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Title: Health vs. Environmental Motivation in Organic Preferences and Purchases

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Abstract:

Economic analyses generally incorporate environmental motivations in examining the factors that determine whether consumers will buy organic and ecolabeled foods, but have not typically considered health and wellness motivations. Market research studies, using both focus groups and surveys, have found that many consumers believe that organic foods are healthier to eat, and have segmented consumers using health and wellness concerns as a factor associated with organic buying behavior. These findings have been widely interpreted in the press as indicating that health and wellness concerns are a primary motivator for buying organic. This study compares the impact of these motivators, as well as demographic and economic factors, in determining how dedicated a consumer is to organic buying as measured by whether more than 50 percent of the consumer's produce purchases are organic. The buying level results are compared to a model of stated preferences.

Introduction

The market for organic food expanded at an annual rate of 20-24 percent during the 1990s, and while estimates vary, appears to be proceeding at similar pace currently The rapid growth must be attributed to many factors, as both supply and demand have grown together. The development of the National Organic Program generated increased awareness of and confidence in organic labels, and by standardizing requirements appears to have encouraged increased supply as well as demand. At the same time the expansion of natural food stores into supermarket style chains has improved the economy of scale in both retailing and distribution, and has provided a venue more mainstream customers find more familiar or attractive. One aspect of these new chains is an emphasis on health, frequently offering herbal and other natural (limited processing-ingredients unrefined) remedies, which coincides with a growth in consumer interest. While market research studies have registered an association in consumer's minds between health and organic foods, economic studies generally have not fully examined the question of health or environmental motivations.

A model based on random utility theory is estimated to evaluate the relative strength of these motivations. In addition to health and environmental motivations demographic and economic factors are incorporated. In contrast to existing studies of organic choice the focus is on (stated) buying levels rather than willingness-to-buy or willingness-to-pay. The stated buying level estimates are compared to those for a model predicting of organic preference.

Literature and Background

Economic studies of potential demand for organic or ecolabeled foods generally examine which consumers indicate a preference or willingness to pay a premium for the alternative product. These studies generally incorporate demographic factors such as gender, income, children,

residence, and education, and sometimes more specific questions about the product regarding pesticides and nutrition and their prior knowledge of the alternative product. Until the last few years the main assessment about either health and wellness or environmental concerns have regarded pesticides.

A study using data from 1989 found that beliefs about pesticides health than were a strong factor in predicting organic preference (Huang, 1996). A study of willingness to pay for organic produce (Govindasamy and Italia, 1999) found positive though highly insignificant affects for the environmental effects of synthetic pesticides and for health hazards from pesticides, however this study also incorporated regular organic buying as a explanatory factor, which may already encompass the pesticide factors. A study of integrated pest management had similar findings. Willingness to pay at least a 10% premium for IPM grown produce (Govindasamy, Italia and Adelaja, 2001) was significantly higher for those that indicated synthetic pesticides were a very serious hazard to human health.

More recently analysts examining ecolabels have tried to take a more general approach to studying the impact of environmental motivations using a series of questions to elicit the strength of environmental motivations (Johnston, Wessells, Donath and Asche, 2001) and using questions that incorporate the tradeoff between decreasing environmental or health risk and costs (Loureiro, McCluskey and Mittelhammer, 2001).

Market research has a different focus than economic studies. When looking at new product segments they generally aim to identify characteristics associated with buyers of certain products and to segment consumers to help in targeting consumers for advertising and promotion. Their work generally incorporates open-ended questions asking what a consumer thinks about a certain product. Reports from market research generally cover how many

consumers list particular motivations for buying organic, and associate it with consumer lifestyles and demographics. For organic products these studies report that many consumers believe organic products are healthier, that "they don't contain pesticides", or that they are better for the environment.

The association of organic buying with both environmentally motivated and/or health motivated consumers found by market research has not been comprehensively examined in economic analysis. To get a better handle on the extent to which environmental and health concerns influence the choice of organic we adopt the approach used to examine environmental concerns for ecolabeled seafood (Johnston, Wessells, Donath and Asche, 2001). This method and the source of the environmental and health questions utilized is discussed after the development of the model below.

