

Demographic Differences in United States Consumers' Perceptions and Willingness to Pay for Sustainable Environmental Practices in the Floral Industry

Coleman L. Etheredge¹, Tina M. Waliczek², and James DelPrince³

KEYWORDS. composting, fairtrade, floral design, floriculture, locally sourced, organic

ABSTRACT. Consumers have become increasingly concerned about the environmental standards of industries from which they purchase products. Because consumers' environmental concerns are increasingly becoming part of their purchasing decisions, industries have begun to restructure their business model to one that is more environmentally sustainable. Studies have indicated consumers' actions and motivations for purchasing sustainable products vary based on consumer demographics. The main purpose of this study was to compare the differences in consumers' perceptions and willingness to pay as they relate to retail floral providers' sustainable and environmentally sound practices based on demographic traits. A total of 2172 people responded to an online survey. The sample used in this study was a random selection of individuals 18 years of age or older living in the United States. Survey responses were collected from 21 Dec 2022 to 27 Jan 2023. Data were analyzed using analyses of variance and post hoc tests as well as descriptive and frequency statistics. Results indicated there was a difference in the way respondents answered the survey questions based on demographics. Respondents 34 years of age or younger with college experience indicated the most willingness to make purchases and pay premiums from floral providers that incorporate sustainable attributes into their business model. Males indicated a stronger willingness to shop at a floral provider based on several of the environmental statements when compared with other genders. The results provide evidence of the value of the integration of sustainability practices into the business model of floral providers to make it more competitive.

Consumers have become increasingly concerned about the environmental standards of industries from which they purchase products. Because consumers' environmental concerns are increasingly becoming part of

their purchasing decisions, industries have begun to restructure their business model to one that is more environmentally sustainable (Ouvrard et al. 2020).

Because consumers have become increasingly aware of health risks and environmental degradation related to the overuse of pesticides, there has been an increase in "Organic," "Sustainable," and "Fair Trade" branded horticulture/floriculture products being sold in the United States and around the world (Lernoud and Willer 2017; Toumi et al. 2016). Branding has been shown to increase profit margins and help stimulate demand in a saturated market (Collart et al. 2010). Certifications of branded products can help ensure growing conditions meet or exceed legal government mandates and industry norms as they relate to environmental sustainability (Lernoud and Willer 2017; Reynolds 2012).

Studies have indicated consumers' actions and motivations for purchasing sustainable products vary based on consumer demographics. For instance,

during a study conducted by the Society of American Florists, it was found that 65% of transactions for fresh cut flowers are made by women (Society of American Florists 2016). Another study found that consumers who are typically willing to pay more for environmentally friendly products are female, married, and have at least one child living at home (Laroche et al. 2001). Additionally, it has been found consumers 36 to 50 years of age are the most likely group to proactively purchase products from environmentally friendly companies (Patel et al. 2017). However, those 30 years of age or younger are more willing to spend their income on various products and are more open to trying new products (Eghbal 2014).

Research has found that although consumers with higher annual household incomes are able to spend extra on green goods, because of a lack of trust in quality, they may not purchase sustainable goods (Nguyen et al. 2019). Research has shown that income has a more significant influence on green purchase intentions and green purchase behaviors in developing and emerging countries (Wijekoon and Sabri 2021). This could be because the percentage of disposable income spent on green products is higher in developing and emerging countries, making eco-friendly products more of a premium product than in advanced economies (Wijekoon and Sabri 2021). The same study also found that income was not the main factor when determining green purchase intentions and green purchase behaviors (Wijekoon and Sabri 2021).

During an analysis of European consumers' purchasing preferences for flowers and plants, increasing evidence showed that consumers value a product's origin and prefer locally grown and seasonal flowers (Gabellini and Scaramuzzi 2022). It was also noted that sustainability and transparency play an increasingly important role in consumer choice, especially among young, educated consumers (Gabellini and Scaramuzzi 2022). Past research has found that a consumer's race was not related to actions such as using green products and recyclable bags and separating trash for recycling (Fisher et al. 2012).

A recent study that investigated United States consumers' perceptions of sustainable environmental attributes incorporated into business models of floral providers found that a majority

Received for publication 25 Sep 2023. Accepted for publication 30 Oct 2023.

Published online 27 Dec 2023.

¹Department of Plant and Soil Sciences, Mississippi State University, Starkville, MS 39759, USA

²Department of Agricultural Sciences, Texas State University, San Marcos, TX 78666, USA

³Mississippi State University Costal Research and Extension Center, Mississippi State University, Biloxi, MS 39532, USA

This study was facilitated and funded by the Floral Marketing Fund in cooperation with the American Floral Endowment and co-sponsored by BloomNet[®], a floral services company, serving more than 5000 local florists across the country, and Syndicate Sales, a leading manufacturer/supplier of floral hardgoods for retail florists.

C.L.E. is the corresponding author. E-mail: cle248@msstate.edu.

This is an open access article distributed under the CC BY-NC-ND license (<https://creativecommons.org/licenses/by-nc-nd/4.0/>).

<https://doi.org/10.21273/HORTTECH05325-23>

of those surveyed were willing to pay up to 10% more for floral designs made from a more sustainable floral provider (Etheredge et al. 2023). The same study also found that of the environmentally sustainable attributes that respondents were asked about, the use of locally sourced flowers was found to be the most influential change that a floral provider could make to increasing a consumer's willingness to purchase. Respondents also indicate a strong willingness to pay a premium to retail floral providers that dispose of floral waste through composting (Etheredge et al. 2023). Research has indicated that the premium a consumer is willing to pay varies depending on the specific environmental attribute (Khachatryan et al. 2014). Additionally, a past study that investigated consumers' environmental practices based on the types of plant purchases found that consumers who purchase predominantly herbaceous plants, flowering annual plants, perennial plants, indoor flowering plants, and herbs or vegetable transplants were more environmentally friendly when compared with consumers who purchase other types of plants (Behe et al. 2010).

A recent study that investigated retail flower shop owners' perceptions of environmentalism and their willingness to compost fresh cut floral waste produced at their retail floral establishments found that most of these owners who participated in the study had a high level of environmental concern and were willing to collaborate with local community programs, such as community gardens and Master Gardeners, if it meant the waste produced at their shops could be composted (Etheredge and Waliczek 2020).

The main reasons why consumers purchase sustainable products are plant/species, soil, and water protection, as well as conservation of resources, greenhouse gas emission reduction, and to encourage recyclability (Isaak and Lentz 2020). A study found that both luxury and utilitarian product perceptions were enhanced by claims emphasizing global environmental benefits (Steinhart et al. 2013). Environmental assertions may also improve consumers' perceptions of luxury items, thus justifying their indulgence in such products (Steinhart et al. 2013).

The main purpose of this study was to compare the differences in consumer perceptions and willingness to pay as they

relate to retail floral providers' sustainable and environmentally friendly practices based on demographic traits.

Materials and methods

SAMPLE. Institutional review board exemption approval was obtained for this research (IRB Protocol 21–211; May 2021). Respondents were drawn from an online survey that was created using Qualtrics (Provo, UT, USA) and posted for 5 weeks by the sponsors and cosponsors of the study on their social media platforms and spread through post sharing between 21 Dec 2022 to 27 Jan 2023. To gain a more robust sample, the researchers also contracted Momentive Inc. (San Mateo, CA, USA), which maintains a panel of more than 50 million people globally. The researchers specified within the survey consent form/summary that individuals who were targeted for the study needed to be at least 18 years old and reside within the United States. Control mechanisms in place by the contracted provider eliminated duplicate responses.

INSTRUMENTATION. The survey consisted of 31 questions within four different sections and was assembled using tested reliable and valid surveys from past research that explored consumers' preferences and purchasing habits for floral products and views toward environmental certifications and awards (Huang and Yeh 2009; Lee et al. 2019; Short et al. 2017; Yue and Behe 2008). An initial search for test instruments measuring consumers' perceptions of environmental sustainability incorporated in business models was performed and sample questions from each instrument were selected and adapted to fit the topic of this study. After questions were selected and adapted to fit the area of environmental sustainability for this study, the questionnaire was reviewed by the panel of experts. The expert panel consisted of eight individuals working within the educational, wholesale, and retail sectors of the floriculture industry. The expert panel was selected based on their experience in the floriculture industry and their willingness to participate on the panel. Then, the questionnaire was pilot-tested to identify problems with the instructions of the questionnaire and specific questions within the survey.

The first section of the survey investigated which sustainable attributes consumers considered to be the most

important based on how much more they were willing to pay for varying sustainable business attributes. This section included 14 questions related to respondents' perceptions of sustainable attributes and their willingness to pay a premium for products from floral providers who were more environmentally sustainable than for those who were not. Respondents answered questions using a 5-point Likert scale (Likert 1932), multiple-choice questions, and ranking questions. Likert answers included "strongly disagree," "disagree," "neither agree nor disagree," "agree," and "strongly agree." Examples of questions included, "I think it is the environmentally right choice to make purchases from retail floral providers based on their environmental practices," and "All other considerations held the same, I would be more willing to make purchases from retail floral providers that recycle their flower waste through composting than retail floral providers that dispose of floral waste in municipal landfills" (Lee et al. 2019). Multiple-choice questions asked respondents to answer questions from a given set of answers. Example of multiple-choice questions included, "Please indicate how much more, if any, you would be willing to pay for a flower arrangement made by a retail floral provider who recycles flower waste through composting rather than disposing of floral waste in a municipal landfill." Examples of multiple-choice answers included "0%," "5%," "10%," "15%," "20%," and "25% or more."

The second section of the survey was modified from a tested, reliable, and valid instrument used in past research to determine consumers' perceptions of hotels that received green awards and certifications (Lee et al. 2019). The wording of questions was altered to pertain to the retail floral industry. This section consisted of three questions including two Likert-type questions and one multiple-choice question. Likert-type (Likert 1932) questions were answered using the "strongly disagree," "disagree," "neither agree nor disagree," "agree," and "strongly agree" scale. The multiple-choice scale included percentage values from which consumers chose a relevant assessment. Examples of questions included, "If an environmentally friendly certification existed for retail floral providers, then I would be more willing to make purchases from a certified environmentally-friendly retail floral

provider than from a retail floral provider not certified” and “Please indicate how much more, if any, you would be willing to pay for flowers and floral designs from an environmentally friendly-certified retail floral provider if such a certification existed.”

The third section of the survey consisted of five questions and collected information regarding consumers’ cut flower shopping habits. Respondents were asked to identify the frequency at which they purchase flowers from a retail flower shop and the way they most often make purchases from a retail flower shop: online, face-to-face, or over the phone. Questions were drawn from previously tested reliable and validated studies (Huang and Yeh 2009; Yue and Behe 2008).

