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VIDALIA Branding and Co-labeling Strategy: A Cluster Analysis of Sweet Onion Buyers and Potential Buyers

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Abstract

The study focuses on several branding, labeling, and co-labeling strategies for sweet onions with a special focus on Vidalia. We evaluated buyers' and potential buyers' preferences for external attributes of sweet onions. We identified market segments for sweet onion buyers and potential buyers based on cluster analysis, followed by a multinomial logit analysis to determine segment membership. Results suggest that producers can attract out-of-state, younger, and higher-educated consumers through a combination of labels, while older consumers tend to focus more on a specific label. Price is the main driver of potential buyers' decisions. Results also suggest the need to increase the amount of information provided to potential buyers, directly on the product sold, using a co-labeling strategy.

Keywords: conjoint analysis, market segment, sweet onions, Vidalia

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Introduction

Like many other states in the United States, Georgia has been using branding and advertising strategies to build a reputation for some of its crops. If the state is well-known for its "*three P's*," peaches, poultry, and peanuts, other agricultural products are also well-known thanks to a successful regional branding strategy. The VIDALIA® brand used for sweet onions is one of them (Carter, Krissoff, and Zwane, 2006). The name emerged in 1949 and became a brand when the "Vidalia Onion Act" was passed in 1986 (Georgia General Assembly, 1986; Oder, 2019). The ownership of the brand was then granted to the state Department of Agriculture and, most importantly, the act stipulated a "region of production" (i.e., 13 counties[1] and parts of seven other counties[2]) to become the official growing area for Vidalia onions. In 1989, the U.S. Department of Agriculture (USDA) provided federal protection to the Vidalia brand, its use, and its restricted area of production. The Vidalia Onion Committee was also created to support marketing and research initiatives (Code of Federal Regulations enacting the Federal Marketing Order No. 955, 1989). In 1990, the Vidalia Sweet Onion was officially designated as the official state vegetable (Georgia Code, 1990).

Regarding consumption, onions occupy the third position in the fresh vegetable sector, behind potatoes and tomatoes, with an average of 21 pounds per capita in 2020 (USDA ERS, 2021). In terms of the value of utilized production, the onion industry represented the third most-valuable fresh vegetable after lettuce (head) and tomatoes, reaching about $1 billion (USDA NASS, 2020) on average every year since 2015, despite an important decrease in numbers of acres planted in the last 20 years (-40%). Although the USDA points out that 2020 was characterized by a widespread decline in fresh vegetable production, the annual utilized production of onions shows a slight rebound of +3% compared to 2018 and 2019 (USDA ERS, 2021). The four largest production regions are Washington, Idaho–Eastern Oregon, California, and Texas (USDA NASS, 2020). However, Georgia, ranked 4th at 12% of the national value of cash receipts for onions in 2020 (USDA ERS, 2020), most of which can be attributed to spring production of the Vidalia sweet onion (UGA CAED, 2021). More precisely, only 9 out of the 13 counties[3] allowed to produce Vidalia account for about 92% of the state's total production (value of about $122,000), a decrease from the 99.9% in 2010 (UGA CAED, 2021).

Hence, determining what specifically makes a region-of-production branding strategy like Vidalia effective is challenging. Thus, the potential contribution of other attributes should be considered when products are sold to new markets (i.e., consumers located outside of the region of production). This paper presents a novel segmentation for the sweet onion market based on the results of a conjoint analysis including characteristics on indication of origin (Georgia, Southeast, United States, and Peru), other labels (Certified Naturally Grown, USDA Organic, Pesticide Free, Non-GMO Verified, and Sustainably Grown), and region-of-production branding (Vidalia, Walla Walla,

[1] Emanuel, Candler, Treutlen, Bulloch, Wheeler, Montgomery, Evans, Tattnall, Toombs, Telfair, Jeff Davis, Appling, and Bacon counties, Georgia.
[2] Jenkins, Screven, Laurens, Dodge, Pierce, Wayne, and Longco counties, Georgia.
[3] Top producing counties: Candler, Emanuel, Evans (3rd), Laurens, Montgomery, Tattnall (1st), Telfair, Toombs (2nd), and Wayne.

and Texas). This study aims to address how key attributes are valued or associated with benefits as perceived by buyers and potential-buyers (not currently purchasing onions) and how a region-of-production branding strategy works in an extended area of sales (miles from Vidalia, GA, the epicenter of where Vidalia onions can legally be grown). This paper shows that branding is essential as it allows producers to differentiate their commodities, thereby potentially increasing demand and revenues. We also show that other characteristics, such as labeling on production practices or origin, are important, but importance varies by market segment.

Motivation and Literature Review

Onions are classified as a vegetable by the U.S. Department of Agriculture, Agricultural Marketing Service, which establishes grade standards (USDA AMS, 2021). According to the National Onion Association (2017), onions from the United States can be divided into two categories based on when they are harvested and sold: spring, summer fresh market versus fall, winter storage onions. This seasonality factor affects their water content (reduced for fall/winter), shelf-life (reduced for spring/summer), and flavor (sweeter for spring/summer), and as a result influences the consumers' preferences toward one category or the other, as well.

Despite a narrow area of production, Vidalia's national recognition is mainly attributed to the "geographical-origin-based branding strategy" (Carter, Krissoff, and Zwane, 2006). By definition and according to research findings, such a strategy is used to convey additional information about the product that consumers find useful and can result in price premiums over generic commodity prices (Simonsen and Lillywhite, 2014). The U.S. fruit and vegetable industry offers multiple examples of similar success with "Country of Origin Labeling" (COOL) (Umberger et al., 2003; Wimberley et al., 2003; Loureiro and Umberger, 2003; Mabiso et al., 2005; Lusk et al., 2006; VanSickle, 2008), state branding like Arizona Grown, South Carolina Grown, or Georgia Grown (Naasz, Jablonski, and Thilmany, 2018), or region-of-production branding (Carter, Krissoff, and Zwane, 2006; Grebitus, Roosen, and Seitz, 2015).

Three major factors—a significant product differentiation, a control of the supply chain, and a broad advertising effort—have proven to be key for the geographical-origin-based branding strategy to be successful in the case of fresh produce (Boyhan and Torrance, 2001; Carter, Krissoff, and Zwane, 2006; Deselnicu et al., 2013). Focusing on product differentiation, literature suggests that taste, freshness, and quality are intrinsic product-based attributes attached to the brand image by consumers (Simonsen and Lillywhite, 2014). In the case of Vidalia, the marketing effort has primarily used flavor to set these onions apart from other sweet onions and onions in general (Costa et al., 2003).

