HortScience 57(9):1110–1119. 2022. https://doi.org/10.21273/HORTSCI16588-22

Using Conjoint-based Experimental Design to Assess Willingness to Purchase Florida Peaches

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Additional index words. additive constant, conjoint, interest value, *Prunus persica*, rule developing experimentation, segments

Abstract. **Although consumers are not very familiar with peach production in Florida, Florida peaches are the first domestic peaches produced in the United States, being available from mid-March through early May. Moreover, Florida peach acreage has increased 8.5-fold in the past 10 years. Using a conjoint-based experimental design and analysis, we measured U.S. consumer reactions to diverse groups of ideas describing peaches, including production regions, and identified attributes that positively and negatively influence consumer preference. The main objective of this research was to identify external and internal attributes that make the "ideal peach." Are consumers willing to pay more for a locally grown peach? Will consumers prefer a Florida peach instead of a Georgia or California peach? The top three peach attributes identified were "juicy and fully ripe," "strong peach aroma and sweet peach taste," and "grown in Georgia." Cluster analysis revealed two segments of consumers: consumers in the first segment focused on physical aspects of the peach, and consumers in the second segment were concerned with peach production regions and health benefits. The findings from this research will be helpful in developing marketing programs for Florida peaches as an item that is perfect for snacking because of their small size and desirable texture and flavor.**

The results of consumer surveys regarding peach fruit conducted in Canada and Italy (Campbell et al., 2013; Giacalone et al., 2005), the U.S. mid-Atlantic states (Kelley et al., 2016), and the entire United States (Olmstead et al., 2015) reveal that peach consumers base their purchase decisions primarily on fruit characteristics such as peel color, firmness (texture), and size. However, providing peaches with pleasing flavor and other excellent sensory attributes could lead to increased purchases, as repeat purchases are based on consumer satisfaction (Kader, 2002). Indeed, sensory evaluation research with peaches conducted in the United States and Italy has revealed the importance of flavor attributes for consumer satisfaction (Colaric et al., 2005; Crisosto and Crisosto, 2005; Delgado et al., 2013; Predieri et al., 2005). In those studies, it was found that sweetness is a main driver of liking for peaches, although attributes such as acidity/astringency and aroma also play a role in the perception of peach flavor by consumers (Crisosto et al., 2003; Meilgaard et al., 1999; Predieri et al., 2005). Consumers preferred cultivars with a balanced sugar/acidity ratio over those with either low or high acidity (Giacalone et al., 2005). Peaches with a balanced sugar/acid ratio comprising low acidity and total soluble solids (TSS) higher than 11%, were preferred by panelists (Crisosto et al., 2003).

Despite the importance of fruit sensory quality to consumer satisfaction, Diehl et al. (2013) found that participants in the fruit and vegetable supply chain, including peach handlers, have different priorities. Moreover, they found that members of the supply chain have dissimilar perceptions of each other's needs and perceived their priorities differently. Producers (growers) prioritize yield and disease-free produce with good shipping performance, whereas packers and market distributors demand fruit with good appearance and flavor, and fruit with a long storage life, which allows them to reach their target market (Diehl et al., 2013; Kader, 2002). Conversely, these two groups agreed that consumers, who are vital to the food supply chain, should be provided flavorful fruit with good appearance (Diehl et al., 2013). Furthermore, consumers have become more involved with the food supply chain in recent years. Consumers are more aware of the provenance of their produce, and terms such as "organic" and "non-GMO" have become a trend not only in the United States, but across the globe (Campbell et al., 2010; Onozaka and McFadden, 2011; Reganold and Wachter, 2016). In the same manner, consumers demand sustainable food production, with preference for locally grown produce (Carpio and Isengildina-Massa, 2009; Feldmann and Hamm, 2015; Meas et al., 2015).

Despite government programs to motivate American citizens to eat more fruits and vegetables by highlighting their health benefits, peach consumption in the United States has been declining [U.S. Department of Agriculture (USDA), 2018; USDA NASS, 2018]. Per capita annual peach consumption has declined by more than half in the past 30 years, from 7.08 lb (3.21 kg) in 1980 to 2.86 lb (1.29 kg) in 2016. Similarly, peach production and bearing acreage has decreased in the past 10 years (USDA FAS, 2018). On the contrary, Florida peach acreage has increased, rising from 234 acres (95 ha) in 2007 to 630 acres (255 ha) in 2011, and the 2012 census reported a total of 1231 acres (498 ha), and 3000 (1214 ha) acres were reported in 2014 (Morgan and Olmstead, 2013; Singerman et al., 2017; USDA, NASS 2018). In a survey and consumer taste panel conducted by Harrison et al. (2009), Florida peaches were favorably rated against Georgia peaches, and respondents preferred Florida peaches over California peaches.

The use of sensory evaluation in concert with physical and compositional measurements can contribute to improved understanding of consumer preference for a specific peach cultivar, production region, or attribute (Colquhoun et al., 2012; Gilbert et al., 2015; Olmstead et al., 2015). Moreover, the use of conjoint-based experimental design and analysis could help marketers target the most important attributes of an "ideal peach." Conjoint-based experimental design measures consumers' responses to statements or descriptor about products rather than the physical product (Moskowitz, 2012). The descriptor or statements are combined differently to measure consumer reactions to these different groups of ideas describing a product, identifying which of the elements or attributes positively or negatively influences consumer preference for the product (Moskowitz and Gofman, 2007; Moskowitz and Silcher, 2006). Conjoint-based experimental design was previously used to identify breeding priorities for blueberry and strawberry flavor (Colquhoun et al., 2012; Gilbert et al., 2015).

Indeed, conjoint-based experimental design and analysis was first used in 2013 to identify the attributes or combination of attributes that would make an ideal peach, the results showed that the top attribute, or element, of a peach was "so sweet … no sugar needed" (Olmstead et al., 2015). However, that study did not evaluate attributes related to the production region of the peach nor how consumers use peaches (consumption). Therefore, the main objectives of this research were to

Received for publication 10 Mar. 2022. Accepted for publication 31 May 2022.
Published online 10 August 2022.
We thank the Florida Department of Agriculture and Consumer Services for the financial support.
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1) assess the effect of production region when consumers purchase a peach, that is, are consumers willing to pay more for a locally grown peach? Will consumers prefer a Florida peach instead of a Georgia or California peach? and 2) identify the consumption habits of peach consumers and the quality attributes that make an "ideal peach." In the work described here, conjoint-based experimental design and analysis were used to combine different peach descriptors to form several peach "concepts" that the participants rated, allowing potential peach consumer segments to be identified.

Materials and Methods

Questionnaire and experimental design. To evaluate consumers' preferences for specific peach attributes, conjoint-based experimental design and analysis was implemented using the Mind Genomics experimental design methodology (Mind Genomics Advisors, Inc., Saratoga Springs, NY) (Moskowitz, 2012). This experiment was approved by the University of Florida Institutional Review Board (IRB) under IRB201701942 authorization.

A questionnaire was developed using descriptors related to general peach characteristics of melting and nonmelting peaches and production regions. The categories and the vocabulary used in each descriptor, "element," or statement were designed by the researchers based on personal expertise, anecdotal conversation with colleagues, and previous research on consumer preferences (Delgado et al., 2013; Giacalone et al., 2005; Olmstead et al., 2015). In conjoint-based experimental design, researchers come up with a list/group of attributes to form a concept, which is then rated by consumers (Gold, 1995; Moskowitz et al., 2006). Seven categories were generated by the researchers: A) production region, B) health benefits, C) consumption habits, D) texture/firmness, E) flavor, F) size and shape, and G) color (Table 1). Within each category, a set of five attributes or "elements" were generated with direct relation to each category. The element "dry and mealy" was included because Florida produces nonmelting flesh (NMF) peaches for fresh consumption, and their texture sometimes can be characterized as "dry and mealy" by the consumer (Olmstead et al., 2015). Thus, even though the researchers knew that "dry and mealy" is not a favorable element, it had to be incorporated.

