2.50, SD = 0.71), Netflix (n = 2, M = 2.50, SD = 0.71), and YouTube (n = 2, M = 2.50, SD = 0.71) most frequently. Individuals in this factor were drawn to visual social media sites, as well.

Convenience-driven consumers, represented by one participant, used social media platforms such as Facebook (n = 1, M = 2.00, SD = 0.00) and Twitter (n = 1, M = 2.00, SD = 0.00) most frequently. The other forms of media that the *convenience-driven consumer* used often were YouTube, Spotify, and iTunes (n = 1, M = 2.00, SD = 0.00; n = 1, M = 2.00, SD = 0.00; n = 1, M = 2.00, SD = 0.00).

Demographic Information

To accomplish RO2.3, describe the demographic characteristics of each persona, participants completed a questionnaire. Based on the factors extracted from the Q sort analysis, the sample was analyzed by factor group to determine the important demographical characteristics for each persona (Table 13).

Table 13.

Total Factor Demographics

	1		2		3		4	
Age	*f*	%	*f*	%	*f*	%	*f*	%
20	--	--	1	25	--	--	--	--
21	--	--	--	--	1	50	--	--
25	--	--	--	--	--	--	1	100
26	--	--	1	25	--	--	--	--
27	--	--	--	--	--	--	--	--
28	--	--	--	--	1	50	--	--
30	1	33	--	--	--	--	--	--
31	--	--	2	50	--	--	--	--
32	1	33	--	--	--	--	--	--
33	1	33	--	--	--	--	--	--
Sex								
Male	1	33	1	25	2	100	1	100
Female	2	66	3	75	--	--	--	--
Race/Ethnicity								
Asian	--	--	1	25	1	50	--	--
White	3	100	3	75	--	--	--	--
Hispanic	--	--	--	--	1	50	1	100
Education (Highest Degree Completed)								
High School Graduation or GED	--	--	1	25	2	100	--	--
Associate's Degree or Equivalent	1	33	--	--	--	--	--	--
Bachelor's Degree	1	33	3	75	--	--	1	100
Master's or Doctorate Degree	1	33	--	--	--	--	--	--

Table 13 Continued

	1		2		3		4	
Combined Annual Income	f	%	f	%	f	%	f	%
< $29,999	--	--	1	25	1	50	1	100
$30,000 - $49,999	--	--	1	25	--	--	--	--
$50,000 - $99,999	2	66	2	75	1	50	--	--
> $250,000	1	33	--	--	--	--	--	--

Note. 1 = Factor 1 (n = 3, M_{AGE} = 31.67, SD_{AGE} = 1.53); 2 = Factor 2 (n = 4, M_{AGE} = 27.00, SD_{AGE} = 5.23); 3 = Factor 3 (n = 2, M_{AGE} = 24.50, SD_{AGE} = 4.95); 4 = Factor 4 (n = 1, M_{AGE} = 25.00, SD_{AGE} = 0.00)

Research Question 3: What Are the Different Personas of Agriculture?

Through analysis of the factors, interviews, and questionnaire information, personas were created to address RO3.1, develop personas that describe the different perspectives of agriculture. RO3.1, describe and explain the different personas about perspectives of agriculture, was discussed simultaneously.

Personas

From the 13 participants selected to represent the five initial perspectives (traditional, health-conscious, indifferent, organic believer, and opinionated learner) described by Walker et al. (2014), 10 participants loaded to four factors, (conventional agriculturalists, environmental protectors, food-oriented consumers, and convenience-driven consumers). The three confounding Q sorts were not included in persona development. The transition from initial selection sample to persona is represented in Figure 25.

Starting with the four factors that emerged from the Q sort analyses, personas were developed and added to with initial interview notes and media consumption and demographical information from the questionnaire. The different types of data aided in creating robust personas that described the perspectives of agriculture for Millennials in Central Texas.

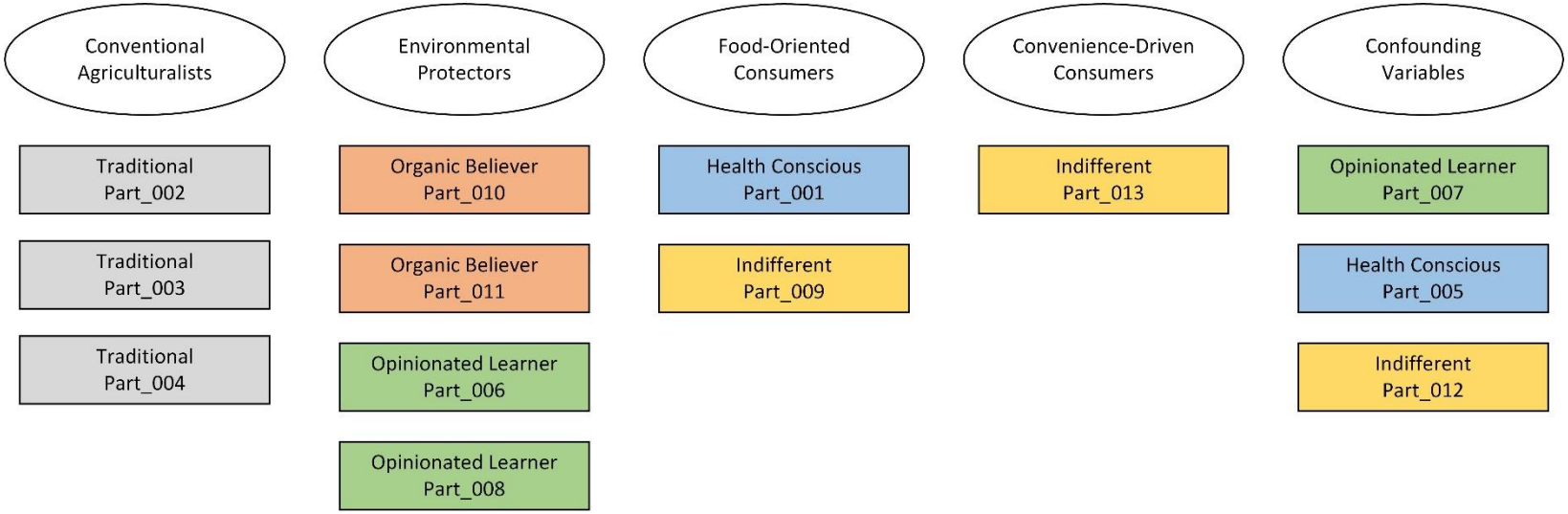

Figure 25. The five types of people selected for this study were sorted into four factors through Q sort analysis. Three participants did not have a clear perspective of agriculture and were confounding variables.

Conventional agriculturalist persona

The *conventional agriculturalist* had a background in agriculture and an idealistic, almost romantic, view toward agriculture. Individuals in this group saw agriculture as part of who they are and who their family is (P03). One participant's (P03) father was the reason she became involved in agriculture and talked about family while discussing agriculture. Family and background have shaped the conventional agriculturist and drove their passion for agriculture. They viewed agriculture as a way of life (P03) and have devoted their careers to it (P02, P03, P04). Individuals in this persona valued hard work (P03) and believed agriculture is what feeds the world (P02, P03, P04).

One of the core beliefs of the conventional agriculturalist was that agriculture is an industry that develops youth into responsible adults (SN = 55, FA = 8, z = 1.65). To them, agriculture is full of learning opportunities and giving back to the community (P02, P03). P04 said that the most positive impact of agriculture was witnessing kids turn into responsible adults with a passion for agriculture.

Conventional agriculturalists also believed that the public should be more educated about agriculture (SN = 1, FA = 6, z = 1.42) and should realize that they depend on agriculture on a daily basis (P03). When asked what they believed was the most negative aspect of agriculture, participants responded that ignorance (P02, P04) and people complaining about procedures and products that they do not know anything about (P03). Such negative aspects adversely affected agriculture and brought more harm to the industry.

Conventional agriculturalists did not have a positive view of PETA and believed the organization is one of the leading causes of negative perceptions toward agriculture (SN = 7, *FA* = 7, *z* = 1.61). They believed PETA is knowledgeable about agriculture (SN = 35, *FA* = 5, *z* = 1.34) and "sway[s] the world's population and how people see agriculture" (P04).

In regard to animal use, the conventional agriculturalist supported animal production and consumption. All of the participants were involved in animal production in some manner. To the conventional agriculturalist, ensuring animals are cared for and healthy was important because it is their business (P02, P03). They enjoyed eating meat (SN = 18, *FA* = 7, *z* = 1.54), and stated that their favorite places to eat were steakhouses (P02, P04) and barbeque joints (P03).

When purchasing food, conventional agriculturalists leaned toward convenience and price over other characteristics (P02, P03, P04), but they liked to spend money locally when they could (P03, P04). They were against processed food (P03, P04) but supported the mass production of food (SN = 43, *FA* = 2, *z* = 0.45). These individuals viewed organic food negatively (P02, P03) and believed that the public is paying premium for a product that is the same as non-organic (P04).

Conventional agriculturalists can be found on social media sites such as Facebook and Snapchat and watch television daily (Figure 26). They are often listening to the radio or a music-streaming website, such as Pandora®. Based on this, the conventional agriculturalist was a visual and auditory audience that appreciated agriculturally-positive messages. To reach this audience, commercials portraying

agricultural in a positive light should be aired on television and posted to Facebook would be most effective. The conventional agriculturalist would react to high-level, cognitive messages. Examples of predictor statements for conventional agriculturalists include:

- People who believe that agriculture is a way of life are more likely to purchase food that is mass-produced (SCT).
- People who are involved in conventional agriculture are more likely to reject organic messages (SJT).
- People who are motivated by producing food for the world are more likely to respond to cognitive messages (ELM).

The average age of the conventional agriculturalist was 32 years, which was slightly older than the other groups. This is important to note because of the initial difficulty in finding someone for this sample selection that fit in the age group of 18 to 32. Most of the people that currently work in agriculture are older than the specified age range, which is something to keep in mind when tailoring messages. Additionally, 33% have completed an associate's degree or equivalent, 33% have completed a bachelor's degree, and 33% have completed a master's or doctorate degree.

