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The effect of branding on consumer choice through blind and non-blind taste tests

Abstract

Brand names have an effect on consumers' evaluation of a product. Most studies deal with a single measure of this brand effect such as choice, preference or perceptions about the product. Few have investigated how branding affects consumers' choice process when sensory-based factors are involved, especially after tasting the product. This study examines the role of branding on consumer behavior through blind and non-blind taste tests of wine. Using a conceptual value model and a probabilistic choice model the author analyzes consumers' choice process between different wines. Results indicate that there is a differential brand effect on the saliency of sensory-based attributes in this choice process. More reputable brands have a positive effect on the saliency of some of these attributes.

Keywords: branding, taste tests, consumer choice.

Introduction

Consumers determine their preferences for products and services based on various factors such as the product's attributes and their personal attitudes toward the product. However, another factor that plays a key role is the shared and unique aspects of the products in the relevant choice set they are facing. Thus, the process of determining what product to buy takes into account the shared characteristics of the product such as its quality and its unique characteristics such as brand name. The decision also involves the distinctiveness of the purchaser. Examples of such factors include the personal characteristics of the purchaser such as socio-economic level, individual characteristics such as personality and situational characteristics such as the purpose of the purchase. Furthermore, the interaction between these characteristics can also have an effect on this choice. This task of choosing a product can be even more complex when different types of product characteristics are involved. Thus, consumers' perceptions about a brand may affect their decisions. These perceptions may be objective, subjective, or involve intangible qualities.

Scholars have repeatedly highlighted the importance of understanding how consumers choose between alternative products. Research points to the physical aspects of a product such as its quality or durability, or how individual differences in terms of gender or other socio-demographic variables affect choice. Food products, however, are unique in that consumers use an additional factor to make their purchase decision – their senses. When dealing with unpackaged food, consumers can use their sense of smell and taste to evaluate the product. Given that research indicates that taste is the most important factor when choosing food products (e.g., Holm and Kildevang, 1996; Koivisto and Sjóden, 1997; Moskovich, German, and Saguy, 2005), it is reasonable to expect that consumers would see a taste test as an important form of product evaluation (e.g., a tasting in a supermarket).

Marketers in various industries often use taste tests to convince potential customers about the superiority of one product over another. Taste tests are also used for new product development and market testing. For example, Minute Maid orange soda was introduced to the Canadian market after a blind taste test (Brennan, 1986). In the Canadian market as well, Labatt Breweries used a mix of a blind and non-blind taste test where customers were asked to state their preference for either Labatt X or Labatt Y (Barrington, 1995). Samples of taste tests range from small in-house panels for planning product design to large-scale test markets (Moskowitz, 1985). That is, from trained, experienced, panels to consumer laboratory or market tests.

Given the importance of this subject in academic research and real-world activities, several academic studies have looked at the various aspects of taste testing. In general, these tests can be divided into two main categories: perceptual discrimination tests and preference tests (Batsell and Wind, 1979). The focus of the former test is to examine whether consumers can distinguish the taste of one brand from that of others in the same product category. In other words, the goal of the test is to determine whether consumers can sense the dissimilarities in taste between different brands (Buchanan and Henderson, 1992). The purpose of preference taste tests is to determine how the firm's product is ranked with respect to other competitive products. This question is also pertinent when a new product is being designed or an existing brand is being reformulated. Typically, such preference evaluations are considered to be indicators of choices made by consumers in the market (see, for example, Greenberg and Collins (1966) for a double preference test to distinguish between discriminators

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and non-discriminators or Woodward and Schucany (1977) for a triangle taste test). As it is evident from the examples provided earlier, marketers use this type of taste test more commonly than the perceptual one.

It is clear, then, that with respect to the taste testing of food products, two factors dominate. One is the consumers' perception about the dissimilarity between products. The second factor is their overall evaluation of or preference for each product. Obviously, *both* perceptions and preferences should affect the firm's product positioning plans. Therefore, it is important for firms to achieve a better understanding about the relationship between them, because each factor represents a different aspect of the consumers' assessment of the firm's product. More importantly, it is essential to distinguish the effect that the product's characteristics themselves have on purchasing choices from the indirect effect of other aspects of the product. In other words, how can marketers determine whether the choice to purchase one food product over another is driven by the product's brand? Using blind and non-blind taste tests is one method for accomplishing this goal.

The difference between the blind and the non-blind taste test in terms of positive or negative changes in preferences or perceptions is the additional information the brand provides to consumers. Brands are used to identify a product in order to create differentiation through various means (e.g., rational reasoning, affective connotations). Researchers have determined that brands serve as a signal of quality (e.g., Erdem and Swait, 1998; Rao and Ruekert, 1994) and influence the choice of product through their credibility (Erdem and Swait, 2004). As a result, brands can affect consumers' preferences and expectations (Aaker, 1990; Rao and Monroe, 1989). Thus, many consumers may evaluate a Tommy Hilfiger dress shirt as being of higher quality than that of a generic brand.

When evaluating food products using blind and non-blind taste tests, we can determine the effect of branding. If consumers' evaluations of a food product change when switching from a blind to a non-blind taste test, we can assume that the change arises from the information about the brand name of the product. This issue is of particular interest when it comes to examining consumers' sensory evaluations. Previous research has shown that branding, on its own, or through blind taste testing can affect consumers' perceptions about the product's attributes or intention of buying it. As noted earlier, the combined effect of both of these constructs, however, can provide more insight into the driving forces behind consumer behavior. By determining the salient factors in making a purchasing choice of food products through a taste test, we may be able to identify how branding affects this choice process.

