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Rachel Corry
University of Georgia

Jessica Holt
University of Georgia

Alexa J. Lamm
University of Georgia

See next page for additional authors

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Berry Convenient: Online Design Preferences for Local Strawberries

Abstract

Agricultural marketers and grocery retailers are tasked with developing effective online marketing of local food products as consumer purchasing preferences shift. Local food sales are increasing through intermediated channels including grocery stores, and consumers are turning to online grocery shopping for their food purchases. Exploration of consumer preferences for visual and textual elements of an online local food product can provide marketing practitioners with strategies to optimize the purchase intent for local food among diverse audiences. Consumers are demonstrating interest in sustainability and information about food production, yet limited research has applied these interests to explore preferences for how local food is presented online. The purpose of this study was to explore consumer preferences for an online grocery design displaying local strawberries, and their purchase intention for local strawberries after viewing one of three designs. An online survey of 906 respondents from Florida, Georgia, and Alabama was used to collect data. Findings revealed that most individuals (42.9%, n = 389) prefer the online design with added information about environmental impact measures associated with local strawberries. However, there were demographic differences in preferred attributes of an online grocery design, and purchase intent was similar for local strawberries regardless of the design. Agricultural marketers should incorporate audience segmentation principles when customizing online grocery platforms for different individuals. Consumers should be presented with their preferred online design according to influential demographic variables and the type of grocery market providing the product. Additional recommendations for agricultural marketers and grocery retailers are provided.

Keywords

Local food, online grocery shopping, consumer purchasing, visual design, marketing

Authors

Rachel Corry, Jessica Holt, Alexa J. Lamm, and Abigail Borron

Introduction

The ability of agricultural production systems to feed an expanding population and adapt to a changing climate is among the most pressing challenges facing our society (Fitton et al., 2019). Agriculture should be at the forefront of plans to address climate change because agricultural systems can develop climate change mitigation and adaptation strategies while sustaining the population (Lal, 2021). Agricultural systems that maximize net benefit to society while meeting current and future needs for food and ecosystem services are a form of sustainable agriculture (Tilman et al., 2002). Sustainable agricultural production processes enhance the natural resource base, make efficient use of nonrenewable resources, satisfy human food and fiber needs, sustain economic viability of farms, and enhance quality of life (Gold, 2016). Furthermore, sustainable agriculture contributes to food security and must be considered in relation to environmental, social, and economic dimensions of sustainability (FAO, 2022).

In recent years, the local food movement has been increasingly seen as a solution for stabilizing food system disruptions and a form of sustainable agriculture (Robbins, 2020). The local food movement is defined as a collaborative effort to create more self-reliant, locally based food economies that enhance the environmental, economic, and local health of a place (DeLind, 2011). As such, the three focus areas of the local food movement are in line with those of sustainability. Local food systems are frequently promoted to improve the environmental footprint of a food system, potentially contributing to greater sustainability (Stein & Santini, 2022). Lower pollutant emissions, energy consumption, and less raw materials are among the reasons that local agricultural production may be viewed as more environmentally sustainable than conventional production (Berger et al., 2020). Local food systems can help local economies grow and improve community well-being through job creation, stronger community identity, positive spillover impacts into other businesses, and personal connections with farmers (Cvijanović et al., 2020).

U.S. agricultural production processes contribute to shaping food system sustainability, and these processes are influenced by consumer purchasing patterns and demand (Morawicki & González, 2018). Among the key trends influencing food consumption in industrialized countries are sustainability, convenience, and health concerns (Grunert, 2014). Public awareness of environmental pollution associated with conventional agriculture is leading to increased interest in sustainability, and local and organic food markets (Asioli et al., 2017). In identifying local food channels, much research has been conducted on direct-to-consumer entities, including farmers' markets and CSAs (DeLind, 2011; Gumirakiza et al., 2014). However, intermediated grocery stores (those that purchase products from farmers, and then provide consumers access to purchase the products) have not been as extensively studied as providers of local food. Sales of local food increased from $6.1 billion in 2012 to $8.75 billion in 2015 and are projected to continue rising exponentially, with most growth predicted in intermediated channels (NASS, 2016). Online grocery shopping has become more widespread and industry experts predict consumer use of online grocery platforms will continue expanding in the coming years (Chintala et al., 2021). Recognizing consumer demand for local food and changing purchasing preferences, a unique opportunity exists for online grocery platforms to optimize the consumer virtual shopping experience (Etumnu & Widmar, 2020).

With farmers selling items in a variety of outlets and consumers paying more attention to how these items are produced, researchers must identify how consumers form attitudes about purchasing locally grown food to further recommend best communication practices (Holt et al.,

2018). Consumer perceptions of local food sourcing information are directly relevant to agricultural marketing professionals seeking to present the public with local food products (Stein & Santini, 2022). Public interest in the agri-food system has increased alongside a growing awareness toward environmental sustainability and health issues (Bianchi & Mortimer, 2015). To address these developing consumer interests, agricultural marketers may use labels and logos to illustrate environmental impact measures that indicate how a food product performs in relation to sustainability (Grunert et al., 2014). In doing so, communication and marketing specialists must identify effective informational design attributes for an online grocery platform. Visual and textual information accompanying a product has important influences on customer decision-making, satisfaction with the platform, and online purchase intentions (Blanco et al., 2017).

Moreover, there is a lack of the research on consumer preferences for how local food is displayed in grocery stores (Printezis & Grebitus, 2018) while accounting for the recent rise of online grocery shopping. Online design informational qualities need to be explored in relation to consumer purchase intention because purchase intention for local food is influenced by a multitude of factors (Zhang et al., 2018). By exploring how consumer perceptions of environmental impact measures vary, and how these perceptions impact purchase intention, this research will inform best practices for creating online grocery displays of local food.