The conjoint experimental design consisted of seven categories with five elements each. A total of 35 elements describing peach attributes and production regions were permutated, providing a total of 63 "concepts." Each respondent evaluated a unique set of 63 concepts, constituting a full experimental design for that respondent (Porretta et al., 2019). Each concept contained no more than one element from each category: some concepts were "complete," containing seven elements, one from each category, and other concepts were "incomplete," containing anywhere from three to six elements, each from a different category. The use of incomplete concepts allows the value of each element to be measured for each participant taking the survey (Gofman and Moskowitz, 2010; Moskowitz et al., 2006; Moskowitz and Silcher, 2006; Porretta et al., 2019). Therefore, each element was rated on its own and had its own interest value (IV) or coefficients (Porretta et al., 2019). To obtain a balanced presentation of each element according to the experimental design, the 36 elements appeared in a statistically independent manner from each other as a preparation for an ordinary least-squares regression (OLS). It is outside the scope of this report to explain the basics of conjoint analysis and its application to marketing. Further reading on this topic can be found in Rao, (2014).

Table 1. Categories and elements used to build concepts for consumers to rate.

	Category A: Production Region
A1	Locally grown
A2	Imported to the United States
A3	Grown in Georgia
A4	Grown in California
A5	Grown in Florida
	Category B: Health Benefits
B1	Full of minerals and vitamins
B2	Rich in Vitamin C
B3	Good source of Vitamin A
B4	High in antioxidants
B5	Natural source of sugar and low in calories
	Category C: Consumption
C1	Perfect as a snack
C2	Blends well in a smoothie
C3	Great flavor in a yogurt
C4	Perfect for a fruit salad
C5	Excellent for making into a homemade jam
	Category D: Texture/Firmness
D1	Juicy and fully ripe
D2	Firm and crisp with the pit attached to the pulp
D3	Slightly hard by mature
D4	Fuzzy outer surface and extremely soft
D5	Dry and mealy
	Category E: Flavor
E1	Strong peach aroma and sweet peach taste
E2	Nice balance of tart and sweet
E3	Rich flavor of a tree-ripened peach
E4	Sour taste but strong peach aroma
E5	Neutral flavor, not fully ripe
	Category F: Size and Shape
F1	Small peaches that you can eat in one or two bites
F2	Large, round peaches
F3	Unique donut shape
F4	Medium-sized peaches
F5	Elongated shape with pointed bottom
	Category G: Color
G1	Yellow flesh
G2	White flesh with a hint of red
G3	Yellow peel with red blush
G4	Red peel with some yellow tints
G5	Golden yellow skin with a blush of red

Participants were recruited by Panel Direct Online (Focus Forward, LLC, New York, NY). Participants were offered the option to enter drawings for cash rewards and/or sweepstakes in return for completed surveys.

At the beginning of the survey, the welcome screen instructed consumers on the survey protocol and how to answer the questions (Fig. 1). The screening question: "Have you ever purchased fresh peaches?" was used, which only allowed respondents who answered "yes" to proceed. Thus, only participants who had previously purchased fresh peaches were part of the study. Participants were presented with 63 concepts and asked, "How likely are you to purchase peaches with attributes like these?" The participants rated each concept on a 9-point scale, anchored at each end with 1 indicating "not at all likely" and 9 indicating "very likely" (Fig. 1) (Porretta et al., 2019). Participants answered 16 demographic questions at the end of the survey. A total of 302 participants were included in this study. There were 302 participants from five different regions of the United States (Table 2); however, there were 77 participants from the western United States compared with 152 from the eastern United States. The structure of each concept was stored in a binary table that was available to download once the study was finished.

Data transformation and analysis. To reduce error, the 9-point scale was transformed into a binary scale. A binary scale is simpler to understand, and it allows division of participants into "interested" and "not interested,"\, and the value 100 helps interpreting the regression analysis "output" as percentages of respondents (Porretta et al., 2019). Thus, when the rating was from 1 to 6, the rating was transformed to 0. When the rating was 7 to 9, it was transformed to 100 (Gofman and Moskowitz, 2010; Moskowitz, 2012). This transformation allows the participants to be either a rejecter or an acceptor of each concept. The binary table of presence/absence of an element was coded as "1" if an element was present in the concept, a "0" was entered if an element was absent from the concept (Porretta et al., 2019). An OLS regression model with dummy variables was performed to find the positive or negative effect of each element. In the regression analysis, the elements were used as independent variables and the ratings as dependent variables. The independent variables had a value of either 1 (present) or 0 (absent) and were related to the dependent variables (transformed ratings), which took on values of either 100 or 0. In the OLS regression, the parameters of the equations, the additive constant (AC), and the 35 coefficients were estimated. The OLS regression model Eq. [1] comprises an AC and 36 coefficients (Gabay et al., 2021; Porretta et al., 2019).

$$\text{Rating} = k0 + k1(\text{element A1}) + k2(\text{element A2}) + \ldots + k35(\text{element G7}) \quad [1]$$

(Moskowitz and Silcher, 2006).

In Eq. [1], k0 represents the "additive constant" (AC), and k1 through k35 are the IVs of each of the elements. The AC provides a baseline level of interest the participant has for peaches alone without the presence of any of the other elements. The IV of each element is the conditional probability of the specific element influencing the consumer liking/purchase of the product. Impact values may be

Fig. 1. Software tool welcome screen that was presented to consumers before beginning the survey.

positive or negative, which determines either an incremental or decremental effect of the element on consumer liking/purchase (Ho et al., 2022; Moskowitz and Gofman, 2007). Elements with an IV of 15 and above are considered "really strong elements," from 10 to 15 are "very good elements," from 5 to 10 are "OK, it could add something," from 0 to 5 are "it does not add much," and elements with a negative IV undermine consumer willingness to purchase the product (Moskowitz and Gofman, 2007; Moskowitz et al., 2006).

Segmentation. The data obtained from the participants were segmented using two methods. The first method used is the one that is traditionally used in marketing research studies, in which participants are segmented by demographics (Moskowitz et al., 2006; Moskowitz and Silcher, 2006). The other type of segmentation ("mind-set segmentation") was done by k-cluster analysis (Duncan et al., 2015). In the k-cluster analysis, the software SYSTAT 13 (Systat Software, Chicago, IL) was used to segment the participants' data, based on the IV for each element (Gabay et al., 2021; Porretta et al., 2019). The k-cluster analysis was applied to the matrices of 302 rows (one per participant) and 35 columns (one per element). The most positive and negative elements are shared within a cluster (Moskowitz, 2012). Significant differences between the segments were identified using the software package JMP 12.0.1 (www.jmp.com, Cary, NC).

Results

The online survey was taken by a total of 302 individuals across the United States, with almost equal numbers of female (149) and male (152) participants. In general, participants purchased peaches at local grocery stores (144), were satisfied with the quality (112) and flavor of peaches (110), and were willing to pay more for locally grown peaches (220). The regions of the United States surveyed were Northeast (23%), Northwest (7%), Midwest (24%), Southeast (28%), and Southwest (19%). Thus, there were fewer participants from the western United States vs. the east.

The AC of this survey was a relatively high number (48) (Table 3). This means that there is a 48% likelihood that any participant would be interested in purchasing peaches irrespective of any elements in the concept. The categories with the strongest elements in this study were texture/firmness, flavor, and production region. Interest values could be positive or negative, which determines either an incremental or decremental effect of the element on consumer liking/purchase (Moskowitz and Gofman, 2007). The higher the IV, the more "superior and preferable" the element; the lower the IV, the "less desirable" the element; thus, a negative IV describes a "weak and undesirable" element (Moskowitz et al., 2006; Moskowitz and Gofman, 2007).

The elements with high IV were "juicy and fully ripe" (IV = 13), "strong peach aroma and sweet peach taste" (IV = 12), "grown in Georgia" (IV = 11), and "locally grown" (IV = 10). Elements with "ok" performance were in the categories of flavor, size and shape, and production region, in which elements such as "rich flavor of a tree-ripened peach," "large, round peaches," and "grown in Florida" had IVs of 9, 6, and 6, respectively. The element "grown in California" had an IV of 5, which it is considered a modest performance. Indeed, elements from the same categories that describe inferior quality, such as "dry and mealy" and "neutral flavor, not fully ripe," had low IVs of −14 and −10, respectively. The highest positive IV for an element in the consumption category was "perfect as a snack," IV of 3. The IVs for elements in the health benefits category were between 2 and 1, which means that those elements do not have much influence on peach purchase or consumption (Moskowitz and Gofman, 2007).