Research findings are also prolific, pointing out the importance of extrinsic characteristics also known as credence attributes and their impact on consumers' willingness to pay. Price premiums have been often associated with specific labeling strategies, such as organic (Yiridoe, Bonti-Ankomah, and Martin, 2005; Batte et al., 2007; Haghiri, Hobbs, and McNamara, 2009; Li and Kallas, 2021), locally grown (Darby et al., 2008; Carpio and Isengildina-Massa, 2009; Onken and

Bernard, 2010; Hu et al., 2012), or a label indicating the absence of genetically engineered material (McFadden and Lusk, 2017).

Additionally, numerous studies (James, Rickard, and Rossman, 2009; Yue and Tong, 2009; Adams and Salois, 2010; Onozaka and Thilmany-McFadden, 2011; Campbell et al., 2014; Chen, Gao, and House, 2015; McFadden and Huffman, 2017) convey that the attribute "local" is increasing in relevance when compared to organic certification or informative labeling like "non-GMO." Moser, Raffaelli, and Thilmany-McFadden (2011) concluded a decade ago that the attribute "local" is generally relevant to the decision to buy fresh fruits and vegetables. Local products are assumed to be fresher and better tasting and, most importantly, they may enhance the trust of consumers who personally know the producers of their fruits and vegetables (Midmore et al., 2005; Rodriguez-Ibeas, 2007; Thilmany, Bond, and Bond, 2008). More recent studies underscored that consumers were willing to pay a substantial premium for locally grown produce if labeled with origin information or that utilize a state or regional branding program (Curtis, Gumirakiza, and Bosworth, 2014; Shi, Halstead, and Huang, 2016).

In contrast, the organic label seems to vary in relevance to consumers depending on the product or the geographic area, despite a recent increase in demand for the organic attribute and price premiums obtained for the organic onion compared to conventional ones (+75% for organic price in $ per pound in 2021, according to USDA ERS, 2021). A key assertion is that consumers weigh the potential benefits of organic by its costs, which are likely to endure throughout their future purchases of organic product (Bezawada and Pauwels, 2013). Well-documented benefits given by consumers include health, nutritional value, taste, animal welfare, ethics, and environmental protection (e.g., Bourn and Prescott, 2002; Fotopoulos and Krystallis, 2002; Makatouni, 2002; Zanoli and Naspetti, 2002), but costs are typically perceived to be higher for organic products than conventional products and more difficult to find in the exact form, flavor, and quantity the consumer prefers (Michelsen et al., 1999).

Another key assertion lies in the fact that many consumers perceive benefits of local foods to be similar to expected benefits from organic foods (e.g., Hempel and Hamm, 2016a, b; Wägeli and Hamm, 2016, Denver and Jensen, 2014). Meas et al. (2015) highlighted that "local has become the new organic." They found strong substitution between organic and local production claims in U.S. consumers' willingness to pay for these products, respectively. Curtis, Gumirakizab, and Bosworth (2014) illustrated this point with products grown conventionally in Utah (locally), outweighing either organically or conventionally grown of unknown origin; specific benefits were associated with local, such as quality, vitality of rural areas, short transportation distances, and freshness (Roininen, Arvola, and Lähteenmäki, 2006).

Despite research efforts to quantify the impact of using labeling, co-labeling, and branding strategies in selling produce, credence attributes tend to be more difficult to evaluate precisely, as the evaluation can reveal consumers' misperceptions or lack of awareness (Lee and Yun, 2015). Among credence features, local tends to always be ranked higher than other attributes, such as organic, certification, brand, and origin, even with no clear definitions or regulating body in place to monitor such claims (Moser et al., 2011). However, the shorter the distance between producer

and consumer (geographically and culturally), the higher the effectiveness of local geographical indicators (Marchesini, Hasimu, and Regazzi, 2007). Other labels such as pesticide free (Baker 1999), non-GMO verified, Certified Naturally Grown, and Sustainably Grown add to the complexity of consumers' perceptions. For example, McFadden and Lusk (2017) pointed out that in the presence of a non-GMO material label, organic is not necessarily valued (i.e., consumers are not willing to pay more for both labels because their perception is that organic does not include genetically modified material).

Data and Methods

Data

An online survey was administered to a nationwide panel of U.S. residents by Toluna, Inc., during the 2018 Vidalia distribution period in June. Survey participants were recruited by a panel provider. A total of 2,211 panelists were randomly selected to participate in a survey regarding their knowledge and potential purchasing behavior of sweet onions. The final recruited sample totaled 1,572 participants. The respondents were classified as "buyers" and "potential-buyers" based on their response to a qualifying question regarding whether or not they bought onions in the last 12 months. Table 1 provides the demographic information related to these two groups. The buyers and potential-buyers then answered questions regarding the factors that affected their decisions to buy produce, their preferred location to buy produce in general, their source of information regarding fresh produce, their ranking of various produce labels, and a conjoint section on their wiliness to buy sweet onions. In addition, the buyers answered specific questions regarding onions, including the types of onions they buy, the frequency and quantity of purchase, their preferred type and brand of onions, and their familiarity with the types and brands of onions. The potential-buyers were asked follow-up questions regarding reasons for not buying onions.

Table 1. Descriptive Statistics by Buying Behavior

	Potential-Buyer		**Buyer**	
	Average	**STD**	**Average**	**STD**
Region				
Northeast	19%		17%	
South	44%		46%	
Midwest	15%		16%	
West	22%		21%	
Age (median years)	53.5		55	
Generation				
Baby boomer and older	54%		58%	
Gen X	31%		33%	
Millennial and younger	15%		9%	
Gender (1 = male)	63%		38%	
Race (1 = caucasian)	81%		83%	

Table 1. Continued

	Potential-Buyer		Buyer	
	Average	**STD**	**Average**	**STD**
Where live				
Metro	36%		29%	
Suburb	50%		48%	
Rural	15%		23%	
Number adults in household (#)	2.15	1.06	2.14	0.98
Number persons under 18 years in household	0.50	1.00	0.56	0.96
Education				
High school or less	20%		25%	
Some college	39%		34%	
Bachelor's degree	25%		25%	
Greater than bachelor's	16%		16%	
Household income (median $)	$55,000		$55,000	
Primary grocery shopper (1 = yes)	80%		97%	
Food neophobia scale	33.4	9.7	27.1	10.5
Distance from Vidalia, GA (miles)	735.6	594.2	732.8	642.9
Observations	124		1,448	

Methodology

Conjoint analysis is a widely used technique to understand consumer preferences for attributes of various agricultural produce. Past examples of its application include apples (Manalo, 1990; Onozaka and Thilmany-McFadden, 2011), bell peppers (Frank et al., 2001), citrus fruit (Campbell et al., 2004; Campbell et al., 2006), strawberries (Darby et al., 2008), peaches (Campbell, Mhlanga, and Lesschaeve, 2013), tomatoes (Onozaka and Thilmany-McFadden, 2011), cucumbers (Jiménez-Guerrero et al., 2012), and produce in general (Campbell et al., 2010).