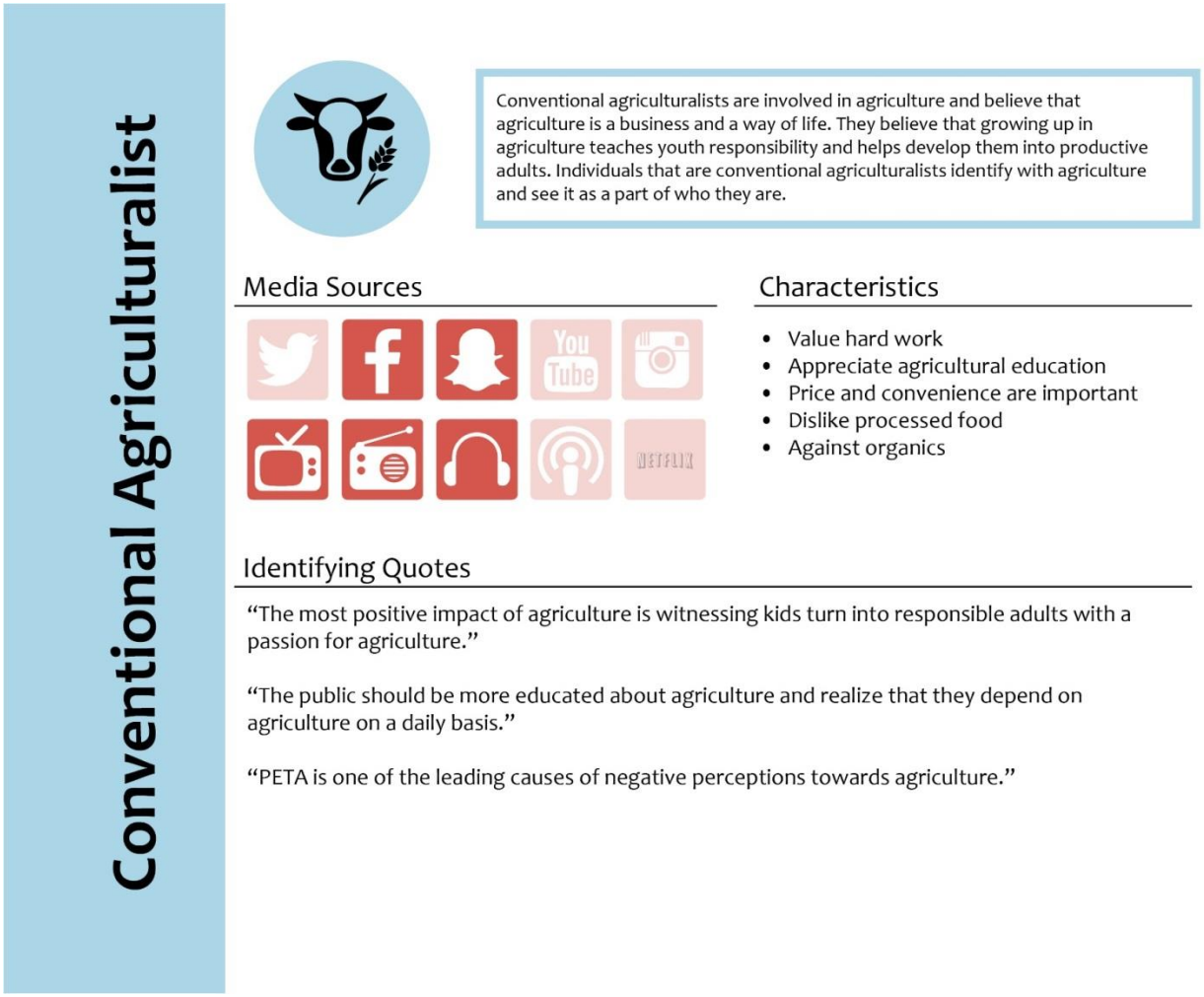

Figure 26. A one-page summary of the key media sources, characteristics, and identifying quotes of conventional agriculturalists.

Environmental protector persona

On the other end of the spectrum, *environmental protectors* believed that agricultural production needs to change (SN = 27, *FA* = -7, *z* = -1.59) and directly opposed mass production (P06, P08, P10, P11). P06 said that agriculture is made up of factories, and believed that there are issues with uncleanliness and carelessness because of the large scale of production. P10 echoed that, saying "vertically-integrated agribusiness is not good at all" and that the problem needs to be addressed. Q11 believed that the current largest suppliers have a lot of flaws. Overall, the driving beliefs of the environmental protector were that the current health of the land needs to be cared for and improved and that food should be grown with respect to the greater ecosystem (SN = 39, *FA* = 8, *z* = 1.67; SN = 47, *FA* = 8, *z* = 1.67). They believed keeping the environment safe and clean affects everyone, not just individuals (Q08). Although the environmental protector had a negative perspective toward production-focused agriculture, they had a positive perspective toward conservation-focused agriculture. There was a good chance that the environmental protector had been involved in conservation-focused agriculture (P08, P10, P11).

Environmental protectors were also troubled about the treatment of animals raised for consumption (SN = 40, *FA* = 7, *z* = 1.59). Although all environmental protectors were not vegetarian or vegan, they still believed that people should limit how much meat consumption (SN = 44, *FA* = 7, *z* = 1.38). They also believed in making sure that animals are well cared for and treated humanely (P06) and believed the large-scale raising of animals is sickening, careless (P06), and unsustainable (P11).

Healthy food was a priority for the environmental protector (SN = 61, *FA* = 7, *z* = 1.47) because it affects more than their health (SN = 60, *FA* = 6, *z* = 1.27). They placed emphasis on food selection and were willing to spend more money on food as long as it was financially feasible (P08, P11). Environmental protectors liked to buy locally grown food or eat at restaurants that use locally sourced food (P08, P10, P11). P06 would like to spend more money on local, organic food but raised concerns about being able to afford it. Along with buying local-grown, fresh food, they were more likely to eat at home than they are to eat out (P06, P08, P11). Cooking his or her own food was important to the environmental protector (SN = 20, *FA* = 3, *z* = 0.59).

Environmental protectors were likely to be found on the social media sites, Facebook and Instagram. P10 and P11 talked about using Instagram as a community forum to ask farmers questions about their crops and techniques. P11 said that it was a "fun and interesting platform." Additionally, the environmental protector used video-streaming sites, such as YouTube and Netflix, frequently. P06, P08, and P10 said that they watched agricultural documentaries, but their main source of agricultural information was written material (P06, P08, P10, P11). Newsletters, books (P10, P11), and magazines (P08) were different ways environmental protectors received information regarding agriculture, but they would "read an interesting article if it pops up on social media" (P08).

To target the environmental protector, messages must be interesting and pertinent to them. They were an image-positive audience and enjoyed watching videos. Environmental protectors were engaged on Instagram with images and videos that are

educational and provide insight to the agricultural industry. P11 said that the agricultural industry should engage the public so that "people can have a say with how their food is produced and handled." Instagram, and Facebook as a secondary platform, would be a great tool to begin this process (Figure 27).

An interesting trait of environmental protectors was their need to feel like they are part of something bigger than themselves (P06). They want to feel like they have made a difference (P06, P08) and want to affect people in a meaningful way (P10). With this in mind, creating messages with a call-to-action could be effective in attracting the attention of the environmental protector. The average age of the environmental protector was 27.00 with 75% having completed a bachelor's degree.

The environmental protector would respond to low involvement, affective appeals that touch on their desire and need to make a difference. Some examples of predictor statements for environmental protectors include:

- People who believe food should be grown with respect to the ecosystem are more likely to spend more money on the food that meets their requirements (SCT).
- People with experience in conservation-focused agriculture are more likely to reject messages promoting production-focused, unsustainable agricultural practices (SJT).
- People who are motivated by a desire to make a difference are more likely to respond to high involvement persuasion techniques (ELM).

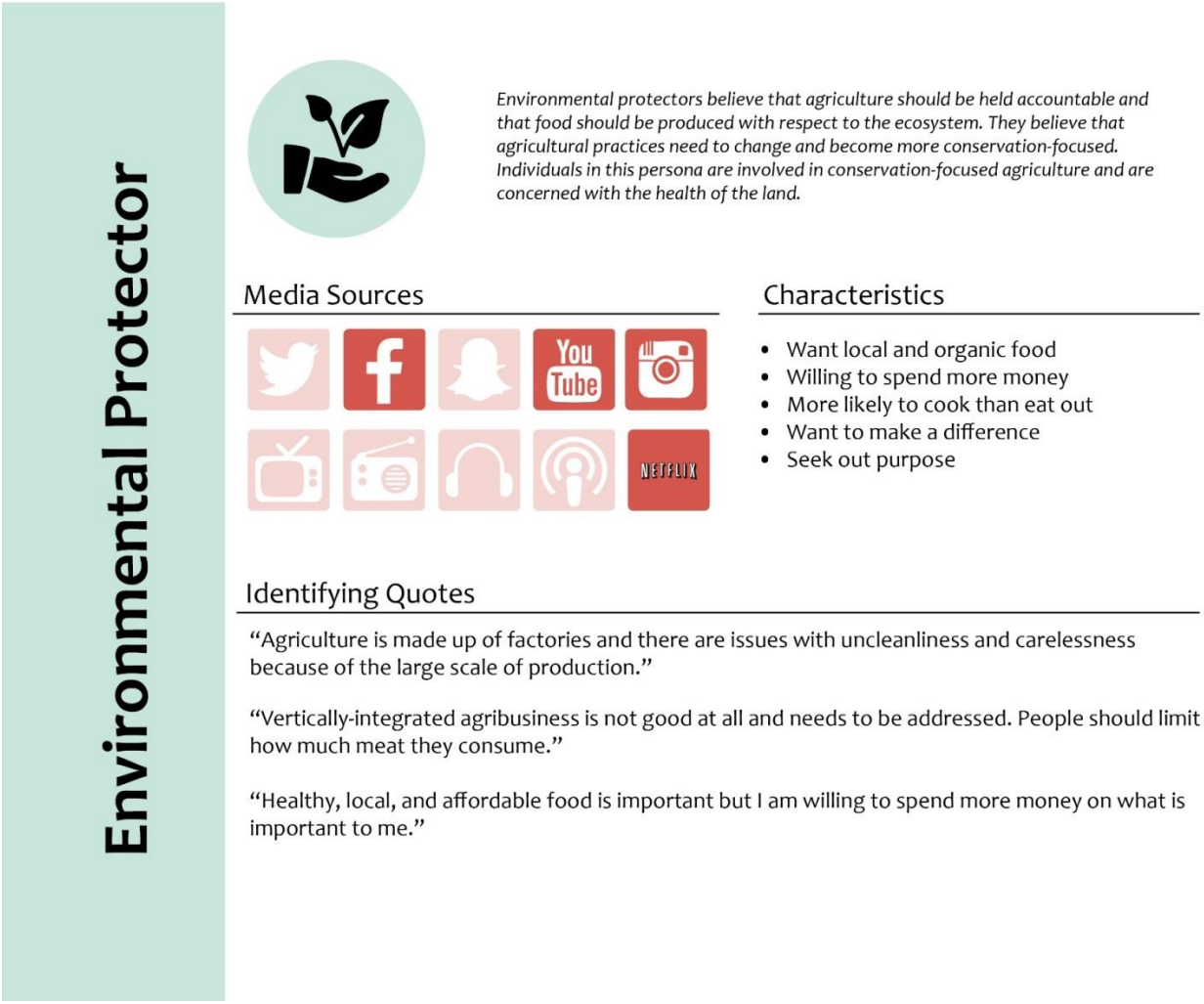

Figure 27. A one-page summary of the key media sources, characteristics, and identifying quotes of environmental protectors.

