Research Reports

Increased Knowledge about Floral Preservatives Influences Consumers' Perception of the Quality and Value of a Floral Arrangement Purchase

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SUMMARY. This research examines whether knowledge about floral preservatives increases consumers' perception of quality, purchase intention, and price of a floral arrangement. A survey was administered to 222 participants at two locations in Manhattan, KS. Seventy-three percent of respondents fell within Generation Y (18 to 30 years old). The survey instrument presented four levels of presentation of a floral arrangement that were associated with increasing knowledge about the use of floral preservatives on consumers' perceptions about the quality and price of that arrangement, as follows: Level 1 showed a photo of a floral arrangement without preservatives; Level 2 showed the same photo of a floral arrangement with a small, unlabeled packet of preservatives; Level 3 showed the same photo of a floral arrangement with a large, clearly labeled packet of preservatives; and Level 4 showed the same photos as Level 3 but was presented after a 191-word message describing the three functions of floral preservatives. Participants of the survey rated the quality of a floral arrangement higher from Level 2 (presence of floral preservatives not explicit) to Level 3 (presence of floral preservatives explicit) and from Level 3 to Level 4 (after reading a message about floral preservatives' function and effectiveness). Their intent to purchase the floral arrangement generally increased with each level of presentation. Females indicated intention to purchase flowers more frequently than males. Participants increased the price that they were willing to pay for the floral arrangement at each level of presentation, starting at \$25.46 at Level 1 (no floral preservatives use indicated) to \$29.19 at Level 4. Participants were more knowledgeable about the benefits of floral preservatives and believed that floral preservatives increased the value of floral arrangements after reading a message describing their function and effectiveness more so than before reading a message. The younger the respondent, the more willing they were to pay more for floral arrangements with floral preservatives. As consumers become more aware of the use of floral preservatives and more knowledgeable about how and why they are effective, they attribute higher quality to floral arrangements with preservatives, they are willing to pay more for arrangements with preservatives, and their purchase intention frequency increases. Florists should always use preservatives in their processing and construction of fresh floral arrangements, consider providing a message about the function and effectiveness of floral preservatives to their customers, and then market their use of these materials.

Floral preservatives are a mixture of ingredients added to the water of a fresh floral arrangement to increase the postharvest longevity of cut flowers and greens (Nowak and Rudnicki, 1990). Commercial floral preservatives contain a combination of compounds that provide a food source for fresh cut materials (carbohydrate) and reduce bacterial growth (antimicrobial agent) in the container's water (McDaniel, 1996). In the consumer trade, floral preservatives are frequently referred to as "floral food." Hydrators promote water uptake by reducing water pH via an acidifying agent (Dole and Wilkins, 2005).

Despite extensive evidence that appropriate use of floral preservatives extends postharvest longevity of most fresh flowers, their use by traditional full-service florists is variable (Coake, 2012). Given that 55% of the retail floral industry's revenue is comprised of fresh floral arrangement sales (First Research, 2010), consumers' beliefs and opinions about these products should be better understood.

In a study of consumer purchases of floral products in supermarkets, Behe et al. (1992a) determined that care and handling instructions and floral longevity were important product attributes for some demographic groups, such as "educated mothers." These researchers later reported that knowledge of postharvest care for cut flowers added value to a floral arrangement (Behe et al., 1992b). Similarly, Huang (2007) found that consumers emphasized floral longevity as important in purchases of floral products for themselves. Most recently, Yue et al. (2011) reported that most survey participants agreed that they "like the idea of knowing how long to expect cut flowers to last." Indeed, according to Gutman's means-end model (Gutman, 1982; Oppenheim, 1996), knowledge of postharvest care for cut flowers has the potential to add value to the floral arrangement for consumers, which is pertinent for florists seeking to increase price per transaction (Yue and Behe, 2008). In addition, consumer regret manipulates repurchasing habits of horticultural products (Dennis et al., 2004), and regret can be combated when floral products are sold with a "use of preservatives" guarantee.

The objectives of this study were to determine 1) if the presence of

floral preservatives or 2) if knowledge gained about the function and effectiveness of floral preservatives increases consumers' perception of quality, purchase intention, and price of a floral arrangement.