The first step of a conjoint study is to identify the key attributes and the levels associated with the attributes. As discussed previously, our study focuses on credence attributes and, more specifically, the attributes related to labeling, co-labeling, and branding strategies impacting consumer preferences when purchasing sweet onions. We identified the attributes for this study after consulting with experts and a review of the relevant literature (see Table 2). Product price is usually one of the most important attributes in purchasing decision. In our study the price attribute had four levels, ranging from $0.79/lb to $2.49/lb, which contains the current price of a pound of sweet onions within the interval. The levels for the origin attribute included information on region, state, country, and no label (Georgia, Southeast, USA, Peru, and no label) for exploring consumer preferences for local and imported onions. Other than Vidalia, the regional branding attribute included two more well-known sweet onion brands in the United States, which are competitors—Walla Walla (a regional brand from Washington) and Texas (a state brand). In addition to the origin and regional branding, we investigated other labels that could be added to the description of

a fresh produce that might affect consumer preferences. Our list included Certified Naturally Grown, USDA organic, Non-GMO, Sustainably Grown, and Pesticide Free labels. Since allowing respondents to evaluate each combination of attribute levels would be overwhelming, we utilized a fractional factorial design for the study. Our final design consisted of 32 product profiles after maximizing D-efficiency, whereby D-efficiency allows for comparison of the orthogonal balance of the design with design efficiency (Kuhfeld, 2010). Many of the conjoint studies involving agricultural products have restricted such profiles to 25 or less to limit respondent fatigue; however, studies in marketing and business have used a higher number to evaluate products (see Moskowitz, Gofman, and Beckley, 2006). There are studies of agricultural products using 30+ profiles (Campbell et al., 2010; Campbell, Mhlanga, and Lesschaeve, 2013; Campbell, Mhlanga, and Lesschaeve, 2016; Ong et al., 2021).[4]

Table 2. Attributes and Levels Used in the Conjoint Analysis

Attribute	**Levels**				
Price per pound	\$0.79	\$1.29	\$1.79	\$2.49	
Regional/state branding	Sweet (none)	Vidalia	Walla Walla	Texas	
Sweet onion origin	No origin	Georgia	Southeast	USA	Peru
Certified naturally grown label	No label	Labeled certified naturally grown			
Organic label	No label	Labeled USDA certified grown			
Pesticide-free label	No label	Labeled pesticide free			
Sustainably certified grown label	No label	Labeled sustainably certified grown			

The 32 product profiles were randomized, and the respondents were asked to state their willingness to purchase 1 pound of the product specified in those profiles on a scale of 0–100, where 0 represented "definitely would not buy," and 100 represented "definitely would buy." The respondents were free to choose anywhere within this interval. Figure 1 provides an example of how the different attributes were presented to the respondents. SAS mkt commands (Kuhfeld, 2003) were used to establish the number of sets as well as their design.

[4] There is no consensus regarding the "right" number of product profiles. In the case of choice experiments, Louviere, Hensher, and Swait (2000) observed that most studies evaluated between 8 and 16 choice sets. However, Louviere (2004) later updated that in marketing and transport research, humans will respond to "dozens" of choice sets. Several studies (Stopher and Hensher, 2000; Hensher, Stopher, and Louviere, 2001) that investigated the impact of number of choice sets provided to respondents reported that the number of choice sets had little impact on response rate, no impact on respondent fatigue, and little impact on the mean WTP (Caussade et al., 2005; Hensher, 2006).

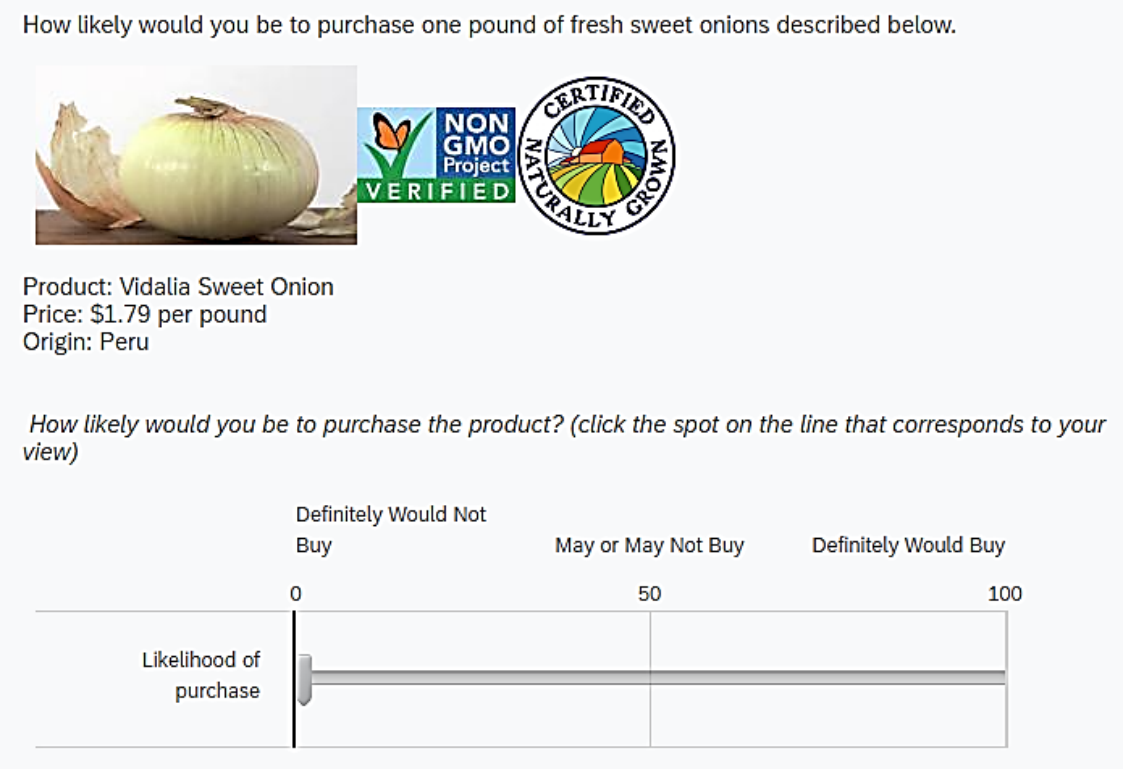

Figure 1. Example of a Set Presented to the Respondents

A consumer's overall utility from consuming the product is the sum of the individual utilities derived from all the attributes that make up the product. Following Lusk and Schroeder (2004), a consumer's willingness to purchase rating is characterized by

