Journal of Agricultural and Applied Economics, 45,2(May 2013):229–242

Consumer Response to Point of Purchase Advertising for Local Brands

Alba J. Collart, Marco A. Palma, and Carlos E. Carpio

This study evaluates the effectiveness of a point of purchase advertising program conducted for two local horticultural brands in Texas. The results based on surveys gathered before and after the program was launched suggest that the campaign size was not sufficient to significantly increase brand awareness and overall demand, yet it increased willingness to pay by 5.5% for those consumers aware of one of the brands. A major factor found to increase willingness to pay and likelihood of brand awareness was purchase frequency measured in transactions per month, which suggests that other advertising methods aimed to increase buying frequency might affect demand more effectively.

Key Words: brand awareness, ornamental branding, point of purchase advertising, willingness to pay

JEL Classifications: D12, M31, Q13

Agricultural brands target consumers' desire for variety and stimulate financial growth of agribusiness companies through higher margins. Although the development of a brand name can be an expensive endeavor, it has gained increasing recognition as a marketing instrument to differentiate generic products in the horticultural industry (Nijssen and Van Trijp, 1998). Moreover, given the importance of promotion in differentiating a brand from its competitors, various studies in marketing research have focused on investigating how promotion affects consumer preferences toward branding.

In the United States, state-sponsored checkoff programs for single agricultural commodities (e.g., Florida citrus, Washington apples) have been around since at least the 1930s. More recently, broad-based advertising programs that collectively promote a group of agricultural products under a state brand (e.g., Arizona-grown, Jersey Fresh, Go Texan) have become widespread (Patterson, 2006). It is therefore not surprising that a plethora of studies has focused on evaluating the impact of generic advertising for food commodities (Alston, Freebairn, and James, 2001; Moore et al., 2009; Williams, Capps, and Palma, 2008; Williams, Capps, and Trang, 2010) as well as the effectiveness of broad-based advertising of food products marketed under state brands (Carpio and Isengildina-Massa, 2010; Govindasamy, Italia, and Thatch, 1998; Patterson et al., 1999).

Recent consumer interest for local products opened the door for the development of state-sponsored branding efforts for nonfood products. Brands of ornamental plants that have adapted to the movement of regional branding

Alba J. Collart is a doctoral candidate, and Marco A. Palma is an associate professor and extension economist, Department of Agricultural Economics, Texas A&M University, College Station, Texas. Carlos E. Carpio is an associate professor, School of Agricultural, Forest, and Environmental Sciences, Clemson University, Clemson, South Carolina.

We gratefully acknowledge financial support for this research from the Texas Department of Agriculture. We also acknowledge the helpful comments of anonymous referee reviewers.

include Florida Garden Select, Louisiana Select, Oklahoma Proven, Colorado Plant Select, Texas Superstar®, Earth-Kind®, among others. These statewide ornamental branding efforts seek to promote plants that best adapt to local weather and soil conditions while enhancing the profitability of green industry growers. Previous estimates suggest that the impact of these programs cannot be overlooked. Retailers of the Oklahoma Proven brand reported increases in sales of 228% as a consequence of this program (Anella, Schnelle, and Maronek, 2001). Mackay et al. (2001) also noticed that consumers returned to the stores based on previous purchases of Texas Superstar® and estimated that approximately $10 million in new plant sales were generated as a result of this program. In addition, these brands encourage a positive environmental impact from the use of suitable plants that require lower levels of water and pesticides.

Although numerous studies have been conducted to evaluate promotion effectiveness for food commodities, many questions remain regarding promotion effectiveness for brands in the ornamental sector. Given that states and industry organizations continuously invest in promotion of branded ornamentals, understanding the impact of advertising is beneficial to producers linked to the industry and to the state promoting the brand. Furthermore, firms often operate on limited marketing budgets and must choose between advertising channels to promote their brands. An examination of consumer response to Point-of-Purchase in-store advertising (POPA) can help brand managers adjust marketing channels and rationalize further investments.

This study considers an in-store POPA campaign of two statewide ornamental brands: Texas Superstar® (TS) and Earth-Kind® (EK). These brands were developed by scientists and extension specialists from the Texas A&M University System in conjunction with other state and private industry stakeholders of the Texas ornamental industry. Both brands consist of plant material that has been selected according to their adaptability to heat, drought, disease, insect tolerance, and other weather and soil local conditions. However, each brand offers different products to some extent. The TS brand includes plant material that ranges from roses to trees, whereas the EK brand includes roses and an environmental stewardship program (i.e., the EK challenge, plant selector, EK principles) that encourages the use of efficient, traditional, and organic gardening techniques.

In 2010, the Texas Department of Agriculture (TDA) launched an advertising campaign, which consisted of developing on-site promotional materials to include with TS and EK products at point-of-purchase locations in an effort to expand consumers' demand for the local brands. The promotional materials consisted of plant tags with information about the brands. The tags were distributed to growers, retailers, and wholesalers in Texas that carry the brands. Because the POPA did not include other forms of mass media advertising, it is of special interest to measure the effectiveness, if any, of this type of in-store advertising on consumer demand. The objectives of this study are to evaluate the effects of POPA on consumer preferences in terms of brand awareness and willingness to pay (WTP) and to identify behavioral and demographic determinants of consumer preferences for branded ornamental plants. By evaluating the effects of POPA on consumer preferences for ornamental brands, we contribute to the existing promotion literature in two ways. First, our focus on ornamentals helps to better understand consumer response to promotion efforts, because we may expect demand for ornamental products to behave differently than demand for agricultural food products. Moreover, the limited amount of research to date on promotion effectiveness of ornamentals has focused on aggressive media campaigns with no attention to smaller advertising programs that still require a sizable monetary investment.

Literature Review

A promotion program can shift demand, change price elasticity, or both. The type of demand response to promotion depends on the components of the program including the message being spread (e.g., basic publicity vs. real information), the type of products being

advertised (e.g., necessities vs. luxuries), and the size of the campaign and choice of advertising channels, among other factors. Johnson and Myatt (2006) showed that a message that merely publicizes a product's existence, price, and other features that are clearly valued by all consumers might increase demand, whereas a message that informs consumers of their personal match with the characteristics of a product might change price elasticity of demand. Also, a message containing both basic publicity and real information may involve a shift in demand and changes in price elasticity. With regard to the type of product, Rickard et al. (2011) evaluated commodity-specific advertising, which intends to promote a category of products (i.e., all types of apples), and broad-based advertising, which refers to the promotion of a group of products that may be substitutes or complements of each other (i.e., all fruits and vegetables). By applying the theoretical framework developed by Johnson and Myatt (2006), they showed that commodity-specific advertising will lead to an upward shift and more inelastic demand, whereas broad-based advertising will lead to an upward shift and more elastic demand.