Data were segmented by demographics (Supplemental Tables 1 to 10), purchase center (Table 4), consumer satisfaction (Tables 5 and 6), production region (Table 7), willingness to pay (Table 8), and k-cluster (Table 9). Each table shows the top three and bottom three elements in each group.

Participants who purchase peaches at roadside stands are unlikely to purchase imported peaches "imported to the United States" (IV = −26), and participants from the "more than satisfied" segment are more likely to buy peaches if the peaches are "locally grown" (IV = 15), "grown in Florida" (IV = 15), or "grown in Georgia" (IV = 14). Participants that are not satisfied with peach flavor are more likely to buy peaches "grown in Florida" (IV = 12), whereas participants that are satisfied with the flavor of the fruit are less likely to buy "imported to the United States" peaches (IV = −11). Participants who did not know if they live in a peach production region are the most likely to buy peaches (AC = 51), whereas people who stated they live in a peach production region and people who stated they do not live in a production region had similar but slightly lower purchase interests (AC = 47 vs. AC = 46, respectively). More than half of the 302 participants expressed "willingness to

Table 2. Demographics of consumers surveyed for the "Ideal Peach."

		n	%
Q1: For demographic purposes only, please indicate gender identity.	Male	152	50
	Female	149	49
	Other	1	0
Q2: Please indicate the age group to which you belong.	18–24	25	8
	25–34	76	25
	35–44	65	22
	45–54	42	14
	55–64	45	15
Q3: For demographic purposes only, which of the following best describes your ethnic background?	White/Caucasian	203	67
	Black/African American	49	16
	Hispanic/Latino	19	6
	Asian/Asian American	20	7
	Other	11	4
Q4: What is your household income per year before taxes?	Under $30,000	89	29
	$30,000–$50,999	69	23
	$51,000–$75,999	57	19
	$76,000–$100,000	41	14
	Over $100,000	46	15
Q5: Please indicate your marital status:	Single	125	41
	Married	130	43
	Separated/Divorced	32	11
	Widowed	15	5
Q6: Are children part of the household?	Yes	106	35
	No	196	65
Q7: Please indicate your level of education:	High school or equivalent	66	22
	Some college	114	38
	Bachelor's degree	86	28
	Advanced degree (postgraduate, professional, etc.)	36	12
Q8: Which best describes the neighborhood in which you live?	Rural	67	22
	Suburban	108	36
	Urban	127	42
Q9: Which best describes the U.S. region in which you live?	Northeast	68	23
	Northwest	20	7
	Midwest	73	24
	Southeast	84	28
	Southwest	57	19
Q10: Have you ever purchased peaches?	Yes	300	99
	No	2	01
Q11: In what form do you most often purchase peaches?	Fresh	261	86
	Frozen	10	3
	Canned	31	1
	Dried	0	0
Q12: Where did you purchase most of your peaches this year?	Supercenter store	99	33
	Local grocery store	144	48
	Farmers market	43	14
	Roadside stand	9	3
	Pick your own	4	1
	Other	2	1
Q13: In the past, how satisfied were you with the quality of the peaches your purchased?	Not applicable	1	0
	Not satisfied at all	3	1
	Somewhat satisfied	44	15
	Satisfied	112	37
	More than satisfied	76	25
	Extremely satisfied	67	22
Q14: In the past, how satisfied were you with with the flavor of peaches you purchased	Not satisfied at all	5	2
	Somewhat satisfied	49	16
	Satisfied	100	33
	More than satisfied	83	27
	Extremely satisfied	65	22
Q15: Do you live in a peach production region?	Yes	76	25
	No	157	52
Q16: Are you willing to pay more for a locally grown peach?	I don't know	69	23
	Yes	220	73
	No	82	27

pay" (WTP) a higher price for locally grown peaches (AC = 50.6).

The k-cluster analysis identified two segments (Table 9). The participants in these two segments mainly differed in their interest in peach flavor, size and shape, healthy attributes, color characteristics, consumption habits, and their interest in "locally grown" peaches. For segment 1, participants were interested in the size, texture, and color of the peach, with IVs from 10.2 to 5.5, 14 to −13.9, and 5 to 1.6, respectively. In contrast, participants in segment 2 prefer a more flavorful peach with an adequate balance of tart and sweet note and are interested in the production region and healthy attributes. Participants in segment 2 are also more interested in health attributes elements compared with participants in segment 1. The IVs of the elements in the health benefits category ranked from 1.7 to −2.1 for segment 1 and from 8.3 to 2.8 for

Table 3. Interest value (IV) of each of the elements rated by the participants for Question 1: "How likely are you to purchase peaches with attributes like these?"

Additive constant	48
Element	Q1 IV
Texture/Firmness: Juicy and fully ripe	13
Flavor: Strong peach aroma and sweet peach taste	12
Production Region: Grown in Georgia	11
Production Region: Locally grown	10
Flavor: Rich flavor of a tree-ripened peach	9
Size and Shape: Large, round peaches	6
Production Region: Grown in Florida	6
Production Region: Grown in California	5
Consumption: Perfect as a snack	3
Color: Yellow peel with red blush	3
Health Benefits: Natural source of sugar and low in calories	2
Texture/Firmness: Fuzzy outer surface and extremely soft	2
Health Benefits: High in antioxidants	2
Health Benefits: Full of minerals and vitamins	2
Size and Shape: Medium-sized peaches	2
Health Benefits: Good source of Vitamin A	1
Flavor: Nice balance of tart and sweet	1
Color: Red peel with some yellow tints	1
Health Benefits: Rich in Vitamin C	1
Color: Golden yellow skin with a blush of red	0
Consumption: Great flavor in a yogurt	0
Size and Shape: Small peaches that you can eat in one or two bites	−1
Consumption: Perfect for a fruit salad	−1
Texture/Firmness: Firm and crisp with the pit attached to the pulp	−1
Color: White flesh with a hint of red	−1
Size and Shape: Elongated shape with pointed bottom	−1
Color: Yellow flesh	−1
Consumption: Blends well in a smoothie	−1
Consumption: Excellent for making into a homemade jam	−2
Texture/Firmness: Slightly hard but mature	−5
Size and Shape: Unique donut shape	−5
Production Region: Imported to the United States	−6
Flavor: Neutral flavor, not fully ripe	−10
Flavor: Sour taste but strong peach aroma	−13
Texture/Firmness: Dry and mealy	−14

segment 2. Participants in segment 1 are also more interested in peach color characteristics (IVs ranging from 5 to 1.6) compared with participants in segment 2 (IVs ranging from −0.7 to −5.7). Participants in segment 1 reported that they are less likely to purchase imported peaches (IV = 10.6) compared with participants in segment 2 (IV = 1.7). Segment 2 participants reported a preference for eating peaches as a snack (IV = 7.6), whereas segment 1 participants did not have a preferred form of consumption, but they are not interested in using peaches to make homemade jam (IV = −4.8). We were therefore able to characterize the preference of segment 1 as "Juicy, colorful and sizeable peach" and that of segment 2 as "Locally grown and healthy."

Demographic segmentation of each of the two segments previously described is provided in Supplemental Fig. 1 and Table 7.

Table 4. Segmentation by purchase center. The three top and bottom elements based on the interest values (IVs) for each segment.