$$U_{ij} = V_{ij} + \varepsilon_{ij} \tag{1}$$

where U_{ij} is the total utility of the ith respondent for the jth product, ε_{ij} is the stochastic error term, and V_{ij} is the systematic portion of the utility function. Given the continuous nature of the willingness-to-purchase rating, we use individual level Ordinary Least Square (OLS) regression to obtain the part-worth utilities associated with each attribute level. The model is specified as

$$Y_{ij} = \beta_0 + \beta_i X_{ij} + \varepsilon_{ij} \tag{2}$$

where Y_{ij} is the rating for willingness to purchase (a scale of 0 to 100), β_0 is the intercept, β_i is a vector of part-worth utilities, X_{ij} is a vector of product-related attributes, and ε_{ij} is the error term, which is assumed to be independent and identically distributed. The attribute levels were effects coded to transform them as deviations from the mean (Hair et al., 2010). By doing so, the effects coded part-worth utility can now be added to or subtracted from the intercept to determine the change in willingness to purchase, holding all other attribute levels constant. We then computed

the relative importance by taking the range of levels within each attribute and dividing by the sum of the range across all attributes (Hair et al., 2010).

After running the regressions, we assigned respondents to segments (clusters) by similarity of preferences represented by part-worth utilities (Green and Helsen, 1989). We used Ward's linkage to cluster respondents and then used a pseudo J statistical test to determine the optimal number of segments following Kotler and Armstrong's (2001) criteria, notably that they be measurable, accessible, substantial, differentiable, and actionable. Ward's linkage is a hierarchical clustering technique that seeks to join groups in a way that minimizes the increase in the error sum of squares (StataCorp LP, 2021).

Finally, after determining the optimal number of segments, we applied a multinomial logit model (MNL) and estimated the corresponding marginal effects to establish profiles for each consumer segment. The MNL model (Greene, 2003) specification was the following:

$$Prob\ (S_i = j) = \frac{e^{\beta'_j x_i}}{\sum_k e^{\beta'_k x_i}} \tag{3}$$

where $Prob\ (S_i = j)$ is the probability that respondent i belong to segment j, k_i is a set of variables related to demographics, purchasing behavior, familiarity with the different origins and onions brands, and food attitudes of the respondents, and β is a vector of parameters. Regarding food attitude, we included an index of food neophobia of the participants. Pliner and Hobden (1992) developed a Food Neophobia Scale (FNS) consisting of a list of five positive and five negative statements regarding food consumption. Participants respond to those 10 statements on a 7-point Likert scale ranging from "strongly disagree" to "strongly agree." The lower the score on FNS, the lower the extent of participants' neophobia.

Zip codes were collected from the respondents and were used to compute the distance between each respondent and Vidalia, GA, using the SAS macro "sashelp.zipcode." We used STATA for all data analysis.

Results and Discussion

Overall Sample

Respondents who reported purchasing sweet onions during the past 12 months represent 92.3% and the buyers' part of our sample. People from the South were oversampled due to our focus on Vidalia and represent 46% among the buyers' category. The remainder of the buyers' sample is composed of 21% from the West, 17% from the Northeast, and 16% from the Midwest. Among these buyers, nearly one-third (29.9%) would be considered as "regular" as they reported eating sweet onions weekly, and another third (29.5%) would be considered as "occasional" as they reported purchasing sweet onions monthly. When considering Vidalia sweet onions specifically, via a multiple choice question, nearly 60% thought of freshness, followed by taste or flavor (45.1%), Georgia (28.7%), and mild (22.1%).

On the question of the origin, when asked where Vidalia onions were grown, 35.7% correctly noted in Georgia, while 14.3% reported some other state, and an additional 7.4% reported Georgia but also added an additional state.

Noticeably, the potential buyers of our sample scored 33.4 on average on the FNS, which is higher than the buyers who scored 27.1 on average, suggesting that the potential-buyers are food neophobic (less likely to try new food).

The following segment analysis is based on the results of the conjoint analysis using different attributes (price, branding, origin, and labeling) and reveals the variability of preferences for buyers and potential-buyers.

Buyers' Market Segments

By clustering buyers with similar preferences based on their part-worth utilities, we identified five market segments. Three of those indicate a strong preference for Vidalia brand and Georgia origin, namely, price-sensitive Georgia-Vidalia lovers, origin sensitive, and price-sensitive Southeast-Vidalia lovers. These three segments represent 52% of our sample of buyers. The other two segments characterize nondiscriminating and price-sensitive respondents and constitute 48% of the buyers. Notably, similar segments have been found, such as price sensitive, origin, and brand (Campbell, Mhlanga, and Lesschaeve, 2013; Behe et al., 2017; Campbell, Berning, and Campbell, 2021). The results of the conjoint analysis and the corresponding marginal effects are presented in Tables 3 and 4, respectively.

Table 3. Sweet Onion Buyer Conjoint Analysis Results: Relative Importance and Part-Worth Utilities