Materials and methods

SURVEY INSTRUMENT. A survey was designed to evaluate four levels of floral arrangement presentation relating the use of floral preservatives to consumers' perception of quality, purchase intention, and price of the same floral arrangement (Fig. 1). The first presentation level showed a photo of a floral arrangement without preservatives (Fig. 1A); the second presentation level showed the same photo of a floral arrangement with a small, unlabeled packet of preservatives (Fig. 1B); the third presentation level showed the same photo of a floral arrangement with a large, clearly labeled packet of preservatives (Fig. 1C); and the fourth presentation level showed the same photos as Level 3 but was presented after a 191-word message describing the three functions of floral preservatives (Fig. 1D). The survey was designed and formatted following guidelines by Dillman et al. (2009).

Each level of floral arrangement presentation (Levels 1 through 4) contained the same three questions, as follows: to rate the quality of the floral arrangement in the picture on that page on a 7-point Likert scale (scale of 1 to 7 with 1 = low quality and 7 = high quality); whether they would purchase the floral arrangement (yes or no); and what price they

would say the floral arrangement is worth (open-ended).

After respondents viewed Level 2, they were asked the open-ended question "what is the small packet in the picture?" After respondents viewed the Levels 3 and 4, they were asked five questions each time to assess their knowledge about floral preservatives, which were "to what extent do you think that using floral preservatives would make the flowers in a floral arrangement last longer?" (scale of 1 to 7 with 1 = zero days longer and 7 = several days longer); a quiz in response to "how do floral preservatives work?" with five multiple choice answer selections; "what is your level of knowledge about floral preservatives?" (scale of 1 to 7 with 1 = nothing to 7 = a lot); "where did you obtain your knowledge about floral preservatives?" with several multiple choice and an open-ended answer selections; and "do you think that using floral preservatives increases the value of a floral arrangement?" (scale of 1 to 7 with 1 = no increase in value and 7 = large increase in value). Finally, after completing Level 4, respondents were asked to answer a question about whether they would be willing to pay more for a floral arrangement with floral preservatives (yes or no) and, if yes, how much more; and a question about the frequency of their future floral purchases.

POPULATION SURVEYED. This research study was approved by the Institutional Review Board for Protection of Human Subjects at Kansas State University (KSU) before implementation. Based on Census Bureau data (U.S. Census Bureau, 2008a, 2008b, 2008c, 2008d), $\approx 13,000$ persons ranging in age from 20 to 24 years made up 28.8% of the overall population in Manhattan, KS; this percentage far exceeds any other generational group. The survey was administered to a sample of this population in the Manhattan, KS community: pedestrians shopping in a downtown retail district and pedestrians on the KSU campus. Both locations were outside of eating establishments. Passersby were asked if they would like to participate in the research. The survey respondents' characteristics of gender and age based on generational classification are described in Table 1.

The population sample recruited from the downtown retail district

included 101 respondents who were recruited between 11:00 AM and 2:00 PM on 1, 2, and 3 Apr. 2010. The respondents represented a diverse range of consumers that spanned a wide range of ages, defined as Generation Y [Gen Y (18 to 30 years old)], Generation X (31 to 44 years old), Baby Boomers (45 to 60 years old) and the Silent Generation (>60 years old); however, 73% of respondents were Gen Y (Table 1). Fifty-one percent of respondents from the business district location were female.

The population sample recruited from the KSU campus included 121 respondents. The specific location was outside a main entrance to the K-State Student Union on the Bosco Student Plaza. Respondents were recruited between 11:00 AM and 2:00 PM on 7, 8, and 9 Apr. 2010. Eighty-two percent of respondents were Gen Y (Table 1). This predominantly student population encompassed various educational majors (data not shown). Forty-four percent of respondents from the campus location were female. Respondents reported that they spent $\approx \$27.96$ (campus location, 108 respondents) to $\$36.70$ (business district location, 97 respondents) on their last floral purchase. A total of 28 respondents (15 from the downtown retail district and 13 from the KSU campus) were eliminated from the statistical analyses because of incomplete responses.

