



Consumer Value for Organic versus Locally Grown

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Introduction

Local foods and organic foods have come to the forefront of consumer issues in the past 5 years, influenced by concerns over nutrition, health, and food safety. Organic has received a lot of attention because of fast growth rates, but the growth has been from a very low. In 2008 organic sales of fresh produce were only 6% of total fresh produce sales and only 1% of total supermarket sales were organic. In contrast to organic, buying local has become more in vogue. Because of the lack of transit, locally grown produce is perceived to be fresher and tastier. Supermarkets are identifying the farmers in produce advertising, in-store promotional material and on websites.

The objective of this study was to quantify the utility and relative importance of, and tradeoffs between, physical apple attributes (sweetness, blemishes and imperfections, size, crispness), credence attributes (conventional vs. organic production method, local origin vs. product of USA vs. imported) and purchase price when buying apples.

Materials and methods

An online survey was administered to an eRewards panel of PA residents. The survey included a conjoint or trade-off analytic experiment. Conjoint analysis (CA) is a popular multivariate technique for quantifying the utility and relative importance of a product's multidimensional attributes. In CA, a product is viewed as a combination of attributes and levels that have high impact on a buyer's product purchase behavior. Table 1 summarizes the seven attributes and attribute levels selected in this study, based upon a review of past apple marketing studies, and two focus groups with Pennsylvania consumers.

Table 1. Apple attributes and attribute levels in consumer conjoint analysis experiment

Attribute	Attribute Level	Attribute	Attribute Level
Quality	Blemish free	Price/lb	\$0.99
	Very few blemishes		\$1.99
	Few blemishes		\$2.99
Size	Small	Origin	PA grown
	Medium		Grown in USA
	Large		Grown outside USA
Flavor	Sweet	Production Method	Organic
	Tart		Conventional
Texture	Crisp		
	Mealy		

Using an orthogonal design, attributes were combined into apple products, with each consisting of one level of each attribute. All main effects plus interactions with price can be estimated with 48 apple products. A Balanced Incomplete Block Design (BIBD) separated the 48 apple products into eight choice sets with six apple profiles per set. Survey participants then rated six apples on a scale of 0 - 10, where 0 was assigned to an "extremely unlikely to purchase" apple product and 10 was an "extremely likely to purchase" apple.

In CA, a buyer's utility for a product, represented by the preference rating, is a function of the buyer's utilities for each product attribute. In the econometric specification of consumer preferences, the product attributes are combined to formulate a conjoint preference model that can be expressed as the following general relationship:

$$\text{Rating} = f(\text{Quality, Price, Size, Origin, Flavor, Production method, Texture}) \quad (1)$$

where the rating equals the preference rating given to the apple products by survey respondents. The relative importance of each apple attribute is estimated as the range of utility over all levels of that attribute, expressed as a percentage of the sum of the utility ranges for all attributes.

Results and discussion

1,218 PA residents who are primary household food shoppers and purchased fresh fruit in the past six months completed the online survey. Respondent demographics showed no significant variations from expected overall state averages. To ensure that the sample was not skewed to either non-organic buyers or organic buyers, the percentage who bought organic at least occasionally was measured. 78% of the respondents buy organic fruits and vegetables at least occasionally, consistent with findings published by The Hartman Group in 2008 that 69% of U.S. adult consumers buy organic products at least occasionally.

The conjoint preference model was estimated in SPSS using Ordinary Least Squares Regression, with all attribute levels specified as qualitative variables. Results are shown in Table 2. A key question addressed by this table is "which attributes are consumers willing to give up in order to gain more of another attribute?" The strength of this tradeoff is represented by the column titled Partial Eta Squared. The higher the Partial Eta Squared, the more willing the consumer is to tradeoff from a lower level to a higher level of that attribute.

Table 2. Conjoint preference model least squares regression estimation results for seven apple attributes. Dependent

Attribute	Type III		Mean Square	F	Sig.	Partial Eta Squared
	Sum of Squares	df				
Price	1270.3	2	635.2	74.5	0	0.0199
Origin	595.2	2	297.6	34.9	0	0.0094
Quality	1662.7	2	831.4	97.6	0	0.0259
Production	0.4	1	0.4	0.1	0.82	0
Size	422.1	2	211.1	24.8	0	0.0067
Crisp	2963.5	1	2963.5	347.8	0	0.0453
Flavor	89.5	1	89.5	10.5	0	0.0014

Crispness and quality are the attributes consumers are least willing to trade off to gain on other attributes. Consumers prefer apples with no blemishes and are less willing to trade off the other attributes if it means accepting more blemishes.

Production method (organic versus conventional), had the least differential impact on preference, and was not statistically significant. In practical terms, this means that adding "organic" to an apple's characteristics will not compensate for lower quality, blemishes, or an adverse level of any other attribute. In contrast to organic, Origin was statistically significant. Other things being equal, consumers would prefer a PA grown apple.