Purchase centers		Elements	IV
Supercenter store			
n	99	D1 Juicy and fully ripe	13.1
Additive constant	47.5	A3 Grown in Georgia	10.5
		E1 Strong peach aroma and sweet peach taste	10.3
		E5 Neutral flavor, not fully ripe	−5.1
		D5 Dry and mealy	−12.4
		E4 Sour taste but strong peach aroma	−12.8
Local grocery store			
n	144	E1 Strong peach aroma and sweet peach taste	15.5
Additive constant	44.3	D1 Juicy and fully ripe	14.2
		A1 Locally grown	10.2
		E5 Neutral flavor, not fully ripe	−10.0
		E4 Sour taste but strong peach aroma	−12.1
		D5 Dry and mealy	−13.9
Farmers market			
n	43	A3 Grown in Georgia	14.7
Additive constant	56.8	D1 Juicy and fully ripe	14.3
		A1 Locally grown	11.0
		D5 Dry and mealy	−13.4
		E5 Neutral flavor, not fully ripe	−16.2
		E4 Sour taste but strong peach aroma	−17.0
Roadside stand			
n	9	A3 Grown in Georgia	11.1
Additive constant	59.8	D4 Fuzzy outer surface and extremely soft	9.8
		A1 Locally grown	6.9
		F5 Elongated shape with pointed bottom	−25.1
		A2 Imported to the United States	−26.3
		F3 Unique donut shape	−28.2

Discussion

The results obtained using conjoint-based experimental design and analysis show the importance of texture/firmness and flavor for peach consumers, as well as the preference for locally grown produce (Campbell et al., 2013; Olmstead et al., 2015). Indeed, texture/firmness and flavor are the most important attributes that consumers use to decide on the quality of peaches (Bruhn,1995; Fernández-Serrano et al., 2020; Kelley et al., 2016; Predieri et al., 2005). Zhou et al. (2018) reported that different consumers value peach quality differently, with one group of consumers valuing flavor, the combination of sugars and acids, which are sensed by taste receptors, and volatiles, which contribute to the aroma of fruits and vegetables and are perceived by the olfactory system (Klee and Tieman, 2018; Meilgaard et al., 1990). Another group values appearance, and a third group of consumers balances the two. Therefore, it is important to harvest peaches at the proper maturity stage to ensure they possess maximum quality potential, handle the fruit appropriately to avoid bruising, and store them properly to avoid internal breakdown (i.e., chilling injury) to maintain and preserve the quality throughout the postharvest distribution and marketing chain (Crisosto et al., 1995; Ramina et al., 2008). Peaches are usually considered mature when the TSS reaches 10% to 12%, the ground color a* values on the CIE L*a*b* scale are positive, and the fruit firmness is lower than 10 to 12 lb (4.5 to 5.4 kg) (Ramina et al., 2008). Thus, harvesting peaches at the proper maturity will improve the likelihood that the fruit will have excellent quality in terms of flavor and appearance when they are delivered to the consumers.

Consumer preference for locally grown produce has increased in recent years (Bruno and Campbell, 2016; Campbell et al., 2010; Carpio and Isengildina-Massa, 2009). Although multiple explanations have been proposed for this local grown preference, two of the primary reasons are 1) consumers think of "locally grown food" as more environmentally friendly, and 2) consumers view "locally grown food" as fresher and more flavorful (Zepeda and Li, 2006). Therefore, making the consumer aware of the production region could increase the likelihood of consumers purchasing peaches in and around the production area (Onozaka and McFadden, 2011). Although

Table 5. Segmentation by quality satisfaction. The three top and bottom elements based on the interest values (IVs) for each segment.

Quality satisfaction			
Not satisfied at all		Elements	IV
n	3	E3 Rich flavor of a tree-ripened peach	69.5
Additive constant	34.6	E1 Strong peach aroma and sweet peach taste	68.0
		D1 Juicy and fully ripe	38.5
		B3 Good source of Vitamin A	−34.6
		B5 Natural source of sugar and low in calories	−35.1
		B4 High in antioxidants	−47.2
Somewhat satisfied		Elements	IV
n	44	E3 Rich flavor of a tree-ripened peach	20.2
Additive constant	27.4	D1 Juicy and fully ripe	17.9
		A3 Grown in Georgia	16.6
		E4 Sour taste but strong peach aroma	−11.6
		F3 Unique donut shape	−16.0
		D5 Dry and mealy	−18.1
Satisfied		Elements	IV
n	112	D1 Juicy and fully ripe	15.4
Additive constant	41.1	E1 Strong peach aroma and sweet peach taste	12.0
		A3 Grown in Georgia	9.7
		E5 Neutral flavor, not fully ripe	−13.1
		D5 Dry and mealy	−14.1
		E4 Sour taste but strong peach aroma	−16.5
More than satisfied		Elements	IV
n	76	A1 Locally Grown	14.8
Additive constant	46.1	A5 Grown in Florida	14.6
		A3 Grown in Georgia	14.3
		E5 Neutral flavor, not fully ripe	−7.8
		E4 Sour taste but strong peach aroma	−14.2
		D5 Dry and mealy	−15.6
Extremely satisfied		Elements	IV
n	67	A1 Locally Grown	5.4
Additive constant	74.1	D1 Juicy and fully ripe	4.8
		A3 Grown in Georgia	4.3
		E4 Sour taste but strong peach aroma	−7.1
		D5 Dry and mealy	−7.5
		E5 Neutral flavor, not fully ripe	−9.8

there is no specific label or accurate definition of what is considered "locally grown," producers should consider mentioning the production region when marketing their fruit (Feldmann and Hamm, 2015). The Florida peach industry needs to familiarize consumers with Florida peaches, because this study and others indicate they are largely unaware of the Florida peach season (Harders et al., 2016). In addition, it is important to consider the disposition of the consumers to buy Florida peaches and how satisfied consumers are with peaches "grown in Florida" (Tables 3 and 5). Even though the logo "Fresh from Florida" is recognized by consumers, its presence on peaches has been found to be only slightly important for consumers in their purchasing decisions (Harders et al., 2016).

Table 6. Segmentation by flavor satisfaction. The three top and bottom elements based on the interest values (IVs) for each segment.

Flavor satisfaction		Elements	IV
Not satisfied at all			
n	5	E3 Rich flavor of a tree-ripened peach	20.7
Additive constant	72.9	A5 Grown in Florida	12.3
		E1 Strong peach aroma and sweet peach taste	11.1
		E5 Neutral flavor, not fully ripe	−35.9
		D5 Dry and mealy	−44.1
		D3 Slightly hard by mature	−56.9
Somewhat satisfied			
n	49	E1 Strong peach aroma and sweet peach taste	21.6
Additive constant	29.5	A3 Grown in Georgia	20.5
		A1 Locally Grown	18.3
		D3 Slightly hard but mature	−8.9
		E4 Sour taste but strong peach aroma	−16.0
		D5 Dry and mealy	−18.5
Satisfied			
n	100	D1 Juicy and fully ripe	11.2
Additive constant	45.5	E1 Strong peach aroma and sweet peach taste	11.0
		E3 Rich flavor of a tree-ripened peach	7.7
		A2 Imported to the United States	−11.0
		D5 Dry and mealy	−13.7
		E4 Sour taste but strong peach aroma	−14.0
More than satisfied			
n	83	D1 Juicy and fully ripe	19.4
Additive constant	38.5	E1 Strong peach aroma and sweet peach taste	13.6
		A3 Grown in Georgia	13.2
		E4 Sour taste but strong peach aroma	−10.1
		E5 Neutral flavor, not fully ripe	−11.4
		D5 Dry and mealy	−12.7

In the k-cluster analysis segments, the health benefits of peaches did not have much influence on the purchase decisions of approximately half of the participants (segment 1), but they were viewed more positively by the other half (segment 2). For all consumers, the health-related elements had low IVs. A reason for this result could be that consumers lack information regarding peach health benefits. Even though consumers may be aware that fruits and vegetables in general are beneficial for their health, they are not aware of what vitamins are found in peaches (Olmstead et al., 2015). Harders et al. (2016) assessed consumers' knowledge of peach health benefits by asking them to rate several statements as correct or incorrect, and 45% of the consumers marked the statement, "peaches are not a source of Vitamin C," as correct, although the statement is actually incorrect. This lack of knowledge could be a reason why the elements such as "good source of Vitamin A" and "rich in Vitamin C" only had IVs of 1.

In previous studies using conjoint experimental design and analysis, similar findings (i.e., low IVs) were reported for health attributes in produce such as strawberry and peach (Colquhoun et al., 2012; Olmstead et al., 2015). Even though price is an important driver in consumer purchase decisions, providing consumers with nutritional information could increase a consumer's WTP (Ali and Rahut, 2019; Kelley et al., 2016; Kozup et al., 2003). This could be the case with blueberries, for which the generic promotion of the fruit as a "superfood" increased consumer awareness of its health attributes (Hancock et al., 2007), and its consumption in the United States subsequently increased 5-fold in 12 years, from 0.26 lb per person in 2000 to 1.30 lb per person in 2012 (USDA ERS, 2018).