SURVEY ADMINISTRATION. All surveys were administered by the same Gen Y researcher. Participants signed an informed consent form. Participating in the survey was explained as follows: "During this survey, you will be asked to rate images of several different variations of the same floral arrangement. This project is research, your participation is completely voluntary, and you may stop participating at any time without explanation or penalty. The survey will take less than 7 minutes to complete, and you will receive a flower after completing it."

An eight-page questionnaire was attached to a clipboard and handed to a participant with the verbal and written instructions that they would be asked to rate several different variations of the same floral arrangement made from fresh cut flowers; they should answer each question in the order presented; and once a page was flipped, they should not return to it.

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A

B

C

D

A brief explanation about floral preservatives

Did you know that the small plastic packet that you receive with fresh flower purchases is floral preservatives? If you follow the instructions on the back of the packet, its use can increase the length of time that your flowers stay fresh from five to ten days compared to just putting them in plain water!

The Science: Floral preservatives are designed to accomplish three functions to result in extended fresh flower vase life:

1. They help minimize bacteria buildup in the water that can reduce water uptake by the flower stems and result in smelly water after a few days.
2. They provide the flowers with food (in the form of sugar). This is helpful because the flower stem has a very limited capacity to continue producing its own food via photosynthesis after it has been cut. Sugar also helps flowers to open fully.
3. They improve flowers' ability to absorb more water through the stem, which helps keep them from wilting.

Using floral preservatives extends the vase life of your fresh flower purchases so that you can enjoy them longer. Now you know!

Fig. 1. The survey instrument presented four levels of presentation of a floral arrangement that were associated with increasing knowledge about the use of floral preservatives on consumers' perceptions about the quality and price of that arrangement, as follows: (A) Level 1 showed a photo of a floral arrangement without preservatives; (B) Level 2 showed the same photo of a floral arrangement with a small, unlabeled packet of preservatives; (C) Level 3 showed the same photo of a floral arrangement with a large, clearly labeled packet of preservatives; and (D) Level 4 showed the same photos as Level 3 (C) but was presented after a 191-word message describing the three functions of floral preservatives.

An incentive of an orange-pink standard carnation (*Dianthus caryophyllus*) was provided to each respondent upon completion of the questionnaire. This incentive was useful in attracting participants but was neutral in terms of manipulating responses to the survey questions.

STATISTICS. Responses were subjected to within-subjects analysis of variance (ANOVA), post hoc Bonferroni tests, and *t* tests, as appropriate,

using SPSS (version 16.0; IBM Corp., Armonk, NY). Mean responses, SE, and SD are reported for key statistics. The format for presentation of F-test results is $F(df \text{ between}, df \text{ within}) = F \text{ result}; P < (\text{significance value})$. The format for presentation of *t*-test results is $t(df) = t \text{ result}, P < (\text{significance value})$. The format for presentation of regression results is $r(df) = \text{regression result}, P < (\text{significance value})$.

Table 1. Responses to questions from two locations that define respondents' characteristics of gender, age, and average dollar amount spent on their last floral purchase from a survey administered to evaluate how knowledge about floral preservatives influences consumers' perception of the quality and value of a floral arrangement purchase.

Respondent characteristic	Respondents at campus location [no. (%)]	Respondents at business district location [no. (%)]	All respondents [no. (%)] ^z
Gender			
Male	65 (55.6)	49 (48.5)	114 (52.3)
Female	52 (44.4)	52 (51.5)	104 (47.7)
Generational classification ^y			
Generation Y (18–25 years)	78 (68.4)	41 (41.8)	119 (56.1)
Generation Y (25–30 years)	16 (14.0)	20 (20.4)	36 (17.0)
Generation X (31–44 years)	11 (9.6)	18 (18.4)	29 (13.7)
Baby boomers (45–60 years)	6 (5.3)	12 (12.2)	18 (8.5)
Silent generation (>60 years)	3 (2.6)	7 (7.1)	10 (4.7)

^zRespondent numbers vary based on various inconsistencies in completing the survey questions.

^yRespondents replied to the question “what year were you born?” with an open-ended answer.