Food-oriented consumer persona

The *food-oriented consumer*'s core belief was that the food they eat has a great deal of impact on their lives. They had not been involved with agriculture (P01, P09) and rarely thought about it (SN = 58, *FA* = 5, *z* = 0.98). Their main concern with agriculture was that it should provide safe and healthy food to the public (P09). They believed what they eat affects more than their health (SN = 60, *FA* = 7, *z* = 1.37) and impacts their habits and emotions (P01). Food-oriented consumers were drawn to meat-based foods and looked for convenient, healthy, and high-quality food (SN = 18, *FA* = 8, *z* = 2.27; SN = 62, *FA* = 6, *z* = 1.19; SN = 61, *FA* = 4, *z* = 0.76; SN = 64, *FA* = 4, *z* = 0.71).

Food-oriented consumers also believed only organic compound pesticides should be used and GMOs should be tested further to make sure that they are safe for consumption (SN = 31, *FA* = 8, *z* = 1.75; SN = 34, *FA* = 7, *z* = 1.73). They believed GMOs and pesticides "destroy minerals and vitamins" (P01) and GMOs are shortcuts changing how plants should naturally grow (P09). P01 went on to say that unclean foods have damaged people's digestive systems, which causes the urges for bad food. Thus, the food-oriented consumers tried to stay away from unclean and processed foods as much as possible (SN = 16, *FA* = 7, *z* = 1.65) but sometimes had to eat what is cheap and necessary because of financial restrictions (P09).

Although food-oriented consumers were not concerned with the current health of the land (SN = 39, *FA* = -4, *z* = -0.69), they did not support the mass production of food (SN = 43, *FA* = -6, *z* = -1.17). This was one of the characteristics that distinguished the food-oriented consumer from the environmental protector. Neither persona supported the

mass production of food, but the food-oriented consumer was more concerned about the quality of food produced than about the adverse effects that agricultural production may have on the environment. The food-oriented consumer, although they believed that producers do not take the time to ensure practices are correct (SN = 51, *FA* = -5, *z* = -1.14) and that better management practices need to be implemented (SN = 28, *FA* = 3, *z* = 0.62), they believed the industry is taking steps to improve (P01). They also hoped better practices and tactics are implemented to show consumers they can grow healthy food (P09) and gain their confidence.

Food-oriented consumers most frequently used Facebook, Netflix, and YouTube, suggesting this group appreciated video-based information and were drawn to visual and auditory messages. P01 said messages providing a "connection of knowledge" grabbed his attention and all opinions and perspectives of a certain topic in a message allows for the reader to form his or her own opinions on topics. Other informational sources that food-oriented consumers liked to utilize were podcasts and the news (P01, P09).

To target the food-oriented consumer, messages should be created that resonate with their desire for healthy and safe food and let them know that things are done right (P01). Messages presenting multiple viewpoints and backing up information with credible sources will be highly salient to food-oriented consumers. Transparent and informational videos should appeal to the food-oriented consumer's desires for the agricultural industry to produce convenient and healthy food that does not harm the consumer (Figure 28). The average age of the food-oriented consumer was 25 years, and the highest degree completed was high school or GED.

Because of their desire to trust the food they are consuming and to find out about their food, food-oriented consumers are more likely to respond to cognitive, logical appeals that present both sides of an argument or issue. Examples of predictor statements for food-oriented consumers include:

- People who believe food affects more than their health are more likely to behave negatively to pro-GMO and pesticide messages when purchasing food (SCT).
- People who are concerned with the effects of the food they consume are more likely to accept messages about healthy options (SJT.)
- People who are driven by healthy food options are more likely respond to logical appeals that have lasting behavior changes (ELM).

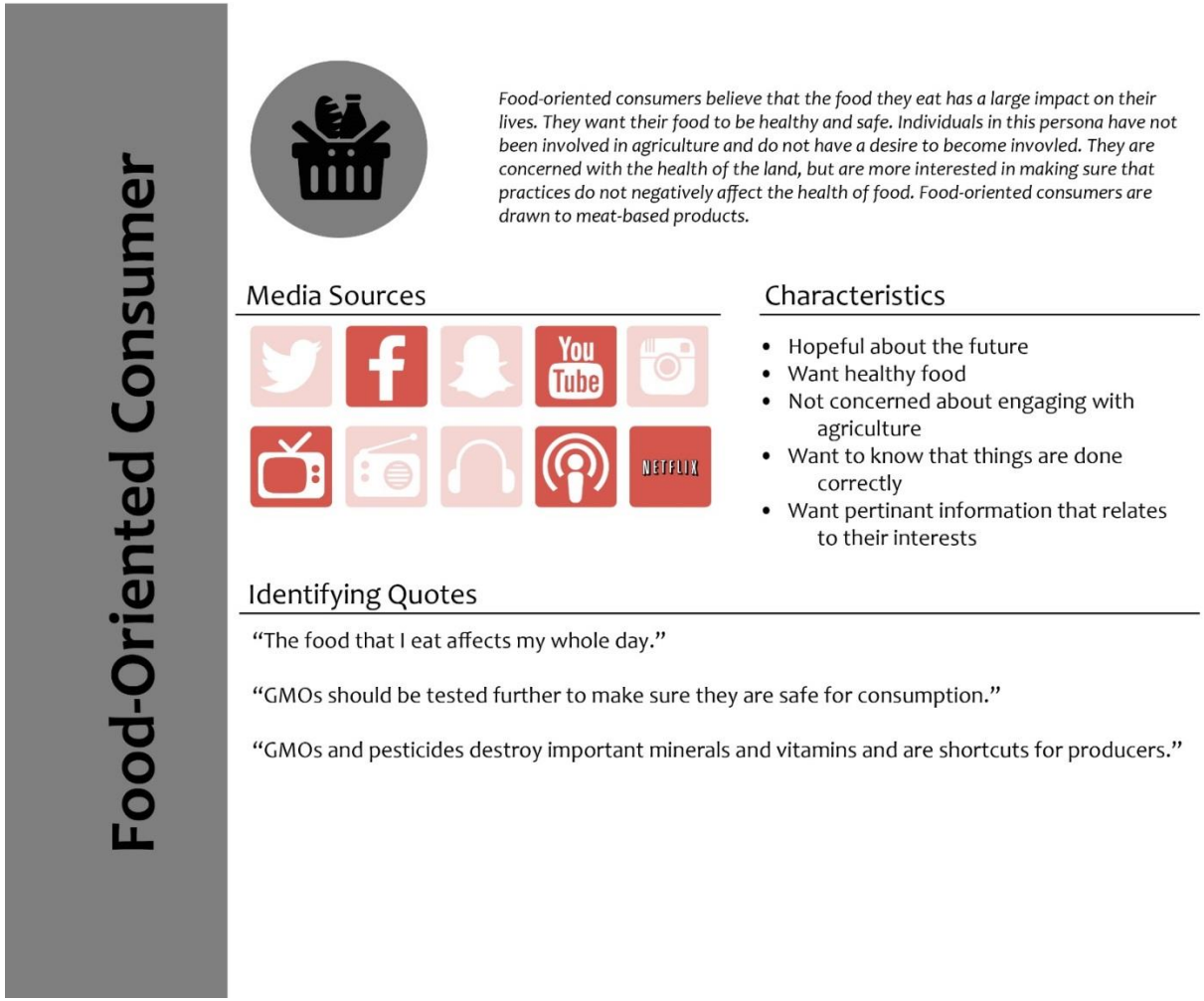

Figure 28. A one-page summary of the key media sources, characteristics, and identifying quotes of food-oriented consumers.

Convenience-driven consumer persona

The defining characteristics of *convenience-driven consumers* were that they desired convenient food (SN = 62, *FA* = 6, *z* = 1.25) and rarely thought about agriculture (SN = 59, *FA* = -8, *z* = -1.97). Cost and convenience were the most important factors that convenience-driven consumers considered when purchasing food (P13). Because of the desire for convenient food, convenience-driven consumers tended to eat out more than cook (SN = 21, *FA* = 6, *z* = 1.30) and mostly at fast food establishments such as McDonalds (P13). The least important factor they considered when purchasing food was organic and healthiness (P13).

P13 stated the health of the land is concerning, but that "other stuff is going on, too" besides agriculture, which could be why concern for the land was sorted so high (SN = 39, *FA* = 8, *z* = 1.49). Even though convenience-driven consumers thought agriculture is area-consuming and possibly bad for the environment, they believed producers are taking better care of the land and being more sustainable (P13).

Convenience-driven consumers highly supported the mass production of food (SN = 43, *FA* = 8, *z* = 1.84) and were against the organic movement (SN = 12, *FA* = 7, *z* = 1.32). They believed the "organic movement is detrimental to the feeding of the world" and that conventional techniques will be able to feed the growing population (P13). During the Q sort, Q13 said that SN 48, the food we eat now is not real, was "the silliest thing" (SN = 48, *FA* = -8, *z* = -1.97). Q13 found it entertaining that people could believe the food we eat is not real.

An interesting characteristic of the convenience-driven consumer was that they readily admitted they do not think about agriculture and do not know enough about it to form strong opinions. For example, “I am ignorant to where my food comes from and what is going on” (P13).

Social media sites that the convenience-driven consumer used frequently were Facebook and Twitter, as well as YouTube, Spotify, and iTunes. Information about agriculture reached them via YouTube channels that were not agriculturally-related, but might have some secondary information (P13). Most of the information regarding agriculture was gathered secondhand, but convenience-driven consumers would read a Facebook post that involved their interests and hobbies (P13). They would also read a post if it was posted by friends (P13). This makes the convenience-driven consumer the hardest to target because they do not actively seek out agricultural information (Figure 29). The average age of convenience-driven consumers was 25 with bachelor’s degree being the highest degree completed.

Some people would argue that convenience-driven consumers are young adults that will change with age and experience. However, it is important to consider that people currently exist in this age bracket. It is likely that as the current people in this age bracket get older, another group will fill these positions. Therefore, simply waiting for this persona to age and mature is not a viable option.

For agricultural messages, convenience-driven consumers are more likely to respond to low involvement, affective, appeals that should be short and easily digestible.

