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How do pricing and the representation of price affect consumer evaluation of nursery products? A conjoint analysis

RESEARCH ARTICLE

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Abstract

This study investigates how pricing and the representation of price (location of price sign, area of price number on price sign, extrinsic cue on price sign) influence consumer evaluation of nursery products. An incomplete orthogonal set of levels for each factor was used in a 3^5 factorial conjoint analysis. A web-based survey was conducted in March 2015. The results show the four factors account for 50.24% of the variance in plant preference, the other factor (plant type) accounts for the remaining 49.76%. Relative importance decreases from price level (16.15%) to cue (12.27%) to area (11.04%) and location (10.79%). Consumer's purchase intention varies by demographics. The price level-purchase intention relationship also depends on cue. Benefit cue is more likely to offset the adverse effect of a price increase on purchase intention than feature cue, and the price level-purchase intention relationship for plants with feature/benefit cue appears to be inverted U shape.

Keywords: nursery product, pricing, representation of price, perceived value, conjoint analysis
JEL code: D03, M31, Q13

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1. Introduction

Although the green industry has grown slowly in recent years, it remains an important contributor to national, state, and local economies. In 2013, it contributed 0.72% of US gross domestic product and 1.11% of total workforce employment (Hodges *et al.*, 2015). US garden retailers have been facing growing competition from mass merchandisers entering the garden market during the last two decades (IBISWorld, 2015). Meanwhile, the nursery industry as a whole was confronted with consumers having an increasing number of alternatives for their discretionary spending other than purchasing plants. Additionally, the population aged 50 and over, the industry's largest market, grows slowly (Colby and Ortman, 2015).

So far, extensive research efforts have made to better understand consumers and their attitude and purchase behavior with nursery products. Researchers have investigated consumer preferences for the price and intrinsic attributes of the plant (Behe *et al.*, 1999; Brascamp, 1996; Kelley *et al.,* 2001; Mason, *et al.,* 2008; Wollaeger *et al.,* 2015) and the container (Kelley *et al.*, 2001; Nambuthiri *et al.,* 2015). Researchers also have examined the variation of preferences by the characteristics of the consumer (Behe *et al.*, 2014, 2015, 2016). However, other than price level, only limited research has investigated the relevance of marketing factors such as branding (Behe *et al.*, 2016; Collart *et al.,* 2010), in consumer evaluation of nursery products.

Lack of this stream of literature, coupled with a long-standing need by retailers for this information, may contribute to the relatively slow growth of the nursery industry during the last decade. For this reason, the goal of the current study is to provide marketing professionals with insight and nursery retailers with information that improves the perceived value of nursery products. We hypothesize that perceived value of nursery products is a function of pricing, the representation of price, and the intrinsic attributes of the plant. We use a conjoint methodology to quantify the relative importance of these factors and attributes. This information will help producers decide whether to invest in product improvements (intrinsic attributes) or in marketing (extrinsic cues) to improve value perceptions. We also postulate that perceived value of nursery products may vary by the demographic characteristics of the consumer, such as age and/or gender. Furthermore, we investigate the potential interactions between marketing and consumer factors.

2. Conceptual framework and hypotheses development

2.1 Perceived quality

A model first proposed by Dodds and Monroe (1985), and then improved by Zeithaml (1988), is adapted to ground our hypotheses (Figure 1). Early authors used the word 'quality' to refer to explicit features (i.e. properties or characteristics) of an object as perceived by a subject (e.g. Russell, 1912). This tendency to infer quality from specific attributes was termed as 'surrogate-based preference forming behavior' (Olshavsky, 1985). Attributes that signal quality were dichotomized into intrinsic and extrinsic cues (e.g. Hersleth *et al.,* 2015; Szybillo and Jacoby, 1974). Intrinsic cues refer to the physical attributes of the product. In a plant, intrinsic cues would include such attributes as flower or leaf color, plant or leaf shape, and growing condition. A plant producer cannot change the intrinsic attributes without changing the nature of the product. We use plant type as a proxy for all of the intrinsic attributes of the plant in the current study. Extrinsic cues are related to the product physically. In other words, they are exogenous to the product. For example, brand, safety certification and origin are all extrinsic cues (Grunert *et al.,* 2015).

H1: Consumer's purchase intention (PI) is related to the plant type of the plant.

Under conditions of imperfect information, consumers may perceive price to be a signal of inherent product quality. The price-perceived quality relationship has received much attention in behavioral price research (Somervuori, 2012). Nevertheless, the relationship has not been made clear yet (Boyle and Lathrop, 2009; Monroe and Krishnan, 1985; Monroe *et al.*, 2015). An increasing number of researchers have recognized that the price-perceived quality studies should focus on the conditions under which price information is