Discrete Choice Model

To model buying behavior related to the conventional-organic produce choice we adopt the discrete choice random utility framework. Because this framework is widely used we will not fully develop it here. Briefly, the utility of the organic choice can be represented by first posing the utility (U) from the organic choice as $U_o = \beta_o'x + \varepsilon_o$ and from the conventional choice as $U_c = \beta_c'X + \varepsilon_c$. X is a vector of random attributes of the consumer that are measurable and $\beta_{i=c,o}$ is a vector that maps those attributes to the utility of that choice. If the organic product is chosen it indicates that $U_o > U_c$ and therefore that $\varepsilon_c - \varepsilon_o < \beta_o'X - \beta_c'X$. Creating $\varepsilon = \varepsilon_c - \varepsilon_o$ and $\beta'X = \beta_o'X - \beta_c'X$ sets up a framework where a binary choice is treated as the probability that $\varepsilon \leq \beta'X$.

To operationalize this framework consider a latent variable approach is devised. Under this framework y, the observed binary decision represented by 0 or 1, relates to the latent variable $y^* = \beta'X + \varepsilon$ and when $y^* > 0$ $y = 1$, $y^* \leq 0$ $y = 0$.

Given a suitable functional form the probability the dependent variable equals one can be estimated as a function of x. To estimate this econometrically it is desirable to have a functional form with properties that convert extreme values (where $\beta'X = -\infty$ the probability goes to 0 and fro $\beta'x = \infty$ probability =1) and which is monotonically increasing along the 0 to 1 interval. For this purpose a cumulative distribution function (CDF) is suitable, the most commonly used in binary choice analysis are those of the normal and logistic distribution functions. In this analysis we adopt the normal CDF which is known as the Probit model.

Survey

The survey instrument was designed in a web-based format and pre-tested with students from three undergraduate classes. The student could earn points for extra credit to take the survey and each was assigned a code they needed to enter which identified who took the survey. The survey was modified in response to the results, and adopted for use on touch screen enabled tablet personal computers so that, despite a large number of questions, it could be taken efficiently at market locations. This procedure was also efficient for analysis because data was directly loaded into a file that could readily be imported into a spreadsheet. Though the survey technically contained 31 questions, 7 had multiple parts with the potential for 60 additional pieces of information collected. Consumers were informed that the survey took about 15 minutes. The novelty of the tablet PC attracted some individuals to take the test for whom the $5 certificate

may have been less attractive. Location as discussed below also broadened the demographic spread of the survey population.

Survey locations were chosen to ensure that the population studied produced sufficient variation in the variables expected to explain the organic choice without requiring an extremely large sample. Rather than sorting consumers by their organic preference and drawing a higher proportion of those to survey, this was accomplished by selecting survey sites that allowed individuals to purchase organic and/or conventional produce. The locations chosen were a conventional supermarket, a farmers market, and a cooperative.

Obviously this was not a purely random sample. Literature on sample design supports alternatives to random sample design because of it reduces costs of data collection along with improving estimator efficiency. Some discussion of this process is useful because the literature in different research areas such as travel, recreation, and health vary in their terminology. The critical factor in the procedure is whether the sample is selected based on an endogenous or exogenous variable. (Manski and McFadden, 1981) term the endogenous selection process *choice based* and the exogenous as *stratified* (sometimes termed exogenously stratified). (Cosslett, 1981) (p. 54-55) clarifies these differences by alluding to the classic travel choice model. If the study is looking at travel from home to work, stratified sampling might choose more suburban residents than those at city center.

The stratified sample increases variation in the exogenous explanatory variables. In stratification a population is broken into groups on the basis of one or more exogenous characteristics and a random sample is drawn from each group. The observations are generally not sampled in numbers based on their portion of the population, the aim is to get more variation in the exogenous variables than would be drawn at random from a limited sample: often the

groups are sampled in approximately even numbers. The benefit of stratified sampling is that it increases the range of variation in the explanatory variables expected to influence the choice, and should reduce the variance of the estimators, for a given sample size.

In this study, the sample is stratified based on shopping location choice. It should be noted that if shopping location choice were endogenous this would be inappropriate. Earlier work on the organic shopper (Thompson and Kidwell, 1998) found that while selection of organic produce was an influence on choice of shopping location, shopping location was at least weakly exogenous to the choice of organic. Tests of the model for this study, discussed below, also accept weak exogeneity for shopping location. (Train, 1993)

To model organic preferences and buying behavior the survey collected information about organic preferences and purchasing levels, consumer demographic characteristics, shopping habits, and their rating of factors that influence their produce choices (such as seasonality, price, and appearance). In addition it contained numerous questions to rate an individuals environmental and health and wellness concerns which is discussed in the next section.