The final section of the survey consisted of six demographic questions asking respondents to provide their age, education level, annual household income, gender, ethnicity, and state where they live. These were modeled on a reliable and validated instrument used in a previous similar study (Short et al. 2017).

DATA ANALYSIS. Data were analyzed using an analysis of variance (ANOVA) and post hoc [least significant difference (LSD)] tests, as well as descriptive and frequency statistics.

Results and discussion

SURVEY RESPONSE. A total of 2172 people responded to the survey. Overall, the demographics of the respondents aligned closely with the overall demographics of the United States (US Census Bureau 2023). However, the respondent population for this study did skew slightly more toward females (1229; 56.6%), Caucasians (1514; 69.7%), and college-educated people (1221; 56.2%) (Table 1). Overall response rates for certain demographic groups were low, thus eliminating generalizations of some demographic groups to the demographics population as a whole. The survey was successfully completed by respondents living within all 50 states and Washington D.C. (Table 1).

DEMOGRAPHIC DATA COMPARISON. ANOVAs were performed to determine if there were differences in responses to questions that were answered based on the gender, age, education level, ethnicity, and annual household income of respondents (Table 2). Significant differences were found in all five demographic groups. Post hoc, LSD, and

Table 1. Frequency statistics during the study of demographic differences in United States consumers’ perceptions and willingness to pay for sustainable environmental practices in the floral industry.

Demographics	(n)	(%)	2020 United States Census data (%)
Gender			
Female	1229	56.6	50.5
Male	921	42.4	49.5
Nonbinary/third gender	22	1.0	Not collected
Age, years			
18–24	207	9.5	9.0
25–34	350	16.1	13.7
35–44	367	16.9	12.9
45–54	407	18.7	12.4
55–64	436	20.1	13.0
65+	405	18.6	16.3
Race			
Black or African American	164	7.6	12.4
Asian or Asian American	196	9.0	5.9
Hispanic or Latino	185	8.5	18.7
Native American or Alaskan Native	27	1.2	1.1
Native Hawaiian or other Pacific Islander	9	0.4	0.4
White or Caucasian	1514	69.7	61.6
Another race	77	3.5	8.4
Education			
K–11	24	1.1	8.9
GED/high school diploma	313	14.4	27.9
Some college	503	23.2	14.9
College degree	784	36.1	23.5
Postgraduate degree	437	20.1	14.4
Associate/trade school degree	111	5.1	10.5
Annual household income			
Under \$15,000	162	7.5	9.4
Between \$15,000–\$29,999	252	11.6	12.7
Between \$30,000–\$49,999	354	16.3	15.6
Between \$50,000–\$74,999	454	20.9	16.5
Between \$75,000–\$99,999	335	15.4	12.2
Between \$100,000–\$149,999	360	16.6	15.3
Between \$150,000–\$199,999	128	5.9	8.0
\$200,000 or more	127	5.8	10.3

GED = general educational development.

frequency tests were used to determine where these significant differences occurred within each demographic category.

ANALYSIS BASED ON GENDER. Based on gender, ANOVAs found significant differences in the way respondents answered seven of the environmental health questions (Table 2). Male respondents agreed or strongly agreed more with four of the statements asking about different sustainable attributes that could be incorporated into a floral providers business model compared with females and nonbinary/third-gender participants. The statements in which males responded differently were as follows: “All other considerations held the same, I would be more willing to make purchases from a retail floral

provider who sells flowers sourced from local farmers and nurseries (farms and nurseries within 100 miles of the retail floral provider)”; “All other considerations held the same, I would be more willing to make purchases from a retail floral provider who uses sustainable, recycled, upcycled, and/or reusable materials instead of single-use products” (single-use plastic products can be defined as items that are used once or for a short period of time before being thrown away); “If an environmentally friendly certification existed for retail floral providers, then I would be more willing to make purchases from a certified environmentally friendly retail floral provider than from a retail floral provider not certified”; and “If an

Table 2. ANOVA and frequency statistics indicating significant differences in the way participants responded to survey questions pertaining to their views on sustainable attributes that could be included in business models of retail floral providers based on the respondent's gender.

Statement	Male		Female		Nonbinary/ third gender		df	SD	F	P
	(n)	(%)	(n)	(%)	(n)	(%)				
Question: All other considerations held the same, I would be more willing to make purchases from a retail floral provider who sells flowers sourced from local farmers and nurseries (farms and nurseries within 100 miles of the retail floral provider).							2	1.152	4.800	0.008*
Choice 1: Strongly agree	231	25.1	332	27.0	4	18.2				
Choice 2: Agree	397	43.1	445	36.2	6	27.3				
Choice 3: Neither agree nor disagree	182	19.8	218	17.7	7	31.8				
Choice 4: Disagree	66	7.2	137	11.1	2	9.1				
Choice 5: Strongly disagree	45	4.9	97	7.9	3	13.6				
Question: All other considerations held the same, I would be more willing to make purchases from a retail floral provider who uses sustainable, recycled, upcycled, and/or reusable materials instead of single-use products. Single-use plastic products can be defined as items that are used once or for a short period of time before being thrown away.							2	1.143	4.474	0.012*
Choice 1: Strongly agree	220	23.0	304	24.7	6	27.3				
Choice 2: Agree	364	39.5	416	33.8	4	18.2				
Choice 3: Neither agree nor disagree	219	23.8	267	21.7	5	22.7				
Choice 4: Disagree	74	8.0	156	12.7	4	18.2				
Choice 5: Strongly disagree	44	4.8	86	7.0	3	13.6				
Question: If an environmentally friendly certification existed for retail floral providers, then I would be more willing to make purchases from a certified environmentally friendly retail floral provider than from a retail floral provider not certified.							2	1.034	3.342	0.036*
Choice 1: Strongly agree	173	18.8	208	16.9	3	13.6				
Choice 2: Agree	369	40.1	449	36.5	8	36.4				
Choice 3: Neither agree nor disagree	258	28.0	383	31.2	5	22.7				
Choice 4: Disagree	82	8.9	135	11.0	3	13.6				
Choice 5: Strongly disagree	39	4.2	54	4.4	3	13.6				
Question: If an environmentally friendly certification existed for retail floral providers, then I would trust a retail floral provider's environmental quality standards when purchasing from an environmentally friendly-certified retail floral provider.							2	1.015	3.540	0.029*
Choice 1: Strongly agree	160	17.4	180	14.6	2	9.1				
Choice 2: Agree	373	40.5	489	39.8	6	27.3				
Choice 3: Neither agree nor disagree	263	28.6	365	29.7	8	36.4				
Choice 4: Disagree	88	9.6	143	11.6	5	22.7				
Choice 5: Strongly disagree	37	4.0	52	4.2	1	4.5				

(Continued on next page)

Table 2. (Continued)

Statement	Male		Female		Nonbinary/ third gender		df	SD	F	P
	(n)	(%)	(n)	(%)	(n)	(%)				
Question: How often do you make floral purchases? Flower purchases can be defined as cut flowers and indoor potted plants purchased at retail flower providers and separate from nursery/greenhouse purchases.							2	1.250	3.082	0.046*
Choice 1: Once per week	63	6.8	63	5.1	1	4.5				
Choice 2: Once per month	169	18.3	222	18.1	1	4.5				
Choice 3: Three to four times per year	322	35.0	429	34.9	10	45.5				
Choice 4: Once or twice per year	210	22.8	266	21.6	3	13.6				
Choice 5: Once or twice every few years	111	12.1	168	13.7	4	18.2				
Choice 6: Never	46	5.0	81	6.6	3	13.6				
Question: In what manner do you most often make floral purchases? Flower purchases can be defined as cut flowers and indoor potted plants purchased at retail flower providers and separate from nursery/greenhouse purchases.							2	0.705	5.678	0.003*
Choice 1: Phone	97	10.5	100	8.1	0	0.0				
Choice 2: In person	600	65.1	805	65.5	13	59.1				
Choice 3: Store website	172	18.7	233	19.0	4	18.2				
Choice 4: I do not make floral purchases	52	5.6	91	7.4	5	22.7				
Question: For what reason do you most often make floral purchases? Flower purchases can be defined as cut flowers and indoor potted plants purchased at retail flower providers and separate from nursery/greenhouse purchases.							2	0.531	19.753	0.001*
Choice 1: I most often purchase flowers for myself	123	13.4	341	27.7	2	9.1				
Choice 2: I most often purchase flowers as a gift for others	726	78.8	783	63.7	14	63.6				
Choice 3: I do not make floral purchases	72	7.8	105	8.5	6	27.3				

* Statistically significant at $P \leq 0.05$.

df = degrees of freedom.

environmentally friendly certification existed for retail floral providers, then I would trust a retail floral providers' environmental quality standards when purchasing from an environmentally friendly-certified retail floral provider." This indicates that males had a stronger willingness to shop at floral providers with certain sustainable attributes associated with them when compared with females and nonbinary/third-gender participants (Table 2).

No significant differences were found when reviewing how much more participants were willing to pay for sustainable attributes based on gender. Although males indicated stronger willingness to make purchases from floral providers based on four of the sustainable

attributes more than other genders, they were not willing to pay more for these sustainable attributes than other genders. Although not significantly different from males, overall, females were slightly more willing to pay at least 10% or more for environmentally friendly floral attributes when compared with males. This is supported by past research that found that females were more willing to pay a premium for environmentally friendly products (Laroche et al. 2001).

It was found that the following participants purchased flowers three to four times per year or more: male participants, 554 (60.1%); female participants, 714 (58.1%), and nonbinary/third-gender participants, 12 (54.5%).

Overall, the most frequent way floral purchases were made, regardless of gender, was in person [males, 600 (65.1%); females, 805 (65.5%); and nonbinary/third gender, 13 (59.1%)]. However, male participants were slightly more likely to make purchases over the phone than female and nonbinary/third-gender participants (Table 2). Female participants were slightly more likely to make purchases using a store website than male and nonbinary/third-gender participants (Table 2).

It was found that male participants made purchases for other people at a higher rate than female participants and nonbinary/third-gender participants. Female participants made floral purchases for themselves at a higher rate than male

and nonbinary/third-gender participants. Nonbinary/third-gender participants were least likely to make floral purchases compared with male and female participants (Table 2). However, because the sample size for nonbinary/third-gender participation was so small, the results cannot be generalized to the population. Regardless of gender, respondents were the most willing to pay a premium of 10% or more for flowers from a floral provider who uses locally sourced flowers, followed by those that compost their floral waste.