The literature in this general area has devoted considerable attention to how branding affects changes in the evaluation of a product's attributes and the resulting consumer behavior. However, these studies evaluated these factors separately. Previous academic studies on taste tests have looked at perceptions only, preferences only, or both but in a different context to determine, for example, which preconditions the other (Buchanan, Givon and Goldman, 1987; Givon, 1989; Givon and Goldman, 1987). However, few studies have tried to uncover the latent competitive market structure that exists in consumers' minds (Ghose and Lowengart, 2001). There is almost no work that combines these factors in a choice situation where both blind and non-blind results are used to relate perceptions to preferences. Moreover, there is scant research that relates brand information to consumers' choice through taste testing. In particular, almost no research exists that examines this effect on the evaluation of the product's endogenous attributes (those attributes that are characteristic of the product's generic benefits) that are determined by consumers' sensory evaluation.

The purpose of this study, therefore, is to examine the effect of the relationship between perceptual and preferential evaluations in light of branding information through taste test discrimination as it evolves from the blind to the non-blind test. We address this issue by formulating a probabilistic choice model to identify sensory-based product attributes that are affected by the non-blind test compared with the blind test. We do so by bringing together these two types of consumer product evaluations and utilizing them to create a choice decision process. Such an analysis provides insights into how this relationship can be used to increase the effectiveness of competitive branded product positioning strategies and improve our understanding of the consumer's choice.

By using this approach, we can also obtain insights of managerial relevance – insights that are difficult to obtain by using only perceptual or preferential data from blind or non-blind taste testing. In addition to estimating market share probabilities, the results will provide diagnostic information about the competitive intensity between brands and also identify the factors that contribute to changing these probabilities.

Wine is one typical product that uses sensory evaluations for product evaluation. Given that credence quality is an important factor in choosing

wine, consumers rely heavily on their experience with the product as well as on quality cues they can relate to a specific wine. We, therefore, used wine as the basis for our empirical analysis.

In the following we present a conceptual framework to identify the effect of branding through blind and non-blind taste tests in a choice situation. We start with a review of the current approaches and present a conceptual model followed by an econometric model. We then present the results of the empirical analysis and conclude with a discussion and the implications of our findings.

1. Branding, taste tests and consumer wine choice

It is widely acknowledged in the marketing literature that the success of branding is usually a result of the right combination of various marketing variables. Therefore, marketers must identify these marketing mix variables and determine their relative effect on a brand's success. As noted earlier, one of the key elements unique to the food industry is the sense of smell and taste. Identifying the effect of such elements as well as any possible haloing effect they might have on the brand is imperative in designing products and brands.

The literature has highlighted instances in which there is a large discrepancy between consumer preferences in blind taste tests and non-blind ones, as was the case in the "cola war" in the mod 1970's where Pepsi launched its Pepsi Challenge against Coca Cola (Looking inside for Competitive Advantage (Barney, 1995). The non-blind case may be a better reflection of reality, but on its own, it provides less useful diagnostic information to the manager than a blind taste test does. For instance, various exogenous variables such as exposure to a television ad or to an attractive in-store point of purchase display may account for the choice of one brand over another. Price is another possible indicator for consumers.

For example, Schnabel and Storchmann (2010) found that wine prices serve as signals of quality, but this relationship diminishes when consumers, wholesalers in this study, are more informed or knowledgeable about the wine's quality, particularly when they can taste it before purchasing. This example sheds light on the importance of taste testing in the purchasing decision, especially for multi-sensory products such as wine. Another potential source of information about quality is the recommendations of wine experts. Horowitz and Lockshin (2002) showed that decisions about wine purchasing are based on several cues that can predict the quality of the wine, but these cues vary for each wine. Factors range from the consumers' knowledge about wine to the reputation of the winery. As a result, wine testing is a more effective way to select a wine.

As noted earlier, branding provides information to consumers. Exposure to the product's brand, therefore, will affect choice behavior. Erdem and Swait (1998) found that brands provide consumers with information that results in reduced search costs and a more simplified decision process. The brand, therefore, provides indirect information about a product's qualities, an important element in choosing a wine.

Taste tests can be used to assess consumers' evaluation of the qualities of a wine. How does branding affect this choice, and how can this effect be demonstrated? The standard type of non-blind taste test itself will not reveal any specific reasons for the brand effect as it is representative more of the overall reality of the market place that includes brand effects. The blind taste test on the other hand, provides clear information about how the endogenous attributes of the wine affect preferences and/or perceptions. However, marketers will benefit by identifying the endogenous product attributes that contribute to consumers' preferences in the non-blind test after accounting for the effect of these attributes in the blind test.

A potential added insight about the exact mechanism of the effect of branding on product evaluations be they endogenous or sensory-based attributes would be relating the two types of tests to a choice task and determining the interactive effect of branding and sensory evaluation. In other words, the experiment should first distinguish between the effect of the non-blind taste test and the blind taste test and then isolate the effect of branding on the consumers' sensory evaluation of the product's attributes.

Given that there is no research on the effect of branding on the process of choosing food products based on their sensory-based attributes, the first research query is to explore whether branding, in general, has an effect on the choice process. This is equivalent to revealing consumers the product's label. The second step is to examine whether there is a differential branding effect. That is, the second research query is exploring whether different brands have a different effect on the relative importance that consumers give to the attributes of a product when making their purchasing choice. Previous research on branding indicates that this effect is not uniform. Therefore, we expect that if there is an effect on the relative importance of the sensory-based attributes, it will be a differential one. In other words, the better known the brand, the

stronger the effect on the relative importance that consumers give to the attributes of a product when making their purchasing choice.