Literature Review and Theoretical Framework

Sustainability Dimensions of Food

Definitions and understandings of local food vary among consumers, producers, and retailers (Trivette, 2015). Two main approaches to defining local food are identified as local by proximity, which relies on a distance measure or geographic boundary, and local by relationship, which emphasizes the personal connections involved in local food interactions (Trivette, 2015). Based on an online literature search (Feldmann & Hamm, 2015), local food is most frequently defined by consumers in relation to distance traveled, ranging from 10 to 30 miles and up to 100 miles. Grocery retailers tend to define local as extending not more than 400 miles from the point of purchase, whereas consumers tend to consider local food as grown 100 miles or less from the point of purchase (Dunne, 2010).

Food miles, or the number of miles that food travels from farm to consumer, is one component contributing to the environmental sustainability of a food product. There are multiple other impactful measures including crop production inputs (such as pesticide and fertilizer application), packaging and processing systems, and greenhouse gas emissions from transportation (Striebig et al., 2019). The multifaceted nature of a food system complicates the assumption that decreasing food miles will automatically lead to lower greenhouse gas emissions and more sustainable food consumption (Avetisyan et al., 2014; Cleveland et al., 2015). Food system sustainability should not focus only on reducing fossil fuel emissions; it also must include considerations of land use, water pollution, energy inputs, biodiversity, and other economic and social externalities (Coley et al., 2009; Passel, 2013). Therefore, more accurate assessment of food sustainability may involve enhancing the food miles concept by adding external costs associated with transporting, packaging, selling, and consuming food (Passel, 2013).

While some local food products may be more sustainable than their conventional counterparts, it should not be assumed all local food processes are inherently sustainable (Dukeshire et al., 2016). However, a labeling system that reflects a food product's performance

in different sustainability aspects may help consumers evaluate the true environmental impacts of a food product (Stein & Santini, 2022). In recognition of this labeling concept, as well as literature that proposes food miles are an insufficient measure alone to represent sustainability (Avetisyan et al., 2014; Coley et al., 2009; Stein & Santini, 2022), other metrics should be considered to identify the sustainability impact that certain foods have on the environment. While buying local food does not necessarily ensure enhanced sustainability, it can provide an entry point into moving consumers to become more environmentally conscious in at least one area of their lives: food purchasing.

In this context, when shopping for groceries, consumers must weigh the environmental risks associated with a food product among other factors such as price, convenience, and access. While sustainability involves considerations of environmental, economic, and social dimensions (Brunori et al., 2016), operationalizing aspects of food production related to environmental risk is the present focus. Evaluation of environmental impacts of food products is difficult for consumers, so there is a need for research exploring how environmental impact measures should be communicated to potentially promote environmentally sustainable food choices (Hoek et al., 2017). Furthermore, improved communication about the environmental risks accompanying food production (Frewer et al., 2015) is necessary to provide individuals with sufficient information as they make food purchasing decisions.

Risk Information Seeking and Processing Model

There is a level of perceived risk involved in the environmental consequences of food production (Frewer et al., 2015) due to uncertainty regarding how a food product is produced and transported. Perceived risk refers to the degree to which a risk is understood and the degree to which it evokes a feeling of dread (Griffin et al., 1999) regardless of whether the risk exists or not. Industrialization and globalization of modern food systems are associated with higher and man-made risk, which enhances perceptions of risk (Asioli et al., 2017). Given the perceived risk when consumers make food purchasing choices, the Risk Information and Seeking Processing Model (RISP) is an appropriate theoretical framework for the present study. The RISP Model explores the interaction between message characteristics and audiences' information processing motivations and capabilities, to ultimately understand and predict their response to risk messaging (Griffin et al., 1999). The framework posits that an individual's information seeking and interpreting are influenced by seven key factors. First, information sufficiency, perceived information gathering capacity, and relevant channel beliefs affect whether an individual will seek risk information and the extent to which they will analyze the information critically (Griffin et al., 1999; Griffin et al., 2004). These factors are in turn impacted by affective emotional response to the risk, subjective norms from relevant people related to information gathering about the risk, perceived hazard characteristics, and individual characteristics including demographics (Griffin et al., 1999).

Consumer attitudes toward potential risks associated with certain food products are likely to influence their food choices (Fischer & Frewer, 2009), so examining the RISP model within online grocery store purchasing of local food is relevant. Although individuals tend to associate local food with ecological sustainability (Wenzig & Gruchmann, 2018), there is limited research on perceived risk toward local food production processes. Grocery stores are a key player in the local food market evolution because they act as intermediaries between producer and consumer to provide local food to customers on a large scale (Dunne et al., 2010). From a retailer

perspective, there is a steadily growing demand to purchase local food from retail settings due to customer reliance on grocery stores for food products that meet diverse needs and preferences (Trivette, 2015). Online grocery platforms represent choice environments in which consumers decide between different food products (Berger et al., 2020). So, agricultural marketers must identify how online local food purchasing may be impacted by perceived risk of the environmental impacts resulting from food production and transportation.

From a consumer perspective, since there is not one official definition of local food, information seeking about local food products influences consumers' attitude which then affects their food purchasing choices (Feldmann & Hamm, 2015). Relevant information may address perceived risks related to production, transportation, and sourcing of local food. An important concept needed to understand how individuals handle such information and relevant to the RISP model development is heuristic and systematic processing. According to Eagley and Chaiken's Heuristic-Systematic model (HSM) of information processing, individuals process information *heuristically*, relying on judgmental cues and existing knowledge, or *systematically*, requiring greater cognitive capacity to analyze information (Chen et al., 2009). Provision of environmental impact measures associated with a local food may motivate consumers to engage in systematic processing if they perceive the new information as relevant to their food consumption choices.