Results

QUALITY. Participants were asked to rate the quality of each floral arrangement on a scale from 1 = low quality to 7 = high quality. A mixed two-factor ANOVA with presentation level as a repeated measures factor and gender as a between-participants factor revealed a significant effect of presentation level [$F(3, 210) = 18.27, P < 0.001$, partial eta-squared = 0.21]. Bonferroni post hoc tests revealed that there was no difference between rated quality in the picture without preservatives [Level 1 (mean = 4.90, SE = 0.08)] and the picture with inexplicit presence of preservatives [Level 2 (mean = 4.94, SE = 0.08)]. Both were rated as being lower quality than the picture with explicitly labeled preservatives [Level 3 (mean = 5.10, SE = 0.07)]. However, the picture with explicitly labeled preservatives and a message about preservatives' function and effectiveness [Level 4 (mean = 5.34, SE = 0.08)] was rated as being of higher quality than Level 3 (Table 2). There were no main effects or interactions with gender.

PURCHASE INTENTION. Participants were asked “Would you purchase this floral arrangement?” at each level; 1 = yes and 0 = no as indicated by

Table 2. Change in quality rating, percent of respondents who would purchase, and price of a floral arrangement is worth over four levels, or a series of the same questions asked after respondent exposure to various treatment conditions, from a survey administered to evaluate how knowledge about floral preservatives influences consumers' perception of the quality and value of a floral arrangement purchase.

	Level 1 ^z Mean	Level 1 (no.)	Level 2 ^y Mean	Level 2 (no.)	Level 3 ^x Mean	Level 3 (no.)	Level 4 ^w Mean	Level 4 (no.)
Quality rating ^v								
All respondents	4.90	214	4.94	214	5.10	214	5.33	214
Mean separation ^u	c		c		b		a	
Female	4.99	102	5.00	102	5.17	102	5.45	102
Male	4.82	112	4.89	112	5.04	112	5.22	112
Would purchase (%) ^t								
All respondents	64	214	65	214	69	214	71	214
Mean separation	b		b		ab		a	
Female	71	101	73	101	74	101	78	101
Male	57	113	58	113	64	113	65	113
Price of a floral arrangement is worth (\$) ^s								
All respondents	25.46	213	26.90	213	27.79	213	29.19	213
Mean separation	d		c		b		a	
Female	25.09	102	26.45	102	27.50	102	29.13	102
Male	25.82	111	27.36	111	28.09	111	29.25	111

^zPhoto of floral arrangement with no floral preservatives.

^yPhoto of floral arrangement with small packet of floral preservatives inexplicitly leaning against vase.

^xPhoto of floral arrangement with large packet of floral preservatives with description explicitly stating “with floral preservatives mixed in water.”

^wPhoto of floral arrangement with large packet of floral preservatives with description explicitly stating “with floral preservatives mixed in water,” after brief 191-word message describing the three functions of floral preservatives.

^vLevels 1 to 4 the same question was asked “please rate the quality of this floral arrangement.” Answers were indicated on a scale of 1 (low quality) to 7 (high quality).

^uMean separation based on Bonferroni test, $\alpha = 0.05$.

^tLevels 1 to 4 the same question was asked “would you purchase this floral arrangement?” Answers were either “yes” or “no.”

^sLevels 1 to 4 the same question was asked “what price would you say this floral arrangement is worth?” Answers were open ended to allow indication of a dollar amount.

a checkmark. A mixed two-factor ANOVA with presentation level as a repeated measures factor and gender as a between-participants factor revealed a significant effect of presentation [$F(3, 210) = 4.20, P < 0.01$, partial eta-squared = 0.06]. Bonferroni post hoc tests revealed that there was no difference in purchase intention between the picture without preservatives [Level 1 (mean = 0.64, SE = 0.03)] and the picture with inexplicit presence of preservatives [Level 2 (mean = 0.65, SE = 0.03)]. However, purchase intention for both of these presentation levels was lower than that for the picture with explicitly labeled preservatives and a message about preservatives' function and effectiveness [Level 4 (mean = 0.71, SE = 0.03)]. In addition, the picture with explicitly labeled preservatives [Level 3 (mean = 0.69, SE = 0.03)] fell between Levels 1 and 2 and Level 4, but was not significantly different from the other conditions (Table 2). There were no interactions with gender, but there was a main effect of gender [$F(1, 212) = 5.25, P < 0.05$] such that females (mean = 0.74, SE = 0.04) intended to purchase flowers more than males (mean = 0.61, SE = 0.04).