ANALYSIS BASED ON AGE. When comparing age groups, ANOVA tests found significant differences in the way respondents answered 16 questions (Table 3).

The data indicated that the overall respondents 55 years of age and older were less willing to make purchases from a retail floral provider who is environmentally friendly when compared with a retail floral provider who is not environmentally friendly in their practices and expressed the least willingness to pay a premium for sustainable attributes (Table 3). When asked to agree or disagree with the statement “I think it is the environmentally right choice to make purchases from retail floral providers based on their environmental practices,” the post hoc analysis (LSD) indicated there was a difference in the way participants 54 years of age and younger responded to the question and the way participants 55 years of age and older responded. Participants 54 years of age and younger agreed or strongly agreed with the statement more when compared with participants older than 55, with participants 34 years of age and younger agreeing the most with the statement [18–24 years of age who agree or strongly agree, 144 (69.5%); 25–34 years of age who agree or strongly agree, 246 (70.3%); 35–44 years of age who agree or strongly agree, 217 (59.1%); 45–54 years of age who agree or strongly agree, 246 (60.4%); 55–64 years of age who agree or strongly agree, 226 (51.9%); 65 years of age or older who agree or strongly agree, 190 (46.9%)] (Table 2). Respondents 65 years of age or older were the least willing to pay a premium for four of the sustainable attributes they were asked about and were the least willing to shop at a floral provider with an environmentally friendly certification (Table 3). Respondents 34 years of age and younger

were the most interested in and willing to pay a premium for all sustainable attributes (Table 3). Additionally, the data indicated that respondents 65 years of age or older made the fewest floral purchases when compared with all other age groups, with those between the ages of 45 and 54 years making the most floral purchases (Table 3). Past research has found that younger consumers show more interest in buying green products, but that consumers 36 to 50 years of age are the most likely group to proactively purchase products from environmentally friendly companies (Nekmahmud and Fekete-Farkas 2020; Patel et al. 2017). Regardless of age, respondents were the most willing to pay a premium of 10% or more for flowers from a floral provider who uses locally sourced flowers and composts floral waste.

ANALYSIS BASED ON EDUCATION LEVEL. Results of the ANOVA indicated a statistically significant difference in the way respondents answered four questions based on their education level (Table 4). Overall, participants with at least some college education more strongly agreed with each statement when compared with other educational groups. Respondents with a postgraduate degree expressed the most interest in making purchases from a floral provider that uses fair trade sourced flowers when compared with other education groups [K–11, 10 (41.6%) agree or strongly agree; general educational development (GED)/high school diploma, 156 (49.8%) agree or strongly agree; some college, 275 (54.7%) agree or strongly agree; college degree, 406 (51.8%) agree or strongly agree; postgraduate degree, 276 (63.1%) agree or strongly agree; associate degree/trade school, 52 (46.0%) agree or strongly agree] (Table 4). However, respondents with a postgraduate degree did not indicate a greater willingness to pay for fair trade flowers when compared with other education groups (Table 4). More of those with a postgraduate education purchased flowers at a higher rate when compared with the other education groups [K–11, 12 (49.9%) made three to four floral purchases per year or more; GED/high school diploma, 172 (54.9%) made three to four floral purchases per year or more; some college, 284 (56.5%) made three to four floral purchases per year or more; college degree, 464 (59.2%) made three to four floral purchases per year or

more; postgraduate degree, 290 (66.4%) made three to four floral purchases per year or more; associate degree/trade school, 58 (52.2%) made three to four floral purchases per year or more] (Table 4). Past research indicated a positive correlation between environmental consciousness and education level (Boztepe 2012). When asked, “If an environmentally friendly certification existed for retail floral providers, then I would trust a retail floral providers’ environmental quality standard when purchasing from an environmentally friendly-certified retail floral provider,” the post hoc analysis (LSD) indicated there was a difference in the way participants with a K to 11 education answered the question when compared with all other education groups. A majority of all other education groups agreed or strongly agreed with the statement, whereas only 7 (29.1%) of K to 11 education participants agreed or strongly agreed with the statement. However, because the sample size of those with a K to 11 education was small, results regarding this demographic group cannot be generalized to the demographic. Regardless of education level, respondents were the most willing to pay a premium of 10% or more for flowers from a floral provider who uses locally sourced flowers and composts floral waste.

ANALYSIS BASED ON RACE. Respondents’ answers were compared based on race. A majority of all the participants (69.7%) were white/Caucasian. Because the sample size for other racial groups was small, results regarding some racial groups other than white/Caucasians cannot be generalized to the population as a whole and could vary when testing a larger, more racially diverse sample.

The ANOVAs indicated significant differences in the way participants answered 14 of the survey questions based on their race (Table 5).

Asian/Asian American respondents were more willing to make purchases from retail floral providers that are environmentally friendly when compared with retail floral providers that are not environmentally friendly when compared with other racial groups [white/Caucasian participants who agree or strongly agree, 915 (60.5%); black/African American participants who agree or strongly agree, 98 (59.2%); Hispanic/Latino participants who agree or strongly agree, 118 (63.8%); Asian/Asian American participants who agree or strongly agree, 140

Table 3. ANOVA and frequency statistics indicating significant differences in the way participants responded to survey questions pertaining to their views on sustainable attributes that could be included in a retail floral provider's business model based on the respondent's age.

Age, years	18-24		25-34		35-44		45-54		55-65		df	SD	F	P		
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)						
Question: I think it is the environmentally right choice to make purchases from retail floral providers based on their environmental practices.																
Choice 1: Strongly agree	45	21.7	71	20.3	64	17.4	90	22.1	67	15.4	73	18.0	5	1.023	13.074	0.001*
Choice 2: Agree	99	47.8	175	50.0	153	41.7	156	38.3	159	36.5	117	28.9				
Choice 3: Neither agree nor disagree	52	25.1	78	22.3	110	30.0	117	28.7	122	28.0	131	32.3				
Choice 4: Disagree	7	3.4	21	6.0	26	7.1	31	7.6	60	13.8	61	15.1				
Choice 5: Strongly disagree	4	1.9	5	1.4	14	3.8	13	3.2	28	6.4	23	5.7	5	1.135	14.209	0.001*
Question: Overall, I would be more willing to make purchases from a retail floral provider who is environmentally friendly than from a retail floral provider who is not environmentally friendly.																
Choice 1: Strongly agree	75	36.2	101	28.9	96	26.2	107	26.3	100	22.9	84	20.7				
Choice 2: Agree	77	37.2	137	39.1	144	39.2	154	37.8	130	29.8	129	31.9				
Choice 3: Neither agree nor disagree	42	20.3	81	23.1	85	23.2	98	24.1	103	23.6	96	23.7				
Choice 4: Disagree	8	3.9	21	6.0	20	5.4	25	6.1	68	15.6	61	15.1				
Choice 5: Strongly disagree	5	2.4	10	2.9	22	6.0	23	5.7	35	8.0	35	8.6	5	1.185	8.213	0.001*
Question: All other considerations held the same, I would be more willing to make purchases from a retail floral provider who recycles flower waste through composting than a retail floral provider who disposes of floral waste in municipal landfills.																
Choice 1: Strongly agree	79	38.2	101	28.9	102	27.8	125	30.7	123	28.2	134	33.1				
Choice 2: Agree	68	32.9	144	41.1	138	37.6	141	34.6	125	28.7	107	26.4				
Choice 3: Neither agree nor disagree	45	21.7	81	23.1	81	22.1	82	20.1	79	18.1	65	16.0				
Choice 4: Disagree	10	4.8	17	4.9	23	6.3	37	9.1	71	16.3	50	12.3				
Choice 5: Strongly disagree	5	2.4	7	2.0	23	6.3	22	5.4	38	8.7	49	12.1				

(Continued on next page)

Table 3. (Continued)

Age, years	18-24		25-34		35-44		45-54		55-65		df	SD	F	P		
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)						
Question: Please indicate how much more, if any, you would be willing to pay for a flower arrangement made by a retail floral provider who recycles flower waste through composting rather than disposing of floral waste in a municipal landfill.																
Choice 1: 0%	27	13.0	39	11.1	70	19.1	79	19.4	109	25.0	112	27.7	5	1.498	10.941	0.001*
Choice 2: 5%	29	14.0	73	20.9	63	17.2	88	21.6	90	20.6	99	24.4				
Choice 3: 10%	71	34.3	96	27.4	112	30.5	105	25.8	129	29.6	106	26.2				
Choice 4: 15%	46	22.2	65	18.6	54	14.7	50	12.3	43	9.9	33	8.1				
Choice 5: 20%	18	8.7	45	12.9	39	10.6	47	11.5	33	7.6	29	7.2				
Choice 6: 25% or more	16	7.7	32	9.1	29	7.9	38	9.3	32	7.3	26	6.4	5	1.152	5.848	0.001*
Question: All other considerations held the same, I would be more willing to make purchases from a retail floral provider who sells flowers sourced from local farmers and nurseries (farms and nurseries within 100 miles of the retail floral provider).																
Choice 1: Strongly agree	49	23.7	74	21.1	92	25.1	111	27.3	114	26.1	127	31.4				
Choice 2: Agree	98	47.3	165	47.1	155	42.2	172	42.3	141	32.3	117	28.9				
Choice 3: Neither agree nor disagree	48	23.2	81	23.1	81	22.1	65	16.0	66	15.1	66	16.3				
Choice 4: Disagree	5	2.4	22	6.3	17	4.6	40	9.8	70	16.1	51	12.6				
Choice 5: Strongly disagree	7	3.4	8	2.3	22	6.0	19	4.7	45	10.3	44	10.9	5	1.468	7.404	0.001*
Question: Please indicate how much more, if any, you would be willing to pay for a flower arrangement made using locally grown flowers (grown within 100 miles of the retail floral provider).																
Choice 1: 0%	23	11.1	32	9.1	57	15.5	76	18.7	82	18.8	100	24.7				
Choice 2: 5%	40	19.3	74	21.1	64	17.4	83	20.4	99	22.7	100	24.7				
Choice 3: 10%	67	32.4	106	30.3	109	29.7	105	25.8	134	30.7	109	26.9				
Choice 4: 15%	47	22.7	71	20.3	63	17.2	60	14.7	41	9.4	35	8.6				
Choice 5: 20%	14	6.8	43	12.3	37	10.1	48	11.8	49	11.2	35	8.6				
Choice 6: 25% or more	16	7.7	24	6.9	37	10.1	35	8.6	31	7.1	26	6.4				