Important information should be prominent without going into much detail. Examples of predictor statements for convenience-driven consumers include:

- People who believe in convenient and accessible food are more likely to eat at fast food establishments or chain restaurants (SCT).
- People who are only interested in accessible, cheap food are more likely to accept short, pertinent information about a topic of interest (SJT).
- People who are motivated by price and convenience are more likely to respond to affective (emotional-based) persuasion techniques that will have a temporary behavior change in comparison to effective (logic-based) persuasion (ELM).

Figure 29. A one-page summary of the key media sources, characteristics, and identifying quotes of convenience-driven consumers.

Persona Relations

A graphical representation of the four personas illustrated participants' relations to each other. Two main characteristics defined polar viewpoints and traits of the four personas—preferred agricultural techniques and level of involvement with agriculture.

Personas had two polar beliefs about preferred agricultural technique—they either supported production-focused practices or conservation-focused practices. Conventional agriculturalists and convenience-driven consumers believed production-focused agriculture is the best option to keep the world fed. With rising populations, these two personas believed production-focused techniques will help in making sure people do not go hungry. Alternatively, environmental protectors and food-oriented consumers believed food should be grown with respect to the environment and be conservation-focused. They are against production-focused practices and want production techniques to be small scale and natural. Figure 30 shows the opposing views of the personas in relation to preferred production techniques.

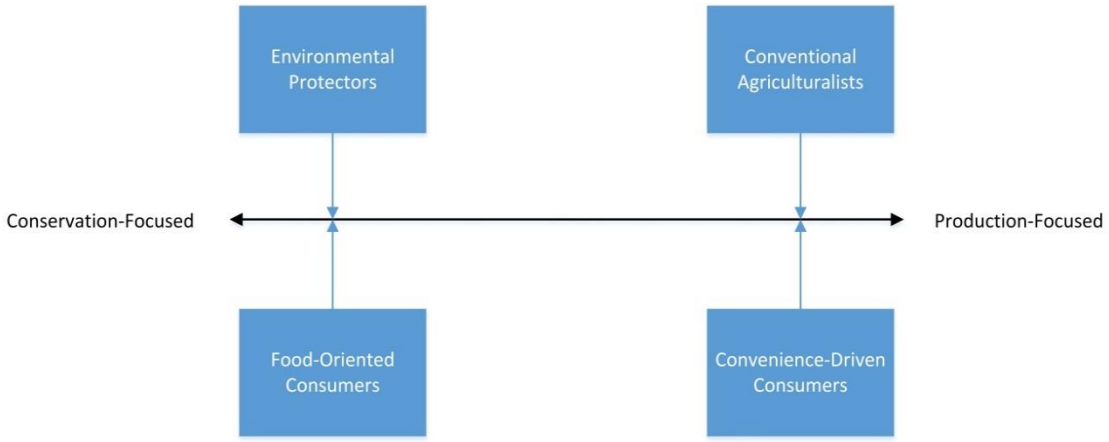

Figure 30. Environmental protectors and food-oriented consumers believed that agricultural production techniques should be more conservation-focused while conventional agriculturalists and convenience-driven consumers believed that agricultural production techniques should be more production-focused.

There was also a clear distinction in level of agricultural involvement for the personas. Conventional agriculturalists and environmental protectors were both heavily involved in agriculture, sought out agricultural information, and had strong opinions regarding agriculture. Adversely, convenience-driven consumers and food-oriented consumers did not have a background in agriculture, sought out agricultural information directly associated with one of their interests, and did not have developed opinions about agriculture (Figure 31).

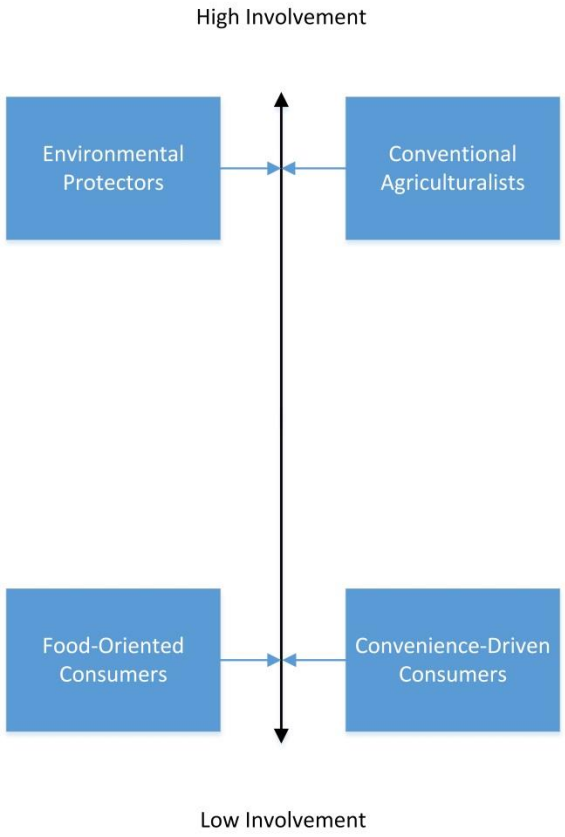

Figure 31. Food-oriented consumers and convenience-driven consumers were less involved in agriculture than environmental protectors and conventional agriculturalists.

Depending on observed characteristics, personas grouped differently when the two scales were combined. Convenience-driven consumers and food-oriented consumers grouped together on level of involvement with agriculture but preferred different agricultural production techniques. For example, both personas had low agricultural involvement, but convenience-driven consumers supported production-focused agricultural techniques and food-oriented consumers supported conservation-focused agricultural techniques. Something similar happened with environmental protectors and conventional agriculturalists. They were both agriculturally involved personas but did

not believe in the same production techniques. Environmental protectors supported and were involved in conservation-focused agriculture and conventional agriculturalists supported and were involved in production-focused agriculture. By combining the two scales on to one graph, a holistic view of persona relationships emerged (Figure 32).

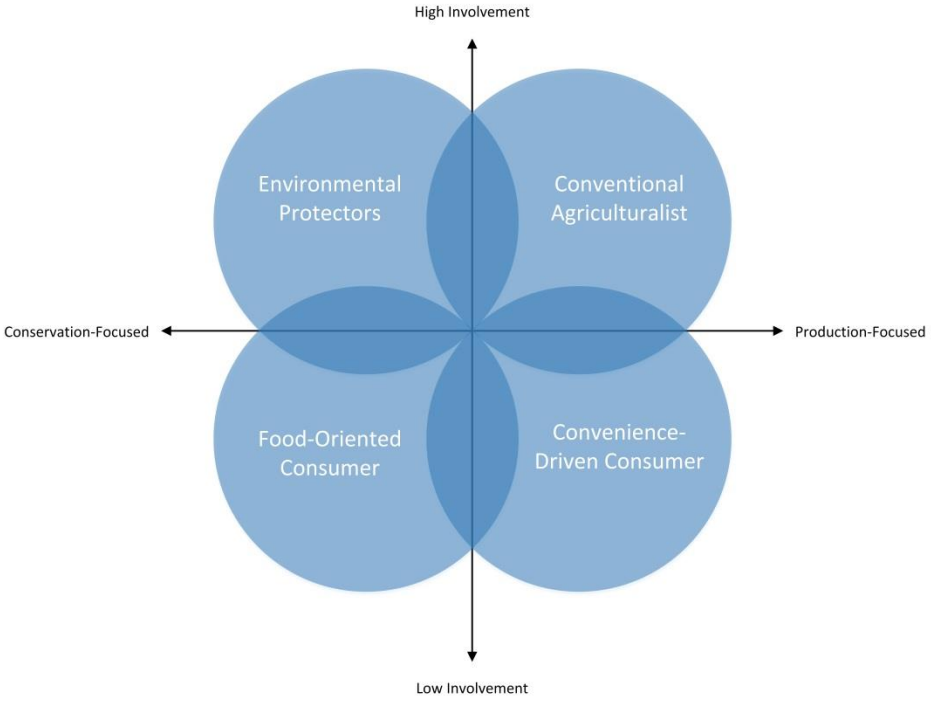

Figure 32. By combining the agricultural production technique scale with level of involvement, a graphical representation of the four personas shows how each persona relates to the others and where overlaps, or common opinions, occur.

Based on this persona model, each persona had its unique identity and characteristics with some overlap. These overlaps between personas are because people are complex people constantly growing and maturing. People are not stagnant. Every person will not fall on the same part of the graph because people behave differently

dependent on personality and environment. People are not identical in their opinions and perspectives, and so there will be differences of opinions within personas. This graph can be helpful in placing people on the graph to understand their relationship within the persona and to other people. When considering participants' perceptions of agriculture plotted on an X-Y axis (X = preferred agricultural techniques; Y = level of involvement with agriculture), there is a difference between individuals who have a high involvement in comparison to those who have a low involvement. This may indicate perspectives are highly congruent with how involved an audience is with agriculture. The more involved people become with agriculture, the more their perspective toward it will change. Although higher involvement might mean changing perspective, other variables need to be considered as to what direction their perspective will move. This movement can be explained through analyzing where the participants for this study fell on the graph.

The10 participants included in personas were placed on the graph according to their preferred agricultural production technique and level of involvement and are represented by yellow starbursts (Figure 33). Each of these participants clearly identified with one of the personas and had clear, identifiable opinions on preferred agricultural techniques.

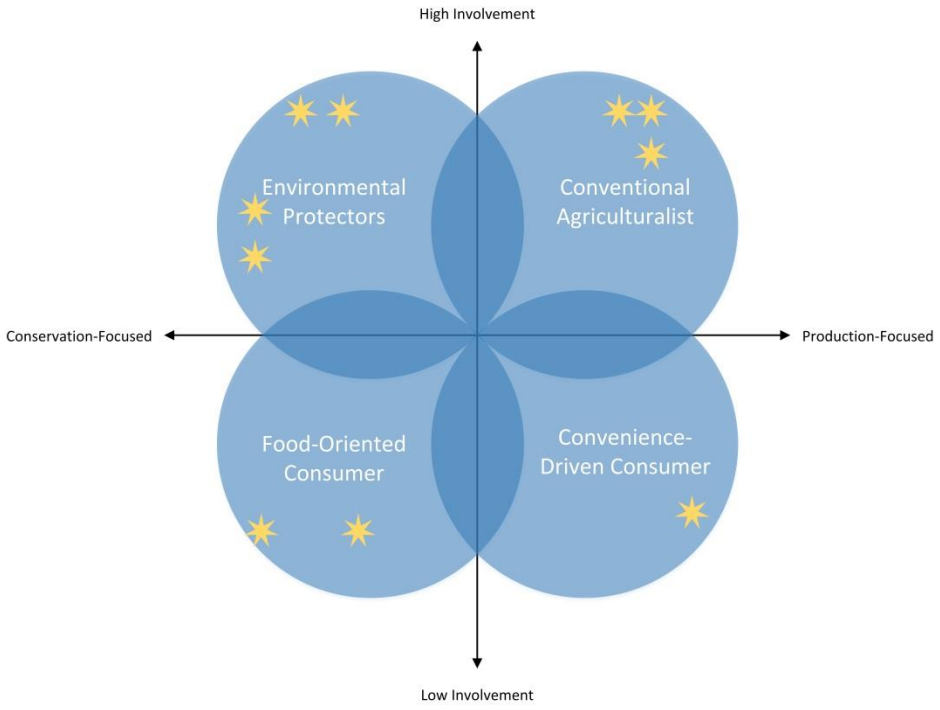

Figure 33. Within the graphical illustration of persona relations, participants were placed on the scale to show how there are differences between individuals within personas.