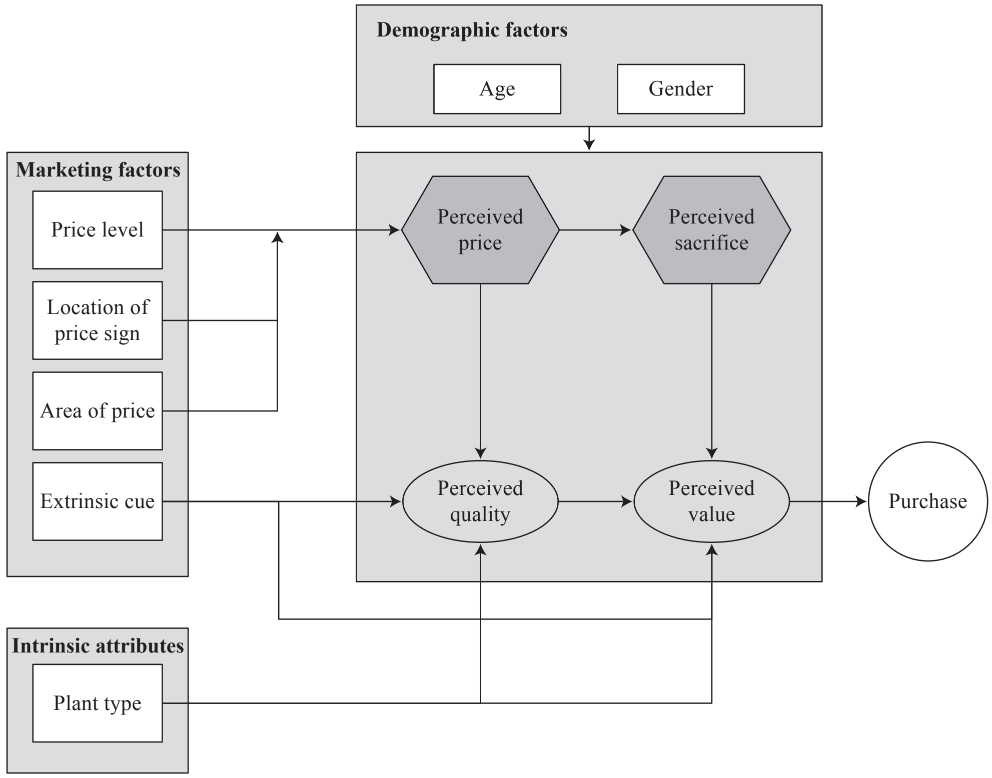

Figure 1. The determinants of perceived value and purchase intention.

likely to signal quality (Lalwani and Forcum, 2016; Olshavsky, 1985; Peterson and Wilson, 1985). There exist three types of factors affecting the use of price as a quality signal.

First, the price-perceived quality relationship may vary by product category. In categories with small price variation among products, the consumer may not attribute higher quality to products that cost only a few dollars more than those of competitors. Similarly, in categories with small quality variation among brands, price may be deemed only as a kind of loss or sacrifice, whereas in categories with significant quality variation among brands (such as cellular phones), price may function also as a signal to quality (Monroe and Krishnan, 1985).

H2: Consumer's PI is negatively related to the price level of the plant.

Second, the price-perceived quality relationship may vary by the characteristics of the consumer. One such characteristic is the price awareness of the consumer: a consumer who does not know the reference prices in the market obviously is unable to use price to infer quality (Cheng and Monroe, 2013). Another characteristic is consumer's knowledge about the product (Lambert, 1972). If a consumer has not enough product knowledge to judge the variation in quality, he may tend to use price and other extrinsic cues. Lalwani and Forcum (2016) showed that consumers high (vs low) in power distance belief have a greater tendency to use price to judge quality because they have a greater need for structure, which makes them more likely to discriminate between products and rank them based on price.

Third, other information available to the consumer may moderate the price-perceived quality relationship. When other intrinsic and extrinsic cues to quality, such as the colors, brand names and advertisement, are highly accessible, the consumer may be more likely to use those cues than price (Monroe and Krishnan, 1985).

H3: The extrinsic cue and price level have an interactive effect on consumer's PI.

H3.1: Consumers are more likely to purchase low priced plants than medium and high priced plants when there are no highly accessible extrinsic cues.

H3.2: Consumers are as likely to purchase low priced plants as medium and high priced plants when there are highly accessible extrinsic cues.

Which type of cue is more important in signaling quality to the consumer? While allocating limited resources to improve consumer perception of quality, producers and retailers face two alternatives: investing in product improvements (intrinsic cues) or in marketing efforts (extrinsic cues). Therefore, an answer to this question would help them make the more effective decision. However, extant research shows conflicting evidence of the importance for intrinsic (Acebrón and Dopico, 2000; Darden and Schwinghammer, 1985) and extrinsic cues (Richardson *et al.,* 1994; Sawyer *et al.*, 1979). Zeithaml (1988) indicated that consumers depend on intrinsic cues more than extrinsic cues under pre-purchase circumstances when intrinsic cues are search attributes (rather than experience attributes), and consumers depend on extrinsic cues more than intrinsic cues under initial purchase circumstances when intrinsic cues are not accessible. In most cases, plant type is both an accessible and a search attribute for consumers shopping at the garden market.

H4: The plant type is the most important factor that determines consumer's PI.

2.2 Perceived value

Figure 1 delineates that perceived value mediates the relationship between quality and purchase. As Olshavsky (1985) suggested, not all consumers want to buy the highest quality item in every category. Instead, quality appears to be factored into the implicit or explicit valuation of a product by many consumers (Zeng *et al.*, 2011). A given nursery product may be of high quality, but if the consumer does not want the product, does not have enough money to buy it, or does not want to spend the amount required, its value will not be perceived as being as high as that of a nursery product with lower quality but a more affordable price. In other words, consumers may obtain more value from the lower quality plants because the low costs compensated for the reduction in quality.

Zeithaml (1988) defined perceived value as 'the consumer's overall assessment of the utility of a product based on perceptions of what is received and what is given.' According to this definition, value perception involves a tradeoff between the benefit and cost components to get a product (Dan, 2008; Zeng *et al.*, 2011). The benefit components include important intrinsic attributes, extrinsic attributes, perceived quality, and other relevant high level abstractions. The cost components of perceived value refer to the perceived price and sacrifice (Völckner, 2008).