(Continued on next page)

Table 3. (Continued)

Age, years	18-24		25-34		35-44		45-54		55-65		≥65		F	SD	df	P
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)				
Question: All other considerations held the same, I would be more willing to make purchases from a retail floral provider who sells organically grown flowers (flowers grown and processed using no synthetic fertilizers or pesticides).																
Choice 1: Strongly agree	45	21.7	60	17.1	68	18.5	83	20.4	69	15.8	66	16.3	5	1.057	6.140	0.001*
Choice 2: Agree	77	37.2	137	39.1	126	34.3	143	35.1	142	32.6	107	26.4				
Choice 3: Neither agree nor disagree	66	31.9	117	33.4	133	36.2	124	30.5	139	31.9	145	35.8				
Choice 4: Disagree	12	5.8	24	6.9	24	6.5	34	8.4	57	13.1	61	15.1				
Choice 5: Strongly disagree	7	3.4	12	3.4	16	4.4	23	5.7	29	6.7	26	6.4	5	1.505	8.117	0.001*
Question: Please indicate how much more, if any, you would be willing to pay for a flower arrangement made using organically grown flowers (flowers grown and processed using no synthetic fertilizers or pesticides).																
Choice 1: 0%	38	18.4	64	18.3	94	25.6	113	27.8	125	28.7	164	40.5				
Choice 2: 5%	48	23.2	74	21.1	67	18.3	73	17.9	90	20.6	84	20.7				
Choice 3: 10%	58	28.0	88	25.1	95	25.9	103	25.3	112	25.7	73	18.0				
Choice 4: 15%	30	14.5	77	22.0	53	14.4	51	12.5	36	8.3	36	8.9				
Choice 5: 20%	21	10.1	27	7.7	28	7.6	44	10.8	46	10.6	29	7.2				
Choice 6: 25% or more	12	5.8	20	5.7	30	8.2	23	5.7	27	6.2	19	4.7	5	1.038	7.190	0.001*
Question: All other considerations held the same, I would be more willing to make purchases from a retail floral provider who sells fair trade-sourced flowers (fair trade can be defined as trade between companies in developed countries and producers in developing countries in which fair prices are paid to the producers).																
Choice 1: Strongly agree	40	19.3	58	16.6	64	17.4	87	21.4	63	14.4	74	18.3				
Choice 2: Agree	85	41.1	164	46.9	141	38.4	139	34.2	139	31.9	121	29.9				
Choice 3: Neither agree nor disagree	63	30.4	100	28.6	119	32.4	122	30.0	140	32.1	134	33.1				
Choice 4: Disagree	12	5.8	18	5.1	29	7.9	43	10.6	64	14.7	56	13.8				
Choice 5: Strongly disagree	7	3.4	10	2.9	14	3.8	16	3.9	30	6.9	20	4.9				

(Continued on next page)

Table 3. (Continued)

Age, years	18-24		25-34		35-44		45-54		55-65		≥65		F	SD	df	P
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)				
Question: Please indicate how much more, if any, you would be willing to pay for a flower arrangement made using fair trade-sourced flowers (fair trade can be defined as trade between companies in developed countries and producers in developing countries in which fair prices are paid to the producers).																
Choice 1: 0%	41	19.8	52	14.9	79	21.5	120	29.5	135	31.0	154	38.0	5	1.425	10.201	0.001*
Choice 2: 5%	50	24.2	92	26.3	87	23.7	74	18.2	100	22.9	95	23.5				
Choice 3: 10%	65	31.4	91	26.0	100	27.2	101	24.8	119	27.3	69	17.0				
Choice 4: 15%	25	12.1	60	17.1	52	14.2	57	14.0	43	9.9	45	11.1				
Choice 5: 20%	17	8.2	33	9.4	29	7.9	35	8.6	24	5.5	28	6.9				
Choice 6: 25% or more	9	4.3	22	6.3	20	5.4	20	4.9	15	3.4	14	3.5	5	1.143	7.197	0.001*
Question: All other considerations held the same, I would be more willing to make purchases from a retail floral provider who uses sustainable, recycled, upcycled, and/or reusable materials instead of single-use products. Single-use plastic products can be defined as items that are used once or for a short period of time before being thrown away.																
Choice 1: Strongly agree	64	30.9	87	24.9	78	21.3	107	26.3	92	21.1	102	25.2				
Choice 2: Agree	73	35.3	147	42.0	147	40.1	150	36.9	151	34.6	116	28.6				
Choice 3: Neither agree nor disagree	47	22.7	80	22.9	101	27.5	86	21.1	86	19.7	91	22.5				
Choice 4: Disagree	17	8.2	25	7.1	21	5.7	44	10.8	66	15.1	61	15.1				
Choice 5: Strongly disagree	6	2.9	11	3.1	20	5.4	20	4.9	41	9.4	35	8.6	5	1.460	8.394	0.001*
Question: Please indicate how much more, if any, you would be willing to pay for a flower arrangement made using sustainable, recycled, upcycled, and/or reusable materials instead of single-use products.																
Choice 1: 0%	34	16.4	42	12.0	71	19.3	94	23.1	113	25.9	130	32.1				
Choice 2: 5%	42	20.3	80	22.9	82	22.3	84	20.6	97	22.2	96	23.7				
Choice 3: 10%	67	32.4	100	28.6	106	28.9	105	25.8	126	28.9	87	21.5				
Choice 4: 15%	34	16.4	72	20.6	52	14.2	49	12.0	40	9.2	37	9.1				
Choice 5: 20%	15	7.2	31	8.9	30	8.2	46	11.3	41	9.4	36	8.9				
Choice 6: 25% or more	15	7.2	25	7.1	26	7.1	29	7.1	19	4.4	19	4.7				

(Continued on next page)

Table 3. (Continued)

Age, years	18-24		25-34		35-44		45-54		55-65		≥65		F	SD	df	P
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)				
Question: If an environmentally friendly certification existed for retail floral providers, then I would be more willing to make purchases from a certified environmentally friendly retail floral provider than from a retail floral provider not certified.																
Choice 1: Strongly agree	51	24.6	67	19.1	58	15.8	69	17.0	77	17.7	62	15.3				
Choice 2: Agree	87	42.0	150	42.9	157	42.8	159	39.1	141	32.3	132	32.6				
Choice 3: Neither agree nor disagree	50	24.2	102	29.1	113	30.8	129	31.7	125	28.7	127	31.4				
Choice 4: Disagree	14	6.8	24	6.9	26	7.1	34	8.4	59	13.5	63	15.6				
Choice 5: Strongly disagree	5	2.4	7	2.0	13	3.5	16	3.9	34	7.8	21	5.2				
Question: If an environmentally friendly certification existed for retail floral providers, then I would trust a retail floral provider's environmental quality standards when purchasing from an environmentally friendly-certified retail floral provider.																
Choice 1: Strongly agree	42	20.3	62	17.7	57	15.5	71	17.4	54	12.4	56	13.8				
Choice 2: Agree	91	44.0	159	45.4	161	43.9	151	37.1	164	37.6	142	35.1				
Choice 3: Neither agree nor disagree	54	26.1	99	28.3	117	31.9	129	31.7	121	27.8	116	28.6				
Choice 4: Disagree	13	6.3	22	6.3	24	6.5	42	10.3	68	15.6	67	16.5				
Choice 5: Strongly disagree	7	3.4	8	2.3	8	2.2	14	3.4	29	6.7	24	5.9				
Question: Please indicate how much more, if any, you would be willing to pay for flowers and floral designs from an environmentally friendly-certified retail floral provider if such a certification existed.																
Choice 1: 0%	32	15.5	47	13.4	77	21.0	99	24.3	108	24.8	125	30.9				
Choice 2: 5%	44	21.3	85	24.3	77	21.0	87	21.4	104	23.9	97	24.0				
Choice 3: 10%	66	31.9	93	26.6	105	28.6	106	26.0	118	27.1	96	23.7				
Choice 4: 15%	42	20.3	69	19.7	55	15.0	57	14.0	49	11.2	42	10.4				
Choice 5: 20%	14	6.8	39	11.1	33	9.0	40	9.8	36	8.3	30	7.4				
Choice 6: 25% or more	9	4.3	17	4.9	20	5.4	18	4.4	21	4.8	15	3.7				

(Continued on next page)

Table 3. (Continued)

Age, years	18-24		25-34		35-44		45-54		55-65		df	SD	F	P
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)				
Question: How often do you make floral purchases? Flower purchases can be defined as cut flowers and indoor potted plants purchased at retail flower providers and separate from nursery/greenhouse purchases.											5	1.250	5.606	0.001*
Choice 1: Once per week	16	7.7	26	7.4	18	4.9	36	8.8	20	4.6	11	2.7		
Choice 2: Once per month	39	18.8	70	20.0	73	19.9	77	18.9	86	19.7	47	11.6		
Choice 3: Three to four times per year	64	30.9	114	32.6	120	32.7	142	34.9	166	38.1	155	38.3		
Choice 4: Once or twice per year	39	18.8	70	20.0	83	22.6	89	21.9	102	23.4	96	23.7		
Choice 5: Once or twice every few year	34	16.4	43	12.3	50	13.6	51	12.5	42	9.6	63	15.6		
Choice 6: Never	15	7.2	27	7.7	23	6.3	12	2.9	20	4.6	33	8.1		

* Statistically significant at $P \leq 0.05$.

df = degrees of freedom.

Table 4. ANOVA and frequency statistics indicating significant differences in the way participants responded to survey questions pertaining to their views on sustainable attributes that could be included into business models of retail floral providers based on the respondent's education level.