In the two consumer segments ("mindsets") identified in this study, participants in segment 1, who have size, texture, and color as the primary drivers of purchase, are likely to also purchase peaches with attributes such as "medium-size peaches" and "small peaches that you can eat in one or two bites." The likelihood that consumers who prefer large peaches will buy peaches other than large-size is definitely an opportunity for Florida peach growers, who generally must thin their trees extensively to obtain fruit of sufficient size (6 to 8 cm or 2 3/8 to 3 5/32 in diameter) to suit the fresh market (Okie et al., 2008; Olmstead et al., 2013). Conversely, participants in segment 2 ("locally grown and healthy") claim that they do not consider size to be an important factor when buying

Table 7. Segmentation by production region. The three top and bottom elements based on the interest values (IVs) for each segment.

Production region		Elements	IV
Yes			
n	76	E3 Rich flavor of a tree-ripened peach	15.9
Additive constant	47.1	A3 Grown in Georgia	15.6
		E1 Strong peach aroma and sweet peach taste	14.8
		F3 Unique donut shape	−7.4
		E4 Sour taste but strong peach aroma	−9.5
		D5 Dry and mealy	−13.6
No			
n	157	D1 Juicy and fully ripe	12.5
Additive constant	46.4	A3 Grown in Georgia	11.8
		E1 Strong peach aroma and sweet peach taste	11.4
		E5 Neutral flavor, not fully ripe	−10.8
		E4 Sour taste but strong peach aroma	−13.9
		D5 Dry and mealy	−14.5
I don't know			
n	69	D1 Juicy and fully ripe	15.1
Additive constant	51	E3 Rich flavor of a tree-ripened peach	9.1
		E1 Strong peach aroma and sweet peach taste	9.0
		E5 Neutral flavor, not fully ripe	−10.3
		D5 Dry and mealy	−12.3
		E4 Sour taste but strong peach aroma	−15.4

Table 8. Segmentation by "willingness to pay" (WTP) for locally grown peaches. The three top and bottom elements are based on the interest values (IVs) for each segment.

WTP for locally grown		Elements	IV
Yes			
n	220	D1 Juicy and fully ripe	14
Additive constant	50.6	E1 Strong peach aroma and sweet peach taste	11.7
		A3 Grown in Georgia	11.6
		E5 Neutral flavor, not fully ripe	−10.1
		E4 Sour taste but strong peach aroma	−12.7
		D5 Dry and mealy	−12.8
No			
n	82	E1 Strong peach aroma and sweet peach taste	11.8
Additive constant	39.5	D1 Juicy and fully ripe	11.4
		A3 Grown in Georgia	8.4
		A2 Imported to the United States	−9.2
		E4 Sour taste but strong peach aroma	−14.3
		D5 Dry and mealy	−16.5

peaches, but are less likely to buy "medium-size peaches" and "small peaches that you can eat in one or two bites." However, in segment 2, participants had an important consumption preference for "perfect as a snack." Therefore, advertising small- or medium-size (Florida) peaches as perfect for snacking could increase the likelihood of participants in this segment to buy peaches with the aforementioned characteristics. The results of the survey carried out by Harders et al. (2016) also indicated that consumers tend to eat peaches as a snack.

An important outcome of this study is the satisfaction expressed by participants with the quality and flavor of peaches (Fig. 2). It was previously reported that consumers were not satisfied with the quality and flavor of peaches, particularly peaches produced in California (Bruhn, 1995). This dissatisfaction was mainly due to internal breakdown, which causes peaches to develop mealy texture. Internal breakdown/mealiness is the result of CI, which is caused by long exposure of the fruit to temperatures ≈36 °F to 46 °F (2.2 °C to 7.8 °C) (Crisosto et al., 1995). Among domestic production regions, California peaches are more prone to internal breakdown because they require longer shipping times within the United States (up to 5 d). Peaches imported from South America have even much longer shipping times (≈3 to 4 weeks; www.searates.com/services/distances-time/), because imported peaches are transported by marine vessels in refrigerated shipping containers. In contrast, Florida peaches are less prone to internal breakdown, not only because they are marketed locally or within short distances from the production area, but also because the NMF peach varieties that are most commonly grown in Florida do not develop the mealy flesh texture associated with internal breakdown when chilled (Brovelli et al., 1998). The differences between melting and NMF is the lack of the pectin-degrading enzyme endopolygalacturonase (EndoPG) in NMF peaches, which results in NMF fruit being firmer during ripening than melting flesh fruit. Thus, NMF peaches showed the capacity to hold up better in storage until the fruit reached the ready-to-eat stage (Brovelli et al., 1998; Kao et al., 2012).

Consumers emphasized that their willingness to purchase peaches is most importantly based on flavor, texture, size, and production region. Similar results were reported by Zhou et al. (2018), consumers based their purchase on color, blemish, firmness, sweetness, flavor, and price. However, Delgado et al. (2013) reported that sweetness is the first driver of liking and purchase in peaches. In contrast, Giacalone et al. (2005) reported a preference for peaches with a balanced sugar/acid ratio over those with either low or high acidity. Thus, these attributes should be highlighted in peach advertising because they increase consumer purchases (Campbell et al., 2010; Carpio and Isengildina-Massa, 2009). Nonetheless, it is important to mention that even though a certain percentage of consumers do not prefer imported peaches (IV = −10.6), others do (1.7) (Table 9). In addition, when imported produce items are advertised as organic, consumers are more likely to purchase (Onozaka and McFadden, 2011). Even though the market window for Florida peaches allows producers to provide the first and only domestic peaches in the U.S. market, educational material addressing peach health benefits, advertisements promoting their perfect size for snacking, sustainable production, and that they are Florida-grown, coupled with highlighting that Florida peaches are flavorful and tree-ripe fruit, could increase sales to multiple consumer segments and improve the industry's profitability. Therefore, marketing campaigns targeting and promoting peaches' healthy attributes and that they are perfect as snacks can increase peach consumption and production in the same manner as was done for blueberries.

Conclusion

This study determined that among U.S. consumers, texture/firmness is the most important attribute for peaches, followed by flavor and production region. An ideal peach is "juicy and fully ripe" with "strong peach aroma and sweet peach taste," either grown in Georgia or locally grown. Consumers stated a preference for Georgia peaches over Florida peaches, and for Florida peaches over California peaches, but locally grown peaches are preferred overall. Half of the peach consumers participating in this study said that they prefer to eat peaches as a snack. Thus, promoting peaches as a healthy snack could increase the Florida peach industry's profitability.

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Table 9. K-cluster segmentation.

		Segment 1 n = 179 Additive constant = 49.7	Segment 2 n = 123 Additive constant = 44.6
Element		IV	
A1	Locally grown	8.2	13.1
A2	Imported to the United States	−10.6	1.7*
A3	Grown in Georgia	9.7	12.2*
A4	Grown in California	1.2	10.7*
A5	Grown in Florida	4.1	8.8
B1	Full of minerals and vitamins	−2.1	8.3*
B2	Rich in Vitamin C	−1.2	3.1
B3	Good source of Vitamin A	−0.7	4.4
B4	High in antioxidants	1.7	2.8
B5	Natural source of sugar and low in calories	1.6	3.7
C1	Perfect as a snack	0.3	7.6*
C2	Blends well in a smoothie	−3.1	1.1
C3	Great flavor in a yogurt	−1.4	1.7
C4	Perfect for a fruit salad	−0.3	−1.0
C5	Excellent for making into a homemade jam	−4.8	2.5*
D1	Juicy and fully ripe	14.0	12.3
D2	Firm and crisp with the pit attached to the pulp	1.5	−3.6
D3	Slightly hard by mature	−4.3	−6.5
D4	Fuzzy outer surface and extremely soft	6.1	−3.4*
D5	Dry and mealy	−13.9	−13.7
E1	Strong peach aroma and sweet peach taste	8.5	16.4*
E2	Nice balance of tart and sweet	−3.3	7.8*
E3	Rich flavor of a tree-ripened peach	4.8	14.2*
E4	Sour taste but strong peach aroma	−18.4	−5.5*
E5	Neutral flavor, not fully ripe	−15.6	−1.1*
F1	Small peaches that you can eat in one or two bites	5.5	−9.4*
F2	Large, round peaches	10.2	0.5*
F3	Unique donut shape	−1.1	−11.7*
F4	Medium-sized peaches	9.7	−10.3*
F5	Elongated shape with pointed bottom	4.4	−9.0*
G1	Yellow flesh	1.6	−5.6*
G2	White flesh with a hint of red	2.8	−5.7*
G3	Yellow peel with red blush	5.0	−0.7
G4	Red peel with some yellow tints	3.0	−2.8
G5	Golden yellow skin with a blush of red	3.5	−4.0*

*Significant differences among participants in each segment for that specific element.