Some intrinsic attributes of nursery products, other than those signaling quality, could provide value to consumers. For instance, flavor is one important intrinsic attribute for edible plant (e.g. cilantro). Most food preparers know which flavors of edible plants their family would eat; only those flavors were considered to be acceptable to the family and therefore to have value. In addition to perceived quality and these intrinsic attributes, other higher level abstractions contributed to perceptions of value. An important higher level abstraction for plant is convenience. Some consumers do not want to water and take care of the plants very often. For this reason, cactus would add more value than begonia. These intrinsic and extrinsic lower level attributes add value through the higher level abstraction of convenience.

Extrinsic attributes often serve as 'value signals' and can substitute for active tradeoff between benefits and costs (Richardson *et al.*, 1994). To judge from the nursery product category, cognitive resources of the consumer are limited. Therefore, we conjecture that rather than carefully having tradeoff between costs and benefits, most consumers tend to use cues, often extrinsic cues (signals such as 'need little care and water,' 'color all the summer'), in value perceptions.

H5: Consumer's PI is related to the extrinsic cue of the plant.

H5.1: Consumers are more likely to buy the plant with intrinsic attributes printed on its price sign (feature cue) than without.

H5.2: Consumers are more likely to buy the plant with higher level abstractions printed on its price sign (benefit cue) than without.

2.3 Objective price, perceived price and sacrifice

Figure 1 depicts the compositions of price: objective pricing (the actual price level) of a plant, perceived price and sacrifice of consumers. According to Jacoby and Olson (1977), the price perceived by consumers is often not the objective price. For instance, some consumers may note that the price of begonia is exactly $1.99 for a container, but others may perceive the price only as 'cheap' or 'expensive'. Still others may not notice the price at all. From the consumer's perspective, some scholars in the pricing field conceptualized the price as 'what is given up or sacrificed' to acquire a product (Monroe and Krishnan, 1985).

A growing body of research supports this difference between objective and perceived price (Allen *et al.,* 1976; Gabor and Granger, 1961). Studies show that consumers are not always aware of the actual price of a product. Instead, they perceive price in ways that are relevant to themselves (Zeithaml, 1982, 1984). Levels of consumer attention, awareness, and knowledge of prices appear to be considerably lower than necessary for consumers to have accurate internal reference prices for many products (Cheng and Monroe, 2013; Dickson and Sawyer, 1986). Zeithaml and Berry (1987) revealed that price awareness varies by demographics, consumers who are female, married, older, and unemployed have the highest levels of awareness. Consumer attention to price is likely to be higher for expensive, durable goods and services than for cheap goods and services.

An additional factor contributing to the gap between actual and perceived price is the representation of price. An increasing number of marketing researchers have been investigating this issue (Monroe, 2003; Thomas and Morwitz, 2009). For example, research has revealed how the digital sequence in a price affects consumer evaluation of the price via a left-digit anchoring effect (Thomas and Morwitz, 2005), right-digit effect (Coulter and Coulter, 2007), or price precision effect (Thomas *et al.,* 2010). Researchers also have shown how fonts affect consumer evaluation of price, whether in larger or smaller sizes (Coulter and Coulter, 2005) or in different colors (Puccinelli *et al.,* 2013). Other researchers have indicated that perceived price is a function of the display location of the sale price relative to the original price, displaying the smaller sale price to the right (vs left) to the original price makes consumers easier to initiate the subtraction task, a phenomenon they refer to as the 'subtraction principle' (Biswas *et al.,* 2013).

The space-based approach to visual attention assumes that, the probability of sampling features will be highest near the center of the item and drop off exponentially as distance from the center of the item increases (Van Oeffelen and Vos, 1982, 1983). The assumption that information about features are distributed over space is similar to assumptions made by Wolford (1975), Ratcliff (1981), and Ashby *et al.* (1996) to account for spatial factors in visual tasks. The assumption can be articulated in terms of the receptive fields of feature detectors in visual cortex: If an item falls in the center of a receptive field, the detector will respond strongly to it. If the item falls near the edge or on the edge of a receptive field, the detector will respond less strongly (Logan, 1996). Therefore, we conjecture that consumer's PI is related to the location where the price sign is placed on the plant (hereinafter referred to as 'location') and the area where the price number is situated at the price sign (hereinafter referred to as 'area').

H6.1 (H6.2): Consumer's PI is highest when the price sign (price number) is at the center location (middle area).

H7.1 (H7.2/H7.3): Consumer's age moderates the price level-PI (location-PI/area-PI) relationship.

H8.1 (H8.2/H8.3): Consumer's gender moderates the price level-PI (location-PI/area-PI) relationship.

3. Method

3.1 Research design and stimuli

In order to answer our research questions and test hypotheses, we adopted a conjoint design for this study. The conjoint design consists of showing respondents a manipulated set of digitally modified plant displays, varying several factors. Conjoint analysis is then conducted to determine how much each of these factors contributes to overall PI of respondent. By analyzing how respondents score these displays, we can also compute the implicit valuation (part-worth utilities) of each level for each of the factors making up the displays.