		Non-discriminating		**Price-sensitive GA Lovers**		**Price-sensitive**		**Origin-sensitive**		**Price-sensitive Southeast lovers**	
		Mean		**Mean**		**Mean**		**Mean**		**Mean**	
		Relative Importance[a]									
Price		**21%**		**33%**		**64%**		25%		**30%**	
Type of onion		**17%**		14%		8%		10%		12%	
Origin		**22%**		**25%**		12%		**43%**		**29%**	
Certified naturally grown label		8%		6%		3%		4%		7%	
Organic		**10%**		6%		3%		4%		**15%**	
Pesticide label		8%		6%		3%		5%		2%	
Sustainably grown certified		7%		5%		3%		4%		1%	
GMO label		7%		6%		3%		4%		4%	
		Part-Worth Utilities[b]									
		Mean	**STD**	**Mean**	**STD**	**Mean**	**STD**	**Mean**	**STD**	**Mean**	**STD**
Constant		69.28	23.11	60.91	18.35	48.59	15.13	57.05	13.44	28.57	0.03
Attribute	Attribute level										
Price per pound	0.79	**0.49**	7.23	**10.86**	8.49	**37.13**	11.29	**13.38**	12.63	**21.61**	1.50
	1.29	-0.61	5.09	3.27	6.15	5.28	12.42	4.58	7.93	13.76	0.80
	1.79	0.56	4.50	0.20	6.14	-9.22	9.78	-0.72	6.47	-8.68	0.23
	2.49	-0.44	6.71	-14.34	10.19	-33.18	12.36	-17.25	15.55	-26.69	0.46
Type of sweet onion	Vidalia	-0.08	5.18	**2.30**	7.39	**1.19**	5.16	**3.38**	6.71	**3.24**	0.21
	Walla Walla	-0.10	4.64	-0.79	5.98	-0.65	4.34	-3.53	5.88	1.13	0.37
	Texas	**0.38**	4.30	-0.22	5.92	-0.31	4.34	1.09	5.99	7.45	1.43
	Sweet	-0.21	4.80	-1.29	5.51	-0.24	4.50	-0.93	5.07	-11.81	0.85
Sweet onion origin	No origin	-0.06	5.37	0.49	8.06	0.35	5.65	2.41	11.86	9.29	1.29
	Georgia	-0.76	5.05	**3.56**	7.70	1.48	4.49	**15.27**	9.18	11.54	1.04
	Southeast	-0.13	4.65	1.93	6.17	1.01	4.58	7.97	8.97	**18.37**	0.71
	USA	-0.20	4.82	2.89	6.56	1.25	4.78	10.77	7.91	-11.12	0.44
	Peru	**1.14**	7.88	-8.88	10.19	-4.10	7.39	-36.42	12.44	-28.08	0.02

Table 3. Continued

		Non-discriminating		**Price-sensitive GA Lovers**		**Price-sensitive**		**Origin-sensitive**		**Price-sensitive Southeast lovers**	
		Part-Worth Utilities[b]									
		Mean	**STD**	**Mean**	**STD**	**Mean**	**STD**	**Mean**	**STD**	**Mean**	**STD**
Constant		69.28	23.11	60.91	18.35	48.59	15.13	57.05	13.44	28.57	0.03
Attribute	Attribute level										
Certified naturally grown label	No label	-0.26	3.20	-1.55	3.51	-0.51	2.51	-2.05	3.35	**5.98**	0.53
	Labeled certified naturally grown	**0.26**	3.20	1.55	3.51	0.51	2.51	**2.05**	3.35	-5.98	0.53
Organic label	No label	-1.03	4.94	-0.66	3.94	0.02	3.02	**0.30**	4.10	**12.00**	0.32
	Labeled USDA certified grown	**1.03**	4.94	**0.66**	3.94	-0.02	3.02	-0.30	4.10	-12.00	0.32
Pesticide label	No label	-0.76	3.90	-1.13	3.47	-0.45	3.09	-1.95	4.78	**1.49**	0.41
	Labeled pesticide free	**0.76**	3.90	**1.13**	3.47	**0.45**	3.09	**1.95**	4.78	-1.49	0.41
Sustainably certified grown	No label	-0.51	3.11	-1.30	3.47	-0.51	2.22	-1.37	3.09	**0.64**	0.15
	Labeled sustainably certified grown	**0.51**	3.11	**1.30**	3.47	**0.51**	2.22	**1.37**	3.09	-0.64	0.15
GMO	No label	-0.65	3.12	-1.12	4.19	-0.36	2.46	-0.96	3.78	-3.38	0.26
	Labeled Non-GMO verified	**0.65**	3.12	**1.12**	4.19	**0.36**	2.46	**0.96**	3.78	**3.38**	0.26
r2		58%		74%		90%		84%		79%	
adjr2		19%		49%		81%		68%		59%	
Observations		378		407		322		241		100	
Buyers' market share		26%		28%		22%		17%		7%	
Overall market share (buyers + potential-buyers)		24%		26%		20%		15%		6%	

Note: [a] Relative importance values that are bolded represent the highest relative importance values for each segment.

[b] Part-worth utilities that are bolded are significant at the $p \leq 0.10$ level.

Table 4. Marginal Effects Associated with the Multinomial Logit Model for Sweet Onion Buyers

	Non-discriminating		**Price-sensitive GA Lovers**		**Price-sensitive**		**Origin-sensitive**		**Price-sensitive Southeast Lovers**	
	Marg. Eff.	***p*-value**	**Marg. Eff.**	***p*-value**	**Marg. Eff.**	***p*-value**	**Marg. Eff.**	***p*-value**	**Marg. Eff.**	***p*-value**
Gen X	**0.169**	**0.000**	-0.048	0.170	-0.023	0.473	**-0.086**	**0.000**	-0.011	0.540
Millennial and younger	**0.318**	**0.000**	**-0.168**	**0.000**	-0.018	0.690	**-0.111**	**0.000**	-0.020	0.439
Gender (1 = male)	0.030	0.318	**-0.093**	**0.003**	0.028	0.314	**-0.060**	**0.007**	**0.095**	**0.000**
Race (1 = caucasian)	-0.052	0.186	0.048	0.233	-0.041	0.282	0.032	0.294	0.012	0.564
Suburb	-0.020	0.543	-0.047	0.171	**0.060**	**0.055**	-0.017	0.477	0.024	0.219
Rural	-0.015	0.702	-0.059	0.149	**0.110**	**0.010**	**-0.069**	**0.011**	0.033	0.236
Number adults in household (#)	0.020	0.168	0.005	0.766	-0.024	0.122	-0.002	0.899	0.000	0.994
Number persons under 18 yrs in household	0.019	0.242	0.005	0.779	**-0.034**	**0.064**	0.001	0.936	0.009	0.360
High school or less	**-0.065**	**0.092**	0.029	0.519	-0.022	0.547	**0.068**	**0.094**	-0.011	0.644
Some college	**-0.077**	**0.029**	0.002	0.959	-0.011	0.736	**0.087**	**0.017**	0.000	0.995
Greater than bachelor's	**0.083**	**0.087**	**-0.104**	**0.018**	-0.046	0.253	0.051	0.292	0.016	0.560
Household income ($)	0.001	0.647	**0.010**	**0.004**	**-0.006**	**0.093**	-0.004	0.128	-0.001	0.424
Primary grocery shopper (1 = yes)	**-0.183**	**0.077**	0.049	0.589	0.049	0.483	**0.127**	**0.000**	-0.041	0.472
Food neophobia scale	0.002	0.110	0.000	0.936	**-0.002**	**0.062**	0.001	0.423	-0.001	0.272
Distance from Vidalia, GA (miles)	**0.004**	**0.061**	0.000	0.884	0.002	0.439	**-0.007**	**0.004**	0.001	0.299
Quantity of sweet onions purchased	**0.005**	**0.000**	-0.001	0.690	**-0.005**	**0.008**	0.001	0.298	0.000	0.531
Purchased Vidalia onions (1 = yes)	0.007	0.847	-0.034	0.401	**-0.071**	**0.051**	**0.099**	**0.000**	-0.001	0.980
Familiarity with Vidalia onions	**0.001**	**0.001**	0.000	0.653	-0.001	0.129	0.000	0.870	**-0.001**	**0.040**
Familiarity with Texas onions	0.000	0.563	0.001	0.275	0.000	0.589	-0.001	0.108	0.000	0.746
Familiarity with Walla Walla onions	0.000	0.472	0.001	0.291	0.000	0.734	0.000	0.721	0.000	0.500
Familiarity with Maui onions	0.001	0.397	-0.001	0.370	**0.001**	**0.048**	**-0.001**	**0.051**	0.000	0.653
Familiarity with Peru onions	0.000	0.858	0.000	0.609	-0.001	0.231	**0.001**	**0.043**	0.000	0.688
LR chi^2	392.92									
Prob chi^2	0.000									
Log likelihood	-1596.834									
R^2	0.1096									

