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Does the Name Matter? Developing Brands for Patented Fruit Varieties

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Does the Name Matter? Developing Brands for Patented Fruit Varieties

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Abstract: Brands have largely been absent for fresh produce products; however, apples are one notable exception whereby varieties partially take the place of brands. Studying the role of brands in this market is particularly interesting given the introduction of several patented or so-called managed apple varieties. We develop an experiment to examine consumer response to a suite of apple varieties; treatments employ different branding strategies using different names for a new managed variety included in the experiment. Results suggest that the name does influence consumer valuation of the new variety and existing managed varieties, but has little impact on markets for traditional apple varieties.

Keywords: Apples; Brand personality; Experimental auctions; Fresh produce; Patents; Product introduction; Willingness to pay.

JEL Classification: M37, Q13

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1. Introduction

In recent years we have seen a dramatic rise in varietal innovation in the horticultural industry, most notably with the expansion in the number of patented or so-called "managed" tree fruit varieties.[1] Brown and Maloney (2009) highlight some of the most important patented apple varieties that are available globally and argue that new managed varieties will not cannibalize the shelf space of existing varieties, but instead will replace existing varieties. Such varieties are marketed by an organization that obtains an exclusive license on a patent held by a plant breeding program, and in turn agrees to pay fees for the trees and royalties on all fruit sold. Developing and marketing new varieties is essential to sales and profit growth in fruit markets. The ability to acquire intellectual property rights for these new varieties provides an interesting marketing opportunity for growers; introducing new varieties is one way to increase product differentiation in the apple market. Given the large number of new patented varieties that are under development, it is important for producers to understand the market potential for each new variety and to understand factors that influence consumer response to new varieties. In this paper, we investigate the ability of apple growers to exploit patent rights to plants with unique attributes by developing proprietary brand identities.

Most of the patented apple varieties that exist today were developed and are promoted by European organizations such as Better3Fruits, Consorzio Italiano Vivaisti, International Fruit Obtention, Inova, Kiku Ltd., and Varicom, among others. In addition, there have also been some managed apple varieties introduced by organizations in New Zealand (e.g., ENZA) and by university breeding programs in the United States. The passage of the Bayh-Dole Act in 1980 in the United States ceded the intellectual property rights for university-conducted research from the federal government to universities. This institutional innovation gave universities additional

incentives to undertake certain types of research, and in some cases an additional source of revenue as a result (Jensen and Thursby 2001; Bulut and Moschini 2009); however, the release of managed apple varieties by public universities has also created some friction among stakeholders in the U.S. apple industry. Lehnert (2010a, 2010b) discusses the development of the Next Best Thing, a grower cooperative that has an exclusive license to produce and market the apple variety SweeTango developed by the Plant Breeding Program at the University of Minnesota. Next Best Thing has spurred much enthusiasm for SweeTango among consumers, but they have also been subject to a legal dispute with growers in Minnesota that do not have access to the new variety.

Research shows that consumer response to new fruit varieties is driven largely by fruit size and sweetness (e.g., Parker and Zilberman 1993). However, apples are one of the few fresh produce items where varietal names take on the role of brands, and brands have been widely shown to influence consumer response in food and beverage markets (Woolfolk, Castellan, and Brooks 1983; Carpenter, Glazer, and Nakamoto 1994; Golan et al. 2001; Dhar and Foltz 2005; Galbraith 2007; Jin, Zilberman, and Heiman 2008). In particular, there is a large literature in marketing that examines the anthropomorphic nature of brands, referred to as brand personalities (e.g., Aaker, 1997; Aaker, Fournier, and Brasel 2004; Johar, Sengupta, and Aaker 2005). Others have extended research in this arena to better understand the interaction between brand personalities and individual characteristics (Fournier 1998; Swaminathan, Stilley, and Ahluwalia 2009).

According to Aaker (1997), there are five brand personalities: competence, excitement, ruggedness, sincerity, and sophistication. Three of these personalities map quite closely to the interpersonal attributes defined by Fletcher, Simpson, Thomas, and Giles (1999)—excitement

with vitality, sincerity with warmth, and sophistication with status. We argue that these three personalities, excitement, sincerity, and sophistication, can be used to describe the names of most apple varieties reasonably well. Figure 1 shows examples of modern apple varieties that fit with each brand personality, and apple varieties with names that use some combination of the brand personalities. Apple varieties that center on the excitement personality typically use sensory attributes in the name (e.g., Honeycrisp); varieties that focus on the sincerity personality tend to make reference to a person or place in the name (e.g., Fuji); and varieties that highlight the sophistication personality use names that highlight the appearance of the apple (e.g., Ambrosia). In addition, as shown in Figure 1, there are many new apple varieties that use names which position them between two of the personalities. For example, Crimson Crisp and Ginger Gold are varietal names that make reference to the both the excitement and sophistication personalities.

Keller and Lehmann (2006) examine a wide range of issues related to brands, including the role of brand personalities, and encourage new research to explore the value of different brand personalities and to assess whether the value varies by product category. Levy (1986) and Batra and Homer (2004) investigate the role of personalities for product categories, as well as brands within categories, and suggest that marketing strategies need to assess the interactions between brand and category personalities. Batra, Lenk, and Wedel (2006) describe products employing brand personalities that are aligned with the personality of the category as following a "points-of-parity" approach, and products adopting brand personalities that are differentiated from the personality of the category as following a "points of difference". Batra and Homer (2004) and Batra, Lenk, and Wedel (2006) find some evidence that brands which capture the personality of the category are preferred by consumers. In this article we extend the literature on

brand personalities with a focus on the fresh produce category, and examine the importance of brand personality on the introduction of a new managed apple that has not yet adopted a varietal name. Although fruit from this managed variety are not available commercially, we have access to a limited amount of fruit from a university breeding program and use it in a consumer experiment.

To better understand how consumers may respond to the new managed variety, we use experimental auctions to elicit willingness to pay (WTP) bids from participants in a laboratory setting. Experimental auctions are a novel way to assess consumer demand for new products, and have many advantages compared to other methods of measuring WTP (Lusk and Hudson 2004). Subjects in our experiment are introduced to five apple varieties, including the new managed variety that is given names reflecting different brand personalities in different treatments. The data collected in our experiment provide us with a unique opportunity to study the role of brand personalities in the fresh produce category, a category that traditionally has had few brands, but that has experienced an increased number of branding initiatives in recent years.