According to Moore et al. (2009), quantifying the magnitude of such demand responses is more complex than to measure a potential increase in sales. Because factors other than promotion affect sales of a product, statistical methods need to account for all these factors to isolate the effects of promotion on demand. For instance, Rickard et al. (2011) estimated constant and random parameter Tobit models to evaluate WTP increases as a result of promotion activities.

Contrary to food, ornamental plants are selected on different quality differentiating attributes such as drought tolerance, light demand, pest vulnerability, color, etc. They are consumed because of the satisfaction consumers derive from their aesthetic characteristics and not to satisfy nutritional needs (Palma and Ward, 2010). Therefore, consumer responses to ornamental promotions may differ compared with traditional food products. Although many studies have analyzed the effectiveness of promotion on demand for food products, fewer studies have focused on floriculture and nursery crops. Most of the ornamental promotion literature has focused on the importance of a firm's choice of advertising channels and campaign size. Rimal (1998) analyzed the effects of generic and brand promotions on sales of fresh cut flowers in the United States and found that generic promotion efforts generated equal gains among all participating retail outlets, whereas brand promotion contributed to an increasing market share in particular outlets. Ort, Wilder, and Graham (1998) reported on the effectiveness of an extensive promotional campaign consisting of print and media advertising conducted by independent garden centers in North Carolina. They found that newspaper advertising for a specific plant produced the highest recall rates among consumers. More recently, Palma et al. (2012) quantified the effectiveness of firm promotion expenditures on sales of green industry firms accounting for firm size and types of advertising. Using cost–benefit analysis, they concluded that for small and medium firms, Internet-based advertising generates the highest returns of $5.90 and $7.50 in sales per $1 spent in advertising, respectively, whereas for large firms, mass media represents the most important advertising channel.

Thus far, no research has examined the impact of low-budget in-store advertising on consumer preferences for branded ornamentals. Understanding the reach of in-store promotions and the main behavioral and demographic factors determining consumer preferences for branded products can help ornamental firms evaluate their marketing mix, optimize their choice of advertising channels given their budget constraints, and target a more specific population of interest.

Data and Sample Weighting

Data regarding consumer perceptions of branding efforts and WTP were obtained through two electronic mail surveys administered to Texas consumers. The first survey was conducted in July of 2008, before the POPA program. From this sample of 800 individuals, approximately 34% were actual consumers of ornamental products; hence, the final number of usable

responses was 273 observations. The second survey was conducted in August 2010 after the program was finished and it consisted of a total of 259 observations. A random sample of 259 observations was taken from the first survey to balance the preprogram and postprogram observations. Moreover, to ensure that the two samples were equivalent in terms of demographic characteristics, each demographic stratum in the second survey (i.e., gender, age, income, etc.) was weighted with respect to the corresponding stratum in the first survey as follows:

$$(1) \qquad w_k = \frac{\%(Sub)Population_k}{\%Sample_k}$$

where the numerator indicates the percentage of stratum k in the population or subpopulation of interest and the denominator indicates the percentage of stratum k in the sample. Poststratification weighting improves comparability of the samples by ensuring that any changes measured in the statistical models are the results of the variables measured and not differences in the demographics of the two samples. The pre-POPA program sample and the weighted post-POPA program sample were pooled and used to estimate the models of brand awareness and WTP.[1] In all models, a dummy variable (POPA) is used to differentiate the preadvertising and postadvertising data (= 1 if postadvertising, zero otherwise). This variable serves to assess the change in the population mean WTP and brand awareness as a result of the advertising campaign. Table 1 provides a comparison of the survey demographics and the general Texas population.

[1] Similar random sampling and weighting procedures were used to obtain the samples used to estimate the models intended to explain the effect of the promotion program on WTP for TS and EK. Because the first survey contained a lower number of observations on WTP for both brands, the final samples had a total of 290 observations used to model WTP for EK and 268 observations used to model WTP for TS. Across all samples, the data were comparable to the overall Texas population. See Grooves et al. (2009) and Levy and Lemeshow (2008) for a theoretical treatment of survey weights.

Methods

The conceptual framework for this study is the Random Utility Theory. In this context, the consumer is rational and has a perfect discrimination capability. However, the analyst has incomplete information and uncertainty is taken into account. More specifically, the utility that individual i associates with choice j is described as:

$$(2) \qquad U_{ij} = V_{ij} + \varepsilon_{ij}$$

where V_{ij} is the deterministic component of utility and ε_{ij} is an independent and identically distributed (iid) random error unobserved to the researcher that reflects characteristics of the consumer or the products. For the individual ε is known, but for the analyst ε is an unobserved random variable with some density f_ε, which induces a density on U (Hanemann, 1984).

Using this framework, the utility obtained from consuming ornamental plants can be written as:

$$(3) \qquad U_{ik} = V_{ik}(x_k, s_i, y_i, POPA) + \varepsilon_{ik}$$

where x_k is a vector of ornamental products, s_i refers to consumer sociodemographic characteristics, y_i is income, and ε_{ik} is a random vector of consumer characteristics or ornamental plant features that are unobservable to the econometrician. Moreover, POPA is a level of advertising that is given by the firm to the consumer and affects consumer preferences (Becker and Murphy, 1993).