Note: Marginal effect coefficients that are bolded are significant at the $p \leq 0.10$ level.

For the price-sensitive Georgia onion lovers (28%, representing the biggest segment), the decision to purchase onions is mainly based on the price tag (33% relative importance), followed by the origin of sweet onions (25% relative importance), with Georgia being the most preferred origin. This segment represents the older participants of the sample (i.e., female Baby Boomers and Boomers with a higher income, who focus more on price and Georgia-grown products). More specifically, Millennials and younger consumers were 16.8% less likely to be in this segment compared to Baby Boomer and older consumers, and male consumers were 9.3% less likely compared to female consumers to belong to this segment. Consumers were 1% more likely to be in this segment for a $10,000 increase in average income. And finally, consumers with higher than a bachelor's degree were 10.4% less likely to be in this segment compared to consumers with a bachelor's degree.

Origin is the main driver for 17% of the buyers' market for sweet onions. The **origin-sensitive group** are also Baby Boomer and older females with education level higher than a bachelor's degree. In addition, they are likely to be the primary grocery shoppers of the household and have familiarity with purchasing Vidalia onions. They also live more in urban areas. More precisely, a Gen X consumer is 8.6% and a Millennial consumer is 11.1% less likely to be in the origin-sensitive category. Male consumers are 6% less likely to be origin sensitive compared to female consumers, and rural consumers are 6.9% less likely to be in this segment compared to the consumers from the metro areas. Consumers with a high-school level education and with some college education are 6.8% and 8.7% more likely, respectively, to belong to this segment compared to consumers with a bachelor's degree or less. Buyers in this segment are likely located in Georgia, as the results show that they become 0.7% less likely to be location sensitive with each 100-mile increase in the average distance from Vidalia, GA.

For the price-sensitive Southeast-loving segment, representing 7% of the buyers' market share, price (30%), origin (29%), and the organic label (15%) are their major purchasing drivers for sweet onions. As indicated by the marginal effects, consumers in this segment are less familiar with Vidalia onions and are 9.5% more likely to be male. In fact, they indicated preferring sweet onions from the Southeastern region, demonstrating their potential lack of knowledge about sweet onion brands or region of origin.

The non-discriminating segment makes up 26% of the buyers' sample. All attributes (i.e., origin [22%], price [21%], type of onion [17%], and organic label [10%]) impact this segment's purchasing decision. As with the price-sensitive Southeast-loving segment, USDA Organic has the strongest preference among all labels. Based on utilities' results and compared to the other four segments, the preference for additional labels (naturally grown, pesticide free, sustainably certified grown, and Non-GMO verified) is likely to be higher. This segment consists of younger, more educated consumers who are not the primary grocery shoppers of the household. More specifically, the marginal effects for the nondiscriminating section indicate that compared to consumers who identify as Baby Boomers and older, Gen X consumers are 16.9% and Millennials are 31.8% more likely to be in this segment. Buyers with a high school education and some college education are 6.5% and 7.7% less likely to be in this segment, respectively, while buyers with more than a bachelor's degree are 8.3% more likely to be in this segment compared to consumers with only a

bachelor's degree. Familiarity with Vidalia onions and purchasing a higher quantity of sweet onions annually increases the likelihood of a consumer belonging to this segment. Additionally, we find that a buyer becomes 0.4% more likely to be in this segment with each 100-mile increase in the average distance from Vidalia, GA. Therefore, buyers from this segment are likely not residents of Georgia, although they have knowledge of the Vidalia brand and trust the information conveyed by labels. This finding is consistent with the latest marketing studies (Hartman Group, 2017), pointing out that younger generations tend to be most interested in learning about the companies they buy from, their brands, and certifications compared to older consumers who rely more on information such as ingredients and nutritional facts to evaluate the fit with their preferences.

The last significant segment is **price-sensitive** and represents 22% of the buyers. As indicated, buyers' purchases of sweet onions are mainly guided by the lowest price ($0.79 per pound), while they heavily discount the highest price presented ($2.49 per pound). The marginal effects for this price-sensitive segment indicate that consumers are 6% and 11% more likely to live in the suburbs and rural areas, respectively, compared to the consumers from metro areas. Consumers with a higher income and more children (below 18 years old) are less likely to be in this segment, as well as consumers with experience buying Vidalia onions (7.1% less likely).

Across the buyers' sample, the cluster analysis reveals that beyond price consistently influencing the purchase of sweet onions, sensitivity to origin and demographic indicators also clearly contribute to identifying buyers' characteristics. Additionally, the USDA Organic label on packaging is more preferred as a source of information compared to other labels presented to respondents.

On the contrary, a sweet onion brand like Vidalia is not discriminant by itself. Studies on region-of-origin have highlighted the importance of the reputation (Shapiro, 1983, cited in Deselnicu et al., 2013; Stefani, Romano, and Cavicchi, 2006) and its association with quality connotations that may be suggested through intrinsic (physical features) or extrinsic (price, brand, or region of origin) cues. More specifically, Costanigro, McCluskey, and Goemans (2010) show that geographical indications are a key differentiation tool within a market of homogeneous food products. However, when purchasing more expensive products, consumers are incentivized to learn about differences in "quality" across brand names.