Findings from our analysis allow us to contribute to the marketing literature that examines brands in three significant ways. First, we estimate the impact of different brand personalities for a product that is not yet available commercially and does not yet have a brand. Second, we are able to provide results that allow for a better understanding of the interaction between brand and category personalities, and test the "points-of-parity" and "points-of-difference" hypotheses. Within the fresh produce category we examine how different brand personalities influence consumers' WTP for the new managed variety. Third, because growers' ability to develop a brand identity for a new variety is contingent on their obtaining a license to the underlying patent, our results shed some light on the expected value of the patent under

different branding strategies. Therefore, from a practical standpoint, our research will provide valuable information for producers considering an investment in managed apple varieties.

2. Personalities used in the branding of food products

More than 10,000 new food products have been introduced annually in recent years in the United States and Europe, and typically less than 25% are successful (Harris, 2002). Branding is an important component in the development of a new product, and much of the research that studies brand personalities has drawn attention to markets for food products. Aaker (1997) used the examples of California Raisins and Jolly Green Giant vegetables to motivate the brand personality construct. In addition, brand personality issues have been studied by Caprara, Barbaranelli, and Guido (2001) for various food products in Italy, by Vranešević and Stančec (2003) for paté, and by Batra and Homer (2004) for snack foods.

Although there is a growing interest in the branding of fresh produce items, brands have not been commonly used in this category (Kaufman, Handy, and McLaughlin 2000), and there has been relatively little research that studies the role of brand personalities for fruits and vegetables. Heiman and Goldschmidt (2004) and Jin, Zilberman, Heiman, and Li (2010) examined consumers' WTP for branded fresh produce items, and found that certain market segments responded to brands in this category. However, they did not explore the impact of different branding strategies or the value of alternative brand personalities for items in the fresh produce category.

The three brand personalities that are most closely aligned with food products are excitement, sincerity, and sophistication. Excitement is used to describe daring or spirited products, sincerity is used to describe honest or genuine products, and sophistication is used to describe glamorous or romantic products (Aaker 1997). We asked a group of 42 senior-level

undergraduate students majoring in marketing to describe the personalities that they would most closely identify with various product categories found in a grocery store. Table 1 lists 17 food categories and the students' responses describing the personalities that were associated with each category. Here we see that beer, ice cream, and snack foods are most associated with the excitement personality; baking ingredients, bread, breakfast cereals, canned goods, frozen meals, milk, and produce are associated with the sincerity personality; and cheese, ethnic foods, health foods, and wine are associated with the sophistication personality. We summarize these findings in Table 2 and highlight two marketing strategies—the "points-of-parity" and "points-of-difference" approaches—that might be used for brands within each category. Because the fresh produce category was identified as having a sincere personality, we assume that the personality for the apple category is also sincere. Therefore a "points-of-parity" approach for a brand within the apple category would employ a sincere brand personality, and a "points-of-difference" approach would employ either a sophisticated or exciting brand personality.

The same group of 42 undergraduate students were asked to identify the personalities that best describe 13 apple varieties. Table 3 shows that Dandee Red, Flavor Haven, Honeycrisp, Piñata, and SweeTango were considered to have an exciting personality by at least 60% of the respondents. By the same measure, Cortland, Granny Smith, McIntosh, and Williams were considered to have a sincere personality, and Burgundy Beauty was selected as the variety with a sophisticated personality. Empire, Fuji, and Pink Lady were not strongly linked to any of the personalities. Of the 13 apple varieties listed in Table 3, there are seven that are widely available commercially, three are managed or club varieties with limited distribution in the United States, and three are fictitious names that we employ in a consumer experiment to explore the role of brand personalities. The three fictitious names—Burgundy Beauty, Flavor Haven, and

Williams—are derived from existing varieties for pome or stone fruits, and were selected by a group of commercial apple growers and marketers as representative names for the three brand personalities.

We develop an experiment to test two hypotheses concerning brands for the new managed apple variety. Our first hypothesis is that a branding strategy that employs a "points-of-difference" approach will be preferred to one that employs a "points-of-parity" approach by growers. The fresh produce category is associated with a sincere personality by 75% of the students polled in our survey, and therefore our hypothesis is that varietal names that adopt exciting or sophisticated personalities will generate higher WTP measures. Our second hypothesis is related to the spillover effects of different brand personalities across the varieties included in our experiment. We include three traditional varieties and two patented varieties in our experiment, and we expect that different brand personalities for the new variety will have the greatest impact on consumers' valuation of the patented varieties. Both hypotheses are eminently testable through experimental methods. Next we outline the experiment that was used to collect data for estimating WTP using treatments that introduced subjects to the new managed variety under different brand personalities.

3. Experimental design

We develop a framed field experiment (Harrison and List, 2004) to examine consumer response to five apple varieties, including one new variety that will not be released commercially until 2015. We collect WTP information from subjects that are exposed to one of three treatments that provide different branding strategies for the new apple variety. Specifically, we use three different names for the new managed apple variety that are aligned with the three brand personalities described above. Eliciting consumers' WTP under these different brand

personalities will help producers assess the market potential for the new variety and understand the value of obtaining a license that would give them access to fruit protected by a patent. In addition, estimates using these unique data allow us to shed some new light on the interaction between personalities for product categories and individual products.

We recruited only adult (non-student) subjects and paid participants $25 each. The subjects were recruited through advertisements posted on *craigslist* and in the primary news publication distributed to staff members at our university. Subjects were seated randomly at individual computer terminals with privacy shields, and were informed that all decisions they made would be kept strictly confidential. A maximum of 24 computer terminals were available, and the sessions ranged in size from 16 to 24 subjects. After signing a consent form, participants were given a brief introduction of the experiment, which included the amount of money they would earn and rules of the experiment. They were also encouraged to view displays of the five apple varieties included in the experiment at the front of the laboratory. Before the auctions commenced, participants were told that the apples were harvested in the fall of 2010, were produced in the United States, and were grown using conventional (non-organic) management practices.