2. Methodology

In terms of methodology, we use a descriptive research approach that was based on two taste tests by the same consumers – one a blind taste test and the other a non-blind test. Consumers were asked to assess the color intensity, aroma, taste, tartness, harmony, and aftertaste of several wines. This set of attributes is consistent with the generally accepted convention of wine tasting (see, for example, Hughson and Boakes, 2001; Kolpan, Smith and Weiss, 1996; Nerlove, 1996).

The sample selection was done through a systematic sampling based procedure. For two days, potential respondents in a large university were approached and asked to participate in the taste test. This sampling technique was used in order to ensure heterogeneity in the sample.

Respondents were asked to rate their responses on a 10-point interval scale with 1 representing a very low level of the attribute and 10 representing a very high level of the attribute. For example, respondents were asked: "On a scale of 1 to 10, where 1 is very light and 10 is very strong, how would you rate the aroma of this brand?" Given that not all respondents were familiar with the various sensory-based attributes of wine, we described each of them to them. For example, aroma is the smell that comes from the grape, whereas bouquet is the smell that comes from the aging process of the wine in oak barrels, not the grape itself, harmony is the balance between the wine components, and so on.

3. Data collection

The subjects for this study were students, visitors and staff members at a large university. One hundred and thirty-five respondents participated in the study, which took place over a two-day period. The sample included 88 males and 47 females. Most of the participants were young adults with 41 of them between the ages of 18 and 24, 89 between 25 and 40, and 5 above 40 (the legal drinking age is 18). With respect to income level, 81 of the participants earned less than the average salary, 46 earned an average salary and 14 earned more than the average income (approximately $2,100 a month). The level of employment ranged from full time, 64, to part time, 8, and full-time students (unemployed), 62.

To attract potential participants, we conducted the tasting experiment in the lobby of a large building complex. The researchers offered visitors who walked through the building the opportunity to taste the wine. We selected red wines because they have more complex sensory attributes than white wines. In the blind test, participants were presented with four wines covered by brown paper. The bottle itself, different color of the glass that might affect the wine color evaluation, or the weight of the bottle itself (i.e., the amount of wine left in it) might have an influence on respondents evaluations (Piqueras-Fiszman and Spence, 2012). In order to avoid such potential biases, all of the tested wines were presented to the subjects simultaneously, without any information about the wine. The cover of the paper was wrapped around the bottle up to its top, thus hiding its color, and the wine was dispensed into the testing glasses in order to avoid bottle weight biases. Furthermore, we randomly mixed the order of the wines across participants to avoid potential primary or recency effects. In order to avoid variation between the bottles of the same wine as there was a time difference between the blind and nob-blind taste tests, the wines were checked for corkage or other signs of inter-bottle variability.

In the second test, the same respondents followed the same procedure, but in this case, they could see the labels of the different wines. In total, we tested four generic red wines from four different brands: an unknown producer with a private label – PL, a well known brand from a large winery – LW – Carmel Mizrahi, a wine from a boutique winery – BW – Recanati Winery, and a very well known, reputable, wine brand – RW – Golan Heights Winery).

After each test, participants filled out a questionnaire pertaining to these tests – one after each test. Subjects were asked to taste each wine and rate it based on its color intensity, aroma, taste, tartness, harmony, and aftertaste. In addition, respondents rated their overall evaluation of each wine and selected the most preferred wine as a choice task where they had to prefer one brand out of the four brands (see also Cohen and Lowengart, 2003; Lowengart, 2010).

4. The model

In a recent study of branding effects, Keller and Lehmann (2005; 2006) examined the effect of branding on value and choice through main and interactive effects. Their formulation included provisions for factors such as function, image and price together with the effect of their interactions with brand effects. Here, we extend this model to account for sensory-based attributes. We start with Keller and Lehmann's basic model (2006) and then add a specific term to account for such attributes. Furthermore, given that we can determine these types of attributes through differences between blind and non-blind taste tests, we account for the interactive effect with branding as well.

We start with the basic concept of the utility that a product provides (Keller and Lehmann, 2006):

$$Value = \Sigma_i \alpha_i F_i - \delta P, \quad (1)$$

where F_i is the functional characteristics of the product and P is the price of the product.

Labeling or branding adds additional image attributes or positive brand associations:

$$Value = (\Sigma_i \alpha_i F_i + \Sigma_j \beta_j I_j) - \delta P, \quad (2)$$

where I_j is image attributes.

Labeling also has a unique effect:

$$Value = (\Sigma_i \alpha_i F_i + \Sigma_j \beta_j I_j) - \delta P + D_L, \quad (3)$$

where D_L is a dummy effect of the label of each brand.

Labeling also interacts with product attributes in a positive manner when such impressions are favorable, and with price, which can be a negative element:

$$\begin{aligned} Value &= \Sigma_i (\alpha_{0i} + \alpha_{1i} D_L) F_i + \\ &+ \Sigma_j (\beta_{0j} + \beta_{1j} D_L) I_j - (\delta_0 + \delta_1 D_L) P + D_L. \end{aligned} \quad (4)$$

Next, we add sensory-based product attributes to this framework:

$$\begin{aligned} Value &= \Sigma_i (\alpha_{0i} + \alpha_{1i} D_L) F_i + \\ &+ \Sigma_j (\beta_{0j} + \beta_{1j} D_L) I_j + \\ &+ \Sigma_k (\gamma_{0k} + \gamma_{1k} D_L) S_k - (\delta_0 + \delta_1 D_L) P + D_L, \end{aligned} \quad (5)$$

where S_k is the sensory-based attributes.