Hence, for marketing purposes (i.e., capturing a larger share of the premium), the results of our study suggest that for Vidalia onions, state branding (e.g., Georgia Grown) should be associated with the region-of-production branding when selling to older generations. It becomes especially relevant when selling outside of the area or state of production. Regarding attracting younger generations, we also find that using co-labeling strategies would be particularly relevant. These generations are more sensitive to information directly available on the product, such as with USDA Organic or Certified Naturally Grown labels, which indicates producers' practices, especially sustainably oriented. Jensen et al. (2019) pointed out the "origin-organic" (prefer organic and local products with a higher degree of purchases coming from direct sales channels) sensitivity of younger generations. Our results argue that producers should not rely solely on a region-of-origin

branding strategy when building their reputation. As mentioned previously, the quality connotations that consumers use to make their purchase decisions are based on different characteristics, including other information or labels. Therefore, addressing the preferences of the identified "brand-origin-organic" sensitive younger consumers should be integrated in onion producers' marketing equation.

Potential-buyers' Market Segments

As shown in Table 5, our sample of potential-buyers (7.7% of total sample) indicated their dislike of sweet onions as the first reason for not purchasing them (31%), or taste (15%). While a little more than a fourth did not know why they did not purchase Vidalia onions, 9% and 8% mentioned quality and preparation time as main reasons, respectively. Lastly, 6% of these potential buyers prefer another variety. Therefore, more than half of potential-buyers (54%) could be considered as a market potential because they do not dislike sweet onions per se. Other factors explain their lack of purchase.

Table 5. Main Reason Respondents Do Not Purchase Vidalia Onions (Multiple Choice)

Reason	Mean (%)
Taste	15%
Preparation time	8%
Quality	9%
Prefer onion powder	3%
Prefer other variety	6%
Do not like sweet onions	31%
Do not know	28%
Other	20%

We identified four segments among the potential-buyers. Two of these are identified by the relevance of origin in the respondents' potential decision to purchase sweet onions, namely, the nondiscriminating segment and the origin-sensitive segment. The nondiscriminating segment makes up 49% of the potential-buyers' market share, and the origin-sensitive represents 13%. The last two segments are price-sensitive (23%) and/or origin-indifferent (15%). The results of the conjoint analysis and the corresponding marginal effects for the potential buyers are presented in Tables 6 and 7, respectively.

Table 6. Sweet Onion Potential-Buyers Conjoint Analysis Results: Relative Importance and Part-Worth Utilities

		Price-sensitive		**Non-discriminating**		**Origin-sensitive**		**Price-sensitive Origin-indifferent**	
		Mean		**Mean**		**Mean**		**Mean**	
		Relative Importance[a]							
Price		**47%**		**19%**		21%		**58%**	
Type of onion		10%		**17%**		12%		9%	
Origin		16%		**24%**		**42%**		13%	
Certified naturally grown label		5%		7%		3%		3%	
Organic		5%		8%		7%		5%	
Pesticide label		6%		10%		6%		4%	
Sustainably grown certified		7%		7%		5%		4%	
GMO label		4%		8%		5%		3%	
		Part-Worth Utilities[b]							
		Mean	**STD**	**Mean**	**STD**	**Mean**	**STD**	**Mean**	**STD**
Constant		52.351	20.749	38.905	29.859	55.252	17.706	42.145	12.835
Attribute	Attribute level								
Price per pound	0.79	**16.146**	7.331	-0.647	5.091	7.964	10.161	**40.346**	9.485
	1.29	2.555	6.219	0.872	3.936	1.363	5.785	5.318	9.132
	1.79	-3.591	5.897	-1.140	4.868	-2.575	6.954	-16.543	9.442
	2.49	-15.109	9.049	0.915	4.121	-6.753	12.194	-29.121	13.500
Type of sweet onion	Vidalia	-1.604	3.039	-0.267	4.255	4.003	8.475	1.520	5.140
	Walla Walla	**1.689**	4.890	1.023	4.526	-2.707	5.684	**2.617**	6.198
	Texas	0.598	2.808	0.837	3.632	2.746	3.711	-2.654	3.710
	Sweet	-0.683	3.941	-1.593	4.137	-4.042	5.848	-1.482	3.488
Sweet onion origin	No origin	0.727	4.661	-0.589	5.805	1.623	9.633	**2.452**	5.449
	Georgia	-0.394	4.637	-1.281	4.806	10.992	11.083	1.728	5.991
	Southeast	-2.402	5.550	-0.958	3.549	7.818	7.321	1.473	5.283
	USA	0.585	4.050	3.763	6.261	8.709	6.576	1.480	5.044
	Peru	**1.485**	6.052	-0.934	6.340	-29.143	14.954	-7.132	12.300
Certified naturally grown label	No label	-0.008	2.667	-0.270	2.593	-1.346	2.452	-0.095	2.599
	Labeled certified naturally grown	**0.008**	2.667	0.270	2.593	1.346	2.452	**0.095**	2.599

Table 6. Continued

		Price-sensitive		**Non-discriminating**		**Origin-sensitive**		**Price-sensitive Origin-indifferent**	
		Mean		**Mean**		**Mean**		**Mean**	
		Part-Worth Utilities[b]							
Organic label	No label	-0.225	4.653	1.525	3.586	1.641	4.500	**3.105**	3.143
	Labeled USDA certified grown	**0.225**	4.653	-1.525	3.586	-1.641	4.500	-3.105	3.143
Pesticide label	No label	-0.804	2.945	-1.284	3.451	-1.306	5.573	-1.534	3.886
	Labeled pesticide free	**0.804**	2.945	1.284	3.451	1.306	5.573	**1.534**	3.886
Sustainably certified grown	No label	**0.156**	3.387	0.353	2.462	-1.565	3.900	**1.676**	3.211
	Labeled sustainably certified grown	-0.156	3.387	-0.353	2.462	1.565	3.900	-1.676	3.211
GMO	No label	**0.144**	1.734	-0.668	3.147	0.201	3.253	-0.628	3.417
	Labeled Non-GMO verified	-0.144	1.734	0.668	3.147	-0.201	3.253	**0.628**	3.417
r2		76%		48%		75%		86%	
adjr2		54%		-1%		51%		73%	
Observations		29		61		16		18	
Potential-buyers' market share		23%		49%		13%		15%	
Overall market sShare (buyers + potential-buyers)		2%		4%		1%		1%	

Note: [a] Relative importance values that are bolded represent the highest relative importance values for each segment.

[b] Part-worth utilities that are bolded are significant at the $p \leq 0.10$ level.