As such, perceived risk toward food production could be addressed through provision of environmental impact measures that communicate local food has lower food miles and may have safer domestic production processes compared to other food items (Ruth & Rumble, 2016). While other RISP variables such as affect, perceived hazard characteristics, and individual characteristics also may be important in this context, the present scope required a more specific focus instead of examining all variables. Information seeking was investigated because it was hypothesized as a relevant variable that shapes consumer perceptions of local food available online. Consumers rely on information to help assess food product credence attributes (Wu et al., 2021), so information seeking patterns must be considered when analyzing perceptions toward environmental impact measures. Information and knowledge about local food production are a necessary antecedent for attitude because consumers must know and believe in advantages of local food before they develop a purchase intention for it (Sirieix et al., 2013).

Purchase Intention for Local Food

Online purchase intention can be understood as a situation where an individual desires to buy a particular product through a website or online platform (Liat & Wuan, 2014). Behavioral intention is a critical antecedent to actual behavior (ex. Teng & Wang, 2015), so intention to perform a behavior is a key determinant of that individual's behavior. Consumer intention to purchase local food is impacted by availability, price, convenience, trust of farmers, and awareness (Holt et al., 2018). Bianchi and Mortimer (2015) found the strongest predictor of purchase intention for local food was attitude toward local food and identified a need for examining whether local food purchase intention is also influenced by consumers' concern for the environment.

Furthering the idea that grocery stores are important avenues for sourcing and marketing local foods, consumers' increasing reliance on online grocery platforms should be considered when studying their purchase intention for local food. The online grocery industry consists of companies that are online-based and companies that have both a physical and online presence (Ahmed, 2019). Continued impacts of the COVID-19 pandemic are intensifying a national

digital divide where businesses that offer online customer services are flourishing, while businesses dependent on more traditional service models are struggling (Worstell, 2020). In 2021, online grocery market sales totaled $97.7 billion via pick-up, delivery, and ship-to home channels, with more than 70% of U.S. households receiving at least one order that year (Redman, 2022). Relevant to grocery businesses using online platforms is that website quality directly affects customer satisfaction, which in turn influences purchase intention (Liat & Wuan, 2014).

Perceptions of and willingness to pay (WTP) for local food have been found to differ within direct-to-consumer settings compared to direct-to-retailer settings (Feldmann & Hamm, 2015; Martinez, 2021; Printezis & Grebitus, 2018). Individuals are willing to pay a more premium price when purchasing local food from grocery stores compared to purchasing direct-to-consumer (Printezis & Grebitus, 2018). This difference is likely due to inconvenience and remoteness of direct venues like farmers markets (Gumirakiza et al., 2014). Consumer WTP for local food is also consistently higher compared to other added-value claims like organic or GMO-free (Printezis et al., 2019). Grocery retailers, therefore, are well-positioned to meet the needs of consumers who want to purchase local food but also seek the convenience and product variety of online grocery shopping (Etumnu & Widmar, 2020).

However, there is a lack of consensus regarding the extent to which local food labeling should communicate details about the product's production and distribution, while capitalizing on WTP for local food (Printezis et al., 2019; Printezis & Grebitus, 2018). Florida consumers had a significantly greater intent to purchase strawberries labeled Fresh from Florida than identical strawberries without the logo, potentially because the logo visually represented the growing location and positive attributes (Ruth & Rumble, 2016). Additional studies show that improved product information may enhance consumer recognition and confidence, in turn improving attitudes and increasing purchase intentions (Teng & Wang, 2015). Niche markets such as organic grocery stores may be well-positioned to implement environmental impacts alongside food products because of customers' higher income and environmental values (Li et al., 2016). Grocery retailers and agricultural marketers, then, must develop online product displays that drive positive attitudes toward local products (Campbell & Fairhurst, 2014).

Visual Communication of Local Food

With increased interest in local food available online from mainstream providers (Thilmany et al., 2020), grocery retailers must optimize the online presentation of local food. In studies investigating customer perceptions of website quality, website features have an important influence on online purchase intention (Ganesh et al., 2010). Attractive, interesting effects on websites can motivate consumers to engage in online shopping (Mansori et al., 2012). Online Instacart shopping baskets were found significantly more similar to each other than offline baskets, suggesting a past-orders-shortcut (Chintala et al., 2021) and highlighting the need to shape a positive perception of the item. Relatedly, Kolesova and Singh (2019) concluded that online grocery displays with reduced visual complexity led to significant positive effects on intention to purchase and revisit the page. Furthermore, grocery retailers should provide an engaging experience through a well-designed platform that holds attention (Kumar et al., 2022).

The selection of informational attributes is directly relevant to marketing specialists and grocery retailers seeking to effectively communicate online about local food to public audiences. Online grocery displays should underscore navigation efficiency and information accuracy, with efforts to communicate the originality of a food product (Barska & Wojciechowska-Solis, 2020).

Information quality enables customers to compare product alternatives, increasing customer satisfaction and contributing to online purchase intention (Hasanov & Khalid, 2015). There are two main types of information involved in online product presentations: visual and textual information (Chau et al., 2000). Visual information elements include images or pictures of a product, and textual information describes a product through words. In developing online presentations of local food, grocery and agricultural marketers need to determine the appropriate balance of visual and textual information accompanying a product (Blanco et al., 2017).