Brand Awareness Models

Thilmany et al. (2011) point out that assessing the effectiveness of promotional activities should note the effects of any shift on demand but also offer insights into the promotion methods that raise awareness and create demand. In modeling brand awareness, the individual is modeled as being aware or not of a certain brand instead of choosing one. Specifically, we model awareness of each brand as a function of the number of monthly transactions (TRAN), purpose of the purchase (PUR), post promotion on place dummy (POPA), and several sociodemographic characteristics, including

Table 1. Comparison of Demographic Variables from Samples Used and Texas Population

		Brand Awareness (n = 518)	EK Willingness-to-Pay (n = 290)	TS Willingness-to-Pay (n = 268)	Census[a]
Demographic Variables		Percentage	Percentage	Percentage	Percentage
Marital status	Married	62.0	62.8	61.2	51.5
	Not married	38.0	37.2	38.8	48.5
Gender	Male	48.1	45.1	46.6	49.6
	Female	51.9	54.9	53.4	50.4
Education	High school	11.7	13.2	9.8	46.0
	College	65.4	65.3	66.9	45.5
	Graduate school	23.0	21.5	23.3	8.5
Age (years)	Less than 39	35.2	31.3	31.3	59.0
	40–55	31.6	34.0	32.8	20.4
	Older than 55	33.2	34.7	35.8	20.6
Income	Under $25,000	15.8	18.6	16.4	24.8
	$25,000–50,000	30.1	29.0	28.4	25.4
	$50,001–75,000	20.8	14.5	17.9	18.2
	$75,001–99,999	13.5	14.5	14.9	11.8
	$100,000 and above	19.7	20.0	22.4	19.8

[a] Source: U.S. Census Bureau 2010, American Community Survey 2006–2010.
Note: n indicates sample size.
EK, Earth-Kind® ; TS, Texas Superstar® .

age, gender, marital status, income, education, and region (Table 2). Because the dependent variable is a binary variable indicating awareness of the brand, a Logit model was considered,[2] and the implications for the likelihood of awareness are interpreted in terms of odds ratios. The model specification for estimating the probability of brand awareness of the j brand (TS or EK) is given by:

$$
\begin{aligned}
AWARE_j = {} & \alpha_j + \beta_1 AGE2 + \beta_2 AGE3 \\
& + \beta_3 FEMALE + \beta_4 MARRIED \\
& + \beta_5 EDU2 + \beta_6 EDU3 + \beta_7 REG2 \\
& + \beta_8 REG3 + \beta_9 TRAN + \beta_{10} PUR \\
& + \delta INC2 + \gamma_{1j} POPA_j + \varepsilon_j
\end{aligned} \tag{4}
$$

where ε_j is assumed to follow a standard logistic distribution. The first hypothesis investigated by the brand awareness models is whether POPA advertising will increase the likelihood of brand awareness (i.e., $\gamma_{1j} > 0$).

[2] A two-stage model was also estimated for brand awareness and WTP to account for the potential endogeneity of brand awareness. The results suggested that brand awareness was not an endogenous factor and hence the models were estimated independently. These results are available from the authors on request.

Willingness-to-Pay Models

A rational individual is assumed to consume product j if the utility from this product is at least as great as the utility without the product. Following Rickard et al. (2011), the marginal value consumer i places on product $j = 1$, denoted as c_{ij}, is defined as the amount of income that leaves the consumer's utility at least as great with or without the consumption of j, that is:

$$
\begin{aligned}
& V_{ij=1}(x_1, z, s_i, y_i - c_{i1}, POPA) \\
& \quad + \varepsilon_{i1} \geq V_{ij=0}(x_0, z, s_i, y_i) + \varepsilon_{i0}
\end{aligned} \tag{5}
$$

By the random utility assumption, the consumer's WTP for j can be solved from the probability of individual i choosing j:

$$
\begin{aligned}
\Pr(x_{i1}) &= \Pr[V_{i1}(.) + \varepsilon_{i1} \geq V_{i0}(.) + \varepsilon_{i0}] \\
&= \Pr(WTP_{i1} \geq c_{i1})
\end{aligned} \tag{6}
$$

which implies that the consumer WTP has to be at least as great as the marginal value for the product; otherwise, the product is not consumed.

Different assumptions about the distribution of the stochastic portion of utility produce different choice models (McFadden, 1974). If ε is assumed to follow a double exponential distribution $(0, \sigma = \pi^2 \mu^2/3)$, where μ is the logit

Table 2. Description of Variables Used in the Econometric Analyses

Variable	Description
TSAWARE	Awareness of Texas Superstar® (= 1 if true and 0 otherwise)
EKAWARE	Awareness of Earth-Kind® (= 1 if true and 0 otherwise)
TSWTP	Mean WTP for Texas Superstar®
EKWTP	Mean WTP for Earth-Kind®
Sociodemographic characteristics	
AGE2	Age between 40 and 55 years old (= 1 if true and 0 otherwise)
AGE3	More than 55 years old (= 1 if true and 0 otherwise)
FEMALE	Gender is female (= 1 if true and 0 otherwise)
MARRIED	Marital status is married (= 1 if true and 0 otherwise)
INC2	Income level (=1 if income equal or above $50,000 and 0 otherwise)
EDU2	Education level (= 1 if college degree, and 0 otherwise)
EDU3	Education level (= 1 if graduate school, and 0 otherwise)
Consumer habits	
TRAN	Number of monthly transactions
PUR	Purpose of the purchase (= 1 if self-consumption and 0 otherwise)
POPA	Point of Purchase Advertising (= 1 if postadvertising and 0 otherwise)
Region	
REG2	Region: Central Texas (= 1 if true and 0 otherwise)
REG3	Region: South Texas (= 1 if true and 0 otherwise)
Dummy variables base levels	
AGE1	Age group of 39 years old or younger
INC1	Income group under $50,000
EDU1	Education level is high school or less
REG1	Region is North

scale parameter, and utility of the nonpurchased option is normalized to 1, the probability of consuming j becomes:

$$\Pr(WTP_{i1} \geq c_{i1}) = \Pr(x_{i1}) = \frac{\exp(V_{i1}/\mu)}{1 + \exp(V_{i1}/\mu)} \tag{7}$$

and after applying a logarithmic transformation on both sides of the odds ratio, we obtain:

$$\ln\left(\frac{\Pr(x_{i1})}{1 - \Pr(x_{i1})}\right) WTP_{i1} = V_{i1}/\mu \tag{8}$$

Finally, assuming utility is additive over its components, and normalizing $\mu = 1$ without loss of generality, the estimable equation can be written as:

$$V_{ij}(y_i, s_i, POPA, \varepsilon_{ij}) = \sum_l \beta_l s_{il} + \delta y_i + \gamma POPA + \varepsilon_{ij} \tag{9}$$

where β_l are the coefficients associated with l sociodemographic characteristics, δ is the coefficient associated with income, γ is the advertising coefficient and ε_{ij} is the iid error term. Based on Carpio and Isengildina-Massa (2010), if WTP elicitation is conducted before and after an advertisement campaign, the change in WTP (ΔWTP)measured by the advertising shock γ can be interpreted as the direct effect or shift in the demand curve as a result of the advertising campaign.