We manipulated five factors (sign location, area on sign where price was displayed, type of cue, plant type, and price) for the plant displays. The first factor is the location of the price sign. We defined three levels for this factor: left, center and right. The second factor is the area of the price locating at the price sign, for which we defined three levels: top, middle and bottom. The third factor, the cue, was manipulated at three levels: none, feature (describing a feature or obvious product attribute on the sign, such as 'novel shapes') and benefit cue (describing on the sign a benefit to the consumer, such as 'needs little care and water'). The fourth factor is the plant type, for which we defined three levels: ornamental (begonia), both ornamental and edible (cactus), and edible (cilantro). Finally, the fifth factor, the price, was also manipulated at three levels for the same size container holding the plant: low ($0.99), medium ($1.99) and high ($2.99).

We used SPSS orthoplan (IBM, Chicago, IL, USA) to generate an incomplete factorial, orthogonal design of 16 plant displays (Figure 2). Each display is a combination of choosing one level for each of the five factors (location, area, cue, plant type and price level). In the orthogonal design, the factor levels are selected such that, for each pair of the factors (say, X and Y), the high level of X appears equally often in displays that have a high level of Y as in displays that have a low level of Y, and vice versa. This design is highly efficient for part-worth utility estimation, and is thus frequently adopted in extant literatures (e.g. Behe *et al.*, 1999, 2016; Brascamp, 1996).

Figure 2. Stimuli to determine the overall purchase intention.

3.2 Measures

The sixteen displays were presented to participants in a randomized sequence, for which participants were instructed to indicate their likelihood to buy on an 11-point Juster scale (0=no chance; 10=certain) (Brennan and Esslemont, 1994; Juster, 1966). Finally, we measured participants' demographics. For multi-item measures, the construct score was calculated by averaging the different items.

3.3 Data collection and sample

The survey was developed on a Qualtrics platform (Provo, UT, USA) and responses were generated from the panel maintained by GMI Lightspeed (New York, NY, USA) in March, 2015. We excluded incomplete questionnaires from our analyses and conducted quality checks by rejecting respondents who scored all 16 displays in the same way, or provided the same answer to reverse-scaled items. The final sample consists of 718 unique respondents (43.18% male; 56.82% female; mean age: 43.73 years) (Table 1).

Table 1. Summary statistics.

Variables	Number of respondents	Mean (SD) or frequency (%)	Variables	Number of respondents	Mean (SD) or frequency (%)
Age (years)	718	43.73 (16.65)	Ethnicity		
18-29	217	30.22%	White/Caucasian	587	81.75%
30-49	238	33.15%	African American	54	7.52%
≥50	263	36.63%	Hispanic	54	7.52%
Gender			Asian	41	5.71%
Male	310	43.18%	Native American	8	1.11%
Female	408	56.82%	Other	9	1.25%
Adults (≥19) in household	718	2.51 (1.12)	Highest level of education		
1	99	13.79%	Less than high School	11	1.53%
2	331	46.10%	High School/GED	109	15.18%
3	173	24.09%	Some college	154	21.45%
4	74	10.31%	2-year college degree	83	11.56%
5	27	3.76%	4-year college degree	268	37.33%
6	10	1.39%	Master's degree	74	10.31%
7	2	0.28%	Doctoral degree (Ph.D.)	4	0.56%
≥8	2	0.28%	Professional degree (JD, MD)	15	2.09%
Children in household	718	0.71 (1.03)	Household income ($)		
0	434	60.45%	Less than 19,999	58	8.08%
1	122	16.99%	20,000-39,999	142	19.78%
2	112	15.60%	40,000-59,999	136	18.94%
3	42	5.85%	60,000-79,999	103	14.35%
4	5	0.70%	80,000-99,999	93	12.95%
5	2	0.28%	100,000-119,999	54	7.52%
≥6	1	0.14%	120,000-139,999	36	5.01%
Residence location			140,000-159,999	25	3.48%
Metropolitan	149	20.75%	160,000-179,999	13	1.81%
Suburban	416	57.94%	180,000-199,999	9	1.25%
Rural	153	21.31%	200,000 or more	18	2.51%
			Prefer not to answer	31	4.32%

Of the total 718 participants, referring to the classification of other authors (Behe *et al.*, 2016; Douglas, 1991; Howe and Strauss, 2009), 30.22% were classified as Gen Y (18-29 years old), 33.15% as Gen X (30-49 years old), and 36.63% as Boomers (≥50 years old). The mean number of adults (≥19 years old) in the household was 2.51 and the mean number of children 0.71; 57.94% lived in a suburban area and 81.75% were white/ Caucasian. More than one third had earned a 4-year college degree. Median household income was in the $60,000 to 79,999 range. The demographic characteristics of this sample are generally consistent with other samples of plant purchasers or gardeners (e.g. Behe *et al.*, 2016; Mason *et al.*, 2008).

4. Results and discussion

4.1 Conjoint analyses

We used SPSS software version 19.0 (IBM, Chicago, IL, USA) to conduct the conjoint analyses. The price level was set to be linear, while all other factors were set to be discrete. Of the 718 respondents, 47 responded with the same PI for all 16 displays and were excluded from conjoint analysis. For each respondent, the part-worth utility for each level of each factor was computed to indicate the relative importance of each factor. The part-worth utility and relative importance means of each factor were calculated by averaging the individual scores over each sample. The correlation between the actual and predicted preferences was calculated for each respondent and tested for statistical significance (Table 2). In each group, the correlations are significant (Pearson's R≥0.97; Kendall's τ≥0.85), indicating good fits (Murtagh and Heck, 2012).

Table 2 shows the relative importance percentages for each factor (Panel A) and the part-worth utility means for each factor level (Panel B) over the total sample and across the age and the gender groups. Higher part-worth means indicate a stronger PI. The range of the part-worth means (highest to lowest) for each factor provides a measure of how important the factor is to affect respondent's PI. Factors with larger part-worth ranges play a more important role than those with smaller ranges. The importance percentages were derived by calculating the utility range for each factor respectively and dividing it by the sum of the utility ranges for all factors. Consequently, the percentages sum up to 100.