The lack of availability, convenience, and ease of identification of local food have been acknowledged as major barriers to local food purchasing (Feldmann & Hamm, 2015; Gumirakiza et al., 2014). In recognition of this barrier, labeling and providing a definition for local food are important methods to share information about product sourcing (Barska & Wojciechowska-Solis, 2020; Printezis et al., 2019; Stein & Santini, 2022). Consumers prefer clear labels to communicate product attributes because they aid in more easily identifying local food when choosing from a diverse product selection (Printezis & Grebitus, 2018). Consumer trust is strongly associated with food labels, and quality information associated with a product can increase awareness and willingness to pay for it (Zhang et al., 2018). Organic food labeling information and related knowledge perceived by consumers significantly impacts their trust in the food product, which then influences their intention to purchase (Teng & Wang, 2015).

To optimize online local food product presentations, in addition to balancing visual and textual information, marketing practitioners must account for how an individual's concerns about environmental sustainability impact their evaluation of a product. Especially for consumers who desire to counteract environmental deterioration by choosing more sustainable products, online grocery platforms might feature condensed information about environmental impacts of a product through labels, icons, or other information displays (Berger et al., 2020). Diverse information seeking styles should be accounted for when informing consumers about environmental impacts of food and encouraging adoption of more sustainable purchase behavior (Tulloch et al., 2021). Research is lacking on best practices for combining visual and informational elements into one product design that accounts for increased consumer interest in sustainable purchasing (Su et al., 2019). Demographic factors may also be an important consideration in online local food design because purchase intent for local food may differ according to age, sex, and income level (Ruth & Rumble, 2016). To address these research gaps, the present study sought to identify consumer perceptions toward three online product displays that illustrate environmental impact measures of a local food product to a varying degree.

Purpose and Objectives

The purpose of this study was to explore consumers' favorite online grocery design, preferred attributes of the design, and intent to purchase local strawberries online after viewing the design. The research was guided by the following objectives and hypotheses:

RO 1: Describe respondents' information seeking, intention to purchase local strawberries, favorite online grocery design, and preferred attributes of an online grocery design for local strawberries.

H1: The treatment with added information about environmental impact measures will be respondents' favorite online grocery design.

RO 2: Measure respondents' intent to purchase local strawberries after viewing one of the three online grocery designs.
H2: Respondents' intent to purchase local strawberries will significantly differ based on the design they viewed.
RO 3: Examine differences between respondents' preferred attributes of an online grocery design based on demographic factors.
RO 4: Determine if respondents' information seeking frequency predicts a change in their favorite online grocery design when they are provided with the most information.
H4: Respondents' information seeking frequency is expected to predict a change in their favorite online grocery design when they are provided with the most information.

Methods

An online Qualtrics survey using an experimental design was used to address the research objectives. This research was part of a larger study exploring communication practices about water issues and climate change to the residents of Alabama, Florida, and Georgia. The population of interest was adults aged 18 and older currently residing in one of these three states. Non-probability opt-in sampling was used to recruit respondents geographically representative of the states' population according to the 2021 U.S. Census. Qualtrics was contracted to obtain the sample and quotas were established to align respondents with the census data based on sex, age, and race/ethnicity. In agricultural communication research, non-probability samples are commonly accepted as a sampling method (Lamm & Lamm, 2019) as well as in public opinion research. The experimental design and random assignment of treatments in this current study helped to account for error or generalization problems associated with non-probability sampling.

An expert panel with members from natural resource conservation, survey design, and communication studies reviewed the survey for content accuracy and face validity. The University of Georgia Institutional Review Board (IRB #00005553) approved the survey design and items. The instrument was pilot tested for content validity with 50 individuals who were representative of the sample. The data collection was paused after the soft launch to ensure the assignment of respondents into each of the treatment groups, appropriate design of the scales, and reliability of all scales. The Cronbach alpha coefficients for all scales were found to be reliable ($\alpha > .70$), and no changes were made to the survey after the pilot test was conducted.