In all treatments we provided identical information for the five apple varieties, and subsequently conducted an auction for one pound of each variety (where the order of the varieties was randomized in each session). For each variety we displayed one pound of fruit at the front of the laboratory, showed a picture of the fruit in the tree, and described key technical details including brix, pressure at harvest (as a measure of firmness), and suggested uses (baking, cooking, and eating). In addition, all subjects in all treatments were given a tasting slice of each apple variety before they placed a bid in the auction.[2] We began each session with a practice

round so as to teach and demonstrate how the WTP auctions would be conducted. In this practice round subjects submitted bids for a pen and became familiar with the bidding process that was used in the auctions for the apples.

A computerized sealed-bid first-price English auction was used to elicit maximum WTP for the varieties from our subjects. In addition, participants were informed that one of the auctions would result in an actual transaction for the highest bidder, and that auction would be randomly chosen after all auctions were held. In this case, the subject with the highest bid for the randomly selected auction would buy one pound of fruit at the price they submitted (and the value of their bid was subtracted from their participation endowment). Lusk, Feldkamp, and Schroeter (2004) reviewed four of the common experimental auction procedures used by economists to elicit WTP data, and their empirical findings show large differences in subject valuations across auction mechanisms. Overall, valuations in the English auction (that did not use a sealed bid) were higher than those in the random *n*th auction, lower than those in the second price auction, and comparable to those in the Becker-DeGroot-Marschak auction. Elyakime, Laffont, Loisel and Voung (1994) showed that the sealed-bid first-price auction is an incentive compatible method of eliciting WTP, and that the equilibrium strategy for a participant is to choose a reservation price equal to their private value. An additional advantage of our experimental approach is that the procedure is relatively easy for subjects to understand (Kagel 1995; Lusk 2003).

4. Data and empirical model

A total of 194 adult (non-student) subjects participated in the experimental sessions, and given five bids per subject, 970 observations were collected and used in our empirical analysis. In each auction a bid clock was used starting at $0.00 per pound and increased by $0.10

increments every second with a maximum bid of $5.00 per pound. After all auctions were completed, participants completed a computerized questionnaire eliciting demographic information and information describing purchase habits. Demographic variables included weight, height, age, income, and education; variables related to purchase habits included frequency of apple consumption, where consumer buy apples, desirability of specific attributes in apples, and likeability of various fruits. The complete list of 35 survey questions is presented in the Appendix.

All subjects participated in auctions for one pound of Empire, Fuji, Honeycrisp, Piñata, and a new managed variety. This suite of apples was chosen so as to represent a traditional variety (Empire), a newer variety (Fuji), a new variety (Honeycrisp), and another patented variety (Piñata). The three treatments assigned three different names, or personalities, for the new variety. Based on responses shown in Table 3, we used the name Flavor Haven to represent an exciting personality, Williams was used to describe a sincere personality, and Burgundy Beauty was used to represent a sophisticated personality.

Table 4 provides descriptive statistics that depict bidding activity for the five varieties and demographic information based on responses to the first 14 questions in the survey. Here we see that the mean bid for one pound of Empire apples was $0.99 per pound. The average bid was $1.19 per pound for Fuji, and approximately $1.13 per pound for both Honeycrisp and Piñata. Across all treatments, the average bid for the new variety was $1.25 per pound, and this suggests that the variety has the potential to generate a 12% price premium over the other four varieties included in the experiment. In addition, Table 4 shows the average bids for the new variety using the different names, and here we see that consumers' WTP increased substantially when the name Flavor Haven was used (a price increase of 27% compared to the average of the other

four varieties). The bottom portion of Table 4 shows the responses to the demographic questions included in the survey. The average age of subjects in our sample was 42.7, which was comprised of 79% females and 81% Caucasians, the average Body Mass Index (BMI) was 27.2, 36% had children in the household, 83% were the primary shoppers, and the average number of fruit servings per day was 2.05 (subjects were instructed that one serving was equal to one cup).

Table 5 outlines some additional descriptive statistics for consumer responses to questions 15 through 35 on the survey—these questions elicited information about subjects' habits related to fruit purchasing patterns. Per capita weekly consumption of apples averages 4.4 during the period between September and December, and drops to 2.9 during the other months. Survey data show that approximately 73% of consumers purchase apples at the grocery store, but that the likelihood of buying a new variety is higher at a farm stand. Nearly 75% of respondents said that there is an appropriate number of apple varieties available at the grocery store; 11% said that there are too few and 14% said there are too many. We asked subjects to rate the relative importance of nine attributes for apples (color, sweet taste, tart taste, size, region, crispness, storability, name, and appearance) on a scale between 1 and 5. On average, crispness was the most important attribute, followed by appearance and sweet taste. We also asked subjects to rank their relative preferences between apples, bananas, grapes, oranges, peaches, and strawberries. There was a small range of relative rankings across fruit types, but apples were selected highest, followed by strawberries and then grapes. Because questions 15 to 35 focused on food purchasing habits, we do not include this information in our regression analysis to avoid potential endogeneity issues.

Because we ask subjects to reveal their maximum WTP for a pound of each apple variety, and because bids for each commodity are bounded between $0 and $5, we employ a Tobit model

to estimate the value of different branding strategies for the new managed variety. Tobit models are commonly adopted for estimating WTP when the dependent variable is not binary and has a large number of at the limit, which is often zero in the case of economic variables (Tobin, 1958). Furthermore, Tobit models have been widely used by agricultural economists to study consumer response to new food products or labels (e.g., Drichoutis, Lazaridis, and Nayga, 2009; Kanter, Messer, and Kaiser 2009). Use of this model assumes that zero and positive WTP observations are the outcome of a unique choice, or that the same factors affect both the decision to place a bid in an auction and the size of the bid.

The optimal WTP for variety j in branding treatment t for individual i, denoted as WTP^*_{jti}, is expressed as a function of the variety V_j, the branding approach for the new variety N_t, and the respondents' personal characteristics X_i. In equation (1) we assume a linear functional form for the WTP equation. However, we observe the variable WTP_{jti} which is related to WTP^*_{jti} , and the relationship between the two is shown in equation (2).