Adjusting for blind and non-blind tests, we get:

$$\begin{aligned} Value &= \Sigma_i (\alpha_{0i} + \alpha_{1i} D_L T_{NB}) F_i + \\ &+ \Sigma_j (\beta_{0j} + \beta_{1j} D_L T_{NB}) I_j + \\ &+ \Sigma_k (\gamma_{0k} + \gamma_{1k} D_L T_{NB}) S_k - \\ &- (\delta_0 + \delta_1 D_L T_{NB}) P + D_L T_{NB}, \end{aligned} \quad (6)$$

where T_{NB} is a 0-1 variable representing the non-blind test effect. The current functional form captures the overall effect of branding, or labeling, through a common effect of the non-blind test.

In order to adapt this framework to a choice situation with N alternative products, we need to determine the separate effect of the label or brand of each product in the choice set. Thus, we extend the conceptual framework mentioned earlier to determine the brand effect through labeling on choice through interaction with the sensory evaluation component. Unlike the concept depicted in equation (6) where we assess the effect of the non-blind test on the product's attributes, here we are interested in determining the brand effect revealed through the non-blind taste test. This effect is unique because each brand conveys different information. The value of the nth product, therefore, would be:

$$\begin{aligned} Value_n &= \Sigma_i (\alpha_{0i} + \alpha_{1in} D_{Ln} T_{NB}) F_i + \\ &+ \Sigma_j (\beta_{0j} + \beta_{1jn} D_{Ln} T_{NB}) I_j + \\ &+ \Sigma_k (\gamma_{0k} + \gamma_{1kn} D_{Ln} T_{NB}) S_k - \\ &- (\delta_0 + \delta_{1n} D_{Ln} T_{NB}) P + D_{Ln} T_{NB}, \end{aligned} \quad (7)$$

where n is the nth alternative in the choice set, $n \ldots N$.

As noted earlier, this study focuses on the effect of labeling on sensory-based evaluations and on consumer behavior. In terms of the model, the effect on the value of the product would be $Value = \Sigma_k (\gamma_{0k} + \gamma_{1k} D_L T_{NB}) S_k + D_L T_{NB}$ and the effect on the product's choice would be $Value_n = \Sigma_k (\gamma_{0k} + \gamma_{1kn} D_{Ln} T_{NB}) S_k + D_{Ln} T_{NB}$, here n represents the nth alternative in the choice set.

5. Econometric model

Aside from determining the probability that a potential consumer will choose a specific wine from a set of alternative wines, we also want to identify the attributes of red wine that most affect customers in their purchasing decision. Such a determination will help managers and wine makers decide which attribute they need to modify in order to improve the chances of their wine being chosen.

We used a probabilistic multi-nomial logit (MNL) choice model (McFadden, 1974) to analyze the data. The MNL model is a simultaneous compensatory attribute choice model that incorporates the concepts of thresholds, diminishing returns to scale and saturation levels (McFadden, 1974). Furthermore, the MNL is based on the assumption that the overall preference of a consumer for a particular choice, in this case, the preferred wine, is a function of the perceived relative utility that the choice has for the consumer.

Let U_{ij} be the utility of alternative product j for customer i, and J the number of alternative products. We can separate the utility function into a deterministic component V_{ij} (measured in terms of perceived value associated with the characteristics of the products), and an unobserved random component, ε_{ij}, which is independent and identically distributed such that

$$U_{ij} = V_{ij} + \varepsilon_{ij}. \quad (8)$$

The distribution of ε_{ij} is assumed to be exponential (Gumbel type II extreme value) and thus, the probability that customer i will choose alternative product j is represented by:

$$P_{ij} = \frac{\exp^{(V_{ij})}}{\sum_{j=1}^{j=m} \exp^{(V_{ij})}}. \quad (9)$$

6. Utility specification

First we want to identify the effect of the blind taste test on the choice process through the saliency of the interactive effect of the non-blind effect and the product's attributes, a two-way interaction effect (corresponding to the value presented in equation (6)). The deterministic component of the utility function that captures this effect is a product of the weighted sum of the product attributes identified earlier and the interaction terms, and has the following form:

$$\begin{aligned} V_{ij} &= (\gamma_{M1} + \gamma_{I1NB})COLOR_{ij} + \\ &+ (\gamma_{M2} + \gamma_{I2NB})AROMA_{ij} + \\ &+ (\gamma_{M3} + \gamma_{I3NB})BOUQUET_{ij} + \\ &+ (\gamma_{M4} + \gamma_{I4NB})TASTE_{ij} + \\ &+ (\gamma_{M5} + \gamma_{I5NB})TANNIC_{ij} + \\ &+ (\gamma_{M6} + \gamma_{I6NB})HARMONY_{ij} + \\ &+ (\gamma_{M7} + \gamma_{I7NB})AFTERTASTE_{ij}, \end{aligned} \quad (10)$$

where $COLOR_{ij}$ is the consumer i's perceptions of the color intensity of wine alternative j; $AROMA_{ij}$ is the consumer I's perceptions of the aroma of wine alternative j; $BOUQUET_{ij}$ is the consumer i's perceptions of the bouquet of wine alternative j; $TASTE_{ij}$ is the consumer i's perceptions of the taste of wine alternative j; $TANNIC_{ij}$ is the consumer i's perceptions of the tartness of wine alternative j; $HARMONY_{ij}$ is the consumer i's perceptions of the harmony of wine alternative j; $AFTERTASTE_{ij}$ is the consumer i's perceptions of the aftertaste of wine alternative j; for j=1, 2, 3, 4. This form is equivalent to equation (6) above.