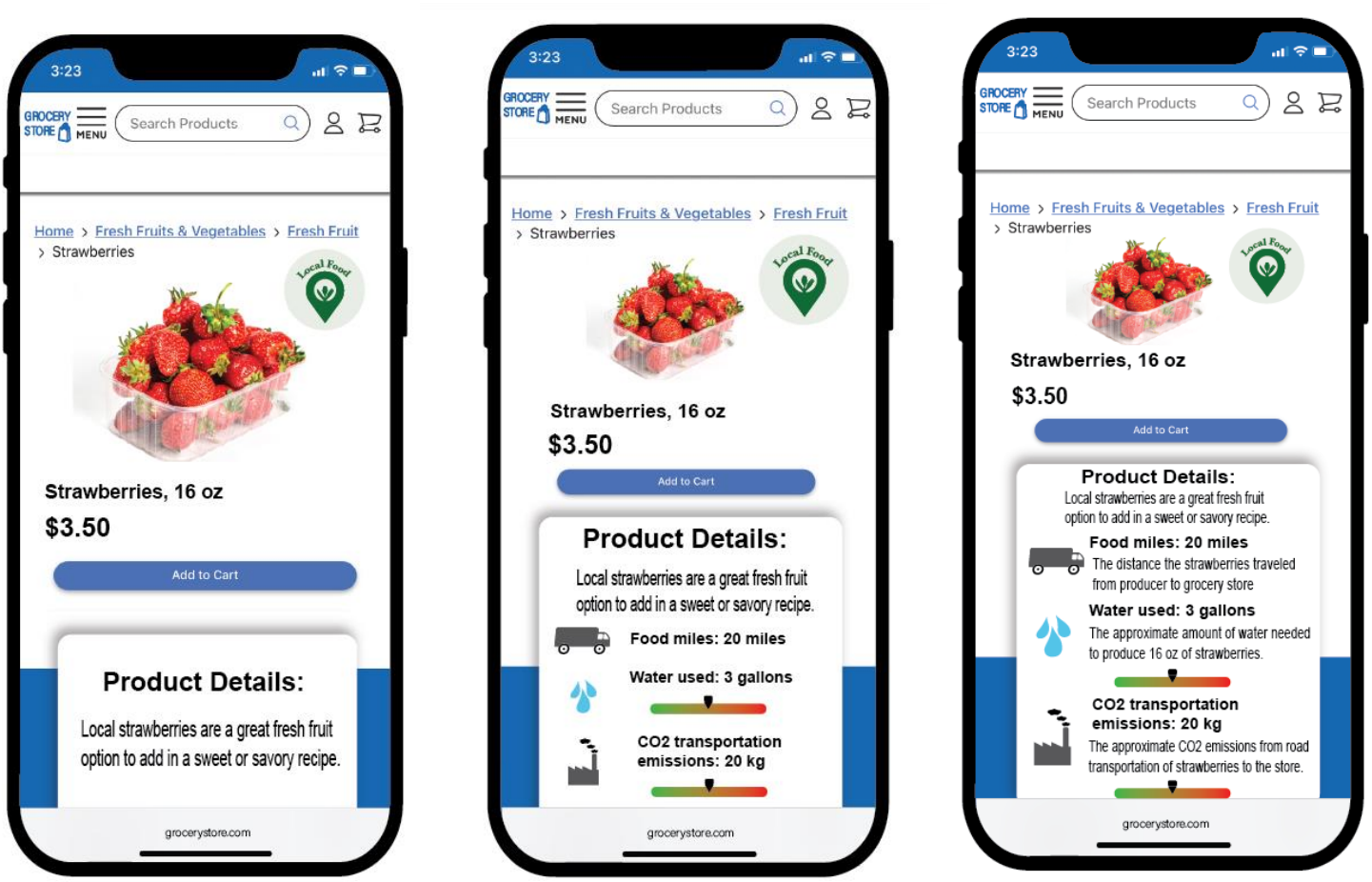
Five sections of the survey instrument were utilized in the current study: information seeking, experimental designs, intention to purchase local strawberries, preferred grocery design attributes, and demographic characteristics. Information seeking was measured as the intent to seek information and adapted from a climate change context in Yang and Kahlor (2012). The five-point, Likert-type scale asked respondents to indicate their level of agreement (1 = *Strongly disagree*; 2 = *Disagree*; 3 = *Neither agree nor disagree*; 4 = *Agree*; 5 = *Strongly agree*) with five statements related to their intent to seek information about local food: "I plan to seek information about local food in the next month," "I intend to look for information about local food in the next month," "I will look for information related to local food in the next month," "I have sought information about local food previously," and "I have no interest in information about local food." The last item was recoded to match the positive wording of the other items. A scale for information seeking about local food was created using the average of the six items ($\alpha = .904$)

After answering the information seeking scale, respondents were randomly assigned to the control group or one of two treatment groups. Each group viewed a design representative of

an online grocery display featuring local strawberries for purchase. Strawberries were selected because they are a common, familiar food available from a grocery store. They are also successfully grown in the Southeast where the survey was available, similar to the justification for fresh food products used in consumer survey research (Printezis & Grebitus, 2018). Adobe Illustrator 2022 was used to create the three designs. Several grocery websites served as a model in creating each design for survey respondents to feel as if they were partaking in an actual online grocery shopping experience. At the top of the page, respondents saw a menu icon, option to search products, profile icon, and shopping cart icon. A plain blue logo "grocery store" and "grocerystore.com" were used in place of actual affiliations to any one grocery store to minimize any brand perceptions. Each of the three designs was placed within a generic mobile iPhone image with a mock time, cellular service bar, WiFi access, and battery level.

Each design included a simple image of strawberries in a carton (Flickr, 2020) with the text "Strawberries, 16 oz" and "$3.50" in 17-point Arial below. This price was based on the average retail price, $2.50, of fresh strawberries (USDA, 2018) with an added dollar to estimate the expected higher cost of fresh local produce. All three versions included a generic green colored "Local Food" label created by the researcher to designate the strawberries as an identifiable local food product but not representative of a specific state. Local strawberries were presented to respondents through an online grocery design to address the availability and convenience barrier because online platforms may be perceived as easier to use (Printezis & Grebitus, 2018). The identification barrier for consumer purchasing of local food (Feldmann & Hamm, 2015) was addressed through exploring whether consumers prefer information about the food product beyond a local food label. This added information included environmental impact measures associated with a food product: food miles, water inputs, and carbon dioxide emissions.

Respondents in the control group received the online grocery design including only the product type, price, local food label, and a sentence providing product details to mimic current online grocery purchasing designs. The product details read "Local strawberries are a great fresh fruit option to add in a sweet or savory recipe." Respondents in a treatment group received either Treatment 1 or Treatment 2. Treatment 1 featured a design identical to the control with added estimates and icons of associated food miles, water inputs, and carbon dioxide emissions as well as a slider scale portraying the environmental impact severity of water inputs and transportation emissions. Treatment 2 included a design identical to Treatment 1 with an additional sentence defining food miles, water inputs, and carbon dioxide emissions. Estimates for the water inputs and carbon dioxide emissions from transportation associated with local strawberry production were based on a lifecycle assessment study of local foods in a southeastern university dining service (Striebig et al., 2019). The numerical estimates in the treatments were adjusted to provide an estimate per 16 oz of strawberries. Estimates for the food miles associated with local strawberries were based on research suggesting that consumers define local food as ranging from 10 to 100 miles from its origin (Feldmann & Hamm, 2015). Images of the control and two treatment designs can be found below in Figure 1.