Plant type is the most important factor affecting respondent's PI (49.76%), consistent with other studies (e.g. Behe *et al.*, 2016; Mason *et al.*, 2008). This result supports the H4. When considering the three levels, in support of H1, we find that the part-worth utilities of begonia (0.84), cilantro (-0.03) and cactus (-0.81) are in descending order and the differences between them are all significant (P<0.001). This indicates that respondents are more likely to buy begonia than cilantro, and cilantro than cactus. The relative importance percentage of price and cue is 16.15 and 12.27% respectively. In support of H2, PI is negatively affected by price (β=-0.50, P<0.001), and the part-worth utility of feature cue is lower than that of benefit cue ($M_{feature}$=-0.20, $M_{benefit}$=0.08; P<0.001), indicating benefit cue is more persuasive than feature cue.

Perhaps counterintuitively, we find feature cue is less likely to improve PI than none cue ($M_{feature}$=-0.20, M_{none}=0.11; P<0.001), and there exists no significant difference between benefit cue and none cue ($M_{benefit}$=0.08, M_{none}=0.11; P>0.10). These results support H5, but not H5.1 and H5.2. With the relative importance percentage being 10.79 and 11.04% respectively, location and area are relatively less important than other factors. However, when considering the three levels, we find that placing price sign at the center location of the plants is most likely to improve PI, whereas placing price sign at the right location of the plants is least likely to improve PI (M_{left}=-0.02, M_{center}=0.07, M_{right}=-0.05; P<0.001). Meanwhile, printing price number on the middle area of the price sign is most likely to improve PI, whereas printing price number on the top area of the price sign is least likely to improve PI (M_{top}=-0.06, M_{middle}=0.04, M_{bottom}=0.02; P<0.001). These results support H6.1 and H6.2.

We followed the same methods as Behe *et al.* (2016) to calculate the monetary value for each factor level. The range in part worth utility means is 1.65 units (0.84 for begonia and -0.81 for cactus), which is equal to $2 (equidistant range from low price to high price). Therefore, each unit of utility scores equals $1.21.

Table 2. Relative importance means and utility.[1,2,3]

Factor		**Panel A: relative importance means**					
		Age[4]			**Gender**		**Total (N=671)**
		Gen X (N=128)	**Gen Y (N=287)**	**Boomer (N=256)**	**Male (N=287)**	**Female (N=384)**	
Location		9.54	12.21	9.72	12.28	9.67	10.79
Area		10.79	12.36	9.65	12.62	9.87	11.04
Cue		12.65	12.87	11.38	12.59	12.02	12.27
Plant		50.54	46.67	52.93	46.29	52.35	49.76
Price		16.48	15.90	16.32	16.23	16.09	16.15
Factor	**Level**	**Panel B: part-worth means (SE)**					
		Age			**Gender**		**Total (N=671)**
		Gen X (N=128)	**Gen Y (N=287)**	**Boomer (N=256)**	**Male (N=287)**	**Female (N=384)**	
Location	(1) Left	0.04 (0.08)	0.01 (0.07)	-0.07 (0.12) δ_{12}^{***}	-0.04 (0.09) δ_{12}^{*}	-0.00 (0.08)	-0.02 (0.08) δ_{12}^{***}
	(2) Center	-0.01 (0.09)	0.07 (0.08) δ_{23}^{***}	0.09 (0.14) δ_{23}^{*}	0.07 (0.10) δ_{23}^{*}	0.06 (0.09) δ_{23}^{***}	0.07 (0.10) δ_{23}^{***}
	(3) Right	-0.03 (0.09)	-0.08 (0.08) δ_{31}†	-0.02 (0.14)	-0.04 (0.10)	-0.06 (0.09)	-0.05 (0.10)
Area	(1) Top	-0.04 (0.08)	-0.04 (0.07)	-0.09 (0.12) δ_{12}^{***}	-0.07 (0.09)	-0.05 (0.08) δ_{12}^{**}	-0.06 (0.08) δ_{12}^{***}
	(2) Middle	0.03 (0.09)	-0.02 (0.08) Δ_{YB}^{*}	0.10 (0.14) δ_{23}^{**}	0.01 (0.10)	0.06 (0.09)	0.04 (0.10)
	(3) Bottom	0.01 (0.09)	0.06 (0.08) δ_{31}†	-0.02 (0.14)	0.05 (0.10) δ_{31}^{**}	-0.00 (0.09)	0.02 (0.10) δ_{31}^{*}
Cue	(1) None	0.11 (0.08) δ_{12}^{***}	0.03 (0.07) $\delta_{12}^{***}\Delta_{YB}^{***}$	0.21 (0.12) δ_{12}^{***}	0.10 (0.09) δ_{12}^{***}	0.13 (0.08) δ_{12}^{***}	0.11 (0.08) δ_{12}^{***}
	(2) Feature	-0.14 (0.09) δ_{23}^{*}	-0.17 (0.08) δ_{23}^{***}	-0.25 (0.14) δ_{23}^{***}	-0.15 (0.10) $\delta_{23}^{***}\Delta_{MF}^{*}$	-0.23 (0.09) δ_{23}^{***}	-0.20 (0.10) δ_{23}^{***}
	(3) Benefit	0.03 (0.09) Δ_{XY}†	0.14 (0.08) $\delta_{31}^{*}\Delta_{YB}^{*}$	0.04 (0.14) δ_{31}^{***}	0.06 (0.10)	0.10 (0.09)	0.08 (0.10)
Plant	(1) Begonia	0.78 (0.08) δ_{12}^{***}	0.66 (0.07) $\delta_{12}^{***}\Delta_{YB}^{*}$	1.08 (0.12) δ_{12}^{***}	0.66 (0.09) $\delta_{12}^{***}\Delta_{MF}^{*}$	0.98 (0.08) δ_{12}^{***}	0.84 (0.08) δ_{12}^{***}
	(2) Cactus	-0.72 (0.09) δ_{23}^{**}	-0.80 (0.08) δ_{23}^{***}	-0.88 (0.14) δ_{23}^{***}	-0.65 (0.10) $\delta_{23}^{***}\Delta_{MF}$†	-0.93 (0.09) δ_{23}^{***}	-0.81 (0.10) δ_{23}^{***}
	(3) Cilantro	-0.06 (0.09) δ_{31}^{***}	0.14 (0.08) $\delta_{31}^{***}\Delta_{YB}$†	-0.20(0.14) δ_{31}^{***}	-0.01 (0.10) δ_{31}^{***}	-0.04 (0.09) δ_{31}^{***}	-0.03 (0.10) δ_{31}^{***}
Price	(1) \$0.99	-0.48 (0.07)	-0.41 (0.06)	-0.62 (0.11)	-0.40 (0.08)	-0.58 (0.07)	-0.50 (0.08)
	(2) \$1.99	-0.96 (0.14)	-0.81 (0.12)	-1.23 (0.21)	-0.80 (0.16)	-1.15 (0.15)	-1.00 (0.15)
	(3) \$2.99	-1.44 (0.22)	-1.22 (0.18)	-1.85 (0.32)	-1.20 (0.24)	-1.73 (0.22)	-1.50 (0.23)
	β	-0.48 (0.04) ***	-0.41 (0.02) *** Δ_{YB}^{**}	-0.62 (0.03) ***	-0.40 (0.03) *** Δ_{MF}^{**}	-0.58 (0.02) ***	-0.50 (0.02) ***
Correlation	Pearson's R	0.98^{***}	0.99^{***}	0.98^{***}	0.97^{***}	0.99^{***}	0.98^{***}
	Kendall's τ	0.86^{***}	0.95^{***}	0.85^{***}	0.86^{***}	0.91^{***}	0.86^{***}