$\gamma_{M1}, \gamma_{M2}, \gamma_{M3}, \gamma_{M4}, \gamma_{M5}, \gamma_{M6}, \gamma_{M7}$ are the parameters to estimate the main effects of the wine's attributes on choice.

$\gamma_{I1NB}, \gamma_{i2NB}, \gamma_{I3NB}, \gamma_{I4NB}, \gamma_{I5NB}, \gamma_{I6NB}, \gamma_{I7NB}$ are the parameters to estimate the two-way interactive effect of the non-blind taste test and the wine's attributes in the choice of this product.

We can capture the branding effect through the non-blind taste test by determining a three-way interaction effect (corresponding to the value presented in equation (7). In other words, the formulation of the deterministic component of the utility is:

$$\begin{aligned} V_{ij} &= (\gamma_{M1} + \gamma_{Ij1NB})COLOR_{ij} + \\ &+ (\gamma_{M2} + \gamma_{Ij2NB})AROMA_{ij} + \\ &+ (\gamma_{M3} + \gamma_{Ij3NB})BOUQUET_{ij} + \\ &+ (\gamma_{M4} + \gamma_{Ij4NB})TASTE_{ij} + \\ &+ (\gamma_{M5} + \gamma_{Ij5NB})TANNIC_{ij} + \\ &+ (\gamma_{M6} + \gamma_{Ij6NB})HARMONY_{ij} + \\ &+ (\gamma_{M7} + \gamma_{Ij7NB})AFTERTASTE_{ij}, \end{aligned} \quad (11)$$

where the product attributes and main effect terms are the same as in the previous formulation, Equation (10), and $\gamma I_{j1NB}, \gamma I_{j2NB}, \gamma_{Ij3NB}, \gamma I_{j4NB}, \gamma_{Ij5NB}, \gamma_{Ij6NB}, \gamma_{Ij7NB}$ are the parameters to estimate the three-way interactive effect of the jth brand through the non-blind test on this wine's attributes in the choice of this product. For example, $\gamma_{I11\ NB}$, $\gamma_{I12\ NB}$ ... $\beta_{I17\ NB}$ are the interaction parameters of Brand 1 and the non-blind taste test with the seven sensory attributes of Brand 1. This formulation is equivalent to equation (7) above.

Since $\gamma_{iN} = 0$ for the blind taste scenario, the utility in this case is:

$$\begin{aligned} V_{ij} &= \gamma_{M1}COLOR_{ij} + \gamma_{M2}AROMA_{ij} + \\ &+ \gamma_{M3}BOUQUET_{ij} + \gamma_{M4}TASTE_{ij} + \\ &+ \gamma_{M5}TANNIC_{ij} + \\ &+ \gamma_{M6}HARMONY_{ij} + \\ &+ \gamma_{M7}AFTERTASTE_{ij}. \end{aligned} \quad (12)$$

7. Results

We first conducted an analysis to verify whether the two different taste tests yielded differences in consumers' evaluations of the attributes of the various wines. Table 1 presents the results of this analysis.

Table 1. Perceptions of sensory attributes of the four wines in blind and non-blind taste tests

	Brand 1			Brand 2			Brand 3			Brand 4		
	Blind	Non-blind	Sig. level	Blind	Non-blind	Sig. level	Blind	Non-blind	Sig. level	Blind	Non-blind	Sig. level
Color	6.86	6.54	0.228	7.54	7.03	0.023	7.14	7.12	0.917	7.22	7.41	0.374
Aroma	6.17	5.52	0.026	6.24	6.12	0.677	6.13	6.45	0.255	6.20	6.53	0.246
Bouquet	6.14	5.43	0.015	6.18	6.05	0.637	5.89	6.48	0.035	6.10	6.61	0.058
Taste	5.56	4.66	0.009	5.62	5.56	0.831	5.40	6.23	0.007	6.04	6.63	0.047
Tartness	5.38	5.20	0.623	6.05	5.76	0.358	5.55	5.76	0.495	5.97	6.09	0.707
Harmony	5.65	4.88	0.014	5.75	5.91	0.636	5.22	6.15	0.002	5.95	6.33	0.145
Aftertaste	5.97	5.15	0.025	5.84	5.40	0.187	5.53	6.05	0.125	5.97	6.18	0.512

As Table 1 shows, in the blind taste test, respondents ranked most of Brand 1's attributes much higher than they did in the non-blind test. In other words, branding had a significant negative effect on respondents' perceptions because they judged the wine to be of less quality when they saw its label. Brand 2 demonstrated almost no branding effect on consumer perceptions, as only the color evaluation was lower in the non-blind test. Differences between the two tests revealed a significant positive branding effect on the perceptions of the attributes of Brands 3 and 4. For both brands, bouquet and taste had higher ratings in the non-blind test than in the blind taste test. Harmony also ranked higher in the non-blind test for Brand 3. Thus, our results demonstrate that branding has an effect on consumer perceptions. To augment the perceptual analysis of the branding effect in order to verify whether the branding effect is consistent across attributes, we conducted two more analyses. In the first analysis, we calculated the perceptual differences between the two tests of each attribute and tested whether these differences varied across attributes for each brand. In other words, we conducted multiple ANOVA tests to verify homogeneity or heterogeneity across attributes within a brand. Table 2 presents the results of this analysis.