In all WTP models, the dependent variable is the average percentage price premium the consumer is willing to pay for the branded product over a regular unbranded plant and it ranges from 0% to 41%. Percentage premiums are used when trying to measure the premium across aggregate categories of products (Carpio and Isengildina-Massa, 2010). Because the mean WTP variable theoretically has a lower threshold of zero, a Tobit specification was used in all WTP models to account for left-censoring. In the first two models, explanatory variables include the number of transactions (TRAN), the purpose of the purchase (PUR), post promotion on place dummy (POPA), awareness of the

brand (TS-AWARE or EK-AWARE), and several demographic characteristics, including age, gender, marital status, income, education, and region (Table 2). The mean WTP for brand j (TS or EK) can be written as:

$$
\begin{aligned}
WTP_j^* = {} & \alpha_j + \beta_1 AGE2 + \beta_2 AGE3 \\
& + \beta_3 FEMALE + \beta_4 MARRIED \\
& + \beta_5 EDU2 + \beta_6 EDU3 + \beta_7 REG2 \\
& + \beta_8 REG + \beta_9 AWARE + \beta_{10} TRAN \\
& + \beta_{11} PUR + \delta INC2 + \gamma_{2j} POPA_j + \varepsilon_j
\end{aligned} \tag{10}
$$

$$
WTP_j = \max\left\{0, WTP_j^*\right\}
$$

where $\varepsilon_j \sim N(0,\sigma^2)$ and WTP^* is a latent variable that is observed for values greater than zero and censored otherwise. The second hypothesis investigated by the WTP models is whether POPA advertising will lead to a shift in overall demand for these products (i.e., $\gamma_{2j} > 0$).

The last two models were estimated for a subset of the sample that consisted of consumers aware of each brand. These models were estimated to isolate the effect of the POPA campaign for a specific group of consumers that has been found to be relevant in other evaluations of promotion effectiveness. For instance, Carpio and Isengildina-Massa (2010) found that only individuals previously aware of the South Carolina-grown promotion campaign expressed a change in preferences as a response to the campaign.

The conditional mean WTP for brand j (TS or EK) can be written as:

$$
\begin{aligned}
(WTP_j^* | AWARE = 1) = {} & \alpha_j + \beta_1 AGE2 \\
& + \beta_2 AGE3 + \beta_3 FEMALE \\
& + \beta_4 MARRIED + \beta_5 EDU2 \\
& + \beta_6 EDU3 + \beta_7 REG2 \\
& + \beta_8 REG + \beta_9 TRAN \\
& + \beta_{10} PUR + \delta INC2 \\
& + \gamma_{3j} POPA_j + \varepsilon_j
\end{aligned} \tag{11}
$$

$$
(WTP_j | AWARE = 1) = \max\left\{0, WTP_j^* | AWARE = 1\right\}
$$

where $\varepsilon_j \sim N(0,\sigma^2)$. The third hypothesis investigated by the conditional WTP models is whether POPA advertising will lead to a shift in demand by individuals aware of the brands (i.e., $\gamma_{3j} > 0$).

Results and Discussion

Texas Superstar® Brand Awareness Results

The Logit results for the TS brand awareness model are presented in Table 3. A likelihood ratio test of 32.05 ($p < 0.0014$) is an indication of the goodness of fit of this model. Moreover, approximately 438 of 498 (88%) of survey participants were correctly classified as either aware or unaware of the brand. The Hosmer and Lemeshow's test of goodness of fit for logistic regression yields a very large p value (0.87), indicating that the predicted frequency and observed frequency matched closely.

Results show no statistically significant influence of the POPA program on raising awareness of TS (i.e. $\gamma_{1,TS} = 0$), indicating that in-store POPA was not sufficient to impact consumer awareness. The results imply that consumers with high income, those with a graduate school degree, and those older than 55 years are approximately 1.5 times more likely to be aware of the TS brand, whereas an additional transaction makes a consumer approximately 1.2 times more likely to be aware of the TS brand.

These findings are consistent with the sociodemographic profile of ornamental consumers that Yue and Behe (2008) identified. They found that wealthier consumers were more likely to choose traditional freestanding floral outlets (i.e., nurseries and garden centers), where mean prices and expenditures per transaction are higher compared with other floral outlets such as box stores or general retailers. The main retail outlets for TS products are traditional freestanding floral outlets and to a lesser extent box stores or mass merchandisers (i.e., Home Depot, Lowe's). Hence, it is possible that wealthier consumers might be more likely to be aware of TS because they are more likely to visit the floral outlets where the majority of TS products are sold. Furthermore, high-income consumers may also be less sensitive to price premiums of branded ornamentals. With regard to education, consumers with graduate degrees might be more likely to be exposed to sources of information other than seeing the products at the marketplace. For example,

Table 3. Brand Awareness Parameter Estimates from Logit Model for the Local Brands