Education Level	K-11		GED/high school diploma		Some college		College degree		Postgraduate degree		Associate/trade school degree		df	SD	F	P
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)				
Question: All other considerations held the same, I would be more willing to make purchases from a retail floral provider who sells fair trade-sourced flowers (fair trade can be defined as trade between companies in developed countries and producers in developing countries in which fair prices are paid to the producers).																
Choice 1: Strongly agree	2	8.3	58	18.5	86	17.1	120	15.3	98	22.4	22	19.8	5	1.038	2.783	0.016*
Choice 2: Agree	8	33.3	98	31.3	189	37.6	286	36.5	178	40.7	30	27.0				
Choice 3: Neither agree nor disagree	12	50.0	124	39.6	170	33.8	233	29.7	96	22.0	43	38.7				
Choice 4: Disagree	0	0.0	23	7.3	43	8.5	105	13.4	38	8.7	13	11.7				
Choice 5: Strongly disagree	2	8.3	10	3.2	15	3.0	40	5.1	27	6.2	3	2.7	5	1.015	2.506	0.029*
Question: If an environmentally friendly certification existed for retail floral providers, then I would trust a retail floral provider's environmental quality standards when purchasing from an environmentally friendly-certified retail floral provider.																
Choice 1: Strongly agree	2	8.3	57	18.2	75	14.9	117	14.9	71	16.2	20	18.0				
Choice 2: Agree	5	20.8	117	37.4	186	37.0	325	41.5	197	45.1	38	34.2				
Choice 3: Neither agree nor disagree	11	45.8	107	34.2	170	33.8	202	25.8	106	24.3	40	36.0				
Choice 4: Disagree	3	12.5	25	8.0	51	10.1	103	13.1	43	9.8	11	9.9				
Choice 5: Strongly disagree	3	12.5	7	2.2	21	4.2	37	4.7	20	4.6	2	1.8	5	1.250	5.844	0.001*
Question: How often do you make floral purchases? Flower purchases can be defined as cut flowers and indoor potted plants purchased at retail flower providers and separate from nursery/greenhouse purchases.																
Choice 1: Once per week	2	8.3	23	7.3	17	3.4	47	6.0	31	7.1	7	6.3				
Choice 2: Once per month	5	20.8	48	15.3	74	14.7	153	19.5	94	21.5	18	16.2				
Choice 3: Three to four times per year	5	20.8	101	32.3	193	38.4	264	33.7	165	37.8	33	29.7				
Choice 4: Once or twice per year	7	29.2	56	17.9	112	22.3	184	23.5	92	21.1	28	25.2				
Choice 5: Once or twice every few years	3	12.5	45	14.4	74	14.7	105	13.4	38	8.7	18	16.2				
Choice 6: Never	2	8.3	40	12.8	33	6.6	31	4.0	17	3.9	7	6.3				

(Continued on next page)

Table 4. (Continued)

Education Level	K-11		GED/high school diploma		Some college		College degree		Postgraduate degree		Associate/trade school degree		F	P		
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)				
Choice 1: I most often purchase flowers for myself	3	12.5	54	17.3	98	19.5	174	22.2	110	25.2	27	24.3	5	0.531	5.972	0.001*
Choice 2: I most often purchase flowers as a gift for others	18	75.0	208	66.5	356	70.8	566	72.2	302	69.1	73	65.8				
Choice 3: I do not make floral purchases	3	12.5	51	16.3	49	9.7	44	5.6	25	5.7	11	9.9				

* Statistically significant at $P \leq 0.05$.
df = degrees of freedom; GED = general educational development.

Question: For what reason do you most often make floral purchases? Flower purchases can be defined as cut flowers and indoor potted plants purchased at retail flower providers and separate from nursery/greenhouse purchases.

Choice 1: I most often purchase flowers for myself

Choice 2: I most often purchase flowers as a gift for others

Choice 3: I do not make floral purchases

(71.4%); American Indian/Alaskan Native participants who agree or strongly agree, 17 (62.9%); Hawaiian/Pacific Islander participants who agree or strongly agree, 5 (55.5%); participants of another race who agree or strongly agree, 41 (53.3%)] (Table 5). However, this did not translate to an overall willingness to pay more for flowers from a floral provider with environmentally sustainable attributes when compared with other racial groups. This could be explained, in part, by cultural upbringing. Past research has found that those from Asian countries are influenced by their cultural norms and the implemented policies of their governments (Chan and Chau 2019).

Caucasians and those who identified as a race other than those on the answer list were found to be the least willing to pay a premium for five of the sustainable attributes asked about when compared with all other racial groups. Those who identified as a race other than those on the answer list were also found to answer an additional four questions differently when compared with all other racial groups. Those statements were as follows: “All other considerations held the same, I would be more willing to make purchases from retail floral providers that sell flowers sourced from local farmers and nurseries (farms and nurseries within 100 miles of the retail floral provider)”; “Please indicate how much more, if any, you would be willing to pay for a flower arrangement made using locally grown flowers (grown within 100 miles of the retail floral provider)”; “When deciding where to make a floral purchase, which of the following aspects of sustainability do you consider to be the most important for a retail floral provider to practice”; and “If an environmentally friendly certification existed for retail floral providers, then I would trust retail floral providers’ environmental quality standards when purchasing from environmentally friendly-certified retail floral providers.” Those who identified as a race other than those on the answer list were found to be the least willing to make floral purchases from a sustainable a floral provider who uses locally sourced flowers and were the least willing to trust and a pay a premium to a floral provider with an environmentally friendly certification. When asked, “When deciding where to make a floral purchase, which of the following aspects of sustainability do

Table 5. ANOVA and frequency statistics indicating significant differences in the way participants responded to survey questions pertaining to their views on sustainable attributes that could be included into the business model of retail floral providers based on the respondent's ethnicity.

Race	White/Caucasian		Black/African American		Hispanic/Latino		Asian/American		American Indian/Alaska Native		Native Hawaiian/Pacific Islander		Another race		df	SD	F	P
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)				
Question: I think it is the environmentally right choice to make purchases from a retail floral provider based on their environmental practices.																		
Choice 1: Strongly agree																		
	274	18.1	44	26.8	41	22.2	32	16.3	5	18.5	0	0.0	14	18.2	6	1.023	4.233	0.001*
Choice 2: Agree																		
	568	37.5	56	34.1	81	43.8	113	57.7	12	44.4	4	44.4	25	32.5				
Choice 3: Neither agree nor disagree																		
	444	29.3	38	23.2	45	24.3	44	22.4	8	29.6	4	44.4	27	35.1				
Choice 4: Disagree																		
	159	10.5	20	12.2	12	6.5	6	3.1	2	7.4	1	11.1	6	7.8				
Choice 5: Strongly disagree																		
	69	4.6	6	3.7	6	3.2	1	0.5	0	0.0	0	0.0	5	6.5	6	1.135	2.243	0.037*
Question: Overall, I would be more willing to make purchases from a retail floral provider who is environmentally friendly than from a retail floral provider who is not environmentally friendly.																		
Choice 1: Strongly agree																		
	387	25.6	44	26.8	56	30.3	52	26.5	4	14.8	2	22.2	18	23.4				
Choice 2: Agree																		
	528	34.9	54	32.9	62	33.5	88	44.9	13	48.1	3	33.3	23	29.9				
Choice 3: Neither agree nor disagree																		
	342	22.6	38	23.2	47	25.4	43	21.9	7	25.9	3	33.3	25	32.5				
Choice 4: Disagree																		
	161	10.6	17	10.4	12	6.5	9	4.6	1	3.7	0	0.0	3	3.9				
Choice 5: Strongly disagree																		
	96	6.3	11	6.7	8	4.3	4	2.0	2	7.4	1	11.1	8	10.4	6	1.185	2.234	0.037*
Question: All other considerations held the same, I would be more willing to make purchases from a retail floral provider who recycles flower waste through composting than a retail floral provider who disposes of floral waste in municipal landfills.																		
Choice 1: Strongly agree																		
	465	30.7	54	32.9	60	32.4	56	28.6	6	22.2	2	22.2	21	27.3				
Choice 2: Agree																		
	488	32.2	53	32.3	57	30.8	93	47.4	10	37.0	1	11.1	21	27.3				
Choice 3: Neither agree nor disagree																		
	297	19.6	29	17.7	42	22.7	34	17.3	6	22.2	4	44.4	21	27.3				
Choice 4: Disagree																		
	158	10.4	16	9.8	16	8.6	9	4.6	2	7.4	1	11.1	6	7.8				
Choice 5: Strongly disagree																		
	106	7.0	12	7.3	10	5.4	4	2.0	3	11.1	1	11.1	8	10.4				

(Continued on next page)

Table 5. (Continued)

Race	White/Caucasian		Black/African American		Hispanic/Latino		Asian/American		American Indian/Alaska Native		Native Hawaiian/Pacific Islander		Another race		df	SD	F	P
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)				
Question: Please indicate how much more, if any, you would be willing to pay for a flower arrangement made by a retail floral provider who recycles flower waste through composting rather than disposing of floral waste in a municipal landfill.																		
Choice 1: 0%	345	22.8	22	13.4	17	9.2	26	13.3	3	11.1	1	11.1	22	28.6	6	1.498	7.984	0.001*
Choice 2: 5%	310	20.5	36	22.0	34	18.4	37	18.9	1	3.7	2	22.2	22	28.6				
Choice 3: 10%	446	29.5	41	25.0	55	29.7	50	25.5	10	37.0	2	22.2	15	19.5				
Choice 4: 15%	167	11.0	25	15.2	40	21.6	43	21.9	7	25.9	2	22.2	7	9.1				
Choice 5: 20%	137	9.0	19	11.6	22	11.9	23	11.7	3	11.1	1	11.1	6	7.8				
Choice 6: 25% or more	109	7.2	21	12.8	17	9.2	17	8.7	3	11.1	1	11.1	5	6.5	6	1.152	2.775	0.011*
Question: All other considerations held the same, I would be more willing to make purchases from a retail floral provider who sells flowers sourced from local farmers and nurseries (farms and nurseries within 100 miles of the retail floral provider).																		
Choice 1: Strongly agree	439	29.0	33	20.1	34	18.4	42	21.4	4	14.8	1	11.1	14	18.2				
Choice 2: Agree	575	38.0	63	38.4	77	41.6	92	46.9	11	40.7	6	66.7	24	31.2				
Choice 3: Neither agree nor disagree	237	15.7	39	23.8	53	28.6	49	25.0	7	25.9	1	11.1	21	27.3				
Choice 4: Disagree	155	10.2	17	10.4	13	7.0	10	5.1	3	11.1	0	0.0	7	9.1				
Choice 5: Strongly disagree	108	7.1	12	7.3	8	4.3	3	1.5	2	7.4	1	11.1	11	14.3	6	1.468	3.190	0.004*
Question: Please indicate how much more, if any, you would be willing to pay for a flower arrangement made using locally grown flowers (grown within 100 miles of the retail floral provider).																		
Choice 1: 0%	271	17.9	26	15.9	17	9.2	27	13.8	4	14.8	1	11.1	24	31.2				
Choice 2: 5%	335	22.1	29	17.7	32	17.3	44	22.4	3	11.1	1	11.1	16	20.8				
Choice 3: 10%	447	29.5	41	25.0	58	31.4	54	27.6	10	37.0	3	33.3	17	22.1				
Choice 4: 15%	192	12.7	30	18.3	44	23.8	37	18.9	4	14.8	2	22.2	8	10.4				
Choice 5: 20%	155	10.2	17	10.4	22	11.9	21	10.7	5	18.5	2	22.2	4	5.2				