Control Treatment 1 Treatment 2

Figure 1. *Treatments provided to respondents*

A timer was set on each treatment to ensure that respondents spent a minimum amount of 10 seconds viewing the grocery platform design. Next, respondents were presented with purchase intention items to measure their intention to buy local strawberries after viewing one of the designs. The purchase intention scale in the present study was researcher adapted from an organic food purchase intention scale (Teng & Wang, 2015) with three items, "if organic foods were available, I would buy them," "I am willing to buy organic foods despite their higher prices," and "the probability I would buy organic foods is very high." "Organic food" was replaced with "local strawberries," and the items "I am more likely to buy strawberries if they are locally grown" and "I would be excited to buy local strawberries" were added to the scale. The five Likert-type items were combined to create the scale (α =.792). In order to elucidate the findings, real limits were assigned. The real limits of the Likert-type scales were 1.00 - 1.49 = *strongly disagree*, 1.50 – 2.49 = *disagree*, 2.50 – 3.49 = *neither agree nor disagree*, 3.50 – 4.49 = *agree*, and 4.50 – 5.00 = *strongly agree*.

After the purchase intention scale, respondents completed a multiple-choice question about their preferred online design. Although originally randomly assigned to the control or one of two treatment designs, this question presented all three designs and asked respondents "Which of these 3 designs do you like best?" Then, respondents answered "Which of the following

factors were important in your selection?" by selecting the attributes relevant to their preferred design. Attributes included: a clean and organized design, inclusion of food miles, inclusion of carbon dioxide emissions, inclusion of water inputs, simplicity, and extra product information/added details. The last portion of the survey asked respondents to complete demographic items. To address the four research objectives, data analysis included descriptive and inferential statistics. Frequencies and means were used to address objective one, an ANOVA was used to address objective two, chi-squared tests were used to address objective three, and logistic regression was used to address objective four.

A total of 906 responses were obtained after accounting for four attention check filters. Respondents' ages ranged from 18 to 88. The average respondent was a white female with a four-year college degree and family income from $25,000-$49,999. Detailed demographics of survey respondents can be found in Table 1.1.

Table 1.1
Demographics of Respondents (N = 906)

Characteristic	*n*	*%*
Sex		
Male	423	46.7
Female	483	53.3
Age		
18-34 years	206	22.7
35-54 years	286	31.6
55+ years	414	45.7
Race*		
White	693	76.5
Black	130	14.3
Asian	55	6.1
American Indian or Alaska Native	20	2.2
Other	42	4.6
Ethnicity		
Hispanic	153	16.9
Non-Hispanic	753	83.1
Education		
Less than 12^{th} grade	27	3.0
High school diploma	196	21.6
Some college	206	22.7
2-year college degree	116	12.8
4-year college degree	232	25.6
Graduate or Professional degree	129	14.2
Family Income		
Less than $24,999	195	21.5
$25,000 - $49,999	236	26.0
$50,000 - $74,999	191	21.1
$75,000 - $149,999	218	24.1

$150,000 - $249,999	48	5.3
$250,000 or more	18	2.0
Geographic Location		
Florida	309	34.1
Georgia	311	34.3
Alabama	286	31.6
Political Affiliation		
Republican	337	37.2
Democrat	271	29.9
Independent	200	22.1
Non-affiliated	88	9.7
Other	10	1.1

Note. * n > 906 for race because respondents could select multiple races.

Results

For the first part of objective one, respondents tended to neither agree nor disagree that they intend to seek information about local food (M = 3.27, SD = .92). For the second part, respondents indicated their agreement toward items on the intention to purchase scale. Respondents tended to agree that they intend to purchase local strawberries (M = 3.56, SD = .79). The majority agreed (46.2%, n = 419) or strongly agreed (25.3%, n = 229) that they would be excited to buy local strawberries. The majority also agreed (45.5%, n = 412) or strongly agreed (24.9%, n = 226) that they are more likely to buy strawberries if they are locally grown.

Table 1.2
Respondents' Intent to Purchase Local Strawberries (N = 906)

Item	Strongly disagree %	Disagree %	Neither agree nor disagree %	Agree %	Strongly agree %
If local strawberries were available online, I would buy them.	11.4	16.4	17.4	36.6	18.1
I am willing to buy local strawberries regardless of their price.	9.9	26.9	26.5	26.3	10.4
The probability I would buy local strawberries is very high.	3.5	7.3	19.9	46.6	22.7
I am more likely to buy strawberries if they are locally grown.	2.9	5.6	21.1	45.5	24.9
I would be excited to buy local strawberries.	3.0	4.7	20.8	46.2	25.3

The third component of objective one was to identify respondents' preferred online design. Of the three designs, most respondents (42.9%, *n* = 389) preferred Treatment 2 with an additional sentence defining water inputs, transportation emissions, and food miles. Hypothesis 1 was therefore accepted. Other respondents rated the control (33.3%, *n* = 302) or Treatment 1 (23.7%, *n* = 215) as their favorite design. Respondents then selected attributes that influenced their preferred online design selection from a multiple-choice question allowing multiple responses. Most respondents selected "clean and organized design" (64.6%, *n* = 585) and "simplicity" (49.6%, *n* = 449) as important attributes when choosing their favorite design. Slightly more respondents (41.8%, *n* = 379) selected "inclusion of food miles" compared to "inclusion of water inputs" (40%, *n* = 362) or "inclusion of CO2 emissions" (37.5%, *n* = 340).