Participants were asked how frequently they purchased flowers (1 = I have never purchased flowers, 2 = almost never, 3 = a few times a year or only for special occasions, 4 = about once a month, 5 = about once a week) before they had read any of the experimental materials. After reading all of the experimental messages, at the end of the survey, they were asked how frequently they anticipated purchasing flowers in the future (using

the same scale). Participants had a greater intention to purchase flowers at the end of the study (mean = 2.96, SE = 0.04) than at the beginning (mean = 2.81, SE = 0.04), [$t(214) = 4.57, P < 0.001$] (Table 3). There were no main effects or interactions with gender.

PRICE. Participants were also asked to rate the price they thought each floral arrangement was worth. A mixed two-factor ANOVA with presentation level as a repeated measures factor and gender as a between-participants factor revealed a significant effect of presentation level [$F(3, 209) = 21.48, P < 0.001$, partial eta-squared = 0.24]. Bonferroni post hoc tests revealed that all of the presentation levels were significantly different from one another. The rated price of the picture without preservatives [Level 1 (mean = \$25.46, SE = 0.80)] was less than that of the picture with inexplicit presence of preservatives [Level 2 (mean = \$26.90, SE = 0.85)], which was less than the picture with the explicitly labeled preservatives [Level 3 (mean = \$27.79, SE = 0.87)], which was less than the explicitly labeled preservative with a message about preservatives' function and effectiveness [Level 4 (mean = \$29.19, SE = 0.94)] (Table 2). As a point of reference, the arrangement was marketed on a national wire service website for \$39.99. There were no main effects or interactions with gender.

We did not specifically ask respondents how much they were willing to pay for the arrangements after each level, and one could argue that a person might say that an arrangement is worth more than they actually

would be willing to pay for it. To determine if, in fact, participants' own willingness to purchase the arrangement influenced their perceptions of worth, a series of t tests was performed that compared the rated perception of worth for the arrangement as perceived by those willing to purchase versus not willing to purchase the arrangement. In every case, participants who said they would purchase the arrangement rated it as also being worth more (means = \$27.51, \$28.49, \$29.22, and \$30.71, for Levels 1 through 4, respectively) than those who would not purchase the arrangement (means = \$21.91, \$24.02, \$24.54, and \$24.99 for Levels 1 through 4, respectively; t results = 3.44, 2.55, 2.54, and 2.82, respectively; all probability values are < 0.02). In addition, when a repeated measures ANOVA was performed on the rated perception of worth using just the participants who said that they would purchase the arrangement (those for whom their answer regarding the worth of the arrangement most clearly indicated the amount they were willing to pay for the arrangement; number = 131, or 63% of respondents), we replicated the results presented above and shown in Table 2. All of the comparisons were still significant. These two sets of analyses suggest that even though we asked participants how much the arrangement was worth after each survey level, the results likely mirror their willingness to pay.

Participants who thought that using floral preservatives increases the value of a floral arrangement said they would be willing to pay more for

Table 3. Change in frequency of floral purchase from beginning to end of a survey administered to evaluate how knowledge about floral preservatives influences consumers' perception of the quality and value of a floral arrangement purchase.

Question	Respondents selecting each rank [no. (%)]						Total respondents(no.)	Mean ^z
	Never	Almostnever	Special occasions	Few times a year	Once a month	Once a week		
Current frequency of flower purchase ^y								
All respondents	5 (2)	48 (22)	83 (38)	65 (30)	12 (6)	3 (1)	216	2.81
Female	2 (2)	24 (23)	43 (42)	27 (26)	5 (5)	2 (2)	103	2.82
Male	3 (3)	24 (21)	40 (35)	38 (37)	7 (6)	1 (1)	113	2.81
Anticipated frequency of flower purchase ^x								
All respondents	3 (1)	26 (12)	103 (48)	63 (29)	19 (9)	2 (1)	216	2.96
Female	1 (1)	11 (11)	52 (51)	28 (27)	10 (10)	1 (1)	103	2.99
Male	2 (2)	15 (13)	51 (45)	35 (31)	9 (8)	1 (1)	113	2.93

^zCoded as 1 = never purchased flowers, 2 = almost never, 3 = only for special occasions, 3 = a few times a year, 4 = about once a month, and 5 = about once a week. The t test for mean comparison between the two questions was borderline significant at $\alpha = 0.05$, $t(216) = 4.65, P = < 0.09$.