(1) $WTP^*_{jti} = \alpha + \Sigma_j \boldsymbol{\beta} V_j + \Sigma_j \Sigma_t \boldsymbol{\gamma} V_j N_t + \Sigma_i \boldsymbol{\delta} X_i + \varepsilon_{jti} + \upsilon_i$

(2) $WTP_{jti} = \max\{0, WTP^*_{jti}\}$

In the model specified above, $\boldsymbol{\beta}$ is a vector of parameters describing the effects for specific apple varieties (relative to the Empire variety), $\boldsymbol{\gamma}$ is a vector of parameters describing the interaction effects between varieties and branding approaches for the new variety (relative to the Empire variety and the Williams brand), and $\boldsymbol{\delta}$ is a vector of parameters for consumer characteristics. We include interaction effects to examine spillover effects from the branding approaches on each variety. For the new variety, we are interested in the direct marketing implications of using the different brand personalities. We also include interaction terms for three other varieties to determine if the branding approach for the new variety may have broader

impacts on consumer response within the apple category. Because individuals submitted bids for different apples in the experiment, we adjusted the Tobit model to incorporate random effects to account for the panel nature of the data; υ_i is an individual specific disturbance for subject *i*. The overall error term ε_{jti} is assumed to follow a Normal distribution with mean zero and standard deviation σ. The estimation is based on OLS regression techniques with an adjustment to correct for bias in the estimated parameters (see Greene 1983 for additional information).

5. Results and implications

In this section we present the estimation results from applying the WTP model developed above to the data collected in our experiment. Results are shown from three model specifications that examine various interaction terms between varieties and brand personalities; all models use bid data from all 194 subjects. The coefficients in the first four rows in Table 6 describe consumers WTP for varieties relative to the Empire variety, the next eight rows examine the interaction between brands and varieties relative to the Empire variety and the Williams brand, and the final 17 rows show the estimated coefficients for selected demographic variables from our survey.

The first column in Table 6 presents the baseline results from our experiment. The intercept estimate is $1.04 per pound and the coefficients for the different varieties—representing consumers' marginal WTP for the varieties—range between $0.15 and $0.28 per pound and are all statistically significant. These results show that the average additional WTP for Fuji, Honeycrisp, and Piñata is $0.18 relative to Empire, and that the new variety yields $0.10 more or a price premium of 58%. The second column in Table 6 reports WTP estimates for the varieties plus it includes interaction terms for the new variety with two of the three branding approaches. Here we see that the estimated coefficient representing WTP for the new variety

falls to $0.21, yet the estimated coefficient for the two interaction terms are quite different. Using the name Burgundy Beauty (relative to using the name Williams) has no statistically significant effect on the WTP for the new variety, whereas using the name Flavor Haven does have a statistically significant effect and leads to a combined marginal WTP of approximately $0.44 per pound.

The third column in Table 6 shows results for a model that includes interaction terms for all variety-brand combinations. The estimated coefficient describing the marginal WTP for the Fuji variety increases to $0.26 and remains statistically significant at the 1% level; however, the coefficients for Honeycrisp and the new variety are no longer statistically significant at the 1% level. In this specification, the coefficient for Piñata is negative and not statistically significant at the 10% level. Similar to the results from the second column, the name Flavor Haven has a positive and statistically significant effect of the WTP for the new variety while the name Burgundy Beauty has a much smaller coefficient that is not significant at the 10% level. Results in the third column also show that the names Flavor Haven and Burgundy Beauty for the new variety have small and statistically insignificant effects on consumers' WTP for Fuji and Honeycrisp. More importantly, and perhaps surprisingly, the two names have a statistically significant effect on consumers' WTP for the Piñata variety.

These results indicate that the use of different brand personalities had very little spillover effects in the markets for the traditional apple varieties included in the experiment, yet had statistically significant impacts for the new variety and Piñata, the other managed variety included in the experiment. Both the exciting and sophisticated brand personalities had statistically significant effects on consumers' WTP for Piñata, and the effects were higher with the use of the name Flavor Haven. This finding suggests that adopting an exciting brand

personality would be best for the new variety, and it would be also be best for the other competing managed variety. The use of a brand with an exciting personality for the new variety increases consumers' valuation for the other managed variety with an exciting personality. Overall, the results suggest that consumers may consider managed apple varieties to be in a separate market from traditional varieties, and that the impacts from branding strategies for managed varieties will be greatest among these very closely-related products.

Although the coefficients for demographic variables included in the model do not have a statistically significant impact on consumers' WTP for the apples included in our experiment, the signs for many of the estimates were expected. The results in Table 6 indicate that WTP decreases with age, and for various ethnic populations, households with children, primary shoppers, vegetarians, and with the overall consumption rate of fruit. It is somewhat counter-intuitive to see a negative coefficient on the vegetarianism variable; however, it may be the case that vegetarians are more cognizant of the relative prices for various fruits and vegetables, and submitted lower than average bids for the apples in our experiment. Our results also show that consumers' WTP increased for females, subjects with higher levels of education, increased for subjects that indicated a preference for organic products and meals at restaurants, and increased for those with a garden at home.

6. Conclusion

An experiment is developed here to examine consumers' WTP for five apple varieties, including one new patented variety that has not yet been released commercially. Extending work in the marketing literature that examines the role of brand personalities, we include three treatments to estimate the effect that the brand, in this case the varietal name, has on consumer valuation. Our research shows that brands have the capacity to be important in the fresh produce

category, a category with limited use of brands. When this new managed apple variety was introduced to consumers with an exciting personality it generated a $0.44 per pound price premium over the Empire variety; when introduced with a sophisticated personality it did not generate a significant price premium over those observed for Fuji, Honeycrisp, and Piñata (all relative to the Empire variety). Furthermore, we find that the brand used for the new variety influences consumer valuation of the managed apple varieties, but has little impact on markets for traditional apple varieties.