To address objective two, an ANOVA was used to determine if there was a difference between respondents' intent to purchase local strawberries based on treatment type received (Table 4.3). Whether respondents viewed the control or treatment online grocery designs did not significantly impact their purchase intention $F_{(2, 903)} = .61$, p = .54. Hypothesis 2 was therefore rejected. Respondents' mean purchase intention was similar for those who received the control (*M* = 3.57, *SD* = .84), Treatment 1 (*M* = 3.52, *SD* = .75), or Treatment 2 (*M* = 3.59, *SD* = .79).

For objective three, a series of Chi-square tests were performed, regardless of treatment group, to determine any significant differences in preferred attributes of an online grocery design based on demographic factors. Chi-square tests were used due to the categorical nature of the demographic variables and the dependent variable (the attribute was important = yes, or not important = no). Demographics including sex, geographic location, ethnicity, race, political affiliation, and education significantly moderated the selection of certain preferred attributes. These results are reported in Table 1.4 - 1.8.

Table 1.4

Preferred Attribute: Food Miles (N = 906)

	No		Yes		
Demographic	*n*	*%*	*n*	*%*	x^2
Sex					
Male	221	41.9%	202	53.3%	11.44*
Female	306	58.1%	177	46.7%	

*Note. * p < .05*

Table 1.5

Preferred Attribute: Carbon Dioxide Emissions (N = 906)

	No		Yes		
Demographic	*n*	*%*	*n*	*%*	x^2
Sex					
Male	247	43.6%	176	51.8%	5.63*
Female	319	56.4%	164	48.2%	
Ethnicity					
Hispanic	82	14.5%	71	20.9%	6.19*
Non-Hispanic	484	85.5%	269	79.1%	

Geographic Location					
Florida	180	31.8%	129	37.9%	7.74*
Georgia	189	33.4%	122	35.9%	
Alabama	197	34.8%	89	26.2%	
Race					
White	449	79.3%	244	71.8%	6.76*
Black	83	14.7%	47	13.8%	.122
Asian	26	4.6%	29	8.5%	5.77*
American Indian	12	2.1%	8	2.4%	.053
Other	19	3.4%	23	6.8%	5.58*

*Note. * $p < .05$*

Table 1.6

Preferred Attribute: Water Inputs (N = 906)

	No		Yes		
Demographic	*n*	*%*	*n*	*%*	x^2
Ethnicity					
Hispanic	80	14.7%	73	20.2%	4.62*
Non-Hispanic	464	85.3%	289	79.8%	
Political Affiliation					
Republican	224	41.2%	113	31.2%	11.43*
Democrat	151	27.8%	120	33.1%	
Independent	108	19.9%	92	25.4%	
Non-affiliated	54	9.9%	34	9.4%	
Other	7	1.3%	3	0.8%	

*Note. * $p < .05$*

Table 1.7

Preferred Attribute: Simplicity (N = 906)

	No		Yes		
Demographic	*n*	*%*	*n*	*%*	x^2
Education					
Less than 12th grade	13	2.8%	14	3.1%	16.90*
High School diploma	113	24.7%	83	18.5%	
Some college	83	18.2%	123	27.4%	
2-year college degree	66	14.4%	50	11.1%	
4-year college degree	110	24.1%	122	27.2%	
Graduate degree	72	15.8%	57	12.7%	

*Note. * $p < .05$*

Table 1.8

Preferred Attribute: Extra Production Information (N = 906)

	No		Yes		
Demographic	*n*	*%*	*n*	*%*	x^2
Education					
Less than 12th grade	17	3.3%	10	2.6%	11.22*
High School diploma	100	19.2%	96	24.9%	
Some college	115	22.1%	91	23.6%	
2-year college degree	60	11.5%	56	14.5%	
4-year college degree	151	29%	81	21%	
Graduate degree	77	14.8%	52	13.5%	

*Note. * $p < .05$*

To address objective four, a binary logistic regression determined if respondents' information seeking frequency predicted a change in the log odds of selecting Treatment 2 as their favorite. Information seeking frequency about local food significantly predicted the selection of Treatment 2 as the favorite design, $x^2(1) = 16.54$, $p < .001$. Therefore, for every 1-point increase in Information Seeking frequency, the log odds of Treatment 2 being selected as the favorite design increased by .35. So, as information seeking increased by 1, the probability of selecting Treatment 2 as the favorite increased by 57.5%. Hypothesis 4 was accepted.

Conclusions and Discussion

The purpose of this study was to understand consumer preferences for online local food product designs by testing the effects of different visual and informational strategies, a key undertaking before recommendations are provided to industry players (Tobi et al., 2019). The findings provide important implications for agricultural marketers and grocery retailers carrying local products. Local food sales are expected to continue rising exponentially in the coming

years with growth concentrated in intermediated outlets including grocery stores (NASS, 2016). Combining the increased consumer demand for local food with the increased use of online grocery shopping (Chintala et al., 2021), agricultural marketers must identify how to best reach audiences through online local food designs. Influential factors on consumer purchase intention for local food include attitude, availability, price, and convenience (Holt et al., 2018) but environmental impact measures preferred by consumers is a developing area in relation to purchase intention. Recommendations for marketing practitioners and grocery retailers regarding online grocery designs for local food are presented according to findings from this study.

The limitations of this research must be acknowledged before further applying the findings. Each of the three treatments used in the experimental design portion of this study included a local food label which may have impacted consumers' perception of the local strawberries. The presence of a local food label may have decreased attention toward the environmental impact measures provided in each treatment because consumers may already have established views toward local food. Strawberries were utilized as the local food product in the treatments and consumers may have responded differently if another food item such as bell peppers or tomatoes were used. For the purposes of this study, sustainability of a food item was represented through food miles, carbon dioxide emissions, and water inputs associated with local strawberry production. However, other metrics should be considered to accurately measure the sustainability impact of food items, such as impacts of food production on biodiversity and land use (Coley et al., 2009; Passel, 2013). This study was limited by available space in each treatment design and could not account for every measure of food product sustainability. Positioning the information seeking scale prior to the treatment designs also could have primed participants to think about local food. Lastly, this study sought to isolate the impact of online grocery design on purchase intention for local food and did not account for factors like existing attitude toward local food or price (Bianchi & Mortimer, 2015).