Eliciting Environmental and Health Behaviors

Individuals level of environmental and health consciousness was elicited through a series of questions drawn from two earlier studies. One of these focused on segmenting consumers for 'Green' orientation (Roberts, 1996) and the other looked at consumers' 'Wellness' orientation (Kraft and Goodell, 1993). The Kraft and Goodell study used factor analysis to organize responses to questions about individual's health and wellness beliefs and behaviors into a set of factors covering specific aspects of health orientation. The four factors identified were described

as: personal health self-responsibility, nutrition and stress management, physical fitness, and health environment sensitivity. From the series of questions asked by Kraft and Goodell fourteen were selected for this study, these produced the same four factors identified by Kraft and Goodell.

The Roberts study also used factor analysis to consider 30 questions on consumer behaviors related to environmental considerations and identified two factors. He termed the first Environmentally Conscious Consumer Behavior (ECCB) and concluded that the second factor formed, which he termed energy conservation and recycling behavior was more of an indication of money-saving behavior than environmentally driven motives. This series formed the basis of questions used to elicit the degree of environmental motivation in an individual's overall behavior. These two studies are the primary basis for the questions used on this survey. A group of questions based on Roberts work was used in a study measuring preferences for ecolabeled seafood (Johnston, Wessells, Donath and Asche, 2001).

In this analysis, as in the seafood study, some of the 'Green' orientation questions are combined or generalized. The questions used entered into the same factors as those found in the original work by Roberts with similar contributions. The strong correspondence between factors produced in this study population and those from the 'Wellness' study, and the 'Green Consumer' study indicates the suitability of these questions for evaluating consumer beliefs across multiple populations.

The rotated factor matrix for the environmental series of questions is shown in Table 2. We call the first of the environmentally oriented factors Environmental Purchasing Behavior (EEPB); questions that contribute highly to this factor are "I have switched products for environmental reasons", "I have convinced members of my family or friends not to buy some products that are harmful to the environment", and "I will not buy from a company if it is

ecologically irresponsible". The second environmental factor is Energy Conservation and Recycling Behavior (EECRB). The question that contributes most highly to this factor is "I buy energy efficient light bulbs for my household."

The rotated factor matrix for the health and wellness series of questions is shown in Table 3. Among the health and wellness questions one factor that seems likely to affect organic choice based on market research studies draws highly on questions such as "I'm concerned about my drinking water quality," and "I worry that there are harmful chemicals in my food". This factor was denoted Health Environment Sensitivity (HHES) in the Roberts study. A high rating of questions such as "It is the doctor's job to keep me well," and "My health is outside my control" produces a high ranking on the factor called Personal Health Responsibility (HPHR). Other groups were found that could be described as Nutrition Management Behavior (HNutrition), and Physical Fitness Activity (HFitness). Though using only 13 of the original questions used by Kraft and Goodell to identify the health conscious consumer, the same four factors are produced and the relative contribution of questions to each factor is quite similar.

The second factor derived from the environmental series, energy conservation and recycling behavior (EECRB) seems unlikely to be related to organic food choices as was found in the Donath et al. study of seafood ecolabels. Fitness also seems less likely to directly influence the organic choice.

Except for the Personal Health Responsibility factor, whose questions are posed in negative terms, the individual placement along the scale of each of these groupings was expected to have either no effect on organic preferences and purchasing or a positive effect. For example, if you usually made product choices for environmental reasons you might be motivated to buy

organic rather than conventional produce. Similarly, if you are concerned about chemicals in food you might choose to buy organic for health reasons.

Other Variables Used in the Analysis

Statistics and definitions for all of the explanatory variables can be found in Table 1. The demographic factors included in the models include gender, income, having children in the household, education, and a variable for whether the respondent was the primary household shopper. In addition variables were included for the location where the survey was taken. Location variables are included to ensure that non-random consumer differences associated with shopping location choice is incorporated. The location variables could potentially be endogenous.

In their study of selection between organic and conventional produce items (Thompson and Kidwell, 1998) point out that the choice of organic and shopping location may be intertwined. Because the respondents have many other choices of where to shop we cannot adequately look at the choice of shopping location and organic selection simultaneously, in addition, the data indicates that those taking surveys at the farmer's market and the cooperative indicated regular shopping at conventional supermarkets (94% and 43% of respondents at those locations respectively) or at natural food stores (43% and 57%). Even at the supermarket 75% of shoppers indicated regular shopping at a farmers' market. Thus respondents have adequate opportunity to buy either organic or conventional produce by selecting locations that allow for it. Thus our expectation is that the location variables are not endogenous and will not produce endogeneity bias. However, this can be readily tested as developed in (Smith, 1987) and (Rivers and Vuong, 1988). These results are discussed below.