(Continued on next page)

Table 5. (Continued)

Race	White/Caucasian		Black/African American		Hispanic/Latino		Asian/American		American Indian/Alaska Native		Native Hawaiian/Pacific Islander		Another race		df	SD	F	P
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)				
Choice 6: 25% or more	114	7.5	21	12.8	12	6.5	13	6.6	1	3.7	0	0.0	8	10.4	6	1.505	9.221	0.001*
Question: Please indicate how much more, if any, you would be willing to pay for a flower arrangement made using organically grown flowers (flowers grown and processed using no synthetic fertilizers or pesticides).																		
Choice 1: 0%	473	31.2	28	17.1	21	11.4	43	21.9	4	14.8	1	11.1	28	36.4				
Choice 2: 5%	319	21.1	26	15.9	34	18.4	39	19.9	2	7.4	2	22.2	14	18.2				
Choice 3: 10%	337	22.3	43	26.2	63	34.1	53	27.0	11	40.7	3	33.3	19	24.7				
Choice 4: 15%	170	11.2	29	17.7	34	18.4	36	18.4	5	18.5	2	22.2	7	9.1				
Choice 5: 20%	136	9.0	20	12.2	19	10.3	13	6.6	3	11.1	1	11.1	3	3.9				
Choice 6: 25% or more	79	5.2	18	11.0	14	7.6	12	6.1	2	7.4	0	0.0	6	7.8	6	1.425	8.991	0.001*
Question: Please indicate how much more, if any, you would be willing to pay for a flower arrangement made using fair trade-sourced flowers (fair trade can be defined as trade between companies in developed countries and producers in developing countries in which fair prices are paid to the producers).																		
Choice 1: 0%	466	30.8	31	18.9	21	11.4	36	18.4	3	11.1	0	0.0	24	31.2				
Choice 2: 5%	353	23.3	31	18.9	44	23.8	47	24.0	2	7.4	1	11.1	20	26.0				
Choice 3: 10%	351	23.2	37	22.6	65	35.1	59	30.1	12	44.4	4	44.4	17	22.1				
Choice 4: 15%	175	11.6	33	20.1	23	12.4	31	15.8	8	29.6	4	44.4	8	10.4				
Choice 5: 20%	105	6.9	17	10.4	23	12.4	15	7.7	1	3.7	0	0.0	5	6.5				
Choice 6: 25% or more	64	4.2	15	9.1	9	4.9	8	4.1	1	3.7	0	0.0	3	3.9	6	1.460	7.669	0.001*
Question: Please indicate how much more, if any, you would be willing to pay for a flower arrangement made using sustainable, recycled, upcycled, and/or reusable materials instead of single-use products.																		
Choice 1: 0%	375	24.8	28	17.1	19	10.3	31	15.8	2	7.4	0	0.0	29	37.7				
Choice 2: 5%	353	23.3	33	20.1	35	18.9	39	19.9	4	14.8	2	22.2	15	19.5				

(Continued on next page)

Table 5. (Continued)

Race	White/Caucasian		Black/African American		Hispanic/Latino		Asian/American		American Indian/Alaska Native		Native Hawaiian/Pacific Islander		Another race		df	SD	F	P
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)				
Choice 3: 10%	379	25.0	46	28.0	67	36.2	66	33.7	8	29.6	4	44.4	21	27.3				
Choice 4: 15%	194	12.8	16	9.8	33	17.8	27	13.8	6	22.2	3	33.3	5	6.5				
Choice 5: 20%	133	8.8	21	12.8	19	10.3	18	9.2	5	18.5	0	0.0	3	3.9				
Choice 6: 25% or more	80	5.3	20	12.2	12	6.5	15	7.7	2	7.4	0	0.0	4	5.2	6	1.286	2.612	0.016*
Question: When deciding where to make a floral purchase, which of the following aspects of sustainability do you consider to be the most important for a retail floral provider to practice?																		
Choice 1: Flowers used in floral designs are sustainably grown and sourced																		
	445	29.4	47	28.7	45	24.3	51	26.0	7	25.9	4	44.4	17	22.1				
Choice 2: Materials (other than flowers) used in floral design are sustainable, recyclable, upcyclable, and reusable																		
	465	30.7	51	31.1	70	37.8	77	39.3	8	29.6	3	33.3	16	20.8				
Choice 3: Floral provider is as energy-efficient as possible (uses energy-efficient light bulbs, cooler, electric vehicles)																		
	176	11.6	29	17.7	41	22.2	37	18.9	7	25.9	2	22.2	12	15.6				
Choice 4: None of the above is important to me when making a floral purchase																		
	300	19.8	26	15.9	20	10.8	16	8.2	3	11.1	0	0.0	22	28.6				
Choice 5: I do not make floral purchases																		
	128	8.5	11	6.7	9	4.9	15	7.7	2	7.4	0	0.0	10	13.0	6	1.015	3.175	0.004*
Question: If an environmentally friendly certification existed for retail floral providers, then I would trust a retail floral provider's environmental quality standards when purchasing from an environmentally friendly-certified retail floral provider.																		
Choice 1: Strongly agree																		
	224	14.8	30	18.3	40	21.6	33	16.8	2	7.4	3	33.3	10	13.0				
Choice 2: Agree																		
	602	39.8	63	38.4	76	41.1	88	44.9	14	51.9	2	22.2	23	29.9				
Choice 3: Neither agree nor disagree																		
	441	29.1	45	27.4	50	27.0	61	31.1	7	25.9	2	22.2	30	39.0				
Choice 4: Disagree																		
	179	11.8	17	10.4	16	8.6	11	5.6	2	7.4	2	22.2	9	11.7				
Choice 5: Strongly disagree																		
	68	4.5	9	5.5	3	1.6	3	1.5	2	7.4	0	0.0	5	6.5	6	1.411	10.694	0.001*
Question: Please indicate how much more, if any, you would be willing to pay for flowers and floral designs from an environmentally friendly-certified retail floral provider if such a certification existed.																		
Choice 1: 0%																		
	392	25.9	23	14.0	18	9.7	30	15.3	2	7.4	0	0.0	23	29.9				
Choice 2: 5%																		
	343	22.7	37	22.6	38	20.5	46	23.5	4	14.8	1	11.1	25	32.5				

(Continued on next page)

Table 5. (Continued)

Race	White/Caucasian		Black/African American		Hispanic/Latino		Asian/American		American Indian/Alaska Native		Native Hawaiian/Pacific Islander		Another race	
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)
Choice 3: 10%	406	26.8	45	27.4	52	28.1	55	28.1	8	29.6	4	44.4	14	18.2
Choice 4: 15%	183	12.1	24	14.6	42	22.7	46	23.5	6	22.2	3	33.3	10	13.0
Choice 5: 20%	130	8.6	19	11.6	23	12.4	13	6.6	4	14.8	1	11.1	2	2.6
Choice 6: 25% or more	60	4.0	16	9.8	12	6.5	6	3.1	3	11.1	0	0.0	3	3.9
Question: How often do you make floral purchases? Flower purchases can be defined as cut flowers and indoor potted plants purchased at retail flower providers and separate from nursery/greenhouse purchases.														
Choice 1: Once per week	76	5.0	13	7.9	17	9.2	14	7.1	3	11.1	0	0.0	4	5.2
Choice 2: Once per month	252	16.6	30	18.3	50	27.0	43	21.9	6	22.2	0	0.0	11	14.3
Choice 3: Three to four times per year	526	34.7	59	36.0	70	37.8	67	34.2	10	37.0	4	44.4	25	32.5
Choice 4: Once or twice per year	358	23.6	32	19.5	29	15.7	37	18.9	5	18.5	3	33.3	15	19.5
Choice 5: Once or twice every few year	210	13.9	20	12.2	15	8.1	20	10.2	1	3.7	2	22.2	15	19.5
Choice 6: Never	92	6.1	10	6.1	4	2.2	15	7.7	2	7.4	0	0.0	7	9.1
Question: For what reason do you most often make floral purchases? Flower purchases can be defined as cut flowers and indoor potted plants purchased at retail flower providers and separate from nursery/greenhouse purchases.														
Choice 1: I most often purchase flowers for myself	337	22.3	42	25.6	46	24.9	24	12.2	6	22.2	1	11.1	10	13.0
Choice 2: I most often purchase flowers as a gift for others	1062	70.1	105	64.0	127	68.6	151	77.0	16	59.3	6	66.7	56	72.7
Choice 3: I do not make floral purchases	115	7.6	17	10.4	12	6.5	21	10.7	5	18.5	2	22.2	11	14.3
* Statistically significant at $P \leq 0.05$. df = degrees of freedom.														

6 1.250 5.801 0.001*

6 0.531 3.539 0.002*

you consider to be the most important for a retail floral provider to practice?” the post hoc analysis (LSD) indicated that there was a difference in the way respondents who identified as another race answered the question when compared with all other racial groups. The most frequently selected answer choice for the question for all racial groups, except those identifying as another race, was “Materials (other than flowers) used in floral design are sustainable, recyclable, upcyclable, and reusable.” The most frequently selected answer choice for those who were from another race was “None of the above is important to me when making floral purchases.”

ANALYSIS BASED ON ANNUAL HOUSEHOLD INCOME LEVEL. The ANOVAs found significant differences in the way participants answered eight of the survey questions based on their annual household income (Table 6). The data indicated that all differences were among respondents with an income of \$200,000 or more when compared with other income groups. In all instances, those with an annual household income more than \$200,000 indicated being less willing overall to make purchases from floral providers with sustainable attributes (Table 6). However, although those with an annual household income more than \$200,000 indicated less interest in making purchases from floral providers based on sustainable attributes, it did not translate to less willingness to pay a premium for sustainable attributes. No significant differences were found in the way respondents answered the questions regarding how much more, if any, they would be willing to pay for sustainable attributes. Past research found conflicting results regarding the annual household income level and consumers’ willingness to purchase sustainable products. It was found that the annual household income does not affect organic food purchases, whereas other research has suggested that consumers earning higher incomes were more likely to have purchased locally produced foods and to have purchased foods produced with reduced pesticides efforts (Govindasamy and Italia 1998; Jolly 1991; Misra et al. 1991; Ross et al. 2000). Additionally, research showed income has a weak relationship with the level of sustainability efforts (Alkadry et al. 2019).