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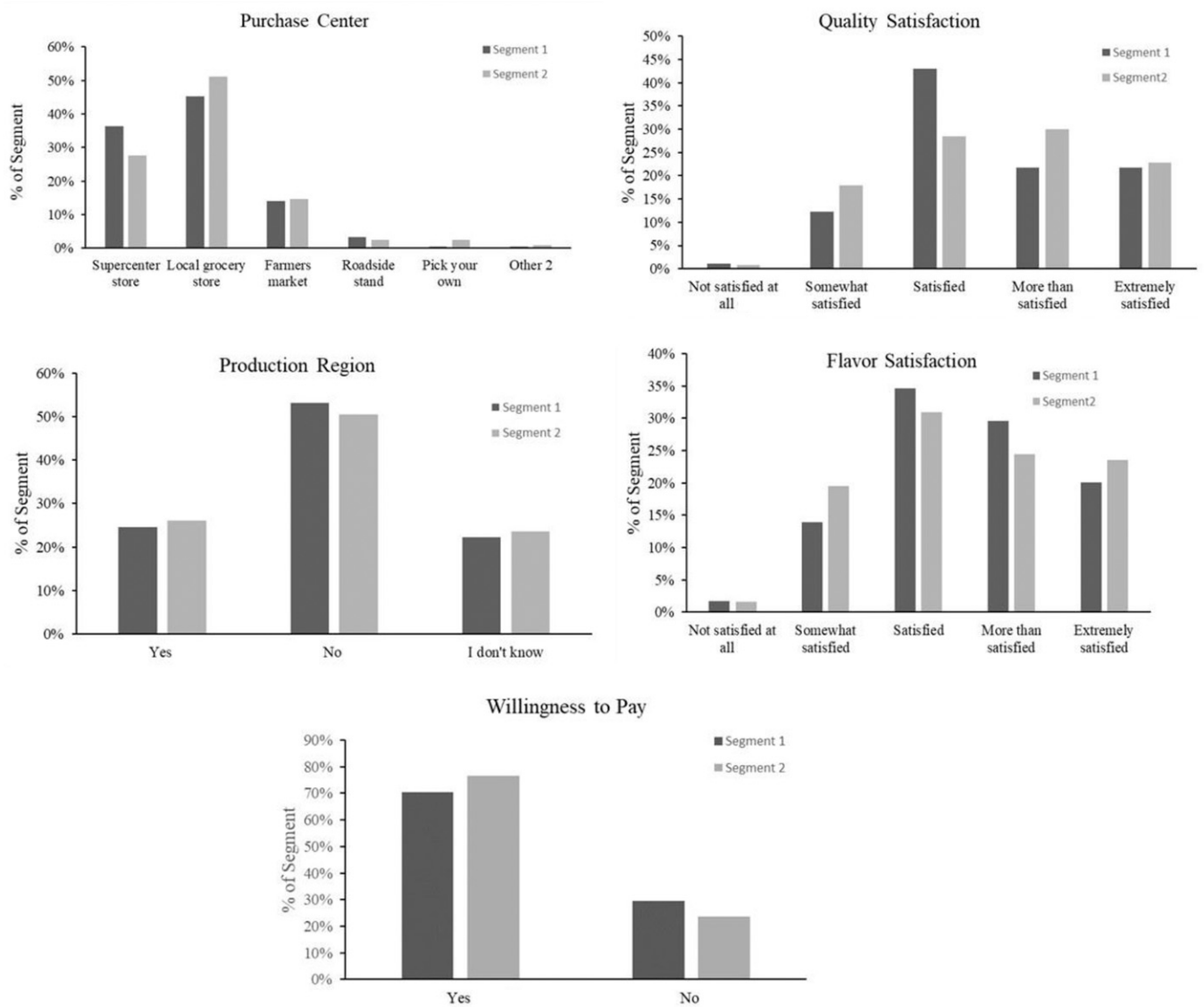

Fig. 2. Preferences and willingness to pay of participants in segments obtained by k-cluster analysis (segments 1 and 2). Segment 1 had 179 participants and segment 2 had 123. Each bar represents the percentage of the total participants.

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Supplemental Table 1. Segmentation by gender. The three top and bottom elements based on the interest values (IVs) for each segment.

Gender		Elements	IV
Male			
n	152	A3 Grown in Georgia	12.8
Additive constant	46.7	D1 Juicy and fully ripe	12.0
		A1 Locally grown	11.5
		F3 Unique donut shape	−7.8
		E4 Sour taste but strong peach aroma	−9.4
		D5 Dry and mealy	−10.8
Female			
n	149	A2 Imported to the United States	14.5
Additive constant	48.8	A4 Grown in California	12.1
		B1 Full of minerals and vitamins	10.3
		G2 White flesh with a hint of red	−12.4
		G5 Golden yellow skin with a blush of red	−16.8
		G4 Red peel with some yellow tints	−16.9

Supplemental Table 2. Segmentation by age group. The three top and bottom elements based on the interest values (IVs) for each segment.

Age		Elements	IV
18–24			
n	25	D1 Juicy and fully ripe	22.5
Additive constant	32.6	B1 Full of minerals and vitamins	15.8
		C3 Great flavor in a yogurt	15.6
		G5 Golden yellow skin with a blush of red	−3.5
		E5 Neutral flavor, not fully ripe	−7.7
		D5 Dry and mealy	−10.2
25–34			
n	76	A1 Locally Grown	11.3
Additive constant	54.6	D1 Juicy and fully ripe	9.1
		A3 Grown in Georgia	9.0
		F3 Unique donut shape	−6.4
		E5 Neutral flavor, not fully ripe	−7.3
		D5 Dry and mealy	−14.5
35–44			
n	65	A3 Grown in Georgia	10.7
Additive constant	56.6	A1 Locally grown	8.4
		D1 Juicy and fully ripe	7.3
		E5 Neutral flavor, not fully ripe	−8.8
		D5 Dry and mealy	−8.9
		E4 Sour taste but strong peach aroma	−12.4
45–54			
n	42	A3 Grown in Georgia	15.6
Additive constant	46.4	D1 Juicy and fully ripe	15.4
		E1 Strong peach aroma and sweet peach taste	15.1
		D5 Dry and mealy	−13.2
		E5 Neutral flavor, not fully ripe	−15.9
		E4 Sour taste but strong peach aroma	−21.7
55–64			
n	45	E1 Strong peach aroma and sweet peach taste	14.8
Additive constant	42.5	A1 Locally grown	13.7
		D1 Juicy and fully ripe	13.3
		E5 Neutral flavor, not fully ripe	−14.6
		E4 Sour taste but strong peach aroma	−15.7
		D5 Dry and mealy	−17.8
65 or over			
N	49	D1 Juicy and fully ripe	21.4
Additive constant	38.3	E3 Rich flavor of a tree-ripened peach	21.48
		E1 Strong peach aroma and sweet peach taste	19.5
		A2 Imported to the United States	−16.3
		D5 Dry and mealy	−17.9
		E4 Sour taste but strong peach aroma	−21.1

Supplemental Table 3. Segmentation by ethnicity. The three top and bottom elements based on the interest values (IVs) for each segment.