	Texas Superstar®		Earth-Kind®	
	Coefficient (SE)	Odds Ratio	Coefficient (SE)	Odds Ratio
Intercept	–1.7319*** (0.5208)		–1.3567*** (0.4943)	
AGE2 (40–55 years)	–0.3557 (0.2216)	0.7007	–0.1691 (0.2189)	0.8444
AGE3 (older than 55 years)	0.4385** (0.2222)	1.5504	0.2714 (0.2225)	1.3118
FEMALE	–0.8432** (0.3618)	0.4303	–0.5684 (0.3618)	0.5664
MARRIED	–0.3619 (0.3511)	0.6964	0.1001 (0.3548)	1.1052
INC2 (above $50,000)	0.3720** (0.1667)	1.4507	–0.3150** (0.1581)	0.7298
EDU2 (college degree)	–0.1767 (0.2380)	0.8381	–0.0808 (0.2148)	0.9224
EDU3 (graduate school)	0.3909* (0.2213)	1.4784	–0.3692 (0.2748)	0.6913
TRAN (number of transactions)	0.1826* (0.0939)	1.2003	0.1923** (0.0926)	1.2120
PUR (self-consumption)	–0.5232 (0.3920)	0.5926	–0.9426** (0.3774)	0.3896
POPA (point of purchase advertising)	0.4746 (0.2931)	1.6073	–0.3421 (0.3070)	0.7103
REG2 (central Texas)	0.1072 (0.1520)	1.1131	–0.0280 (0.1716)	0.9724
REG3 (south Texas)	0.1584 (0.3082)	1.1716	0.5375* (0.3072)	1.7117
Number of usable observations	498		498	
Log-likelihood full model (L_1)	–167.18		–155.85	
Likelihood ratio	32.05		25.92	
LR p value	0.0014		0.011	
McFadden's R^2	0.0875		0.0768	
Hosmer and Lemeshow's P value	0.87		0.45	
Percentage of correct predictions	87.95		89.16	

Note: *, **, *** indicate significance at $p < 0.1$, 0.05, or 0.01, respectively.
SE, standard error.

agricultural extension services of universities in Texas promote both brands through marketing displays at extension offices on campus. The expected positive relationship between brand awareness and frequency of purchase indicates that as consumers increase the number of monthly transactions and physically visit the stores, they are considerably more likely to become aware of the brands.

Results indicate that a female consumer is 43% less likely to be aware of the TS brand. The increasing use of landscaping contractor services by females may explain this relationship (Collart, Palma, and Hall, 2010). Another possibility is related to the floral outlets that females prefer and the outlets where TS are offered. Yue and Behe (2008) found that females preferred to buy ornamental products at general retailers (i.e., supermarkets) followed by box stores, yet most TS products are sold through traditional freestanding outlets and have been introduced only more recently into box stores. The propensity score indicates that there is a 9.8% probability that the average consumer in Texas is aware of TS.

Earth-Kind® Brand Awareness Results

The Logit results for the EK brand awareness model are presented in Table 3. A likelihood ratio test of 25.92 ($p < 0.011$) serves as an indicator of goodness of fit. This model compared with a naïve model with a 0.5 cutoff predicted 443 of 498 (89%) of the observations correctly as either aware or unaware of the brand. The Hosmer and Lemeshow's test for logistic regression yields a large p value (0.45), indicating that the model fits the data well.

Results indicate no statistically significant influence of the POPA program on consumer awareness of the EK brand, suggesting again that in-store promotion was not enough to affect brand awareness (i.e., $\gamma_{1,EK} = 0$). Contrary to the TS case, the relationship of the variable measuring income above $50,000 (INC2) was negative. It indicated that consumers with high

income are 73% less likely to be aware of EK. The negative relationship between awareness of EK and income appears consistent with consumers' choices of floral outlets. The main outlets for EK roses are box stores such as Wal-Mart and general retailers including supermarkets such as HEB. As income level decreases, consumers are more likely to choose box stores and general retailers as floral outlets because of lower prices. Thus, lower-income consumers might be more likely to be aware of EK because they are more likely to use the floral outlets where EK products are available. Also, high-income level citizens are increasingly contracting professional lawn care services (Hall, Hodges, and Haydu, 2006), possibly because they can afford to make more use of landscaping contractor services. In turn, these consumers may be less involved in the design of their landscape and therefore less likely to be familiar with the EK challenge, plant selector, the EK principles to design a sustainable landscape, or to actively participate in the educational component of EK.

The purpose of the purchase for self-consumption (PUR) also had a negative effect on awareness. Consumers whose purpose of purchase is self-consumption are approximately 39% less likely to be aware of EK products. This result suggests that ornamental consumers may be inclined to search for generic products that associate with lower prices when purchasing roses for self-consumption purposes and care more about differentiated products when purchasing roses for gifts. The number of transactions per month (TRAN) and the South Texas region (REG3) appeared to positively affect awareness of EK, implying that influencing the frequency of purchase significantly impacts brand awareness. Estimates suggest that a consumer located in South Texas is 1.7 times more likely to be aware of EK and that an additional transaction makes the consumer approximately 1.2 times more likely to be aware of EK. The propensity score indicates that there is an 8.8% probability that the average consumer in Texas is aware of the EK program, a value slightly lower than that for TS.

Overall results of the brand awareness models for both TS and EK show that in-store POPA did not have statistically significant effects on consumer awareness. Instead, the key outcomes that seem to influence awareness of local branded ornamentals are income level and frequency of buying. As the number of visits to a store increases, the chances of a consumer being aware of local brands promoted through POPA also increase.

Texas Superstar® Willingness-to-Pay Results

The parameter estimates for the WTP models for all respondents and respondents aware of each brand are presented in Table 4. The sigma parameter that refers to the estimated standard deviation of the residual shows a censoring of the data. The mean WTP is measured in percentage terms; thus, a positive marginal effect denotes a price premium for the brand over a regular plant, whereas a negative marginal effect denotes a price discount.

Results of the WTP model for TS for all respondents indicate no statistically significant influence of POPA or any demographic factors on WTP, indicating that in-store promotion did not affect consumer demand for ornamentals (i.e., $\gamma_{2,TS} = 0$). The self-consumption purpose of the purchase (PUR) had a negative relationship with WTP. Its marginal effect implies a price discount of 3.7% if the purpose of the purchase is self-consumption and a price premium of 3.7% if the purpose is a gift, which suggests a predisposition of consumers to save when purchasing branded ornamentals for self-use purposes. In contrast, the number of transactions per month (TRAN) and brand awareness (TS-AWARE) had a positive relationship. Notably, the variable with the highest effects on WTP was brand awareness; consumers aware of the TS brand are willing to pay a 4.5% price premium for TS-certified plants compared with regular unbranded plants. Consumers with an additional transaction per month are willing to pay a price premium for branded plants of 1% over nonbranded plants. Results show that the average consumer of ornamentals in Texas is willing to pay a price premium of 10.4% for TS plants over regular plants.