When asked, “How often do you make floral purchases?” (flower purchases

can be defined as cut flowers and indoor potted plants purchased at retail flower providers and separate from nursery/greenhouse purchases), the post hoc analysis (LSD) indicated there was a difference in the way respondents with an income of \$75,000 or more answered the question when compared with those with an income less than \$75,000. The results showed that those with an income more than \$75,000 make floral purchases more frequently than those with an income less than \$75,000 (Table 6). Regardless of the annual household income, respondents were the most willing to pay a premium of 10% or more for flowers from a floral provider who uses locally sourced flowers and composts floral waste.

Conclusions

The methods that retail floral providers use to source floral material, create floral designs, market, and brand their companies are increasingly becoming important considerations when trying to promote their services toward environmentally conscious consumers and creating a valuable repeat customer base. Based on the findings of this study, floral providers that currently incorporate any sustainable attributes into their business models should strongly consider using this in promotion and advertisement to set themselves apart from the competition and make consumers aware of their environmental efforts. From the list of sustainable attributes covered in this study, respondents indicated the use of locally sourced flowers and the composting of floral waste as being the two sustainable attributes that could be incorporated into the business model of floral providers that have the most perceived value to consumers.

The fact that respondents placed the most value on the use of locally sourced flowers indicates a need to further research this attribute to understand what locally sourced flowers means more fully to the United States population, as well as the possible need for the expansion of the local cut flower-growing industry into smaller regional pockets.

When analyzing survey question responses based on the demographics of participants, it was found that males indicated a stronger willingness to shop at a floral provider based on several of the environmental statements when compared with other genders. This

indicates that floral providers who have incorporated these specific environmental attributes for which males respond more positively should consider promoting their businesses in areas where males are likely to encounter them. Additionally, although males make more purchases as gifts, it was found that females purchase more flowers for themselves. These findings support past research that also found that females are more willing to purchase environmentally sustainable products (Laroche et al. 2001).

Respondents 34 years of age or younger were the most interested in and willing to pay a premium for sustainable attributes. As the age of the participants increased, their overall willingness to pay for environmentally friendly practices tended to decrease. Respondents 55 years of age or older expressed the least willingness to pay a premium for sustainable attributes, with respondents 65 years of age or older being the least willing to pay a premium for environmentally friendly attributes. Respondents 65 years of age or older also indicated they made fewer floral purchases within 1 year than all other age groups. This supports past research that also found that younger consumers have a greater interest in purchasing environmentally friendly products (Gabellini and Scaramuzzi 2022). These findings indicated that floral providers incorporating sustainable attributes in their business model should focus their promotional efforts on individuals younger than age 55 years, and especially those younger than age 35 years.

There was little disagreement among participants when comparing survey answers based on education. Overall, respondents with college experience indicated a greater willingness to make purchases from floral providers with sustainable attributes.

Because of the small sample size of several of the racial demographic groups, generalizations regarding racial groups could change with a larger, more racially diverse sample.

When analyzing responses based on the annual household income level, it was found that participants with an income of \$200,000 or more indicated less agreement with several of the environmentally friendly attribute questions. However, participants with an income \$200,000 or more were still willing to

Table 6. ANOVA and frequency statistics indicating significant differences in the way participants responded to survey questions pertaining to their views on sustainable attributes that could be included into the business models of retail floral providers based on the respondent's annual household income.

Annual household income	Between \$15,000 and \$29,999		Between \$30,000 and \$49,999		Between \$50,000 and \$74,999		Between \$75,000 and \$99,999		Between \$100,000 and \$149,999		Between \$150,000 and \$199,999		Between \$200,000 or more		df	SD	F	P		
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)						
Question: I think it is the environmentally right choice to make purchases from a retail floral provider based on their environmental practices.																				
Choice 1: Strongly agree	38	23.5	45	17.9	73	20.6	80	17.6	53	15.8	71	19.7	27	21.1	23	18.1	7	1.023	2.788	0.007*
Choice 2: Agree	60	37.0	100	39.7	139	39.3	197	43.4	143	42.7	139	38.6	47	36.7	34	26.8				
Choice 3: Neither agree nor disagree	52	32.1	73	29.0	106	29.9	128	28.2	94	28.1	93	25.8	29	22.7	35	27.6				
Choice 4: Disagree	8	4.9	22	8.7	28	7.9	33	7.3	33	9.9	38	10.6	18	14.1	26	20.5				
Choice 5: Strongly disagree	4	2.5	12	4.8	8	2.3	16	3.5	12	3.6	19	5.3	7	5.5	9	7.1				
Question: Overall, I would be more willing to make purchases from a retail floral provider who is environmentally friendly than from a retail floral provider who is not environmentally friendly.																				
Choice 1: Strongly agree	37	22.8	66	26.2	100	28.2	118	26.0	83	24.8	99	27.5	36	28.1	24	18.9	7	1.135	2.111	0.039*
Choice 2: Agree	52	32.1	94	37.3	123	34.7	175	38.5	120	35.8	123	34.2	40	31.3	44	34.6				
Choice 3: Neither agree nor disagree	59	36.4	58	23.0	83	23.4	101	22.2	77	23.0	77	21.4	27	21.1	23	18.1				
Choice 4: Disagree	8	4.9	18	7.1	28	7.9	39	8.6	38	11.3	38	10.6	13	10.2	21	16.5				
Choice 5: Strongly disagree	6	3.7	16	6.3	20	5.6	21	4.6	17	5.1	23	6.4	12	9.4	15	11.8				
Question: All other considerations held the same, I would be more willing to make purchases from a retail floral provider who recycles flower waste through composting than a retail floral provider who disposes of floral waste in municipal landfills.																				
Choice 1: Strongly agree	40	24.7	79	31.3	115	32.5	141	31.1	100	29.9	110	30.6	45	35.2	34	26.8	7	1.185	2.501	0.015*
Choice 2: Agree	52	32.1	80	31.7	130	36.7	154	33.9	118	35.2	118	32.8	41	32.0	30	23.6				
Choice 3: Neither agree nor disagree	53	32.7	56	22.2	66	18.6	93	20.5	64	19.1	61	16.9	15	11.7	25	19.7				
Choice 4: Disagree	9	5.6	19	7.5	20	5.6	44	9.7	34	10.1	46	12.8	14	10.9	22	17.3				
Choice 5: Strongly disagree	8	4.9	18	7.1	23	6.5	22	4.8	19	5.7	25	6.9	13	10.2	16	12.6				

(Continued on next page)

Table 6. (Continued)

Annual household income	Less than \$15,000		Between \$15,000 and \$29,999		Between \$30,000 and \$49,999		Between \$50,000 and \$74,999		Between \$75,000 and \$99,999		Between \$100,000 and \$149,999		Between \$150,000 and \$199,999		\$200,000 or more		df	SD	F	P
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)				
Question: All other considerations held the same, I would be more willing to make purchases from a retail floral provider who sells flowers sourced from local farmers and nurseries (farms and nurseries within 100 miles of the retail floral provider).																				
Choice 1: Strongly agree																				
	33	20.4	71	28.2	98	27.7	134	29.5	84	25.1	87	24.2	32	25.0	28	22.0	7	1.152	3.157	0.003*
Choice 2: Agree																				
	57	35.2	87	34.5	145	41.0	177	39.0	134	40.0	160	44.4	51	39.8	37	29.1				
Choice 3: Neither agree nor disagree																				
	52	32.1	58	23.0	64	18.1	86	18.9	57	17.0	42	11.7	22	17.2	26	20.5				
Choice 4: Disagree																				
	11	6.8	13	5.2	27	7.6	41	9.0	37	11.0	40	11.1	14	10.9	22	17.3				
Choice 5: Strongly disagree																				
	9	5.6	23	9.1	20	5.6	16	3.5	23	6.9	31	8.6	9	7.0	14	11.0	7	1.057	2.262	0.027*
Question: All other considerations held the same, I would be more willing to make purchases from a retail floral provider who sells organically grown flowers (flowers grown and processed using no synthetic fertilizers or pesticides).																				
Choice 1: Strongly agree																				
	26	16.0	57	22.6	64	18.1	76	16.7	55	16.4	64	17.8	32	25.0	17	13.4				
Choice 2: Agree																				
	51	31.5	71	28.2	132	37.3	158	34.8	118	35.2	125	34.7	40	31.3	37	29.1				
Choice 3: Neither agree nor disagree																				
	65	40.1	85	33.7	119	33.6	161	35.5	105	31.3	116	32.2	36	28.1	37	29.1				
Choice 4: Disagree																				
	13	8.0	26	10.3	25	7.1	35	7.7	44	13.1	35	9.7	11	8.6	23	18.1				
Choice 5: Strongly disagree																				
	7	4.3	13	5.2	14	4.0	24	5.3	13	3.9	20	5.6	9	7.0	13	10.2	7	1.038	2.305	0.024*
Question: All other considerations held the same, I would be more willing to make purchases from a retail floral provider who sells fair trade-sourced flowers (fair trade can be defined as trade between companies in developed countries and producers in developing countries in which fair prices are paid to the producers).																				
Choice 1: Strongly agree																				
	25	15.4	45	17.9	67	18.9	81	17.8	49	14.6	69	19.2	27	21.1	23	18.1				
Choice 2: Agree																				
	59	36.4	81	32.1	130	36.7	165	36.3	126	37.6	148	41.1	49	38.3	31	24.4				
Choice 3: Neither agree nor disagree																				
	61	37.7	93	36.9	111	31.4	154	33.9	113	33.7	89	24.7	26	20.3	31	24.4				
Choice 4: Disagree																				
	10	6.2	26	10.3	31	8.8	36	7.9	38	11.3	33	9.2	17	13.3	31	24.4				
Choice 5: Strongly disagree																				
	7	4.3	7	2.8	15	4.2	18	4.0	9	2.7	21	5.8	9	7.0	11	8.7				

(Continued on next page)

Table 6. (Continued)