^yQuestion was "how frequently do you purchase flowers?" and was asked before respondent exposure to information about floral preservatives.

^xQuestion was "how frequently do you anticipate purchasing flowers?" and was asked after respondents read a message about floral preservatives and were exposed to the use of floral preservatives throughout four levels of presentation.

a floral arrangement with floral preservatives [$r(211) = 0.38$, $P < 0.001$] after Level 4, when they were specifically asked about willingness to pay. In addition, a significant negative correlation occurred between age and willingness to pay [$r(211) = -0.19$, $P < 0.006$]. The younger the respondent, the more willing they were to pay more for use of floral preservatives.

KNOWLEDGE. At the end of the second presentation level, when participants were asked to identify the packet inexplicitly shown in the photo, the majority of respondents (73%) identified the small packet as flower food or nutrients. Twelve percent believed that the packet was flower seeds, 6% responded “do not know,” and 7% provided other answers.

Respondents were asked to indicate where they obtained their knowledge of floral preservatives (Table 4). Before reading a message about the function and effectiveness of floral preservatives in Level 4, participants were also asked to rate their level of knowledge about floral preservatives after viewing Level 3 on a scale from 1 = I know nothing to 7 = I know a lot, as well as their belief concerning whether using floral preservatives increases the value of a floral arrangement on a scale from 1 = no increase in value to 7 = large increase in value. In general, before reading a message, participants did not appear to know much about preservatives (mean = 2.09, $SD = 1.20$); nor did they appreciate the value that their use added to a floral arrangement (mean = 3.47, $SD = 1.65$). However, the correlation between participants' rating of their knowledge concerning floral preservatives and their belief concerning whether using floral preservatives increases the value of a floral arrangement was borderline significant [$r(215) = 0.13$, $P < 0.07$].

To determine whether just describing the benefits of floral preservatives would influence participants' knowledge and beliefs concerning their use, participants were asked a set of questions both before (Level 3) and after (Level 4) reading a message describing preservatives' function and effectiveness. One question was a quiz, asking participants to indicate how floral preservatives worked by selecting from four possibilities: “provides a source of food for the flowers” (true); “minimizes bacteria build up in the water” (true); “kills insects on the flowers” (false); and “improves flowers' ability to absorb more water” (true). Answers correctly selected out of four were added together. Based on a t test, participants were more knowledgeable about the function and effectiveness of floral preservatives after reading a message (mean = 2.46, $SD = 1.40$) than before (mean = 2.06, $SD = 0.97$) [$t(217) = 4.39$, $P < 0.001$].

Participants were also asked to rate to what extent they thought that using floral preservatives would make the flower arrangement last longer (from 1 = zero days longer to 7 = several days longer) both before and after reading a message. In addition, the previously described question concerning whether preservatives increased the value of floral arrangements was also asked after participants read the description of floral preservatives. Based on a t test, participants believed that preservatives make floral arrangements last longer after reading a description (mean = 5.65, $SD = 1.33$) than before (mean = 4.77, $SD = 1.52$) [$t(217) = 8.92$, $P < 0.001$]. Before reading a message, a correlation analysis between participants' age and their results on the quiz about floral preservatives' function and effectiveness was not significant. Therefore, age was not related to the amount of

preexisting knowledge that participants exhibited.

VALUE. In relation to questions pertaining to value, participants believed that preservatives increase the value of floral arrangements after reading a message (mean = 4.03, $SD = 1.66$) than before (mean = 3.47, $SD = 1.63$) [$t(211) = 6.57$, $P < 0.001$]. Age did not influence whether respondents valued the use of floral preservatives in the floral arrangement.