According to the results from this research, Treatment 2 was the overall preferred online grocery design. This indicates that when making food purchasing decisions, consumers desire sufficient information on environmental risks associated with food production (Frewer et al., 2015). This design had the most details, suggesting that more information about local food production may enhance perceived trust within an e-commerce realm (Liat & Wuan, 2014), which is congruent with Hypothesis 1. Specific preferred attributes of the online grocery design differed by demographic factors. For example, sex moderated the preferred attribute of food miles, political affiliation moderated the preferred attribute of water inputs, and education level moderated the preferred attribute of extra production information. This aligns with previous literature that recognizes demographics are a key consideration in online local food designs because factors like sex can impact local food purchasing preferences (Ruth & Rumble, 2016). Simplicity and clean/organized design, however, were most frequently selected as preferred attributes of an online design despite demographic differences.

Furthermore, perceived information quality could have contributed to higher trust and informed purchase decisions (Blanco et al., 2017). However, the present study found that differing amounts of visual and textual information accompanying environmental impact measures did not significantly impact consumers' intention to purchase the product. Purchase intention was relatively high regardless of treatment, indicating that consumers may already possess established ideas about local food. This is not necessarily surprising due to the growing demand for local food (NASS, 2016) and individuals' willingness to pay more premium prices when purchasing local food from grocery stores (Printezis & Grebitus, 2018). Other variables in

addition to treatment type are likely needed to more thoroughly understand how consumer purchase intention varies for local food. Factors like age, sex, political affiliation, and socioeconomic status could play a more important role in forming purchase intent than accounted for in the present study. Thus, audience segmentation practices should be added when using a RISP framework to explore preferences for online grocery design and perceptions of local food sourcing information (Stein & Santini, 2022).

Implementation of audience segmentation should inform more thorough shopping app customization, so consumers can be presented with their preferred design when seeking local food online. Recognizing that purchase intent does not significantly differ by design, the goal of shopping app customization should be to match consumers with their preferred design to support their already existing purchase intention for local food. This is relevant because online features influence purchase intention, and interesting components in e-commerce websites may increase motivation to engage in online purchasing (Mansori et al., 2012). Factors such as information seeking frequency in the present study were found to significantly predict favorite online grocery design when the favorite is Treatment 2. Therefore, individuals who engage in information seeking frequently may be a key target audience for agricultural marketing professionals to provide with informational displays about sustainability measures (Teng & Wang, 2015).

Grocery retail managers and marketing specialists should be encouraged by respondents' tendency to agree that they intend to purchase local strawberries regardless of treatment type. Agricultural marketers should focus on consumers' pre-existing purchase intent for local food so they can be presented with appropriate online design attributes according to psycho-demographic factors like their information seeking style, sex, and education level. Knowing as much as possible about the customer to enhance their experience may improve their overall perception of online grocery shopping and maintain their purchase intention for local food. This is supported by research indicating that pleasurable aspects in e-commerce websites promote greater customer interaction (Kolesova & Singh, 2019), and shaping early positive perceptions of grocery items helps to develop repeat purchasing (Chintala et al., 2021). Consumer preferences for visual and textual elements about local food production should still be accounted for as more individuals show interest in information about agri-food system sustainability (Tulloch et al., 2021). The findings indicate that higher-end markets such as Whole Foods would likely see benefits from investing in environmental impact measures associated with food products compared to larger supermarket chains like Walmart or Kroger. Support for environmental labeling programs has been identified primarily from niche audiences who are higher income earning, less price conscious, and are concerned about the environment (Li et al., 2016). These consumers tend to shop at organic, "green," or "healthy" grocery outlets (Li et al., 2016), so they may also be a target demographic for providing extra information about environmental impacts of local food.

Future research should explore whether results are similar if the online grocery designs are used without the local food label. Labeling of local food has been strongly associated with greater consumer trust (Zhang et al., 2018), so it is possible that the design did not impact purchase intention because of the confounding label. Considering the generally high purchase intention for local strawberries regardless of treatment type, local food may not be as polarizing as terms like "organic" or "sustainable." Application of the designs into an organic food context may shed light on nuances of purchase intention since organic food information has been found to significantly impact consumer trust in the food product which influences their purchase intention (Teng & Wang, 2015). Focus groups may provide insight on factors influencing consumers' favorite design yet why the design treatment type did not significantly impact their

purchase intention for local strawberries. Additionally, individuals may desire information about social factors more than, or in addition to, environmental factors related to local food production. The present study focused on environmental indicators of sustainability, but social indicators such as community economic development may also interest consumers seeking information about local food (Cleveland et al., 2015).

As the online grocery shopping realm grows rapidly and offers more options for local food purchasing, consideration of a RISP framework that applies audience segmentation principles is appropriate. More research is needed on how these two frameworks interact to explain consumer purchase intention for local food online. For example, consumer purchase intent may need to be predicted from a more advanced model that includes information seeking frequency, attitude toward local food, and demographic variables like sex, education level and political affiliation. Consumer preferences for visual and textual information about the environmental impacts of local food is a key area of understanding for agricultural marketers who inform consumers as they make food purchasing decisions. Empowering consumers to evaluate their food consumption choices (Ferrari et al., 2019) requires that they have access to information regarding how the food product travels from farm to fork.

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