[1] ***, **, * and † denote significance level at 0.1, 1, 5 and 10%, respectively; 47 of the 718 respondents responded with the same purchase intention for all 16 displays and were therefore excluded from conjoint analysis.

[2] $\delta_{ij} = (i) - (j)$, $i, j \in \{1,2,3\}$.

[3] Δ_{XY} = Gen X – Gen Y; Δ_{YB} = Gen Y – Boomer; Δ_{BX} = Boomer – Gen X; Δ_{MF} = Male – Female.

[4] Gen X = 30-49 years old; Gen Y = 18-29 years old; Boomer ≥ 50 years old.

Feature cue detracts 24.2 cents from the perceived value of the product; whereas benefit cue and none cue add 9.68 and 13.31 cents in value respectively. This result does not support H5.1 and H5.2, and is different from that of Leclerc and Little (1997) that showed feature cue would help to persuade customer to make purchase decision. Left and right location detract 2.42 and 6.05 cents respectively, whereas center location adds 8.47 cents in value. Top area detracts 7.26 cents, whereas middle and bottom area add 4.84 and 2.42 cents in value respectively. Although these results indicate that location and area are two relatively less important factors than the plant type and the price level, they are still considerable in the value perception of the respondents.

Next, we investigated whether these relative importance and utility scores vary by age and gender. We conducted separate conjoint analyses for the three sets of groups respectively. Table 2 shows the part-worth utility means for each level, and the relative importance means of the five factors for each group. For each group, plant, price and cue are the three most important factors, and the relative importance means of them are in descending order. For the Boomer, this is followed by the location than the area. However, for other groups, the cue is followed by the area than the location in terms of relative importance.

We found a few subtle differences in part-worth utility means by age and gender (Table 2). Firstly, for each group, begonia is the most preferred plant and cactus the least. However, Boomers (vs Gen Y) and females (vs males) are more likely to buy begonia (M_{Boomer}=1.08, M_{GenY}=0.66, P<0.05; M_{Female}=0.98, M_{Male}=0.66, P<0.05). Females were slightly less likely to buy cactus than males (M_{Female}=-0.93, M_{Male}=-0.65, P<0.10), and Gen Y is slightly more likely to buy cilantro than Boomers (M_{GenY}=0.14, M_{Boomer}=-0.20, P<0.10).

Secondly, Boomers (vs Gen Y) and females (vs males) are more sensitive to price while making purchase decision (β_{Boomer}=-0.62, β_{GenY}=-0.41, P<0.01; β_{Female}=-0.58, β_{Male}=-0.40, P<0.01). These results support H7.1 and H8.1.

Thirdly, although the feature cue is least preferred for each group, it is relatively more persuasive for males (vs females) respondents (M_{Male}=-0.15, M_{Female}=-0.23, P<0.05). Meanwhile, Boomers (vs Gen Y) respondents are more likely to buy product with no cue (M_{Boomer}=0.21, M_{GenY}=0.03, P<0.001). Gen Y is more likely to buy product with a benefit cue than the Boomers and Gen X (M_{GenY}=0.14, M_{Boomer}=0.04, M_{GenX}=0.03, P<0.05). In addition, it is worth noting that the preference for benefit cue to none cue varies by the age of respondent. For Boomers, no cue is preferred to a benefit cue (M_{none}=0.21, M_{benefit}=0.04, P<0.001), whereas for Gen Y, a benefit cue is preferred to no cue (M_{none}=0.03, M_{benefit}=0.14, P<0.05).