Discussion

The survey structure, with four levels of presentation along with repetition of questions at each level, requires a warning of measurement called self-generated validity, which is the process of measurement-induced (increasing approval of subject matter) responses throughout a questionnaire (Feldman and Lynch, 1988). The self-generated validity theory explains that respondents participating in a survey relating to self-judgment of belief, attitude, intention, and behavior have a tendency to generate answers according to “social desirability, evaluation apprehension and sensitization to experimental treatments” (Feldman and Lynch, 1988). Self-generated validity is likely an issue with this study through at least Level 3. By Level 3, the participants had encountered the presentation of the labeled preservatives, but the higher ratings after reading a message in Level 4 are likely the result of the message. The improvement on the knowledge test question between these Levels 3 and 4 could not have been influenced by self-generated validity. The results of this study support this idea: explicitly stating that floral preservatives were used, and—separately—providing a message about their function and effectiveness, increased respondents' perceived

Table 4. Respondent source of knowledge about floral preservatives from two locations of a survey administered to evaluate how knowledge about floral preservatives influences consumers' perception of the quality and value of a floral arrangement purchase. Respondents may have marked more than one answer to the question “where did you obtain your knowledge about floral preservatives?”

Location	Respondents (no.)	Not knowledgeable	Respondents selecting each option (no.)							
			Florist	Instructions on floral preservative packet	Reference book, magazine, or online	Word of mouth	Female family member	Male family member	Work or school experience	Other
Campus	121	50	15	23	3	51	5	0	3	2
Business district	101	46	12	21	5	23	4	1	4	3
All respondents	222	96	27	44	8	74	9	1	7	5

quality, purchase intention frequency, and price of a floral arrangement.

Though participants in our survey generally lacked concrete knowledge about the benefits of floral preservatives, this did not cause them to disagree that floral preservatives were beneficial in increasing the longevity of a floral arrangement. These results are consistent with research performed by Behe et al. (1992b), which indicated that different sources of knowledge may influence the accuracy of knowledge about floral preservatives. The means-end model suggests that knowledge of floral preservatives' attributes produces links about floral arrangements for the consumer (Oppenheim, 1996). The means-end model also helps explain why respondents had a greater intention to purchase flowers at the end of the survey; the more consumers are exposed to a product and its benefits, the more favorable they feel toward it, resulting in increased purchase intention.

Reading a message about floral preservatives' function and effectiveness increased respondents' perceived quality, purchase intention frequency, and price of the floral arrangement more so than before they read the message. These results are supported by Behe et al. (1992b), in which knowledge of postharvest care for cut flowers added value to a floral arrangement. The idea to provide a message about the function and effectiveness of floral preservatives also augments the results of Yue et al. (2011) who report consumers' favorable response to the use of longevity labels on floral purchases.

Results indicated that all participants in the survey responded favorably to floral preservatives. Because 73% of the respondents were in Gen Y, we can extrapolate that this generation would respond favorably to marketing efforts that emphasized use of floral preservatives. Educating Gen Y about floral preservatives could potentially increase their appreciation for and interest in purchasing flowers.

Developing strategies to educate consumers is a component of offering high-quality customer service and products for horticultural businesses (Behe and Barton, 2000). Increasing consumers' knowledge about floral preservatives could be carried out in a variety of ways (Sellmer et al., 2003). However, in a direct approach, a retail florist business could distinguish

itself in the marketplace by marketing directly to its customers their use of floral preservatives, especially after focusing continued effort on educating their customers about proper care and handling of floral purchases to maximize postharvest longevity. A simple approach would be to briefly explain the benefits of floral preservatives and provide instructions on use at the end of most floral purchase transactions.

The results of this study suggest that as consumers become more knowledgeable about floral preservatives, they attribute higher quality to floral arrangements with preservatives, they are willing to pay more for arrangements with preservatives, and their purchase intention frequency increases. Many participants did not appreciate the benefits of floral preservatives before reading a message about their function and effectiveness. However, providing such a message increases consumers' appreciation of the role of floral preservatives on floral product quality and value. In tandem with the findings of Yue et al. (2011), information about floral preservatives could be combined with a floral longevity label. Florists should always use preservatives in their processing and construction of fresh floral arrangements, consider providing a message about the function and effectiveness of floral preservatives to their customers, and then market their use of these materials.

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