The movement from one perspective to another becomes clearer when double-loading participants are considered. The three participants who double-loaded or fell into the shaded overlapped areas and did not represent one persona over another (Figure 34). This indicates that participants in the overlapped areas did not have a clear and identifiable perspective of agriculture. Participants without a clear perspective could be confused, conflicted, or not have enough information to be able to identify with one particular persona.

Part_005, who double-loaded between environmental protector and food-oriented consumer, was in the middle of a perspective transition during this study due to health

concerns. Growing up around agriculture, Part_005 had average involvement but had to change her lifestyle because of health concerns that caused her to take more care about the food she consumed. Additionally, Part_005 became less involved with agriculture after graduation. These variables caused a shift in perspective, and that became apparent during analysis. Part_012 double loaded between conventional agriculturalist and convenience-driven consumer. While there was not a clear reason for a shift in perspective, Part_012 had expressed slight agricultural involvement at home. This overlapping perspective can be attributed to confusion and not enough information about agriculture.

The interesting double loading was Part_007, who double loaded between environmental protector and convenience-driven consumer. This was confusing because he did not sit in the middle of all four personas, but rather set between two that did not overlap. This can be attributed to confusion of his perspectives and opinions. Part_007 was in a relationship with one of the environmental protectors and shared many of their opinions and beliefs during the interview. This could be why Part_007 showed characteristics of environmental protectors as well as convenience-driven consumer.

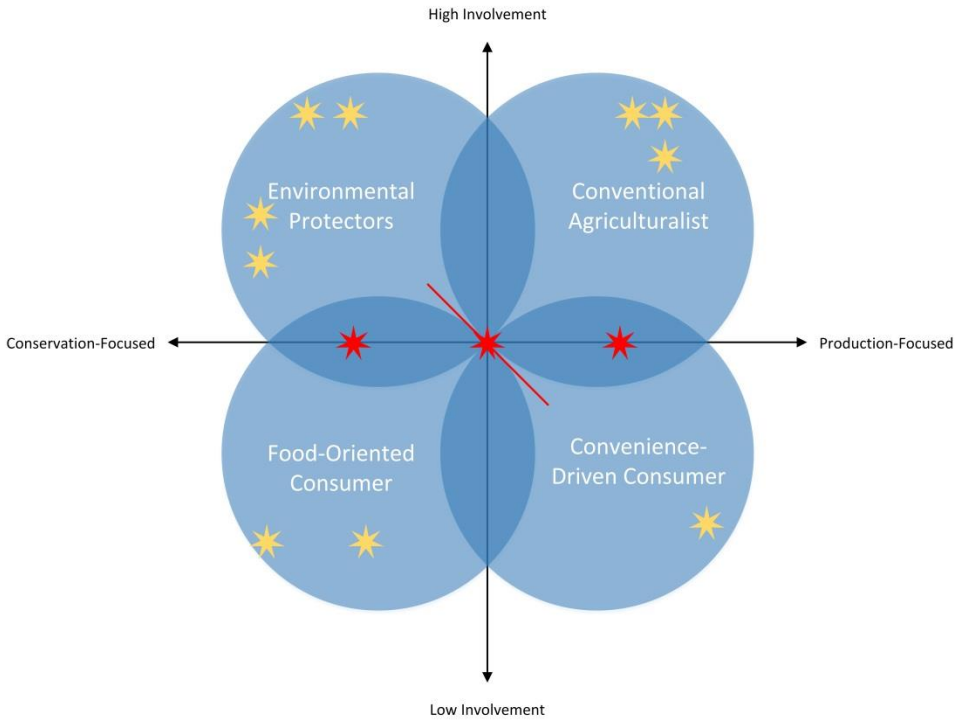

Figure 34. Participants with an unclear or confused perspective of agriculture did not fall into a specific persona, but rather fell in the overlapping areas between personas. By understanding individuals' preferred agricultural production technique with how involved they have been in agriculture, researchers can predict which persona they relate to the most.

Demographic differences

In addition to differences of opinion on agricultural techniques and level of agricultural involvement, there were demographical differences that set the personas off from each other. Education and age were the two demographic characteristics that had prevalent findings. The small sample size is a limiting factor to be able to generalize based on these findings, but present an opportunity for future researchers to conduct research based on sampling for demographics.

Education

Educational characteristics were not part of the literature review or design for this study, but are an important outcome. Sixty-six percent of conventional agriculturalists had completed a bachelor's degree or higher in comparison to the 75% of environmental protectors. Additionally, the convenience-driven consumer had completed a bachelor's degree, but the persona was only comprised of one participant. Convenience-driven consumers had only received high school diploma or GED.

Age

Differences in age between the personas were also an unexpected outcome of this study. Conventional agriculturalists were the oldest age group with an average age of 31.7 compared to 27 for environmental protectors, 24.5 for food-oriented consumers, and 25 for convenience-driven consumers. There is a positive relationship between age and education with the older groups holding higher degrees. While there were differences in education and age between the personas, it was unclear how those differences impacted perspectives of agriculture.

CHAPTER VII

RESULTS AND DISCUSSION: AIM II

To answer the second aim of this study, data were analyzed using SPSS® and PQMethod software for comparison. One research question guided aim 2—are the results of an SPSS® Q analysis equivalent to the results generated by PQMethod? Four objectives drove RQ1. The first two objectives were the creation of syntax and a step-by-step procedure for conducting a Q sort and analysis in SPSS®, which were presented in the aim 2 methods section (chapter 5). They were presented in the methods section because they were the steps I followed as the method for aim 2. This chapter focuses on the last two objectives: compare results between the SPSS® and PQMethod methods (RO1.3) and compare the advantages and disadvantages of conducting a Q analysis in SPSS® and PQMethod (RO1.4).

Statistical Differences

Both SPSS® and PQMethod analyses produced the same four factors and factor loadings. The results from both methods were extremely similar and bordered on identical. The correlation tables and loadings were different only in the decimal range but not enough to be statistically significant in the differences. To test the statistical significance, I compared statement *z*-scores from both methods by analyzing paired samples *t*-tests (Table 14). There were high correlations between the statement *z*-scores for each method, but Group 4 had a slightly lower correlation than the other groups.

Table 14

Paired Samples Correlations Between SPSS® and PQMethod Statement Z-scores.

Paired Variables	*n*	*r*	*p*
Factor 1 *z*-scores	64	0.95	0.00
Factor 2 *z*-scores	64	0.97	0.00
Factor 3 *z*-scores	64	0.94	0.00
Factor 4 *z*-scores	64	0.79	0.00

In Table 15, there were no significant differences between the *z*-scores of any of the groups, even though the correlations were lower. For Factor 1, statements were not significantly different between SPSS *z*-scores (M = 0.00, SE = 0.13) and PQ *z*-scores (M = 0.00, SE = 0.12), $t(63) = 0.00$, $p = 0.99$). For Factor 2, statements were not significantly different between SPSS *z*-scores (M = 0.00, SE = 0.13) and PQ *z*-scores (M = -0.00, SE = 0.13), $t(63) = -0.01$, $p = 1.00$). For Factor 3, statements were not significantly different between SPSS *z*-scores (M = 0.00, SE = 0.13) and PQ *z*-scores (M = -0.00, SE = 0.13), $t(63) = -0.01$, $p = 0.99$). For Factor 4, statements were not significantly different between SPSS *z*-scores (M = 0.00, SE = 0.13) and PQ *z*-scores (M = 0.00, SE = 0.13), $t(63) = 0.00$, $p = 1.00$).

Table 15

Paired Samples Test Comparing SPSS® and PQMethod Statement Z-scores.

Paired variable *z*-scores	*df*	*M*	*SD*	*p*
Factor 1	63	0.00	0.32	1.00
Factor 2	63	0.00	0.25	1.00
Factor 3	63	0.00	0.33	0.99
Factor 4	63	0.00	0.64	1.00

Note. Significance values were two-tailed

Additionally, I used a *post hoc*, two-tailed pairwise comparison to further compare the statement *z*-scores and the rank of statements between SPSS® and PQMethod.

SPSS® Advantages and Disadvantages

PQMethod was designed for one specific purpose, but SPSS® has much more statistical versatility and ability to manipulate data. The process of entering data into SPSS® was simpler because once data were entered, they could be adjusted and changed throughout the process. If data were entered incorrectly into SPSS®, or required adjustment, data entry errors could be corrected immediately and saved for further analyses. Another advantage of analyses in SPSS® is that Q data can be analyzed together with other datasets or appended with additional data. In this case, descriptive statistics could be analyzed simultaneously with both the Q sort values and the questionnaire variables.

Reporting descriptive statistics of the sorts could lead to a deeper understanding to the individual sorts and how they correlate to each other. One example of this is Statement 18, "I like anything with meat in it" for environmental protectors. The *z*-score for Statement 18 in SPSS was -1.68; whereas, the *z*-score in PQMethod was -1.47. Based solely on the *z*-score, all individuals in this factor strongly disagreed with this statement. However, when responses were considered on frequency instead of mean, it became apparent only one-half of the individuals disagreed and the other one-half were neutral about the statement. Although none of the individuals included in this factor agreed with the statement, one-half of the participants had a much stronger opinion about it than the

other half. This was an advantage of SPSS® because it broke down each statement per factor to allow me to gain a better understanding of the types of people that made up each factor. An example of this breakdown is included in Table 16.

Table 16

Statement 18 "I like anything with meat in it" Frequency for Factor 2 in SPSS®

Value	*f*	%	Cumulative Percent
-7	1	0.25	0.25
-6	1	0.25	0.50
0	2	0.50	1.00
Total	4	1.00	

One of the disadvantages of using SPSS® over PQMethod is that it requires an understanding of statistics for the generation of the results, but this can be overcome with the syntax developed in this study and the books mentioned in the syntax guide. Also, the length of the syntax can seem daunting, but by creating the syntax commands in Excel using its formula functions, the task can be simplified (see Figure 35).