Ethnicity		Elements	IV
White/Caucasian			
n	203	D1 Juicy and fully ripe	16.7
Additive constant	42.5	E1 Strong peach aroma and sweet peach taste	15.8
		A3 Grown in Georgia	12.2
		E5 Neutral flavor, not fully ripe	−8.5
		E4 Sour taste but strong peach aroma	−13.8
		D5 Dry and mealy	−14.0
Black/African American			
n	49	A3 Grown in Georgia	13.4
Additive constant	58.8	E3 Rich flavor of a tree-ripened peach	12.4
		E1 Strong peach aroma and sweet peach taste	8.5
		E5 Neutral flavor, not fully ripe	−11.3
		E4 Sour taste but strong peach aroma	−12.0
		D5 Dry and mealy	−16.3
Hispanic/Latino			
n	19	D1 Juicy and fully ripe	6.6
Additive constant	70.4	E2 Nice balance of tart and sweet	6.0
		A5 Grown in Florida	4.1
		E3 Rich flavor of a tree-ripened peach	−10.1
		G4 Red peel with some yellow tints	−10.5
		D5 Dry and mealy	−11.3
Asian/Asian American			
n	20	C3 Great flavor in a yogurt	10.0
Additive constant	54.2	B2 Rich in Vitamin C	9.5
		B3 Good source of Vitamin A	8.4
		E2 Nice balance of tart and sweet	−12.2
		E4 Sour taste but strong peach aroma	−16.2
		E5 Neutral flavor, not fully ripe	−16.8
Other			
n	11	A1 Locally Grown	25.6
Additive constant	41.2	E3 Nice balance of tart and sweet	22.7
		A4 Grown in California	16.7
		E5 Neutral flavor, not fully ripe	−14.3
		A2 Imported to the United States	−16.6
		E4 Sour taste but strong peach aroma	−17.1

Supplemental Table 4. Segmentation by income. The three top and bottom elements based on the interest values (IVs) for each segment.

Income		Elements	IV
Less than $30,000			
n	89	D1 Juicy and fully ripe	15.5
Additive constant	45.7	E1 Strong peach aroma and sweet peach taste	13.3
		E3 Rich flavor of a tree-ripened peach	12.3
		D5 Dry and mealy	−13.2
		E5 Neutral flavor, not fully ripe	−13.5
		E4 Sour taste but strong peach aroma	−16.5
$30,000–$50,999			
n	69	A3 Grown in Georgia	14.8
Additive constant	47.9	A1 Locally Grown	14.7
		E1 Strong peach aroma and sweet peach taste	9.9
		E5 Neutral flavor, not fully ripe	−9.0
		E4 Sour taste but strong peach aroma	−13.1
		D5 Dry and mealy	−17.4
$51,000–$75,999			
n	57	E1 Strong peach aroma and sweet peach taste	15.7
Additive constant	44.6	D1 Juicy and fully ripe	14.9
		E3 Rich flavor of a tree-ripened peach	11.3
		E4 Sour taste but strong peach aroma	−7.1
		F5 Elongated shape with pointed bottom	−7.8
		D5 Dry and mealy	−15.5
$76,000–$100,000			
n	41	G4 Red peel with some yellow tints	13.1
Additive constant	52.8	F2 Large, round peaches	10.0
		G3 Yellow peel with red blush	8.4
		E5 Neutral flavor, not fully ripe	−10.9
		D5 Dry and mealy	−12.6
		E4 Sour taste but strong peach aroma	−15.2
More than $100,000			
n	46	D1 Juicy and fully ripe	21.2
Additive constant	49.9	E1 Strong peach aroma and sweet peach taste	11.1
		A1 Locally Grown	9.4
		D5 Dry and mealy	−8.5
		E4 Sour taste but strong peach aroma	−12.4
		E5 Neutral flavor, not fully ripe	−14.8

Supplemental Table 5. Segmentation by marital status. The three top and bottom elements based on the interest values (IVs) for each segment.

Marital status		Elements	IV
Single			
n	125	D1 Full of minerals and vitamins	14.5
Additive constant	45.9	E3 Rich flavor of a tree-ripened peach	12.2
		E1 Strong peach aroma and sweet peach taste	11.6
		E5 Neutral flavor, not fully ripe	−5.0
		E4 Sour taste but strong peach aroma	−5.9
		D5 Dry and mealy	−10.5
Married			
n	130	D1 Juicy and fully ripe	14.5
Additive constant	49.3	A1 Locally grown	13.3
		E1 Strong peach aroma and sweet peach taste	12.7
		E5 Neutral flavor, not fully ripe	−14.1
		D5 Dry and mealy	−14.2
		E4 Sour taste but strong peach aroma	−18.1
Separated/Divorced			
n	32	A3 Grown in Georgia	15.6
Additive constant	47.7	E1 Strong peach aroma and sweet peach taste	12.5
		F4 Medium-sized peaches	10.8
		D3 Slightly hard by mature	−17.7
		E4 Sour taste but strong peach aroma	−19.4
		D5 Dry and mealy	−22.9
Widowed			
n	47	F2 Large, round peaches	10.8
Additive constant	15	F4 Medium-sized peaches	10.8
		B2 Rich in Vitamin C	10.1
		D5 Dry and mealy	−18.1
		C2 Blends well in a smoothie	−19.6
		A2 Imported to the United States	−23.4

Supplemental Table 6. Segmentation by the presence of children in household. The three top and bottom elements based on the interest values (IVs) for each segment.

Children in the household		Elements	IV
Yes			
n	106	A1 Locally grown	8.8
Additive constant	56.6	A3 Grown in Georgia	8.4
		E1 Strong peach aroma and sweet peach taste	7.9
		E5 Neutral flavor, not fully ripe	−8.9
		D5 Dry and mealy	−10.3
		E4 Sour taste but strong peach aroma	−14.0
No			
n	196	D1 Juicy and fully ripe	16.3
Additive constant	42.8	E1 Strong peach aroma and sweet peach taste	13.8
		A3 Grown in Georgia	11.9
		E5 Neutral flavor, not fully ripe	−10.2
		E4 Sour taste but strong peach aroma	−12.7
		D5 Dry and mealy	−15.7

Supplemental Table 7. Segmentation by educational group. The three top and bottom elements based on the interest values (IVs) for each segment.

Education		Elements	IV
High school or equivalent			
n	66	A3 Grown in Georgia	12.1
Additive constant	55.9	D1 Juicy and fully ripe	11.4
		E1 Strong peach aroma and sweet peach taste	7.3
		D5 Dry and mealy	−12.7
		E5 Neutral flavor, not fully ripe	−13.5
		E4 Sour taste but strong peach aroma	−19.5
Some college			
n	114	D1 Juicy and fully ripe	16.0
Additive constant	41.7	A1 Locally grown	15.7
		E1 Strong peach aroma and sweet peach taste	13.8
		E5 Neutral flavor, not fully ripe	−9.5
		E4 Sour taste but strong peach aroma	−12.8
		D5 Dry and mealy	−16.4
Bachelor's degree			
n	86	E1 Strong peach aroma and sweet peach taste	10.6
Additive constant	48.9	A3 Grown in Georgia	10.4
		D1 Juicy and fully ripe	10.3
		E5 Neutral flavor, not fully ripe	−7.6
		E4 Sour taste but strong peach aroma	−10.4
		D5 Dry and mealy	−12.4
Advanced degree			
n	36	E1 Strong peach aroma and sweet peach taste	16.1
Additive constant	48.1	D1 Juicy and fully ripe	15.4
		E3 Rich flavor of a tree-ripened peach	8.6
		E4 Sour taste but strong peach aroma	−9.1
		A2 Imported to the United States	−10.6
		D5 Dry and mealy	−11.0

Supplemental Table 8. Segmentation by type of neighborhood. The three top and bottom elements based on the interest values (IVs) for each segment.