Our research also sheds new light on the relationship between brand personalities and category personalities, and follows in a vein of research noted by Keller and Lehmann (2006). Based on the assumption that the fresh produce category has a sincere personality, we conduct a test of hypotheses proposed in Batra and Homer (2004) and Batra, Lenk, and Wedel (2006) concerning branding strategies. A "points-of-difference" approach suggests that a brand personality should draw attention to product characteristics that are not common within the category, whereas a "points-of-parity" approach suggests that a brand should remind consumers of the similarities between the brand and the category. Batra and Homer (2004) argue that brands will have a greater impact when they fit consumer schemas about the benefits derived from the product category. Laboratory experiments focusing on snack foods yielded some evidence supporting the "points-of-parity" hypothesis in Batra and Homer (2004). Here we find that using the brand personalities that differ from the category personality led to higher valuation of the new product". At a minimum, this finding suggests that the optimal brand personality strategy may depend on the category, and these questions need to be carefully considered across categories. Several of the new managed apple varieties seem to be following this path, yet not

all as evidenced in Figure 1. We find strong evidence for using a "points-of-difference" strategy for this new managed apple variety.

Ultimately the success of a new product will depend on consumer response, and it is especially difficult to measure how well a new apple variety will perform in the marketplace given the long lag between adoption and fruit sales. Our analysis collects consumer valuations on a new variety using different branding strategies and offers useful information for apple producers and plant breeders on the market potential for new managed apple varieties. The results presented here also provide a starting point for additional research that investigates the value of a license required by producers to be eligible to grow and market patented apple varieties.

Footnotes

[1] Some examples of managed apple varieties available in Europe and the United States include Ambrosia, Cameo, Kanzi, Kiku, Jazz, Junami, Pacific Rose, Piñata, Pink Lady, and Red Prince (Bareuther, 2011; Brown and Maloney 2009).

[2] We did provide subjects with an opportunity to record "tasting notes" for the apples included in the experiment, but did not require them to complete this activity. It would have been interesting to make the tasting analysis more formal and then decompose the sensory and brand effects for the new variety in the econometric model. However, for the most part, the tasting notes showed that subjects described the new variety as relatively "sweet" and "crispy", which were two of the parameters given for the apple varieties in our experiment.

References

Aaker, J.A. 1997. "Dimensions of Brand Personality." *Journal of Marketing Research* 34(3): 347–356.

Aaker, J.A., S. Fournier, and S.A. Brasel. 2004. "When Good Brands Do Bad." *Journal of Consumer Research* 31(1): 1–16.

Bareuther, C.M. 2011. "Washington Apples: Variety Report." *Produce Business* 27(8): 42–50.

Batra, R., and P.M. Homer. 2004. "The Situational Impact of Brand Image Beliefs." *Journal of Consumer Psychology* 14(3): 318–330.

Batra, R., P. Lenk, and M. Wedel. 2006. "Separating Brand from Category Personality." University of Michigan, Ann Arbor, MI. Available at: http://webuser.bus.umich.edu/plenk/Brand%20Personality.pdf

Brown, S.K., and K.E. Maloney. 2009. "Making Sense of New Apple Varieties, Trademarks and Clubs: Current Status." *New York Fruit Quarterly* 17(3): 9–12.

Bulut, H., and G. Moschini. 2009. U.S. Universities' Net Returns From Patenting and Licensing: A Quantile Regression Analysis." *Economics of Innovation and New Technology* 18(2):123–137.

Caprara, G.V., C. Barbaranelli, and G. Guido. 2001. "Brand Personality: How to Make the Metaphor Fit?" *Journal of Economic Psychology* 22(3): 377–395.

Carpenter, G.S., R. Glazer, and K. Nakamoto. 1994. "Meaningful Brands from Meaningless Differentiation." *Journal of Marketing Research* 31(3): 339–350.

Dhar, T., and J.D. Foltz. 2005. "Milk by Any Other Name: Consumer Benefits from Labeled Milk." *American Journal of Agricultural Economics* 87(1): 214–228.

Drichoutis, A.C., P. Lazaridis, and R.M. Nayga. 2009. "Would Consumers Value Food-Away-From-Home Products with Nutritional Labels?" *Agribusiness: An International Journal* 25(4): 550–575.

Elyakime, B., J.J. Laffont, P. Loisel, and Q. Vuong. 1994. "First-Price Sealed-Bid Auctions with Secret Reservation Prices." *Annales d'Economie et de Statistique* 34: 115–141.

Fletcher, G.J.O., J.A. Simpson, G. Thomas, and L. Giles. 1999. "Ideals in Intimate Relationships." *Journal of Personality and Social Psychology* 76(1): 72–89.

Fournier, S. 1998. "Consumers and Their Brands: Developing Relationship Theory in Consumer Research." *Journal of Consumer Research* 24(4): 343–373.

Galbraith, D. 2007. "Produce Variety Names Run Gamut from Godly to Ghoulish." *The Packer*. Available at: http://dangalbraith.blogspot.com/2007/10/dan-galbraith-editorialopinion-columns.html

Golan, E., F. Kuchler, L. Mitchell, C. Greene, and A. Jessup. (2001). "Economics of Food Labeling." *Journal of Consumer Policy* 24 (2):117-184.

Greene, W.H. 1983. "Estimation of Limited Dependent Variable Models by Ordinary Least Squares and the Method of Moments." *Journal of Econometrics* 21(2): 195–212.

Harris, J.M. 2002. "Food Product Introductions Continue to Decline in 2000." *FoodReview* 25(1): 24–27.

Harrison, G.W., and J.A. List. 2004. "Field Experiments." *Journal of Economic Literature* 42(4): 1009–1055.

Heiman, A., and E.E. Goldschmidt. 2004. "Testing the Potential Benefits of Brands in Horticultural Products: The Case of Oranges." *HortTechnology* 14(1): 136–140.

Jensen, R., and M. Thursby. 2001. "Proofs and Prototypes for Sale: The Licensing of University Inventions." *American Economic Review* 91(1): 240–259.

Jin, Y.H., D. Zilberman, and A. Heiman. 2008. "Choosing Brands: Fresh Produce Versus Other Products." *American Journal of Agricultural Economics* 90(2): 463–475.