Furthermore, WTP for TS was also estimated for a subsample of ornamental consumers aware

Table 4. Willingness-to-Pay Parameter Estimates from Tobit Model for the Local Brands

	Texas Superstar®				Earth-Kind®			
	All Respondents		Aware Respondents		All Respondents		Aware Respondents	
	Coefficient (SE)	Marginal Effect	Coefficient (SE)	Marginal Effect	Coefficient (SE)	Marginal Effect	Coefficient (SE)	Marginal Effect
Intercept	0.1044*** (0.0277)		0.1360 (0.0815)		0.0853*** (0.0298)		0.1259** (0.0510)	
AGE2 (40–55 years)	–0.0022 (0.0095)	–0.0019	–0.0111 (0.0447)	–0.0101	–0.0060 (0.0097)	–0.0048	–0.0245 (0.0247)	–0.0235
AGE3 (older than 55 years)	–0.0081 (0.0098)	–0.0068	0.0160 (0.0466)	0.0146	–0.0123 (0.0103)	–0.0099	–0.0701*** (0.0238)	–0.0672
FEMALE	0.0082 (0.0173)	0.0069	–0.1136** (0.0550)	–0.1033	0.0247 (0.0179)	0.0199	–0.0711* (0.0388)	–0.0682
MARRIED	–0.0008 (0.0167)	–0.0007	0.0054 (0.0538)	0.0049	–0.0167 (0.0173)	–0.0134	0.0120 (0.0311)	0.0115
INC2 (above $50,000)	–0.0002 (0.0075)	–0.0002	–0.0385 (0.0276)	–0.0350	0.0071	0.0057	–0.0084	–0.0081
EDU2 (college degree)	0.0143 (0.0110)	0.0119	–0.0207 (0.0489)	–0.0188	0.0140 (0.0107)	0.0113	–0.0124 (0.0209)	–0.0119
EDU3 (graduate school)	–0.0128 (0.0098)	–0.0107	–0.0582** (0.0234)	–0.0529	–0.0083 (0.0110)	–0.0067	0.0003 (0.0239)	0.0003
TRAN (number of transactions)	0.0105** (0.0045)	0.0088	0.0578*** (0.0151)	0.0526	0.0148*** (0.0048)	0.0120	0.0282** (0.0108)	0.0271
PUR (self-consumption)	–0.0427** (0.0211)	–0.0371	–0.0564 (0.0566)	–0.0523	–0.0391* (0.0220)	–0.0327	–0.0460 (0.0339)	–0.0446
POPA (point of purchase advertising)	0.0021 (0.0137)	0.0018	0.0351 (0.0548)	0.0321	0.0004 (0.0144)	0.0003	0.0575* (0.0328)	0.0555
AWARE (brand awareness)	0.0520** (0.0205)	0.0453			0.0562*** (0.0201)	0.0475		
REG2 (central Texas)	–0.0041 (0.0071)	–0.0034	–0.0014 (0.0275)	–0.0013	0.0012 (0.0076)	0.0009	0.0099 (0.0173)	0.0095
REG3 (south Texas)	–0.0003 (0.0141)	–0.0003	0.0006 (0.0421)	0.0005	0.0024 (0.0146)	0.0020	0.0164 (0.0230)	0.0157
SIGMA	0.1062*** (0.0051)		0.1076*** (0.0137)		0.1145*** (0.0055)		0.0872*** (0.0093)	
Number of usable observations	259		39		278		45	
Likelihood ratio	22.59		24.5		34.43		31.49	
LR p value	0.0469		0.0174		0.001		0.0017	

Note: *, **, *** indicate significance at $p < 0.1$, 0.05, or 0.01, respectively.
SE, standard error.

of the TS brand (Table 4). Results show no statistically significant influence of the POPA program on WTP (i.e.,$\gamma_{3,TS} = 0$). However, female consumers aware of TS have a significant price discount of approximately 10.3% for this brand. The previous discussion of TS awareness indicated that females may have lower probability of awareness because of their choice of retail outlets, yet even females aware of the brand express a price discount, which exposes the importance of gender and retail outlet selection for marketing of this brand. Regarding the frequency of monthly transactions, an additional transaction by consumers aware of TS is estimated to increase the mean WTP by 5.3%, implying that purchase frequency plays a role not only in increasing the likelihood of awareness of TS, but also in inducing price premiums.

Earth-Kind® Willingness-to-Pay Results

Results of the WTP model for EK for all respondents indicate there were no significant effects of in-store promotion (i.e.,$\gamma_{2,EK} = 0$) or demographic factors, but once more, there were strong effects from the number of monthly transactions (TRAN), the purpose of the purchase (PUR), and brand awareness (EK-AWARE). The negative sign and significance of the variable that measured purpose of the purchase imply a price discount of 3.3% if the purpose of the purchase is self-consumption, which validates the propensity of consumers to save when purchasing branded plants for self-use. The positive estimate of frequency of purchase (TRAN) indicates that an additional transaction per month carries an increase of 1.2% in mean WTP for EK. As in the TS case, the variable with the highest effect on WTP was brand awareness (EK-AWARE); consumers aware of the EK brand are willing to pay a 4.7% price premium for EK roses compared with regular roses. Based on the econometric model estimates, the average consumer of ornamentals in Texas is willing to pay a price premium of 9.8% for EK roses, a lower but close estimate to the premium that consumers are willing to pay for TS products.

Results of the model examining WTP for a subsample of consumers aware of the EK brand (Table 4) show that, for this segment of the buying population, the POPA program effectively shifted demand for EK products (i.e.,$\gamma_{3,EK} > 0$). Despite being a low-cost in-store promotion, the program expanded demand for consumers that have been previously exposed to EK (Table 4). For those consumers, the magnitude of the increase in WTP is estimated to be approximately 5.5%. This model also supports a negative relationship between female consumers aware of branded ornamentals and WTP price premiums, that is, female consumers aware of EK have price discounts that reach 6.8%. Finally, frequency of purchase not only increases the likelihood of awareness of EK, but also induces price premiums in consumers aware of the brand; an additional transaction by aware consumers is estimated to increase mean WTP by 2.7%.

Industry Implications

Branding, only when combined with effective marketing, can help agribusiness firms develop awareness and increase price premiums that can lead to enhanced profitability. Results from this study suggest that in-store POPA was not sufficient to significantly increase brand awareness and total demand for local ornamental brands. However, a major factor found to increase both overall demand and likelihood of brand awareness was buying frequency, which suggests that other advertising methods aimed to increase buying intensity might affect demand more effectively.