Table 2. ANOVA results – variations in perceptions between blind and non-blind taste tests across attributes

	Color	Aroma	Bouquet	Taste	Tartness	Harmony	Aftertaste	*F*-value
Brand 1	-0.32	-0.66	-0.71	-0.90	-0.17	-0.77	-0.82	0.384
Brand 2	-0.51	-0.12	-0.13	-0.06	-0.29	0.16	-0.44	0.724
Brand 3	-0.02	0.32	0.59	0.83	0.22	0.93	0.53	0.068
Brand 4	0.19	0.32	0.52	0.59	0.12	0.39	0.22	0.724

Notes: The values in the table represent the average difference between the blind and non-blind taste test for each attribute. For example, the difference between these two tests in the perceptions of color intensity in Brand 1 is -0.32, indicating a decline in favorable perception.

The results in Table 2 point to a good deal of homogeneity in the respondents' over- and under-estimation of the product's attributes. Specifically, the non-significant differences between the non-blind test evaluations and the blind test evaluations were not significant across attributes in each brand. There was only one case in Brand 3 where the differences between the two tests for the color and harmony attributes were marginally significant. These results indicate the presence of a halo effect where the branding effect has a rather uniform effect across attributes and points to homogeneity in the branding effect.

In the second analysis, we assessed the adjusted relative perceptual importance of an attribute of a brand in one of the two tests by computing a measure based on the difference between the perception of attribute k and the overall perception of that brand across attributes, $Attribute_k - 1/k\sum_{k=1}^{k=7} Attribute_k$ (see also Wilkes and Valencia (1985) and Bellizzi et al. (1981) for details about perceptions analysis). A positive adjusted value indicates that this k^{th} attribute has a higher perception rating than the overall ratings of that brand, and vice versa. Table 3 presents the results of this analysis[1].

Table 3. Adjusted average importance of attributes for each brand across attributes

	Color	Aroma	Bouquet	Taste	Tartness	Harmony	Aftertaste	*F*-value
Brand 1								
Non-blind	1.199[a]	0.177[b]	0.091[b]	-0.683[b]	-0.134[b]	-0.462[b]	-0.188[b]	0.001
Blind	0.900[a]	0.212[ab]	0.180[ab]	-0.401[b]	-0.584[b]	-0.315[b]	0.008[ab]	0.001
Brand 2								
Non-blind	1.097[a]	0.183[b]	0.118[b]	-0.376[b]	-0.172[b]	-0.312[b]	-0.538[b]	0.001
Blind	1.363[a]	0.061[b]	0.008[b]	-0.551[b]	-0.121[b]	-0.422[b]	-0.336[b]	0.001
Brand 3								
Non-blind	0.799[a]	0.132[ab]	0.089[ab]	-0.093[b]	-0.556[b]	-0.174[b]	-0.265[b]	0.001
Blind	1.304[a]	0.293[b]	0.057[bc]	-0.438[bc]	-0.287[bc]	-0.621[c]	-0.309[bc]	0.001

[1] Table 4 presents the values of the overall perceptions of the different brands, $1/k\sum_{k=1}^{k=7} Attribute_k$.

Table 3 (cont.). Adjusted average importance of attributes for each brand across attributes

	Color	Aroma	Bouquet	Taste	Tartness	Harmony	Aftertaste	*F*-value
Brand 4								
Non-blind	0.868[a]	-0.014[b]	0.072[ab]	0.094[ab]	-0.455[b]	-0.207[b]	-0.358[b]	0.001
Blind	1.009[a]	0.002[b]	-0.109[b]	-0.163[b]	-0.238[b]	-0.260[b]	-0.238[b]	0.001

Notes: [a,b,c] The perceptual difference in this product's attributes are significantly different (at the 5% level) from the perceptual difference in the other product's attributes in a pair-comparison test; [ab] The perceptual difference in this product's attributes are not significantly different (at the 5% level) from the perceptual difference in product attribute *a* or dimension *b*; [bc] The perceptual difference in this product's attributes are not significantly different (at the 5% level) from the perceptual difference in product attribute *b* or dimension *c*.

The results in Table 3 indicate that in most cases there is no change in the relative importance of the attributes. In other words, attributes rated higher than the overall ratings of a specific brand in the blind test maintained that position in the non-blind test as well. With the exception of the aftertaste of Brand 1 that changed from positive to negative when the label was exposed, and the bouquet and taste of Brand 4 that changed from negative to positive with the brand information, the pattern between the two tests remained the same. When we conducted ANOVA tests to assess whether the relative importance had changed, we determined that the color of the wine had the highest rating across brands and across tests. Small changes were detected in bouquet and taste.

Another way to look at the effect of branding through these taste tests is to evaluate changes in brand equity. We used a simple measure of that factor by calculating the ratio of the overall evaluation, through overall preference, to overall perceptions, through the average measure discussed earlier. A ratio greater than 1 represents higher brand equity, indicating an overall preference for this brand. In other words, taking a uniform relative weight for the attributes with respect to formulating a preference should yield an overall preference score that equals the average perceptions. Table 4 presents the results of this measure.

Table 4. Changes in brand equity measures in the blind and non-blind taste tests

		Brand 1	Brand 2	Brand 3	Brand 4
Preference	Non-blind	4.51	5.49	6.18	6.54
	Blind	5.65	5.60	5.42	5.69
Perceptions	Non-blind	5.34	5.94	6.32	6.54
	Blind	5.96	6.18	5.86	6.21
Ratio	Non-blind	0.84	0.93	0.98	1.00
	Blind	0.95	0.91	0.92	0.92
Change		-10.9%	2.0%	5.8%	9.1%

Notes: Preference is the overall evaluation of the brand; Perceptions is the average overall perceived value of the brand; Ratio is the preference divided by perceptions; Change is the percentage of difference in the ratio of the non-blind to the blind taste tests.