Finally, inconsistent with H7.2 and H8.2, the part-worth utilities for each level of the location do not vary by age or gender. However, the Boomer respondents are more likely to buy plants with the price number in the middle area of the sign than the Gen Y (M_{Boomer}=0.10, M_{GenY}=-0.02, P<0.05). These results support H7.3 and H8.3.

4.2 The interaction of price and cue

With the scores for different displays as the dependent measure, a 3 (location)×3 (area)×3 (price)×3 (cue)×3 (plant) repeated measure analysis of variance (ANOVA) was used to test the hypotheses 3. In support of H3, A significant 'cue×price' term clearly reveals this interactive effect (F (3,11469)=4.80, P<0.01). Table 3 indicates that, in support of H3.1, consumers are more likely to purchase low priced plants than medium and high priced plants when there are no accessible extrinsic cues (M_{low}=7.05, M_{medium}=5.10, M_{high}=5.10; P<0.001). However, H3.2 is only partially supported. Table 3 shows that, consumers are as likely to purchase low priced plants as high priced plants (M_{low}=5.65, M_{high}=5.54; P>0.10), whereas less likely to purchase low priced plants than medium priced plants (M_{low}=5.65, M_{medium}=6.31; P<0.001) when there are accessible feature cues. When there are accessible benefit cues, consumers are less likely to purchase low priced plants than medium and high priced plants (M_{low}=5.78, M_{medium}=6.43, M_{high}=6.20; P<0.001).

Table 3. Comparison of means by price and cue.[1]

Plant	Price	Cue	N	Mean (SD)	a-b	a-c	b-c	F, *P*
Begonia			5,744	6.58 (3.37)a	1.54***	0.81***	-0.73***	F(2,11485)=204.02, *P*<0.0000
Cactus			2,872	5.04 (3.47)b				
Cilantro			2,872	5.77 (3.45)c				
	Low		5,744	6.38 (3.55)a	0.65***	0.90***	0.25*	F(2,11485)=75.66, *P*<0.0000
	Medium		2,872	5.73 (3.38)b				
	High		2,872	5.48 (3.33)c				
		None	5,744	6.07 (3.50)a	0.29***	0.03	-0.26*	F(2,11485)=7.02, *P*<0.0009
		Feature	2,872	5.79 (3.44)b				
		Benefit	2,872	6.04 (3.45)c				
	Low	None	2,872	7.05 (3.39)a	1.40***	1.27***	-0.13	F(2,5741)=106.49, *P*<0.0000
		Feature	1,436	5.65 (3.57)b				
		Benefit	1,436	5.78 (3.59)c				
	Medium	None	1,436	5.10 (3.36)a	-1.21***	-1.33***	-0.12	F(2,2869)=52.87, *P*<0.0000
		Feature	718	6.31 (3.27)b				
		Benefit	718	6.43 (3.28)c				
	High	None	1,436	5.10 (3.32)a	-0.44*	-1.10***	-0.66***	F(2,2869)=26.45, *P*<0.0000
		Feature	718	5.54 (3.29)b				
		Benefit	718	6.20 (3.29)c				

[1] ***, ** and * denote significance level at 0.1, 1 and 5% based on Bonferroni test, respectively.

As shown in Figure 3, inconsistent with H5.1 and H5.2 and , when price level is low, displays without cues are evaluated more favorably than those displays with feature or benefit cue (M_{none}=7.05, $M_{feature}$=5.65, $M_{benefit}$=5.78; F(2,5741)=106.49, P<0.001). The low price is convincing enough information that consumers are not influenced by more cues (e.g. feature or benefit). Conversely, in support of H5.1 and H5.2, displays without cues are evaluated less favorably than displays with feature or benefit cues when price level is medium (M_{none}=5.10, $M_{feature}$=6.31, $M_{benefit}$=6.43; F(2,2869)=52.87, P<0.001) or high (M_{none}=5.10, $M_{feature}$=5.54, $M_{benefit}$=6.20; F(2,2869)=26.45, P<0.001). In other words, for moderate and higher prices, consumers are influenced by feature and benefit cues to help convince them to buy the product.