Our findings indicated that female consumers are less likely to be aware of branding efforts such as TS and those aware expect price discounts. Also, consumers buying for self-use are willing to pay less for branded ornamentals. Previous studies in the literature have found that buyer frequency in ornamentals increased with females, self-use purchases, and in certain months of the year (Palma and Ward, 2010), which suggests that those consumers that do most floral transactions per household might be those that expect price discounts for branded ornamentals (i.e., females, self-use purchases).

This implies that if marketing managers would like to increase demand for branded ornamentals among those consumers willing to pay price premiums, they could personalize their marketing strategies to increase buying frequency among male consumers and those who buy only for special occasions. An increase in buying frequency could be accomplished through specific marketing tools such as loyalty programs or online retailing. Loyalty programs differ from other strategies by their emphasis on increasing repeat-purchase loyalty rather than only on gaining market share (Sharp and Sharp, 1997). Their impact on purchase behavior has led to an increasing popularity across industries, which has also resulted in the introduction of new currencies (e.g., frequent flyer miles, rewards points) that can lower consumers' perceived cost for a product (Dreze and Nunes, 2004). However, for a loyalty program to be a worthy investment that effectively increases buying intensity, it must be designed in a way that adds value to consumers. Online retailing can facilitate the purchase of products by consumers who spend large amounts of time on the Internet and by time-constrained consumers (Bellman, Lohse, and Johnson, 1999). In online retailing, aspects such as an easy returns process have been shown to positively influence repurchase behavior (Griffis et al., 2012).

Another factor that had a strong effect in consumer WTP was brand awareness. Marketing efforts aimed to increase buying frequency likely increase the level of consumer awareness and WTP; as consumers make more transactions and visit the stores, they are more likely to be exposed to in-store promotion and to become aware of ornamental brands, which influence their WTP. However, increasing brand awareness through other types of advertising also has a direct effect on WTP. For instance, because consumers with less discretionary time are turning to the Internet to search for product information and to make purchases, social media is playing an increasingly important role as a source of information with the advantage that it can be easily tailored to the population of interest at a low cost. Our estimates suggest that once consumers are aware of a brand, in-store promotion might help boost demand.

Consumer income also had a significant effect on brand awareness. Consumers with relatively high income (above $50,000) are more likely to be aware of branded ornamentals sold at traditional freestanding floral outlets, where average prices are higher, but less likely to be aware of ornamental brands sold at general retailers that include products and educational components. This implies that marketers need to tailor their communications intended to spread brand awareness not only to the product being offered, but also to consumers' demographics and their preferred floral outlets.

Summary and Conclusions

This study analyzed the effects of a low-cost POPA program launched for the local brands TS and EK on brand awareness and WTP. The study used two electronic surveys conducted in Texas, before and after POPA, to study the main factors affecting consumer preferences. Exposure to the POPA did not have significant effects on overall consumer demand. Instead, consumer habits of purchase including brand awareness, the purpose of the purchase, and the number of transactions had the largest effects on WTP. We identified a price discount for both brands when the purpose of the purpose is self-use and price premiums when the purpose is a gift and with marginal increases in the number of transactions.

The POPA program shifted demand solely for a subpopulation of consumers that have been previously exposed to the EK brand (i.e. $\gamma_{3,EK} > 0$). Given that the consumer is already aware of EK, the presence of the POPA induces a price premium of approximately 5.5%. These conditional models also evidenced a negative relationship between females and WTP. The number of transactions positively affected the likelihood of awareness of branded ornamentals and induced price premiums in respondents aware and nonaware of TS and EK. With regard to brand awareness, consumers with relatively high income (above $50,000) are expected to be more likely to be aware of TS but less likely to be aware of brands with educational components such as EK. Moreover, older and more educated consumers are more likely to be aware

of TS, whereas females have a lower likelihood of awareness. Self-use purchases had a significant negative effect on awareness of EK, whereas the South Texas region had a positive effect on awareness of this brand. Also, an increasing buying frequency consistently increased awareness of both brands.

These results must be interpreted with caution because other exogenous factors may have played a role in promotion effectiveness. The lack of significance of the POPA parameter suggests that in-store promotion did not have an effect on brand awareness or WTP for the overall population. However, the value of this parameter measured the difference in the population WTP between the 2008 and 2010 periods; hence, it might also account for other exogenous factors. Particularly, the economic recession of 2009 may have had an effect in consumer spending in ornamental goods despite advertising efforts by firms and represent a limitation to our findings. In addition, because a stated preference method was used to elicit consumer valuations of branded ornamentals, our WTP measures may be an overestimate of consumers' true WTP. However, the same elicitation method was used to assess WTP before and after the advertising campaign, and we focused on the difference in WTP as a result of in-store promotion rather than the actual level of WTP. Recent literature that has also made use of stated preference methods include Tonsor and Wolf (2012), who administered an online survey to US consumers to collect stated WTP for milk attributes, and Holmquist, McCluskey, and Ross (2012) who used hypothetical contingent valuation to elicit WTP for wine attributes. In contrast, the use of revealed preference methods may provide gains in accuracy of valuation estimates, yet even in nonhypothetical settings factors such as participatory fees, bid affiliation, and zero bidders can potentially introduce bias into the valuations (Lusk and Hudson, 2004).

The results of this study provide insights into the effectiveness of in-store advertising for local branded ornamentals in terms of brand awareness and WTP. The profile of ornamental consumers identified in this study can be helpful in the design of future marketing strategies aimed to increase buying frequency, which was found to effectively increase brand awareness and WTP for branded ornamentals.

[Received April 2012; Accepted November 2012.]

References

Alston, J.M., J.W. Freebairn, and J.S. James. "Beggar-thy-Neighbor Advertising: Theory and Application to Generic Commodity Promotion Programs." *American Journal of Agricultural Economics* 83(2001):888–902.

Anella, L.B., M.A. Schnelle, and D.M. Maronek. "Oklahoma Proven: A Plant Evaluation and Marketing Program." *HortTechnology* 11(2001): 381–84.

Becker, G.S., and K.M. Murphy. "A Simple Theory of Advertising as a Good or Bad." *The Quarterly Journal of Economics* 108(1993):941–64.