The results indicate that branding has an effect in the expected direction. The value of the more reputable brands, Brand 3 and 4, increased when participants learned the brands' names, while the value of generic Brand 1 decreased as a result of this information.

Thus, the results of both the perceptual analysis and the brand equity measure provide support for the effect of branding on the perceptions of sensory evaluations. The pattern of the change is uniform across attributes. In other words, when respondents learned the name of the brand, we observed a shifter-type pattern indicative of a halo effect. We observed similar changes in perceived brand equity as well. These results also support the manipulation we used in this study – the product label – and are consistent with previous studies in this general area.

We also conducted a similar analysis for the differences in choice between the two taste tests. Figure 1 presents the results of this analysis.

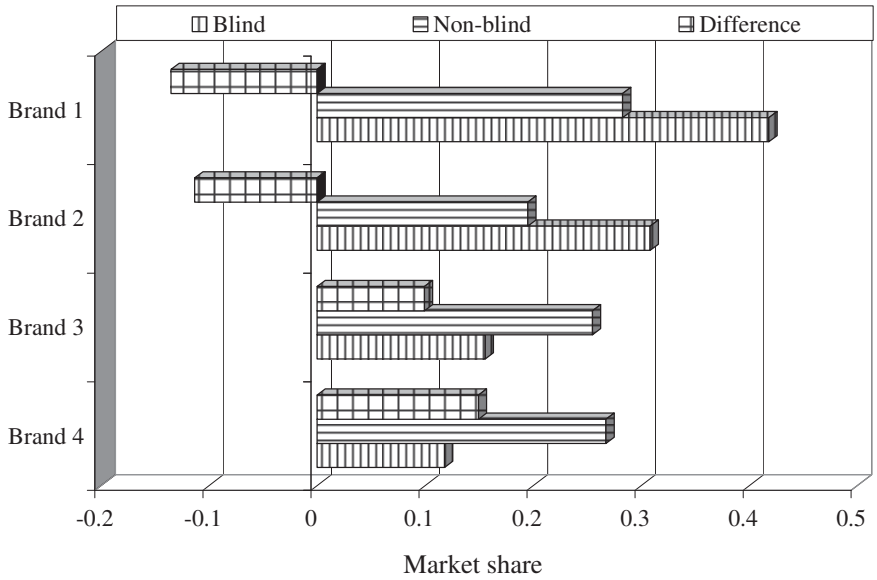

Fig. 1. Differences in market share between the two taste tests

Figure 1 shows that the market shares of Brands 3 and 4 increased in the non-blind taste test while the market shares of Brands 1 and 2 have decreased. This finding is consistent with the positive effect we observed in the perceptual analysis.

The next step in the analysis is the modeling of consumer choice in these two test scenarios. To accomplish this goal, we used an MNL model for all of the participants in the wine tasting. Table 5 presents the estimated parameters of the model. The data indicate that two wine attributes are salient in the choice process – taste and harmony. Thus, wine producers and marketers should focus on these attributes when targeting wine consumers similar to those in our study.

Table 5. Multinomial logit of the main and interactive effect of the non-blind taste test

	Main effect	Interaction non-blind test-attribute
γ_{M1} – Color	-0.039	
γ_{M2} – Aroma	-0.119	
γ_{M3} – Bouquet	0.119	
γ_{M4} – Taste	0.594*	
γ_{M5} – Tartness	0.101	
γ_{M6} – Harmony	0.670*	
γ_{M7} – Aftertaste	0.074	
γ_{I1NB} – Color		0.101
γ_{I2NB} – Aroma		0.132
γ_{I3NB} – Bouquet		-0.085
γ_{I4NB} – Taste		0.380
γ_{I5NB} – Tartness		0.030
γ_{I6NB} – Harmony		-0.030
γ_{I7NB} – Aftertaste		0.240
McFadden R^2	0.4668	
Log likelihood	-136.7413	

Notes: *Significant at the level of at least 5%. Interpreting the notations, for example, γ_{M1} – color means the parameter, γ, of the main effect, $_M$, of attribute 1 (color); γ_{I1NB} – color means the parameter, γ, of the interactive effect, $_I$, of attribute 1 (color) with the non-blind taste test, $_{NB}$.

The results of the MNL model in Table 5 (depicting equation (10) indicate that two attributes affect consumers' choice of wine. As for the effect of the blind vs. the non-blind taste test, there is no significant interaction effect of the non-blind test with the product's attributes. We observed only a main effect of the product's attributes. Therefore, in response to our first research question, the general effect of the blind vs. non-blind taste test resulted in a non-general interactive effect. Next, we analyzed the results of the triple interaction effect of brand, non-blind test, and the product's attributes, and present the results in Table 6.