Jin, Y.H., D. Zilberman, A. Heiman, and Y. Li. 2011. "Willingness to Pay for Brands: A Cross-region, Cross-category Analysis." *Agricultural Economics* 42(2): 141–152.

Johar, G.V., J. Sengupta, and J. Aaker. 2005. "Two Roads to Updating Brand Personality Impressions: Trait versus Evaluative Inferencing." *Journal of Marketing Research* 42(4) 458–469.

Kagel, J. H. 1995. "Auctions: A Survey of Experimental Research." In J.H. Kagel and A.E. Roth, eds. *Handbook of Experimental Economics*. Princeton University Press, pp. 501–585.

Kanter, C., K.D. Messer, and H.M. Kaiser. 2009. "Does Production Labeling Stigmatize Conventional Milk?" *American Journal of Agricultural Economics* 91(4): 1097–1109.

Kaufman, P., C.R. Handy, and E.W. McLaughlin. 2000. "Understanding the Dynamics of Produce Markets: Consumption and Consolidation Grow." USDA/ERS AIB-758. Washington, DC.

Keller, K.L., and D.R. Lehmann. 2006. "Brands and Branding: Research Findings and Future Priorities." *Marketing Science* 25(6): 740–759.

Lehnert, R. 2010a. “Not so Sweet Tangle: Minnesota growers sue over club agreement.” *Good Fruit Grower*. August 2010. pp. 8–9.

Lehnert, R. 2010b. “Minnesota growers feel excluded: Public-developed SweeTango released as managed variety.” *Good Fruit Grower*. August 2010. pp. 10–11.

Levy, S.J. 1986. “Meanings in advertising stimuli.” In J. Olson and K. Sentis (Eds.), *Advertising and Consumer Psychology* (pp. 214–226). Westport, CT: Praeger.

Lusk, J.L. 2003. “Using Experimental Auctions for Marketing Applications: A Discussion.” *Journal of Agricultural and Applied Economics* 35(2): 349–360.

Lusk, J.L., T. Feldkamp, and T.C. Schroeder. 2004. “Experimental Auction Procedure: Impact on Valuation of Quality Differentiated Goods.” *American Journal of Agricultural Economics* 86(2): 389–405.

Lusk, J.L., and D. Hudson. 2004. “Willingness-to-Pay Estimates and Their Relevance to Agribusiness Decision Making.” *Review of Agricultural Economics* 26(2): 152–169.

Parker, D.D., and D. Zilberman. 1993. “Hedonic Estimation of Quality Factors Affecting the Farm-Retail Margin.” *American Journal of Agricultural Economics* 75(2): 458–466.

Swaminathan, V., K.M. Stilley, and R. Ahluwalia. 2009. “When Brand Personalities Matter: The Moderating Role of Attachment Styles.” *Journal of Consumer Research* 35(6): 985–1002.

Tobin, J. 1958. “Estimation of Relationships for Limited Dependent Variables.” *Econometrica* 26(1): 24–36.

Vranešević, T., and R. Stančec. 2003. “The Effect of the Brand on Perceived Quality of Food Products.” *British Food Journal* 105(11): 811–825.

Woolfolk, M.E., W. Castellan, and C. Brooks. 1983. “Pepsi Versus Coke: Labels, Not Tastes, Prevail.” *Psychological Reports* 52 (1): 185–186.

Table 1. Student ratings of food and beverage category personalities, N=42

Category	Excitement	Sincerity	Sophistication
Baking ingredients	7 (17.0%)	33 (80.5%)	1 (2.5%)
Non-alcoholic beverages (non-dairy)	19 (47.5%)	19 (47.5%)	2 (5.0%)
Beer	35 (83.3%)	5 (12.0%)	2 (4.7%)
Bread	2 (4.9%)	38 (92.7%)	1 (2.4%)
Breakfast cereals	15 (36.6%)	25 (61.0%)	1 (2.4%)
Canned goods	2 (5.1%)	34 (87.2%)	3 (7.7%)
Cheese	5 (11.9%)	14 (33.3%)	23 (54.8%)
Ethnic foods	15 (36.6%)	6 (14.6%)	20 (48.8%)
Frozen meals	6 (15.0%)	32 (80.0%)	2 (5.0%)
Health foods	1 (2.6%)	13 (33.3%)	25 (64.1%)
Ice cream	35 (85.4%)	6 (14.6%)	0 (0%)
Meat	13 (31.0%)	15 (35.7%)	14 (33.3%)
Milk	3 (7.3%)	37 (90.2%)	1 (2.5%)
Produce	1 (2.5%)	30 (75.0%)	9 (22.5%)
Ready-to-eat meals & desserts	18 (45%)	16 (40.0%)	6 (15.0%)
Snack foods	37 (90.2%)	4 (9.8%)	0 (0%)
Wine	5 (12.2%)	1 (2.4%)	35 (85.4%)

Table 2. Food and beverage categories, personalities, and branding strategies

Food and Beverage Category	Category Personality	Corresponding Interpersonal Relationship Factors	Strategies for Brand Personalities	
			Points of parity	Points of difference
Beer, Ice cream, Snack foods,	Excitement	Vitality	Excitement	Sincerity Sophistication
Baking ingredients, Bread, Breakfast cereals, Canned goods, Frozen meals, Milk, Produce	Sincerity	Warmth	Sincerity	Excitement Sophistication
Cheese, Ethnic foods, Health foods, Wine	Sophistication	Status	Sophistication	Excitement Sincerity

Table 3. Personality associations for selected apple varieties by students, N=42

Apple Variety	Excitement	Sincerity	Sophistication
Burgundy Beauty	4 (9.8%)	4 (9.8%)	33 (80.4%)
Cortland	1 (2.4%)	37 (90.2%)	3 (7.4%)
Dandee Red	25 (61.0%)	10 (24.4%)	6 (14.6%)
Empire	3 (7.3%)	16 (39.0%)	22 (53.7%)
Flavor Haven	25 (61%)	8 (19.5%)	8 (19.5%)
Fuji	15 (36.6%)	12 (29.3%)	14 (34.1%)
Granny Smith	4 (9.7%)	35 (85.4%)	2 (4.9%)
Honeycrisp	22 (55.0%)	10 (25.0%)	8 (20.0%)
McIntosh	3 (7.3%)	32 (78.1%)	6 (14.6%)
Piñata	36 (87.8%)	1 (2.4%)	4 (9.8%)
Pink Lady	22 (53.7%)	1 (2.4%)	18 (43.9%)
SweeTango	31 (75.6%)	2 (4.9%)	8 (19.5%)
Williams	0 (0%)	35 (85.4%)	6 (14.6%)