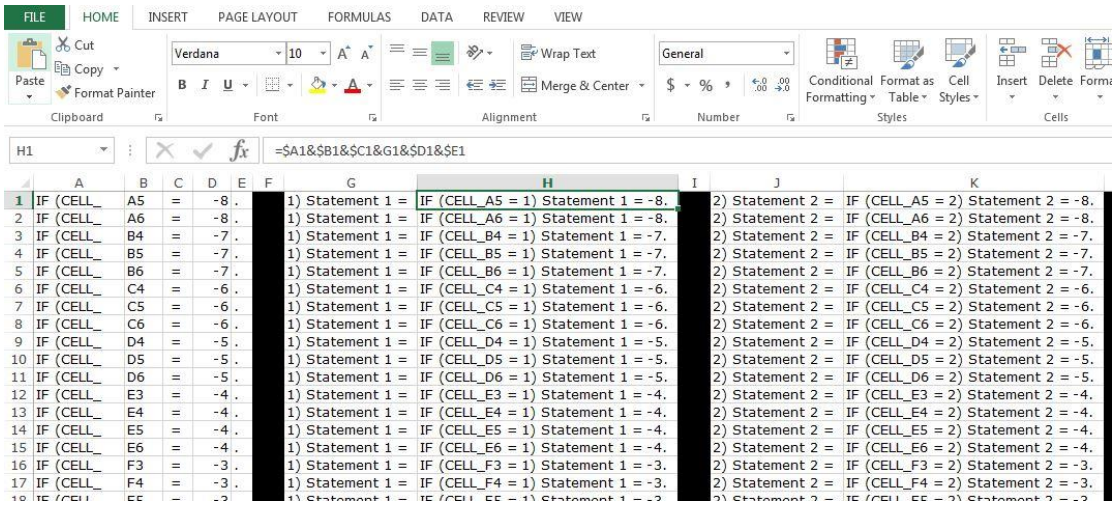

Figure 35. Large, repetitive syntax code can be created with the help of Excel and its formula functions.

Both methods require an understanding of factor analysis, rotation of the factors, and factor extraction to effectively analyze a Q sort. Although the analyses are similar, there are a few more steps using the SPSS® method than PQMethod, but once the data are entered into SPSS, additional tests can be analyzed and connections to descriptive variables can be identified using the SPSS® functions cross tables or custom tables. Researchers can also filter cases by specific variables or values, or add data later on.

PQMethod Advantages and Disadvantages

PQMethod is a statistical software package developed for the sole purpose of analyzing Q sorts. This is one of the main advantages of analyzing Q data in PQMethod. Another advantage to PQMethod is that it is a widely used and accepted Q analysis software and is often the method of choice for articles published in *Operant Subjectivity*, the journal dedicated to Q methodology. During data entry, if a statement is entered

twice, or if a statement is missing, the software will prompt the researcher to remedy the data. The disadvantage to this is that the prompt occurs after the complete sort is entered. After the sort is complete, it can be difficult to go back and change entries. Although PQMethod is a reliable and trusted software for analyzing Q sorts, it can be difficult to maneuver and use because the software is an automated DOS based application. Without help from the online PQGuide or books, including Watts and Stenner (2012), it is hard to understand how data should be entered and what each step is accomplishing. The guidelines within the software are not clear and do not give examples of how the data should be entered (see Figure 36).

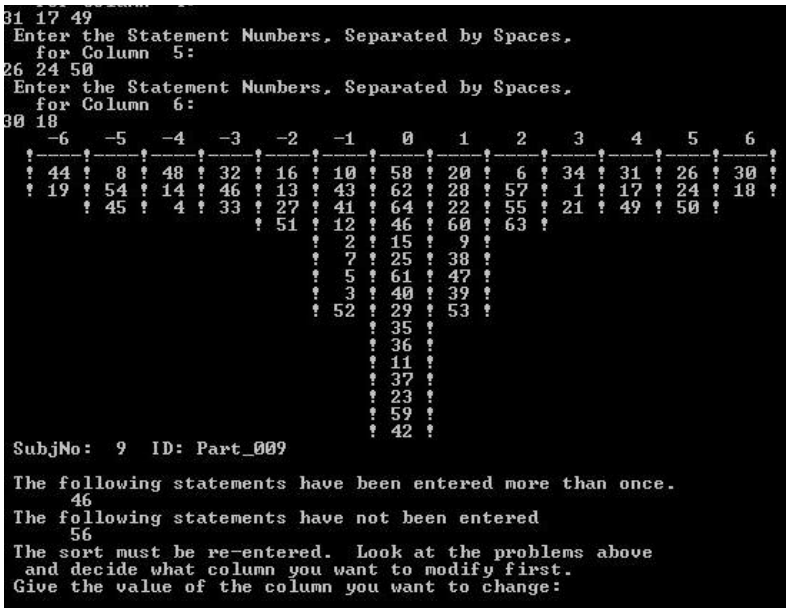

Figure 36. Within PQMethod , it is difficult to enter data, fix errors, and conduct analysis due to it being a DOS based software.

Once analyses are complete and the outputs available, outputs are saved in .lis, .unr., rot., and dat. files that can only be opened with Notepad, which can make it difficult to open and print the outputs for interpretation. The .lis file format can be opened and printed with instructions from the PQGuide found online, but not printing on legal paper can change the format of the data and make the paper difficult to read and understand.

Another disadvantage of PQMethod is that it only has the ability to analyze a 13-column Q sort (point values ranging from -6 to +6). Because of this drawback, the values of statements had to be changed in the PQMethod analysis portion of this study, which was discussed in the Aim 1 method section. Only being able to analyze 13 columns limits the creation of form boards that fit the needs of both the Q and P sets. For this study, there were 64 statements in the Q set. Based on Watts and Stenner's (2012) recommendations, if the participants are familiar with the topic of interest, the form board should have a shallower distribution, or lower kurtosis. To be able to fit 64 statements onto a poster while creating a form board with a shallow distribution, I chose to distribute the statements into 17 columns. At the time I was creating the form board, I was unaware of the 13-column limitation in PQMethod. This is one area that SPSS® excels over PQMethod—it has the ability to analyze an endless amount of columns and can analyze multiple sets of data together.

Also, PQMethod does not have the ability to analyze tests on multiple types of data—it is limited to Q sorts only. Conversely, SPSS can be used to create a dataset with Q sorts and traditional R configured data, such as a questionnaire. SPSS allows

researchers to set filters and conduct analyses on specific variables while keeping all of the data together.

CHAPTER VIII

CONCLUSIONS AND RECOMMENDATIONS

The aim of this study was to develop an understanding of the different beliefs and opinions the public holds about agriculture. Through the interviews, questionnaire, and Q sorts, four personas focusing on perspectives of agriculture emerged—*conventional agriculturalist*, *environmental protector*, *food-oriented consumer*, and *convenience-driven consumer.* Agricultural communicators and other interested organizations, such as Texas A&M AgriLife Extension, can use these four personas to target Millennials in Central Texas.

To target individuals that fall into these personas, communicators can use the one-sheet summary pages of each persona to learn about their audience characteristics. The one-sheet summary pages also include media platforms that each persona uses regularly, which can be helpful in identifying where to send out messages. Because Facebook was the common platform over all four personas, I recommend that communicators try to reach all audiences through Facebook. Other messages can be crafter to meet particular needs of personas and types of messages that each platform is used for. Another helpful tool in reaching a target audience would be to use the audience predictor statements. The predictor statements have not been empirically tested, but are a good starting point for communicators to understand how messages can affect audiences' perceptions and behaviors through theory.

By understanding audiences' experiences and perspectives, communicators can begin to craft messages that will have greater impact. For example, if communicators are trying to reach recent college graduates that don't have the time, money, or drive to learn more about their food and what processes occur to make their food, the communicators need to tailor the information to fit what kind of messages *convenience-driven consumers* want. The message will need to be short, shareable, and most likely posted to social media platforms such as Facebook. For this type of person, the message would need to include affective (emotional) characteristics and have low involvement levels. A message that contains too much detail and creates a need for an individual to spend too much time thinking about the message would cause this type of person to either skim over it without truly consuming and engaging with the message, or ignore it completely.

The four personas were built from psychographic, demographic, and media consumption information, which lead to robust personas. During the content analysis of the interviews, one of the themes was excluded from the Q set due to the nature of Q sorts evaluating psychographic information—beliefs and opinions. Although the background information included in the personal theme from the content analysis was not used in Q set development, it was used in persona development as corroboratory data. Understanding an individual's background and history helped in understanding why some participants had issues with defining their perspective of agriculture, such as the participants that double loaded. Although the background information might not be necessary for future Q sorts, future researchers should look into how participants' background and family influence their perspectives toward agriculture.

The perspectives and personas that emerged from this study were heavily centered of food, but food is only one small portion of the large agricultural industry. This focus on food could have been due to the purposeful sample selection or to the order of questions during the interview process. During interviews, questions started with food to ease participants into the questioning process and to make them feel comfortable. Also, the sample was chosen based on the five initial perspectives, which dealt heavily with food. Because food is one of the most recognizable facets of agriculture, it could be as simple as participants not understanding that agriculture is responsible for many different areas, such as fiber and natural resources.

Because of this focus on food, I recommend that researchers conduct studies with new sample criteria to find participants that are associated with different areas of agriculture. In-depth interviews followed by Q sorts could possibly lead to new ideas and perspectives of agriculture. A possible outcome of new perspectives could be to create new personas of agriculture or to design area-specific personas related to the different sectors of agriculture. Another area within the different types of agriculture that needs more attention is how people interpret agricultural terms related to their perspective of agriculture. Researchers could look into how individuals in the four personas respond to agricultural terms, such as “sustainability” and “mass production.” Understanding how people interpret agricultural words would help communicators craft effective messages. Word choice matters, so knowing if individuals in personas view agricultural terms as negatively or positively is important.

An additional area that should be researched is if social and economic responsibility affects how people perceive agriculture. Individuals in the environmental protector persona felt a need to make the world a better place and to help others while taking care of the environment; whereas, individuals in the conventional agriculturalist persona felt it was their duty to feed the world as efficiently as possible. Interviews should be conducted with individuals that identify with these two personas to find if there is a split between social and economic responsibility, and if there is, how it affects the persona relations.

Sampling Suggestions

With this study's small, limited sample size, one of the most important steps for future researchers is to design studies based solely on sampling. The results from this study suggest that there are demographical differences between the personas, but there is a possibility that these differences could have been due to the small sample. Age and education were the two demographics that stood out the most, and should be the focus of future research. Based on the outcomes of this study, there is reason to believe audience age and level of education may be predictors of persona type. Therefore, researchers should consider audience age and level of education as the primary sampling criteria for further studies to understand perspectives of agriculture. . Other demographics should not be excluded, but the data from this study did not suggest that other demographics were important to understanding the personas. With larger sample sizes, researchers would have the ability to analyze if other demographics are important to understanding these personas more fully.