Table 6. Multinomial logit coefficients of the main and triple interactive effects of the brand, attribute, and non-blind taste test

		Main effect	Interaction non-blind test-attribute-brand			
			Brand 1	Brand 2	Brand 3	Brand 4
Main effect	γ_{M1} – Color	-0.039				
	γ_{M2} – Aroma	-0.119				
	γ_{M3} – Bouquet	0.119				
	γ_{M4} – Taste	0.594*				

Table 6 (cont.). Multinomial logit coefficients of the main and triple interactive effects of the brand, attribute, and non-blind taste test

		Main effect	Interaction non-blind test-attribute-brand			
			Brand 1	Brand 2	Brand 3	Brand 4
Main effect	γ_{M5} – Tartness	0.101				
	γ_{M6} – Harmony	0.670*				
	γ_{M7} – Aftertaste	0.074				
Brand 1	γ_{I11NB} – Color		0.344			
	γ_{I12NB} – Aroma		-0.222			
	γ_{I13NB} – Bouquet		-0.059			
	γ_{I14NB} – Taste		0.396			
	γ_{I15NB} – Tartness		0.649			
	γ_{I16NB} – Harmony		0.278			
	γ_{I17NB} – Aftertaste		0.125			
Brand 2	γ_{I21NB} – Color			-0.182		
	γ_{I22NB} – Aroma			0.251		
	γ_{I23NB} – Bouquet			0.402		
	γ_{I24NB} – Taste			0.502		
	γ_{I25NB} – Tartness			0.530		
	γ_{I26NB} – Harmony			-0.125		
	γ_{I27NB} – Aftertaste			0.119		
Brand 3	γ_{I31NB} – Color				0.640**	
	γ_{I32NB} – Aroma				0.285	
	γ_{I33NB} – Bouquet				0.069	
	γ_{I34NB} – Taste				0.437	
	γ_{I35NB} – Tartness				0.128	
	γ_{I36NB} – Harmony				-0.433	
	γ_{I37NB} – Aftertaste				0.421	
Brand 4	γ_{I41NB} – Color					-0.108
	γ_{I42NB} – Aroma					-0.095
	γ_{I43NB} – Bouquet					-0.254
	γ_{I44NB} – Taste					0.794**
	γ_{I45NB} – Tartness					0.073
	γ_{I46NB} – Harmony					0.659
	γ_{I47NB} – Aftertaste					0.486*
McFadden R^2		0.5121				
Log Likelihood		-125.1329				

Notes: * Significant at the level of at least 5%; **significant at the level of at least 10%; Interpreting the notations is, for example, γ_{M1} – color means the parameter, γ, of the main effect, $_M$, of attribute 1 (color). γ_{I11NB} – color means the parameter, γ, of the triple interactive effect, $_I$, of Brand 1, with attribute 1 (color), and the non-blind taste test, $_{NB}$.

As Table 6 shows, beyond the main effect, there is a significant branding effect for Brands 3 and 4, the brands with higher brand equity or favorability. The triple interaction with color is significant for Brand 3, and taste and aftertaste are significant for Brand 4. Thus, the differences between the results in the blind and non-blind taste tests indicate that branding through blind and non-blind taste test has a significant effect on the relative importance of sensory attributes when choosing a product such as wine. This effect, however, is not uniform and varies with the strength of the brand. Nevertheless, our findings do support the suggested answer to the second research question.

Conclusion and discussion

The objective of this study is to examine whether brands have an effect on the relative importance of sensory-based attributes in the process of choosing a product. Despite the abundance of literature with respect to the effect of branding on the perceptions and preferences of consumers in the presence of such attributes, this notion was overlooked. It is imperative, therefore, to examine this effect in a choice context especially when consumers use taste tests to formulate preferences and make purchase decisions. Furthermore, from a theoretical perspective, there is no specific reason to assume that the relative importance of such attributes will change in light of branding information. Why

should taste be more salient when choosing a wine when one knows the brand as opposed to when one does not? Previous research examining the issue of changes in the relative importance of attributes on demand formation in the presence of information about health hazards indicates that there are changes in the relative importance attached to such factors (Heiman and Lowengart, 2008). We add to this body of literature by extending these results to a choice situation.

To address this issue, we extended a branding effect modeling approach (Keller and Lehamnn, 2005; 2006) by including another component of value to consumers – sensory-based attributes. We also included a provision to accommodate the blind vs. non-blind taste test, which allowed us to detect the role of branding and its interactive effect. Finally, we formulated an econometric model to empirically test the main and interactive effects of branding on sensory product attributes through two-factor and triple interaction effects. While we applied the model to a product in which the credence of its quality is paramount – wine – we maintain that the model can also be applied to other marketing related problems such as the case of experienced quality products (Nelson, 1974) and products that have fewer tangible attributes.

The modeling approach and the results of this study demonstrate that consumers' choice of wine, which in this case is based solely on sensory-based attributes, is affected by the branding of the product. While consumers' evaluations of these attributes will change in light of such conditions, we cannot directly conclude that it will also have an effect on the saliency of such attributes on the choice of wine. The stronger the brand, the more effect it will have on the relative importance of the sensory-based attributes in the choice process. This positive relationship is also consistent with the expected directional change documented in previous research (Heiman and Lowengart, 2008).

The results also highlight several managerial implications. First, wine marketers can use a blind taste test to determine consumers' true preferences in a given product. Then, when rolling out their wine to the market place with the brand, they should enhance consumers' taste perceptions about the wine. This step is, of course, above and beyond the traditional strategies of branding emphasizing the product's exogenous attributes in an effort to enhance brand equity. For example, the manufacturer of a premium brand can highlight the taste and aftertaste of its brand in marketing communications. Given that tasters selected wine based mainly on these two factors, emphasizing them in marketing communication programs should improve the chances of consumers choosing them and increase the brand's market share.

Further research can enhance the understanding of branding and sensory-based product evaluation by extending it to other product categories as well as including other, non-sensory attributes and examining the potential interaction between them.

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