Annual household income	Less than \$15,000		Between \$15,000 and \$29,999		Between \$30,000 and \$49,999		Between \$50,000 and \$74,999		Between \$75,000 and \$99,999		Between \$100,000 and \$149,999		Between \$150,000 and \$199,999		\$200,000 or more	
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)
Choice 1: Strongly agree	26	16.0	58	23.0	96	27.1	115	25.3	79	23.6	94	26.1	30	23.4	32	25.2
Choice 2: Agree	59	36.4	87	34.5	131	37.0	181	39.9	115	34.3	133	36.9	49	38.3	29	22.8
Choice 3: Neither agree nor disagree	53	32.7	64	25.4	79	22.3	96	21.1	87	26.0	67	18.6	21	16.4	24	18.9
Choice 4: Disagree	12	7.4	28	11.1	30	8.5	40	8.8	38	11.3	40	11.1	20	15.6	26	20.5
Choice 5: Strongly disagree	12	7.4	15	6.0	18	5.1	22	4.8	16	4.8	26	7.2	8	6.3	16	12.6
Question: How often do you make floral purchases? Flower purchases can be defined as cut flowers and indoor potted plants purchased at retail flower providers and separate from nursery/greenhouse purchases.																
Choice 1: Once per week	20	12.3	10	4.0	22	6.2	25	5.5	12	3.6	22	6.1	7	5.5	9	7.1
Choice 2: Once per month	28	17.3	40	15.9	41	11.6	69	15.2	69	20.6	83	23.1	28	21.9	34	26.8
Choice 3: Three to four times per year	33	20.4	66	26.2	118	33.3	169	37.2	139	41.5	134	37.2	56	43.8	46	36.2
Choice 4: Once or twice per year	32	19.8	55	21.8	97	27.4	103	22.7	71	21.2	75	20.8	21	16.4	25	19.7
Choice 5: Once or twice every few years	27	16.7	51	20.2	54	15.3	59	13.0	34	10.1	33	9.2	15	11.7	10	7.9
Choice 6: Never	22	13.6	30	11.9	22	6.2	29	6.4	10	3.0	13	3.6	1	0.8	3	2.4
Question: All other considerations held the same, I would be more willing to make purchases from a retail floral provider who uses sustainable, recycled, upcycled, and/or reusable materials instead of single-use products. Single-use plastic products can be defined as items that are used once or for a short period of time before being thrown away.																
Choice 1: Strongly agree																
Choice 2: Agree																
Choice 3: Neither agree nor disagree																
Choice 4: Disagree																
Choice 5: Strongly disagree																
Question: How often do you make floral purchases? Flower purchases can be defined as cut flowers and indoor potted plants purchased at retail flower providers and separate from nursery/greenhouse purchases.																
Choice 1: Once per week																
Choice 2: Once per month																
Choice 3: Three to four times per year																
Choice 4: Once or twice per year																
Choice 5: Once or twice every few years																
Choice 6: Never																

* Statistically significant at $P \leq 0.05$.
df = degrees of freedom.

pay the same premium levels for environmentally friendly attributes compared to those with other income levels and even slightly more in some instances. In general, all income groups were willing to pay at least 10% or more for sustainable attributes.

Because floral providers may not be able to differentiate certain demographic groups from others, efforts should be made by retail floral providers who have implemented sustainable attributes within their businesses to inform an audience that is as broad and diverse as possible through as many promotional venues available, such as instore signage, statements posted to online websites and social media accounts, and information regarding the businesses' sustainable efforts sent to customer e-mail lists.

Because this was a preliminary study of consumers' stated preferences for hypothetical environmentally sustainable attributes that could be incorporated into retail floral providers' businesses, future studies investigating this topic using the revealed preferences methods are suggested to ascertain whether the participants' real-world purchasing decisions reflect the survey findings.

References cited

- Alkadyr MG, Trammell E, Dimand AM. 2019. The power of public procurement: Social equity and sustainability as externalities and as deliberate policy tools. *Intern J Procurement Manage.* 12:336–362. <https://doi.org/10.1504/IJPM.2019.099553>.
- Behr BK, Campbell B, Dennis J, Hall C, Lopez R, Yue C. 2010. Gardening consumer segments vary in ecopractices. *HortScience.* 45(10):1475–1479. <https://doi.org/10.21273/HORTSCI.45.10.1475>.
- Boztepe A. 2012. Green marketing and its impact on consumer buying behavior. *Eur J Econ Political Stud.* 5:5–21.
- Chan SHG, Chau KY. 2019. Cultural differences between Asians and non-Asians affect buying attitudes and purchasing behaviors towards green tourism products. *J Service Sci Manag.* 16(5): 241–261. <https://doi.org/10.4236/jssm.2023.165033>.
- Collart AJ, Palma MA, Hall CR. 2010. Branding awareness and willingness-to-pay associated with the Texas superstar and earth-kind brand in Texas. *HortScience.* 45:1226–1231. <https://doi.org/10.21273/HORTSCI.45.8.1226>.
- Eghbal M. 2014. Emerging markets account for 90% of the global population aged under 30. *Euromonitor Intern.* <https://www.euromonitor.com/article/emerging-markets-account-for-90-of-the-global-population-aged-under-30>. [accessed 1 Jun 2023].
- Etheredge CL, Waliczek TM. 2020. Perceptions of environmental health and willingness to compost fresh cut floral waste by retail flower shop owners. *HortTechnology.* 30:751–760. <https://doi.org/10.21273/HORTTECH04724-20>.
- Etheredge CL, DelPrince J, Waliczek TM. 2023. U.S. consumer perceptions & willingness to pay for sustainable environmental practices in the floral industry. <https://floralmarketingfund.org/product/sustainable-practices/>. [accessed 18 Jul 2023].
- Fisher C, Bashyal S, Bachman B. 2012. Demographic impacts on environmentally friendly purchase behaviors. *J Targeting Measure Anal Market.* 20:172–184. <https://doi.org/10.1057/jt.2012.13>.
- Gabellini S, Scaramuzzi S. 2022. Evolving consumption trends, marketing strategies, and governance settings in ornamental horticulture: A grey literature review. *Horticulturae.* 8:1–28. <https://doi.org/10.3390/horticulturae8030234>.
- Govindasamy R, Italia JA. 1998. Willingness to purchase comparison of integrated pest management and conventional produce. *Agribusiness.* 14:403–414. [https://doi.org/10.1002/\(SICI\)1520-6297\(199809/10\)14:5<403::AID-AGR6>3.0.CO;2-7](https://doi.org/10.1002/(SICI)1520-6297(199809/10)14:5<403::AID-AGR6>3.0.CO;2-7).
- Huang LC, Yeh TF. 2009. Floral consumption values for consumer groups with different purchase choices for flowers. *HortTechnology.* 19:563–571. <https://doi.org/10.21273/HORTTECH.19.3.563>.
- Isaak M, Lentz W. 2020. Consumer preferences for sustainability in food and non-food horticulture production. *Sustainability.* 12:7004. <https://doi.org/10.3390/su12177004>.
- Jolly DA. 1991. Differences between buyers and nonbuyers of organic produce and willingness to pay organic price premiums. *J Agribus.* 9:97–111.
- Khachatryan H, Campbell B, Hall C, Behr B, Yue C, Dennis J. 2014. The effects of individual environmental concerns on willingness to pay for sustainable plant attributes. *HortScience.* 49(1):69–75. <https://doi.org/10.21273/HORTSCI.49.1.69>.
- Laroche M, Bergeron J, Barbaro-Forleo G. 2001. Targeting consumers who are willing to pay more for environmentally friendly products. *J Consumer Mktg.* 18:503–520. <https://doi.org/10.1108/EUM000000006155>.
- Lee KH, Lee M, Gunarathne N. 2019. Do green awards and certifications matter? Consumers' perceptions, green behavioral intentions, and economic implications for the hotel industry: A Sri Lankan perspective. *Tourism Econ.* 25:593–612. <https://doi.org/10.1177/1354816618810563>.
- Lernoud J, Willer H. 2017. The organic and fairtrade market 2015, p 143–148. In: Willer H, Lernoud J (eds). *The world of organic agriculture* (18th ed). Medienhaus Plump, Rheinbreitbach, Germany.
- Likert R. 1932. A technique for the measurement of attitudes. *Arch Psychol.* 22: 140–155.
- Misra S, Huang CL, Ott SL. 1991. Georgia consumers' preference for organically grown fresh produce. *J Agribus.* 9:53–65.
- Nekmahmud MD, Fekete-Farkas M. 2020. Why not green marketing? Determinates of consumers' intention to green purchase decision in a new developing nation. *Sustainability.* 12:1–31. <https://doi.org/10.3390/su12197880>.
- Nguyen HV, Nguyen CH, Hoang TB. 2019. Green consumption: Closing the intention-behavior gap. *Sustain Dev.* 27: 118–129. <https://doi.org/10.1002/sd.1875>.
- Ouvrard S, Jasimuddin SM, Spiga A. 2020. Does sustainability push to reshape business models? Evidence from the European wine industry. *Sustainability.* 12:2561. <https://doi.org/10.3390/su12062561>.
- Patel J, Modi A, Paul J. 2017. Pro-environmental behavior and socio-demographic factors in an emerging market. *Asian J Bus Ethics.* 6:189–214. <https://doi.org/10.1007/s13520-016-0071-5>.
- Raynolds LT. 2012. Fair trade flowers: Global certification, environmental sustainability, and labor standards. *Rural Sociol.* 77:493–519. <https://doi.org/10.1111/j.1549-0831.2012.00090.x>.
- Ross NJ, Anderson MD, Goldberg JP, Rogers BL. 2000. Increasing purchases of locally grown produce through work-site sales: An ecological model. *J Nutr Educ.* 32:304–313. [https://doi.org/10.1016/S0022-3182\(00\)70589-9](https://doi.org/10.1016/S0022-3182(00)70589-9).
- Short K, Etheredge CL, Waliczek TM. 2017. Studying the market potential for specialty cultivars of sunflower cut flowers. *HortTechnology.* 27:611–617. <https://doi.org/10.21273/HORTTECH03710-17>.

- Society of American Florists. 2016. Consumer trends on buying flowers. <https://safnow.org/aboutflowers/about-the-flower-industry/consumer-buying-trends/>. [accessed 16 May 2021].
- Steinhart Y, Ayalon O, Puterman H. 2013. The effect of an environmental claim on consumers' perceptions about luxury and utilitarian products. *J Cleaner Production*. 53:277–286. <https://doi.org/10.1016/j.jclepro.2013.04.024>.
- Toumi K, Vleminckx C, Van Loco J, Schifffers B. 2016. Pesticide residues on three cut flower species and potential exposure of florists in Belgium. *Int J Environ Res Public Health*. 13:943. <https://doi.org/10.3390/ijerph13100943>.
- US Census Bureau. 2023. Census results. <https://www.census.gov/programs-surveys/decennial-census/decade/2020/2020-census-results.html>. [accessed 16 Jun 2023].
- Wijekoon R, Sabri MF. 2021. Determinants that influence green product purchase intention and behavior: A literature review and guiding framework. *Sustainability*. 13:6219. <https://doi.org/10.3390/su13116219>.
- Yue C, Behe BK. 2008. Estimating U.S. consumers' choice of floral retail outlets. *HortScience*. 43:764–769. <https://doi.org/10.21273/HORTSCI.43.3.764>.