Table 4. Summary statistics for data collected from subjects (included in regressions)

Variable	Survey Question #	N	Mean	Standard Deviation	Minimum	Maximum
WTP ($ per pound)						
Overall		970	1.14	0.78	0	4.00
Empire		194	0.99	0.71	0	3.70
Fuji		194	1.19	0.77	0	4.00
Honeycrisp		194	1.13	0.76	0	3.20
Piñata		194	1.13	0.82	0	3.90
New variety		194	1.25	0.80	0	3.50
Burgundy Beauty (Sophisticated)		64	1.18	0.80	0	3.00
Flavor Haven (Exciting)		64	1.41	0.85	0	3.50
Williams (Sincere)		66	1.15	0.74	0	3.00
Demographic Variables						
Age	1	194	42.732	10.432	19	63
Female	2	194	0.799	0.401	0	1
Caucasian	3	194	0.814	0.389	0	1
African	3	194	0.021	0.142	0	1
Asian	3	194	0.098	0.297	0	1
Hispanic	3	194	0.010	0.101	0	1
Native	3	194	0.010	0.101	0	1
Other race	3	194	0.046	0.210	0	1
Income	4	194	2.165	0.905	1	5
Education	5	194	2.820	1.191	1	5
Weight (pounds)	6	194	167.995	44.081	100	300
Height (inches)	7	194	65.835	3.289	56	75
BMI		194	27.233	6.586	16.05	48.71
Household with children	8	194	0.361	0.480	0	1
Primary shopper	9	194	0.825	0.380	0	1
Vegetarian	10	194	0.031	0.173	0	1
Organic consumer	11	194	0.742	0.438	0	1
Restaurant goer	12	194	2.505	2.175	0	16
Garden owner	13	194	0.464	0.499	0	1
Fruit per day	14	194	2.052	1.179	0	10

Table 5. Summary statistics for data collected from subjects (not included in regressions)

Variable	Survey Question #	N	Mean	Standard Deviation	Minimum	Maximum
Apple and Fruit Purchase Habits						
Apples in winter	15	194	4.356	2.825	0	15
Apples in summer	16	194	2.856	2.791	0	20
Likelihood of grocery purchases	17	194	0.727	0.446	0	1
Likelihood of farmer market purchases	17	194	0.082	0.275	0	1
Likelihood of farm stand purchases	17	194	0.191	0.393	0	1
Buy new variety at grocery store	18	194	2.835	1.124	1	5
Buy new variety at farm stands	19	194	3.505	1.047	1	5
Too few varieties available	20	194	0.113	0.317	0	1
Appropriate number of varieties available	20	194	0.747	0.435	0	1
Too many varieties available	20	194	0.139	0.346	0	1
Color	21	194	3.495	1.105	1	5
Sweet taste	22	194	3.907	0.996	1	5
Tart taste	23	194	3.546	1.122	1	5
Size	24	194	3.309	0.978	1	5
Region	25	194	3.062	1.432	1	5
Crispness	26	194	4.376	0.830	1	5
Storability	27	194	3.598	1.246	1	5
Catchy name	28	194	1.825	1.099	1	5
Appearance	29	194	4.103	0.825	1	5
Apples	30	194	4.479	0.748	2	5
Bananas	31	194	3.933	1.113	1	5
Grapes	32	194	3.969	1.005	1	5
Oranges	33	194	3.876	0.966	1	5
Peaches	34	194	3.959	1.103	1	5
Strawberries	35	194	4.289	1.021	1	5

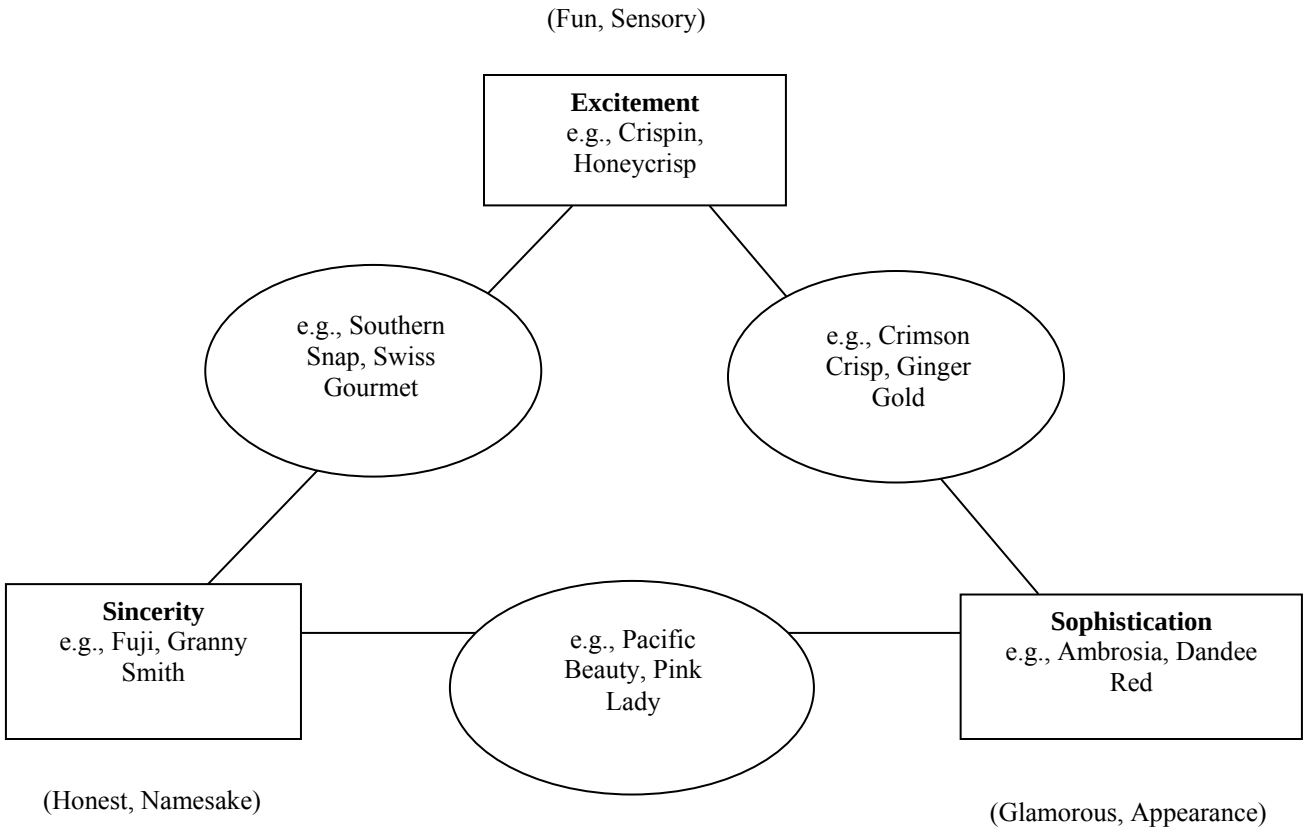
Table 6. Willingness to pay estimates using a random effects Tobit model