Additionally, researchers should design studies that sample based solely on media use and habits. Now that we have a beginning understanding of which media platforms personas are using, the next step is figuring out how they engage with the media, how they consume messages, what times they use the media, and how message content and message mediums may affect message consumption and understanding. Researchers should ask participants about specific social accounts they follow and what they look for in messages that they engage with. It would be beneficial to know how participants use the media platforms that they are familiar with, when they access their media, and for what reasons. This could aid communicators in developing messages that fit their audiences' needs and send them out at the most effective time for engagement and absorption.

When designing future studies based on sampling criteria, psychographic questions should also be included to validate that participants still factor into the personas. In addition to sampling based on demographics, it is also important to conduct future research based on sampling from the four personas created from this study for validation. Examples of a new selection criteria list were created to help researchers start the process (Appendix L). Researchers can ask possible participants these questions to determine if they have some of the characteristics found in the personas and if they would be good candidates for studies.

In particular, the participants recruited from the indifferent and health-conscious groups during the initial sample selection process were the most varied and unsure of their viewpoints toward agriculture. This could be because indifferent participants were

chosen based upon their lack of opinions toward agriculture. The health-conscious individuals were chosen for their healthy lifestyle and commitment to healthy food, not agricultural knowledge. These types of people should be questioned further to develop a clearer understanding of the similarities and differences between the personas.

Of the four personas developed, convenience-driven consumers and food-oriented consumers require more research and development than environmental protectors and conventional agriculturalists. All four require more research and development, but the two former personas had fewer participants than the latter. There was only one and two significant loading for convenience-driven consumers and food-oriented consumers, respectively. It is also important to remember that this study was geographically bound to Central Texas, so researchers should recreate this study in other areas to compare results.

Q Sort Method Recommendations

Due to time, geographical barriers, and specific sampling procedures, the sample for this study was small, which is not an issue for Q research. To build more information about these personas and to be able to generalize the findings to the larger population, more research should be conducted with larger samples. One of the ways to do this could be to conduct Q sorts via mail. van Exel and Graaf (2005) presented an argument for conducting Q sorts through self-administered means such as mail. In a study conducted by van Tubergen and Olins (1979), results from self-administered Q sorts collected via mail were highly congruent with Q sorts administered face-to-face. Although this could widen the geographical distribution, interviewing participants and observing their sort

during data collection helps in interpretation and enables researchers to understand results better (van Exel & Graaf, 2005).

At this point, different methods of collecting data could be implemented as well to enlarge the sample size and expand the geography. Researchers should form questions based on the Q set statements from this study and send them out in the form of R data questionnaires. By collecting the data for an R technique analysis, researchers could implement CFA rather than EFA to test working hypotheses and further validate the findings of this study. Researchers could use the Q set statements as a starting place for development of questionnaire items in Likert style format to test if the same results are found with different analysis techniques.

Each method collection has its advantages and disadvantages. I recommend that questionnaires in Likert style format be conducted next to test and verify the four personas on a larger scale. Now that the groundwork has been laid, larger samples are needed to be able to generalize to the public. Although Q sort allows for participants to rank each statement against each other and carefully evaluate each item, questionnaires allow for larger samples, and have the ability to be analyzed with CFA.

Persona Development Considerations

Persona development is not an easy or straightforward task. There are numerous considerations and multiple types of data needed to create a well-rounded and useful persona (Adlin & Pruitt, 2010). This study provided a foundation for future researchers to continue building these agricultural personas and develop them to adulthood. Because Adlin and Pruitt (2010) developed their Persona Lifecycle based on methods that are not

as rigid as academic research, Hill (2016) and Mobly (2016) proposed that two additional stages be added between birth and maturation and adulthood. The adapted eight-stage lifecycle includes: 1) family planning, 2) conception, 3) gestation, 4) infant, 5) toddler, 6) adolescent, 7) adulthood, and 8) lifetime achievement, reuse, and retirement (Hill, 2016; Mobly, 2016). By extending the lifecycle, researchers can develop a streamlined path in persona development. Additionally, it is easier for researchers and communicators to understand how many steps and processes it requires to develop a fully functional, useful persona.

Because this study only developed personas to the beginning of the birth and maturation stage of persona development, it is important that researchers continue to develop and add to these personas so that they can be as useful as possible to communicators. In the adapted lifecycle of Hill (2016), the personas developed in this study stopped at the infant stage. The four personas still require more research and understanding before they can become fully functioning personas, but that does not mean that communicators cannot start using them to identify their audiences, understand their basic characteristics, and incorporate the platforms their audiences are using into their communication plans.

Q Sort Syntax Recommendations

There were no statistical differences between analyzing a Q sort study in SPSS® and PQMethod. The strength of analyzing Q data in SPSS® is the freedom of statistical analyses and the ability to compare the data in numerous ways; whereas, PQMethod does not allow researchers the freedom of choosing analyses beyond the few offered.

Therefore, I recommend that Q sort researchers adopt SPSS® as an option to analyzing Q sorts using the syntax from this study. Researchers who plan to use Q methodology can use SPSS® to create a dataset that allows for a wider array of tests along with Q data.

To create the syntax needed for analyses in SPSS®, I suggest that researchers use the Excel® formula that was used for this study (available at http://tx.ag/SPSSSyntaxGen). The shortcuts allow for researcher to write large syntax quickly and efficiently by entering in the consistent words and then auto-filling the rest through the use of formulas. Along with the Excel® sheet, writing the syntax in a Word document and then pasting it into SPSS® will help researchers catch spelling and spacing errors. With the provided syntax (available at http://tx.ag/QSort), future studies can quickly implement Q sort analyses in SPSS® rather than PQMethod.

Some Q sort researchers may argue that PQMethod would be a good fit for beginners because of its focused analysis and procedure that can be followed with the assistance of the PQGuide or the Watts and Stenner (2012) book (Appendix 2). It is important researchers understand the statistical tests and theories behind the analyses within PQMethod, as well as the different rotations, but it is not necessary to have expert knowledge to analyze the tests and interpret the outcomes.

Because this study compared the tests and interpretations between SPSS® and PQMethod, it should be recreated with different datasets to confirm the syntax works for other studies and in other contexts. Each dataset is unique, so the syntax will need to be adapted, but by using the syntax on different datasets, it will further validate the findings

of this study. Through validation, researchers can be confident that this method is accurate and valid, and a good alternative to PQMethod.

With new statistical analyzing software emerging, researchers could also use the syntax created from this study as a starting block and translate it into different software languages, such as Stata® or SAS®. This could prove useful as technologies change over time. Being able to replicate this study using different software packages will also help future researchers choose which statistical package would be the most helpful and useful for their study and provide more platform and analysis options for researchers.

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APPENDIX A

SCREENING QUESTIONS FOR SAMPLE SELECTION

Traditionalist:

1. I love everything about agriculture
2. I was surrounded by agriculture at a very young age
3. I cannot see my life without agriculture
4. My family is involved in agriculture
5. I think about agriculture at least once per week

Health Conscious:

1. I am a health-conscious person
2. I am concerned about how my food is produced
3. I want to know what is in my food
4. My food choices are health-oriented
5. I want to know where my food comes from

Organic Believer:

1. I do not believe in the use of herbicides
2. I believe pesticides are harmful to the environment
3. I am concerned about the environment
4. I am opposed to conventional agriculture
5. I am concerned about how animals are treated

Opinionated Learner:

1. I have strong opinions about food
2. I have strong opinions about what I eat
3. I read a lot about the environment on the Internet
4. I want to learn about agriculture
5. I want to learn about the environment

Indifferent:

1. I don’t care about what I eat
2. I buy whatever food is available in the grocery store as long as it is cheap
3. I have no desire to learn about agriculture
4. Agriculture does not affect me
5. I don’t care about agriculture

APPENDIX B

GUIDING SEMI-STRUCTURED INTERVIEW QUESTIONS

- What are some of your go-to foods? Something you eat once a week or more?
- What are some of your favorite restaurants to visit? What about them draw you?
- One of the reasons I enjoy doing interviews is to meet new people and visit new places. Tell me a little about your community. Do you like it here (there)?
- What is the most important factor you consider when purchasing food?
- What is the least important factor you consider when purchasing food?
- Please describe the images that come to mind when you think of the word "agriculture."
- How do you define agriculture?
- Are you, or have you ever been, involved in agriculture?
- How has your family/background affected your view of agriculture?
- Describe the most positive impact of agriculture.
- Describe the most negative impact of— agriculture.
- Are you concerned with the health of the land? Animals?
- What can agriculture do to change for the better?
- Where (or how) do you receive information regarding food? Agriculture?

Additional questions were asked if the participant brought up a topic that was not anticipated.

APPENDIX C

INFORMED CONSENT FORM

Project Title: Speaking their language: Communicating to the different perspectives of agriculture

You are invited to take part in a research study being conducted by Megan Homeyer, a researcher from Texas A&M University. **The information in this form is provided to help you decide whether or not to take part. If you decide to take part in the study, you will be asked to sign this consent form. If you decide you do not want to participate, there will be no penalty to you, and you will not lose any benefits you normally would have.**

Why Is This Study Being Done?
The purpose of this study is to investigate the thoughts, beliefs, and opinions people have about agriculture.

Why Am I Being Asked To Be In This Study?
You are being asked to be in this study because you are between the ages of 18 and 32 in Texas.

What Are the Alternatives to being in this study?
The alternative to being in the study is not to participate.

What Will I Be Asked To Do In This Study?
You will be asked to answer questions about your perspectives of agriculture. Your participation in this study will include 2 meetings.

Will Photos, Video or Audio Recordings Be Made Of Me during the Study?
The researchers will take photographs/make an audio/video recording during the study so that they can check their notes for credibility and accuracy only if you give your permission to do so. Indicate your decision below by initialing in the space provided.

_____ I give my permission for photographs/audio/video recordings to be made of me during my participation in this research study.

_____ I do not give my permission for photographs/audio/video recordings to be made of me during my participation in this research study.

Are There Any Risks To Me?

The things that you will be doing have no more risks than what you would come across in everyday life.

Will There Be Any Costs To Me?
Aside from your time, there are no costs for taking part in the study.

Will I Be Paid To Be In This Study?
You will not be paid for being in this study

Will Information From This Study Be Kept Private?
The records of this study will be kept private. No identifiers linking you to this study will be included in any sort of report that might be published. Research records will be stored securely and only the Primary Investigator and the research team will have access to the records.