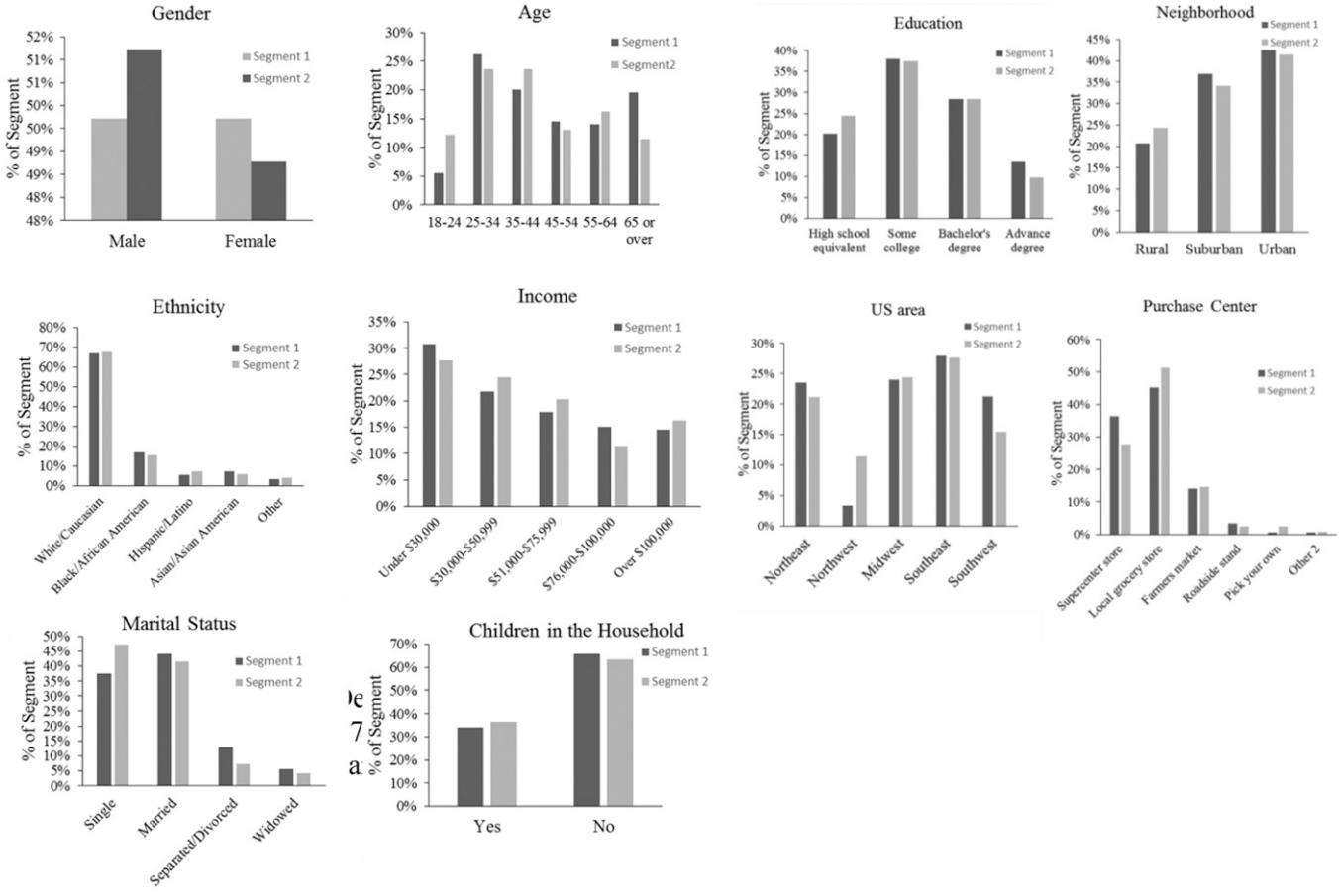
Neighborhood		Elements	IV
Rural			
n	67	A1 Locally grown	17.0
Additive constant	43.8	E1 Strong peach aroma and sweet peach taste	12.7
		D1 Juicy and fully ripe	11.9
		E4 Sour taste but strong peach aroma	−7.9
		F3 Unique donut shape	−8.1
		D5 Dry and mealy	−10.0
Suburban			
n	108	D1 Juicy and fully ripe	16.6
Additive constant	41.1	E1 Strong peach aroma and sweet peach taste	14.9
		A3 Grown in Georgia	14.4
		E5 Neutral flavor, not fully ripe	−8.8
		D5 Dry and mealy	−15.2
		E4 Sour taste but strong peach aroma	−16.7
Urban			
n	127	D1 Juicy and fully ripe	11.2
Additive constant	55.1	E3 Rich flavor of a tree-ripened peach	8.8
		E1 Strong peach aroma and sweet peach taste	8.5
		E5 Neutral flavor, not fully ripe	−12.4
		E4 Sour taste but strong peach aroma	−12.9
		D5 Dry and mealy	−14.6

Supplemental Table 9. Segmentation by location in the United States. The three top and bottom elements based on the interest values (IVs) for each segment.

U.S areas		Elements	IV
Northeast			
n	68	D1 Juicy and fully ripe	18.3
Additive constant	58.5	A1 Locally grown	9.4
		E1 Strong peach aroma and sweet peach taste	8.8
		E5 Neutral flavor, not fully ripe	−11.4
		E4 Sour taste but strong peach aroma	−18.9
		D5 Dry and mealy	−20.6
Northwest			
n	20	A1 Locally grown	8.0
Additive constant	56.1	D1 Juicy and fully ripe	7.6
		D2 Firm and crisp with the pit attached to the pulp	6.4
		G4 Red peel with some yellow tints	−15.2
		G1 Yellow flesh	−16.0
		E5 Neutral flavor, not fully ripe	−19.3
Midwest			
n	73	D1 Juicy and fully ripe	12.2
Additive constant	50.3	A3 Grown in Georgia	11.3
		E1 Strong peach aroma and sweet peach taste	9.7
		E5 Neutral flavor, not fully ripe	−13.9
		D5 Dry and mealy	−16.3
		E4 Sour taste but strong peach aroma	−16.8
Southeast			
n	84	E1 Strong peach aroma and sweet peach taste	17.9
Additive constant	36.8	A3 Grown in Georgia	14.8
		E3 Rich flavor of a tree-ripened peach	14.7
		E5 Neutral flavor, not fully ripe	−2.6
		E4 Sour taste but strong peach aroma	−7.0
		D5 Dry and mealy	−7.5
Southwest			
n	57	A1 Locally grown	15.4
Additive constant	44.2	A3 Grown in Georgia	13.6
		D1 Juicy and fully ripe	12.1
		E5 Neutral flavor, not fully ripe	−9.6
		E4 Sour taste but strong peach aroma	−10.9
		D5 Dry and mealy	−14.1

Supplemental Table 10. Segmentation by purchase center. The three top and bottom elements based on the interest values (IVs) for each segment.

Purchase centers		Elements	IV
Supercenter store			
n	99	D1 Juicy and fully ripe	13.1
Additive constant	47.5	A3 Grown in Georgia	10.5
		E1 Strong peach aroma and sweet peach taste	10.3
		E5 Neutral flavor, not fully ripe	−5.1
		D5 Dry and mealy	−12.4
		E4 Sour taste but strong peach aroma	−12.8
Local grocery store			
n	144	E1 Strong peach aroma and sweet peach taste	15.5
Additive constant	44.3	D1 Juicy and fully ripe	14.2
		A1 Locally grown	10.2
		E5 Neutral flavor, not fully ripe	−10.0
		E4 Sour taste but strong peach aroma	−12.1
		D5 Dry and mealy	−13.9
Farmers market			
n	43	A3 Grown in Georgia	14.7
Additive constant	56.8	D1 Juicy and fully ripe	14.3
		A1 Locally grown	11.0
		D5 Dry and mealy	−13.4
		E5 Neutral flavor, not fully ripe	−16.2
		E4 Sour taste but strong peach aroma	−17.0
Roadside stand			
n	9	A3 Grown in Georgia	11.1
Additive constant	59.8	D4 Fuzzy outer surface and extremely soft	9.8
		A1 Locally grown	6.9
		F5 Elongated shape with pointed bottom	−25.1
		A2 Imported to the United States	−26.3
		F3 Unique donut shape	−28.2



Supplemental Fig. 1. Demographics of segments obtained by k-cluster analysis (segments 1 and 2). Segment 1 had 179 participants and segment 2 had 123. Each bar represents the percentage of the total participants.