Table 7. Marginal Effects Associated with the Multinomial Logit Model for Sweet Onion Potential-Buyers

	Price-sensitive		**Non-discriminating**		**Origin-sensitive**		**Price-sensitive Origin-indifferent**	
	Marg. Eff.	***p*-value**	**Marg. Eff.**	***p*-value**	**Marg. Eff.**	***p*-value**	**Marg. Eff.**	***p*-value**
Gen X	0.014	0.930	-0.325	0.129	0.021	0.471	0.290	0.101
Millennial and younger	-0.131	0.328	0.080	0.726	-0.007	0.526	0.058	0.759
Gender (1 = male)	**0.329**	**0.015**	**-0.617**	**0.000**	0.031	0.379	**0.257**	**0.023**
Race (1 = caucasian)	0.162	0.160	**-0.307**	**0.020**	0.006	0.482	**0.140**	**0.034**
Suburb	-0.035	0.817	-0.062	0.723	0.021	0.433	0.075	0.418
rural	0.060	0.794	-0.107	0.688	0.022	0.675	0.025	0.883
Number adults in household (#)	0.093	0.280	-0.059	0.562	0.012	0.392	-0.046	0.397
Number persons under 18 yrs in household	-0.131	0.261	**0.236**	**0.071**	-0.018	0.390	-0.087	0.239
High school or less	0.090	0.683	-0.164	0.513	0.013	0.687	0.062	0.714
Some college	0.032	0.842	-0.203	0.310	0.012	0.591	0.159	0.220
Greater than bachelors	0.071	0.757	0.016	0.949	0.034	0.656	-0.120	0.115
Household income ($)	0.000	0.661	0.000	0.675	0.000	0.476	0.000	0.273
Primary grocery shopper (1 = yes)	0.020	0.896	-0.006	0.976	0.016	0.426	-0.031	0.806
Food neophobia scale	0.003	0.594	0.002	0.734	0.000	0.463	-0.005	0.119
Distance from Vidalia, GA (miles)	0.000	0.544	0.000	0.434	0.000	0.393	0.000	0.126
Reason for not buying: taste	**-0.369**	**0.000**	**0.466**	**0.000**	-0.010	0.453	-0.088	0.164
Reason for not buying: preparation time	**-0.289**	**0.001**	**0.386**	**0.000**	-0.009	0.485	-0.089	0.242
Reason for not buying: quality	0.169	0.682	-0.501	0.045	0.174	0.582	0.159	0.624
Reason for not buying: variety	**-0.241**	**0.002**	-0.038	0.919	0.385	0.282	**-0.107**	**0.059**
Reason for not buying: do not like	0.311	0.325	-0.279	0.365	0.023	0.599	-0.055	0.613
Reason for not buying: do not know	**-0.301**	**0.073**	**0.458**	**0.015**	0.037	0.570	-0.194	0.081
Reason for not buying: other	**-0.264**	**0.059**	**0.333**	**0.066**	0.001	0.949	-0.070	0.518
LR chi2	105.27							
Prob chi2	0.0015							
Log likelihood	-79.947752							
R^2	0.397							

Note: Marginal effect coefficients that are bolded are significant at the $p \leq 0.10$ level.

The non-discriminating segment represents 49% of the potential-buyers (4% of the total sample). The preference of these respondents is driven by knowing the origin of the produce (24%), price (19%), and brand (17%). Male and non-causasian respondents were 61.7 % and 30.7% less likely, respectively, to be in this segment. Having one additional child (below 18 years of age) in the household increased the probability of a respondent being in this group by 23.6%. Participants who responded taste and preparation time as reasons for not buying were 46.6% and 38.6% less likely, respectively, to be in this segment.

For the origin-sensitive segment, Georgia was the most preferred, while Peru was the least. None of the demographic variables used to analyze the consumer profile of this segment were significant.

It's worth highlighting that the **price-sensitive** segment is mainly composed of males (32.9% more likely). This group indicated a surprising preference for sweet onions grown in Peru. Additionally, potential-buyers who indicated taste, preparation time, and other varieties as reasons for not buying sweet onions are 36.9%, 28.9%, and 24.1% less likely, respectively, to be in this segment.

Finally, for the **price-sensitive origin-indifferent segment**, the "No origin" label was preferred the most, suggesting that the location where the onions were grown was not as important. The marginal effects associated with this group of consumers indicate that male and caucasian potential-buyers are 25.7% and 14%, respectively, more likely to be in this segment. Respondents who indicated variety as the reason for not buying were 10.7% less likely to belong to this segment.

Results from the cluster analysis suggest that most potential buyers are price-sensitive, and one segment is origin-sensitive (but origin is not determined). Beyond the primary reasons given for not buying sweet onions (e.g., taste and time of preparation), there might be a lack of information on the different brands of sweet onions available. This paper suggests the need to promote and increase the amount of information provided to consumers directly on the product or package sold.

Conclusion

This study explores the most effective branding and labeling strategy for sweet onions with a particular focus on Vidalia and the region of production in Georgia. By testing and assessing the importance of different credence attributes, such as indication of origin, region-of-production branding, and other additional labels on buyers' and potential-buyers' purchases, we show that producers, marketers, and retailers should consider stronger co-labeling strategies to attract new segments of consumers who appear to be "brand-origin-organic" sensitive. However, before enacting this strategy, producers and marketers should consider the time and costs associated with obtaining organic certification.

Across the buyers' sample, the cluster analysis reveals that price is a strong discriminant when purchasing sweet onions. A low price represents a large incentive for most of the sample (buyers and potential-buyers), especially with older generations. The sweet onion brand Vidalia alone does not significantly impact preferences. The origin, indicated by a region, a state, or a country, is preferred by the majority of buyers, especially among older generations. Additionally, the USDA

Organic label emerges as the most preferred label on production practices. Results highlight that younger generations rely more on multiple kinds of information provided on the packaging, such as brand, origin, and organic. For marketing purposes, this study suggests that state branding (e.g., Georgia Grown) should be associated with the region-of-production branding (e.g., Vidalia) as well as the USDA organic label.

Overall, this study suggests the need to promote and increase the amount of information provided to consumers directly on the product or package sold. This strategy would be particularly relevant when selling outside the region-of-production and for potential-buyers who, beyond the obvious reasons they gave for not buying sweet onions (e.g., taste and prep time), might have a lack of information on the different brands of sweet onions available and their different benefits.

Our results also point out that intrinsic characteristics of sweet onions—quality, freshness, and taste—are still valued. These results corroborate previous findings (Simonsen and Lillywhite, 2014) on certification and branding programs lacking standards of quality and freshness, which decreased consumers' interest and constituted an incentive to choose an alternative. In addition to considering efficient co-labeling strategies, growers exploring certification and branding strategies need to be committed to continued assessment of product quality to build or maintain the brand's value and reputation.

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