Information about you will be stored in a locked file cabinet, and computer files protected with a password. This consent form will be filed securely in an official area.

People who have access to your information include the Principal Investigator and research study personnel. Representatives of regulatory agencies such as the Office of Human Research Protections (OHRP) and entities such as the Texas A&M University Human Subjects Protection Program may access your records to make sure the study is being run correctly and that information is collected properly. Information about you and related to this study will be kept confidential to the extent permitted or required by law.

Who may I Contact for More Information?
You may contact the Principal Investigator, Megan Homeyer, B.S., to tell her about a concern or complaint about this research at 979-458-2304 or mhomeyer14@exchange.tamu.edu. You may also contact the Protocol Director, Dr. Billy McKim at 979-845-2954 or brmckim@tamu.edu. You may also contact the Co-Protocol Director, Dr. Holli Leggette at 979-458-3039 or hollileggette@tamu.edu.

For questions about your rights as a research participant, to provide input regarding research, or if you have questions, complaints, or concerns about the research, you may call the Texas A&M University Human Subjects Protection Program office by phone at 1-979-458-4067, toll free at 1-855-795-8636, or by email at irb@tamu.edu.

What if I Change My Mind About Participating?
This research is voluntary and you have the choice whether or not to be in this research study. You may decide to not begin or to stop participating at any time. If you choose not to be in this study or stop being in the study, there will be no effect on your relationship with Texas A&M University.

STATEMENT OF CONSENT

I agree to be in this study and know that I am not giving up any legal rights by signing this form. The procedures, risks, and benefits have been explained to me, and my questions have been answered. I know that new information about this research study will be provided to me as it becomes available and that the researcher will tell me if I must be removed from the study. I can ask more questions if I want. A copy of this entire consent form will be given to me.

_____	_____
Participant's Signature	Date
_____	_____
Printed Name	Date

APPENDIX D

QUESTIONNAIRE

Q2.1 Please select the forms of social media you use at least once per month:

- ❑ Facebook
- ❑ Twitter
- ❑ Instagram
- ❑ Pinterest
- ❑ Snapchat

Q2.2 How often do you use each of the following forms of social media?
Selected social media appears here*

	More Than Once Per Week	Once Per Week	Once In A While	Never
Facebook	❍	❍	❍	❍
Twitter	❍	❍	❍	❍
Instagram	❍	❍	❍	❍
Pinterest	❍	❍	❍	❍
Snapchat	❍	❍	❍	❍

Q3.1 Please select the forms of media you use at least once per month:

- ❑ Television
- ❑ Radio - AM or FM
- ❑ Sirius - XM Satelite Radio
- ❑ Magazines
- ❑ YouTube
- ❑ Spotify
- ❑ Pandora
- ❑ Netflix
- ❑ Hulu
- ❑ iTunes

Q3.2 How often do you use each of the following forms of media?
Selected media appears here*

	More Than Once Per Week	Once Per Week	Once In A While	Never
Television	❍	❍	❍	❍
Radio – AM or FM	❍	❍	❍	❍
Sirius – XM Satelite Radio	❍	❍	❍	❍
Magazines	❍	❍	❍	❍
YouTube	❍	❍	❍	❍
Spotify	❍	❍	❍	❍
Pandora	❍	❍	❍	❍
Netflix	❍	❍	❍	❍
Hulu	❍	❍	❍	❍
iTunes	❍	❍	❍	❍

Q1.5 What is your gender?
❍ Male
❍ Female

Q30.1 What is your current zip code?
Text Entry

Q7.1 Are you currently a student?
❍ Yes
❍ No

Q7.3 Which of the items, noted below, best describes your highest level of education?
❍ Did NOT complete high school
❍ Completed high school diploma or equivalent (GED)
❍ Completed a 2-year college degree (associate's) and/or technical certification
❍ Completed a 4-year college degree (bachelor's)
❍ Completed a graduate degree (master's or doctorate)

Q7.4 Which of the items, noted below, best describes the degree program you are currently enrolled in?

- ❍ Bachelor's degree
- ❍ Graduate degree (master's or doctorate)
- ❍ Other

Q5.1 What year were you born? (YYYY)
Text Entry

Q6.1 Which of the items, noted below, best describes your relationship status?

- ❍ Single, NOT in a relationship
- ❍ In a relationship, but not engaged or married
- ❍ Engaged
- ❍ Married
- ❍ Widowed

Q4.1 I listen to music… (Please select all that apply)

- ❑ While I am driving
- ❑ While I am working
- ❑ While I am getting ready for the day
- ❑ During free time
- ❑ While I am working out (at the gym)
- ❑ Other _____

Q19.2 What is your estimated annual household income?

- ❍ Less than $30,000
- ❍ $30,000-$49,999
- ❍ $50,000-$99,999
- ❍ $100,000-$249,999
- ❍ More than $250,000

Q20.1 What is your race and/or ethnicity? Please select all that apply.

- ❑ American Indian or Alaska Native
- ❑ Asian
- ❑ Black or African American
- ❑ Hispanic and/or Latino/Latina
- ❑ Native Hawaiian or other Pacific Islander
- ❑ White or Caucasian
- ❑ Other _____

APPENDIX E

COMPLETE SYNTAX GUIDE

The complete syntax guide can be accessed and downloaded at [http://tx.ag/QSort].

APPENDIX F

CORRELATION COEFICIENTS FROM SPSS®

	Participant												
	001	002	003	004	005	006	007	008	009	010	011	012	013
Part_001	—												
Part_002	0.06	—											
Part_003	0.14	0.68	—										
Part_004	0.08	0.72	0.61	—									
Part_005	0.43	0.29	0.26	0.36	—								
Part_006	0.24	-0.19	-0.24	-0.13	0.31	—							
Part_007	0.08	0.23	0.32	0.23	0.39	0.31	—						
Part_008	0.19	-0.02	0.02	-0.01	0.35	0.60	0.32	—					
Part_009	0.35	0.32	0.31	0.27	0.30	-0.01	0.15	0.14	—				
Part_010	0.31	0.24	0.25	0.13	0.41	0.44	0.31	0.40	0.18	—			
Part_011	0.34	0.30	0.31	0.35	0.41	0.49	0.34	0.35	0.15	0.58	—		
Part_012	-0.11	0.58	0.56	0.39	0.08	-0.27	0.24	-0.07	0.17	0.10	0.06	—	
Part_013	0.19	0.24	0.36	0.21	0.17	-0.08	0.37	-0.06	0.27	0.12	0.06	0.43	—

APPENDIX G

CORRELATION COEFICIENTS FROM PQMETHOD

	Participant												
	001	002	003	004	005	006	007	008	009	010	011	012	013
Part_001	—												
Part_002	0.07	—											
Part_003	0.15	0.65	—										
Part_004	0.01	0.70	0.60	—									
Part_005	0.42	0.33	0.29	0.33	—								
Part_006	0.18	-0.12	-0.20	-0.14	0.34	—							
Part_007	-0.01	0.21	0.31	0.21	0.31	0.37	—						
Part_008	0.15	-0.03	0.02	-0.06	0.29	0.55	0.32	—					
Part_009	0.31	0.33	0.33	0.26	0.27	-0.05	0.08	0.08	—				
Part_010	0.27	0.26	0.34	0.12	0.39	0.43	0.38	0.38	0.16	—			
Part_011	0.30	0.28	0.29	0.28	0.45	0.45	0.31	0.32	0.09	0.60	—		
Part_012	-0.10	0.55	0.55	0.39	0.04	-0.25	0.23	-0.07	0.12	0.16	0.06	—	
Part_013	0.17	0.27	0.36	0.23	0.15	-0.05	0.30	-0.03	0.29	0.14	0.03	0.40	—

APPENDIX H

FACTOR ARRAY FOR FACTOR 1

								6								
						28	36	57	11	53						
				5	17	21	10	33	62	43	20	41				
	8	56	40	12	31	60	61	46	64	49	14	51	35	23	18	
58	19	44	42	45	30	25	15	63	47	29	22	4	32	1	24	55
13	37	16	48	50	2	27	52	34	39	3	9	54	38	26	7	59
-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8

APPENDIX I

FACTOR ARRAY FOR FACTOR 2

								57								
						29	22	23	34	11						
				43	46	48	16	15	19	28	1	14				
	41	12	51	30	62	52	9	2	38	8	20	26	42	60	44	
58	18	6	25	7	35	63	3	53	45	55	54	49	50	59	61	39
17	27	21	33	32	56	31	37	4	10	36	13	24	64	5	40	47
-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8

APPENDIX J

FACTOR ARRAY FOR FACTOR 3

								12								
						52	36	38	26	50						
				39	59	11	25	49	42	1	63	61				
	32	43	51	54	3	23	29	35	37	57	28	53	15	24	60	
44	33	46	4	41	27	7	2	40	55	22	30	20	17	56	16	18
19	8	45	5	9	48	10	6	47	13	14	21	64	58	62	34	31
-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8

APPENDIX K

FACTOR ARRAY FOR FACTOR 4

								7								
						19	30	55	60	38						
				14	36	29	17	9	34	33	42	40				
	20	56	13	27	53	18	64	49	10	5	2	58	47	21	12	
48	41	3	35	11	51	37	44	23	28	26	32	24	22	54	52	43
59	61	31	15	4	8	46	45	16	1	6	25	57	63	62	50	39
-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8

APPENDIX L

NEW SCREENING QUESTIONS FOR FUTURE SAMPLE SELECTION

Conventional Agriculturalist:

6. I have been involved in production agriculture.
7. I believe that agriculture is a business and a way of life.
8. I believe agriculture is important to teaching youth responsibility.
9. I believe that the public should be more educated about agriculture.
10. I am not concerned with agricultural practices that harm the environment.

Environmental Protector:

6. I believe that food should be grown with respect to the ecosystem.
7. I believe conservation-focused agriculture is better than production-focused agriculture.
8. I believe that the agricultural industry should be held accountable for their practices.
9. I want local and organic food.
10. I cook more than I eat out.

Food-Oriented Consumer:

6. I believe that GMOs and pesticides are harmful to the food we eat.
7. I believe that what I eat has a large impact on my day-to-day life.
8. I am concerned about agricultural practices that harm the environment.
9. I am not involved in production agriculture.
10. I believe eating healthy food is extremely important.

Convenience-Driven Consumer:

6. I do not know where my food comes from.
7. My main concern when purchasing food is that it is convenient and cheap.
8. I do not have a strong opinion about agriculture.
9. I eat out more than I cook.
10. I do not believe in the organic movement.

APPENDIX M

CODING SHEET

The complete coding sheet can be accessed and downloaded at

[http://tx.ag/MHomeyerThesis].