Bellman, S., G.L. Lohse, and E.J. Johnson. "Predictors of Online Buying Behavior." *Communications of the ACM* 42(1999):32–38.

Carpio, C.E., and O. Isengildina-Massa. "To Fund or Not to Fund: Assessment of the Potential Impact of a Regional Promotion Campaign." *Journal of Agricultural and Resource Economics* 35(2010):245–60.

Collart, A.J., M.A. Palma, and C.R. Hall. "Branding Awareness and Willingness-to-Pay Associated with the Texas Superstar™ and Earth-Kind™ Brands in Texas." *HortScience* 45(2010):1226–31.

Dreze, X., and J.C. Nunes. "Using Combined-Currency Prices to Lower Consumers' Perceived Cost." *JMR, Journal of Marketing Research* 41(2004):59–72.

Govindasamy, R., J. Italia, and D. Thatch. "Consumer Awareness of State Sponsored Marketing Programs: An Evaluation of the Jersey Fresh Program." *Journal of Food Distribution Research* 29(1998):7–15.

Griffis, S.E., S. Rao, T.J. Goldsby, and T.T. Niranjan. "The Customer Consequences of Returns in Online Retailing: An Empirical Analysis." *Journal of Operations Management* 30(2012):282–94.

Grooves, R.M., F.J. Fowler Jr., M.P. Couper, J.M. Leprowski, E. Singer, and R. Tourangeau. *Survey Methodology*. Hoboken, NJ: John Wiley & Sons, 2009.

Hall, C.R., A.W. Hodges, and J.J. Haydu. "The Economic Impact of the Green Industry in the United States." *HortTechnology* 16(2006):1–9.

Hanemann, W.M. "Discrete/Continuous Models of Consumer Demand." *Econometrica: Journal of the Econometric Society* 52(1984):541–62.

Holmquist, C., J. McCluskey, and C. Ross. "Consumer Preferences and Willingness to Pay for Oak Attributes in Washington Chardonnays." *American Journal of Agricultural Economics* 94(2012):556–61.

Johnson, J.P., and D.P. Myatt. "On the Simple Economics of Advertising, Marketing, and Product Design." *The American Economic Review* 96(2006):756–84.

Levy, P.S., and S. Lemeshow. *Sampling of Populations: Methods and Applications*. Hoboken, NJ: John Wiley & Sons, 2008.

Lusk, J.L., and D. Hudson. "Willingness-to-Pay Estimates and Their Relevance to Agribusiness Decision Making." *Review of Agricultural Economics* 26(2004):152–69.

Mackay, W.A., S.W. George, T.D. Davis, M.A. Arnold, R.D. Lineberger, J.M. Parsons, L.A. Stein, and G.G. Grant. "Texas Superstar and the Coordinated Educational and Marketing Assistance Program (CEMAP): How We Operate." *HortTechnology* 11(2001):389–91.

McFadden, D. "Conditional Logit Analysis of Qualitative Choice Behavior." *Frontiers in Econometrics*. P. Zarembka, ed. New York, NY: Academic Press, 1974.

Moore, E.D., G.W. Williams, M.A. Palma, and L. Lombardini. "Effectiveness of State-Level Pecan Promotion Programs: The Case of the Texas Pecan Checkoff Program." *HortScience* 44(2009):1914–20.

Nijssen, E.J., and H.C.M. Van Trijp. "Branding Fresh Food Products: Exploratory Empirical Evidence from The Netherlands." *European Review of Agriculture Economics* 25(1998):228–42.

Ort, J., B. Wilder, and J. Graham. *Economic and Socioeconomic Factors Affecting Consumer Purchases of Fall Nursery Products.* Raleigh, NC: North Carolina Cooperative Extension Service, North Carolina Association of Nurserymen, and North Carolina Department of Agriculture and Consumer Services, Pub. No. 15, 1998.

Palma, M.A., C.R. Hall, B. Campbell, H. Khachatryan, B. Behe, and S. Barton. "Measuring the Effects of Firm Promotion Expenditures on Green Industry Sales." *Journal of Environmental Horticulture* 30(2012):83–88.

Palma, M.A., and R.W. Ward. "Measuring Demand Factors Influencing Market Penetration and Buying Frequency for Flowers in the U.S." *International Food and Agribusiness Management Review* 13(2010):65–82.

Patterson, P.M. "State-Grown Promotion Programs: Fresher, Better?" *Choices Magazine* 21(2006):41–46.

Patterson, P.M., H. Olofsson, T.J. Richards, and S. Sass. "An Empirical Analysis of State Agricultural Product Promotions: A Case Study on Arizona Grown." *Agribusiness* 15(1999):179–96.

Rickard, B.J., J. Liaukonyte, H.M. Kaiser, and T.J. Richards. "Consumer Response to Commodity-Specific and Broad-Based Promotion Programs for Fruit and Vegetables." *American Journal of Agricultural Economics* 93(2011):1312–27.

Rimal, A.P. "Effect of Generic and Brand Promotions of Fresh Cut Flowers on the Use of Retail Flower Outlets." PhD dissertation, University of Florida, Gainesville, FL, 1998.

Sharp, B., and A. Sharp. "Loyalty Programs and Their Impact on Repeat-Purchase Loyalty Patterns." *International Journal of Research in Marketing* 14(1997):473–86.

Thilmany, D., M. Sullins, M. Phillips, and A. Gunter. "Cost Effective Promotion for Local Foods and Direct Markets: Evaluation of Colorado's Technical Assistance for Local Food Supply Chains." *Journal of Agribusiness* 29(2011):23–40.

Tonsor, G.T., and C.A. Wolf. "Effect of Video Information on Consumers: Milk Production Attributes." *American Journal of Agricultural Economics* 94(2012):503–508.

Williams, G., O. Capps, and M.A. Palma. "Effectiveness of Marketing Promotion Programs: The Case of Texas Citrus." *HortScience* 43(2008): 385–92.

Williams, G., O. Capps, and T. Trang. "Does Lamb Promotion Work?" *Agribusiness* 26(2010): 536–56.

Yue, C., and B.K. Behe. "Estimating U.S. Consumers' Choice of Floral Retail Outlets." *HortScience* 43(2008):764–69.