Table 3. Estimated utilities of apple product attribute levels

Attribute	Utility	Attribute	Utility
<u>Quality</u>		<u>Price/lb.</u>	
Blemish free	5.369	\$0.99	5.058
Very few blemishes	4.612	\$1.99	4.858
Few blemishes	4.027	\$2.99	4.092
<u>Size</u>		<u>Origin</u>	
Small	4.295	PA Grown	5.044
Medium	4.816	Grown in USA	4.719
Large	4.896	Grown outside USA	4.245
<u>Flavor</u>		<u>Production</u>	
Sweet	4.780	Conventional	4.662
Tart	4.559	Organic	4.677
<u>Texture</u>			
Crisp	5.305		
Mealy	4.034		

The fundamental application of the conjoint preference model is the calculation of attribute utility values and attributes' relative importance. Table 3 provides the calculated utility values for each level of each apple attribute. Since all feature utility results are expressed in a common unit, utilities can be compared from feature to feature. The highest utility is associated with a blemish free apple, followed closely by crisp texture. The first-choice apple product would be the product with the highest overall consumer utility: a blemish free, large, sweet, crisp, PA Grown apple at the lowest possible price. As reported, production method was not significant.

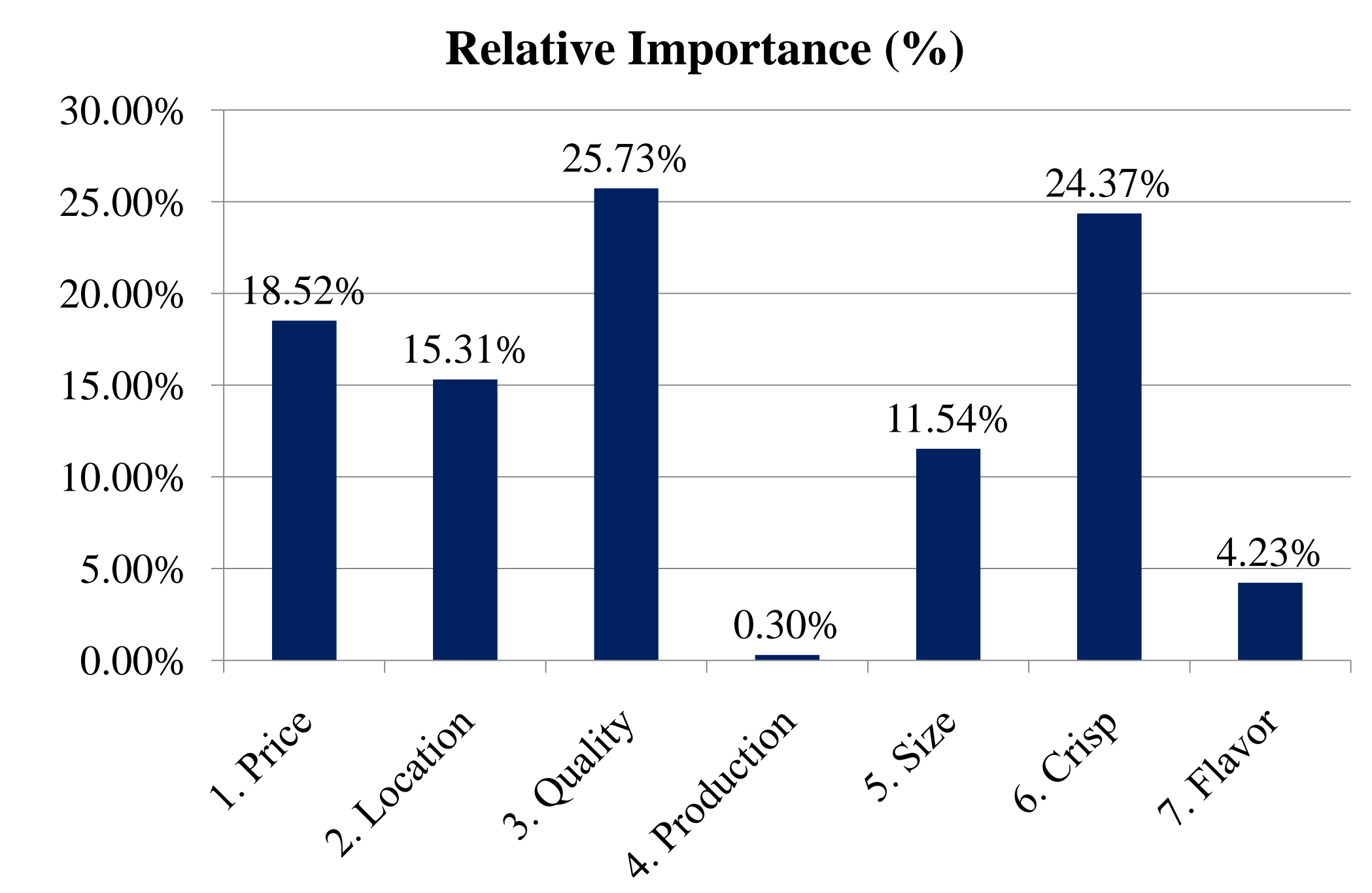


Figure 1. Relative importance of apple attributes in preference rating

The attributes' relative importance, shown in Figure 1, measures the extent to which each attribute contributes to the preference level. About 50% of the preference comes from quality and texture. Origin (PA grown) contributes almost as much as price, with an expected gain in preference of 15% when you move from an apple grown outside the country to a PA Grown apple. Production method (organic vs. non-organic) contributes almost nothing to apple preference.

There is almost no value to producing an organic apple for the "mass market." In terms of apple production, the authors believe that allocation of scarce resources into organic apple production may not be economically justifiable. PA Grown will be a far more efficient approach for apple growers than "going organic."

For further information

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