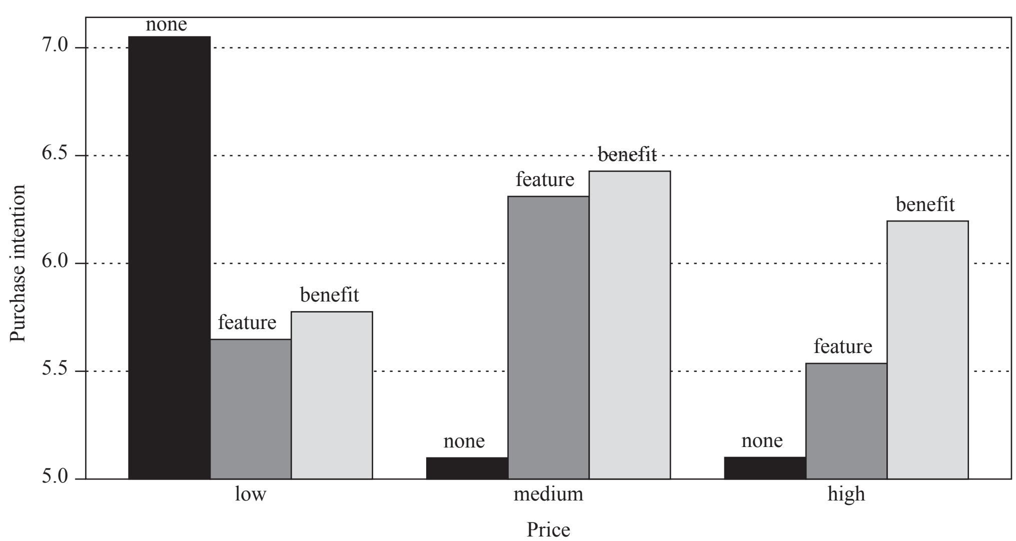

Figure 3. The interaction effect of price (low vs medium vs high) and cue (none vs feature vs benefit) on purchase intention.

Further indications of the impact of cue can be observed by comparing particular conditions involving feature cue with analogous conditions involving benefit cue. Referring to Table 3, we cannot find a pattern of results in which the scores of displays with benefit cue are invariably higher than the scores of displays with feature cue at a given level of price. Concretely, at the high price level, the displays with benefit cue are rated higher than those same displays with feature cue ($M_{feature}$=5.54, $M_{benefit}$=6.20; P<0.001; Bonferroni test). Whereas there is no significant difference between feature cue and benefit cue at the low ($M_{feature}$=5.65, $M_{benefit}$=5.78; P>0.15) or medium price level ($M_{feature}$=6.31, $M_{benefit}$=6.43; P>0.15). These results held for both plants, suggesting that benefit cue could be more likely to offset the adverse effect of price increase on PI than feature cue.

In addition, the results show a significant main effect for price on participant reactions in the expected direction that price negatively influences PI (M_{low}=6.38, M_{medium}=5.73, M_{high}=5.48; F(2,11485)=75.66, P<0.001). However, This result held only for displays without cue (M_{low}=7.05, M_{medium}=5.10, M_{high}=5.10; F(2,5741)=241.52, P<0.001). Whereas there existed a likely invert U relationship between price and PI for displays with feature (M_{low}=5.65, M_{medium}=6.31, M_{high}=5.54; F(2,2869)=11.47, P<0.001) or benefit cue (M_{low}=5.78, M_{medium}=6.43, M_{high}=6.20; F(2,2869)=9.55, P<0.001).

5. Conclusions

The major results are summarized in Table 4. All hypotheses, except H7.2 and H8.2, are supported, with the exception that H3.2 is partially and H5.1 and H5.2 are conditionally supported. Among the five factors tested here, the representation of the total price has an impact not less than price per se. This is a new finding in the horticulture marketing literature. Price has been deemed as a determinant of purchase decision in most economics and marketing literatures. Here, we provide some evidence that the representation of price is, at least, as important as price per se. Therefore, producers and retailers should pay more attention to how and where to present the price to help positively influence consumers' purchase decision.

We find subtle differences by age and gender. Boomers (vs Gen Y) and females (vs males) are more price sensitive while making purchase decision. The Boomer consumers are more likely to buy the plants with price number on the middle area of the price sign than the Gen Y. We have not found that the location-PI relationship varies by age or gender. These data suggest that producers and retailers should use different price presentation strategies while entering these segments of market.

In addition, we find benefit cue is more likely to offset the adverse effect of price increase on PI than feature cue, and the price level PI relationship for plants with feature or benefit cue appears to be invert U shape. We also find that consumer's PI for plants with feature or benefit cue relative to none cue is dependent on price level. The low priced plants without cues are more favorable than that with cues, while the medium

Table 4. Major results.

Hypothesis	Support	Hypothesis	Support	Hypothesis	Support	Hypothesis	Support
H1	yes	H4	yes	H6.2	yes	H8.2	no
H2	yes	H5	yes	H7.1	yes	H8.3	yes
H3	yes	H5.1	depends on	H7.2	no		
H3.1	yes	H5.2	price level	H7.3	yes		
H3.2	yes (partially)	H6.1	yes	H8.1	yes		

Other findings

1. The preference for each type of the plant varies by age and gender.
2. The preference for none cue varies by age, for feature cue varies by gender, for benefit cue varies by age.
3. Benefit cue is more likely to offset the adverse effect of price increase on purchase intention (PI) than feature cue.
4. Invert U shape price level-PI relationship for displays with feature or benefit cue.

or high priced plants without cues are less favorable than that with cues. We explain that low price and accessible extrinsic cues provide two conflicting signals to quality simultaneously, which lead consumers to be skeptical of the quality of the plant and therefore reduce their evaluation. However, this explanation needs more direct evidence.

We used an incomplete factorial, orthogonal design to collect data, which enabled us to analyze by using fewer groups of sample. However, one major limitation of orthogonal design is that it often confounds interactions (Green and Srinivasan, 1990), so that we can only use it to estimate main effects. Therefore, we can only draw a tentative conclusion about the interactive effect of price and cue by ANOVA in this study. Future research should further investigate this effect. Moreover, respondents may process live plants differently from plant pictures, even though the pictures were of high quality. Future research could consider using live plants as stimuli instead. Finally, more research is needed to reveal consumer's visual attention to the representation of price and the extrinsic feature/benefit cues. That information may help us to better understand the underlying mechanism that the representation of price and extrinsic cues affects consumer perception of value.

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