Explanatory variables	**Model 1** (only apple varieties)	**Model 2** (interaction terms for new variety)	**Model 3** (all interaction terms)
Intercept	1.042**	1.047**	1.046**
Apple varieties			
Fuji	0.228***	0.228***	0.260***
Honeycrisp	0.158***	0.158***	0.137*
New variety	0.279***	0.205***	0.166**
Piñata	0.149***	0.149***	-0.048
Interaction terms[a]			
Fuji-Burgundy Beauty			-0.084
Fuji-Flavor Haven			-0.016
Honeycrisp-Burgundy Beauty			-0.038
Honeycrisp-Flavor Haven			0.099
New variety-Burgundy Beauty		-0.008	0.021
New variety-Flavor Haven		0.230**	0.322***
Piñata-Burgundy Beauty			0.257**
Piñata-Flavor Haven			0.340***
Demographics			
Age	-0.009	-0.009	-0.008
Female	0.041	0.039	0.037
African-American	0.096	0.077	0.049
Asian-American	-0.252	-0.253	-0.252
Hispanic	-0.404	-0.390	-0.360
Native American	-0.115	-0.098	-0.087
Other race	0.045	0.039	0.036
Income	-0.015	-0.016	-0.016
Education	0.058	0.059	0.062
BMI	0.006	0.005	0.005
Household with children	-0.026	-0.024	-0.015
Primary shopper	-0.127	-0.127	-0.126
Vegetarian	-0.365	-0.363	-0.363
Organic consumer	0.131	0.128	0.124
Restaurant goer	0.032	0.032	0.033
Garden owner	0.123	0.122	0.119
Fruit per day	-0.051	-0.051	-0.051

Note: * denotes statistical significance at the 10% level, ** denotes statistical significance at the 5% level, and *** denotes statistical significance at the 1% level.

[a] We used the name "Williams" to represent a sincere brand, the name "Flavor Haven" to represent an exciting brand, and the name "Burgundy Beauty" to represent a sophisticated brand.

Figure 1. Brand personalities and attributes associated with selected apple varieties



Appendix: Survey Questions.

1. What is your age? _____
2. Are you male ____ female _____?
3. What race are you? ____ Caucasian ____ African American ___ Asian ___ Hispanic ____ Native American ___ Other
4. What is your household income level? ____ less than $40,000 ___ $40,000-$80,000 ____ $80,000 - $120,000 ___ $120,000-$160,000 ___ over $160,000
5. What is the highest education level that you have achieved? __ High School __ Associates Degree __ College Degree __ Masters Degree __ Doctorate
6. What is your approximate weight in pounds? ____
7. What is your height in feet and inches (e.g., 5' 9")? ____ feet ____ inches
8. Do you have children under 18 years old living at home? Yes____ No _____
9. Are you the primary food shopper in your family? Yes ____ No ____
10. Are you a Vegetarian or Vegan? Yes ____ No ____
11. How many meals per week do you purchase from a restaurant or a cafeteria? _____
12. Do you have a fruit and/or vegetable garden at home? Yes _____ No _____
13. Do you ever buy organic fruits and vegetables? Yes ___ No ____
14. Approximately how many servings of fruit (a serving is approximately one medium sized apple or half a cup) do you eat per day? ____
15. Approximately how many apples do you eat per week during the months between September and December? _____
16. Approximately how many apples do you eat per week during the months between January and August? _____
17. Where do you primarily purchase apples? Grocery store ____ Farmers' market ____ Farm Stand _____
18. How likely are you to purchase a new apple variety (one that you have not tried before) while shopping for food at the **grocery store**? ____ Not at all likely ____ Not very likely ____ Somewhat likely ____Likely _____ Very likely
19. How likely are you to purchase a new apple variety (one that you have not tried before) while shopping for food at a **farm stand or a farmers' market**? ____ Not at all likely ____ Not very likely ____ Somewhat likely ____Likely _____ Very likely

20. What is your opinion on the number of apple varieties that are currently available?
Too few varieties_____ The correct number of varieties_____ Too many varieties_____

For questions 21 to 28: On a scale of 1 (not important) to 5 (very important), please rank how much you weight you place on the following attributes when purchasing apples:

21. Color ___
22. Sweet taste ___
23. Tart taste ____
24. Size _____
25. Region where they were produced ___
26. Crispness ___
27. How well they store in the fridge_____
28. A catchy name _____
29. General appearance _____

For questions 30 to 35: On a scale of 1 (dislike very much) to 5 (like very much), please rank how much you like the following fruits:

30. Apples _____
31. Bananas _____
32. Grapes _____
33. Oranges _____
34. Peaches _____
35. Strawberries _____

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