Estimated Models

Two binary choice models estimated for both the fresh fruit and fresh vegetable choices are presented here. The first model examined whether or not a consumer preferred organic, the second model looks only at those that prefer organic and examines whether and individual was a high or low buyer of organic produce based on whether or not 50% or more of their produce purchases were organic. The dependent variable equals one if the preference is for organic or if the consumer indicates greater than 50% organic purchasing, and zero otherwise.

Goodness of Fit and Model Tests

Binary choice models are generally evaluated based on the value of their log-likelihood function and the accuracy of their predictions. By these measures the models perform remarkably well. The McFadden[1] R^2 is above 0.40 in all but one case, and more than 80% of observations are correctly predicted in all cases, an earlier study of organic choice (Huang, 1996) reported a Psuedo R^2 of 0.21 for organic preference as compared to a Psuedo R^2 of 0.68 for the organic fruit preference model in this study. The hi-lo buying level model for fresh fruit is the least successful in terms of goodness of fit and significance of parameters though parameter magnitudes are quite similar to those for the fresh vegetable version.

The exogeneity tests for location variables accept weak exogeneity as the $\chi 2$ statistics are 2.432, 3.408, and .41668 for the preference, hi-low buy, and buying percentage models respectively are below the critical value of 5.99 for two restrictions for a probability level of 0.95. It seems fair to conclude that those that wish to buy are not limited in their selections and that if they want a greater availability or selection of organic foods they will select stores that offer them. (Thompson and Kidwell, 1998) also found that, though the selection of organic is not

[1] [1-Log Likelihood /Log Likelihood (constant only)]

exogenous to location choice, location choice is weakly exogenous to organic selection. We cannot duplicate their test of the exogeneity of organic preferences and buying in the location decision because consumers have far more choices of shopping venue to obtain organic produce at present than they did in the Thompson and Kidwell study.

Results and Discussion

Tables 4 and 5 present the parameter estimates, their standard errors and the calculated partial derivates computed at the mean of the explanatory variables. For dummy variables the reported marginal is for the change probability when the dummy variable goes from 0 to 1 rather than from its mean. The factors are normalized to have a mean of zero and a standard error of one and therefore can be directly compared in each model.

By this measure it is obvious that the most consistent and influential factor score in each model is the one representing environmental purchasing behavior (EEPB). Though not as strong a factor as environmental purchasing behavior a high score for a factor that associates health with environmental factors (I worry that there are harmful chemicals in my food, I'm concerned about my drinking water quality), HHESENS, is also generally a significant factor. In the preference models health environmental sensitivity is of slightly more important for vegetables and less for fruits. However, it definitely has a lower contribution to purchasing level among those who have already indicated a preference for organic produce. Among the remaining factor scores those who do not take personal responsibility for their health (HPHRESP) are less likely to be high buyers for organic fruit. This variable is consistently negative as expected, but only significant in the fruit purchase model.

The store variables clearly explain part of the variation in choice, however it should be noted that their omission has little affect on the remaining variables.

The location variables are usually significant at the 10% level or better with one exception. For ease of viewing the farmer's market location is the base location, because it falls between the conventional supermarket in number of organic shoppers. In each instance the conventional location respondent has a lower probability of preferring organic produce, and when preferring it having a lower probability of buying it most of time, while the survey respondents at the cooperative are more likely, but that there is less of a difference in preferences between the base location, a Farmer's Market, and the Cooperative (Store 3). For the population that prefers organic there is less of a difference between locations but it is significant for both locations.

We attribute the differences between location primarily to some consumer's having higher levels of interest in food. Those that derive higher utility from food may seek out shopping venues that offer a different food buying experience such as a cooperative or a Farmer's market and in so doing may have developed a greater interest in how the food is produced. A noted difference between organic and non-organic shoppers is how they select their primary grocery store according to a survey (Food Marketing Institute, 2001): 90% of "organic shoppers rank high quality fruits and vegetables as the number one factor" while 88% of "non-organic shoppers chose a clean/neat store as their top factor."

The importance of price variable is significant and negative in all models, and though appearance is negative for preferences it is not significant. It should be noted that the store choice variables may be picking up some of the appearance impact as models that do not contain the store variables find the importance of appearance to be significant.

Overall, the demographic variables make limited contributions to explaining preferences and buying behavior. This finding is not surprising in that demographics generally represent indirect aspects of consumers that the factors are intended to represent. The signs of demographic factors, however, are generally in agreement with that of earlier studies. Younger people are more likely to prefer organic though even a 10 year increase in age only drops the probability of preferring organic 7%, for the prefer subset this impact, while still negative, drops to 3% and is no longer significant. Education though not significant in preference or in hi-lo buy model for the prefer subset is also negative. Similar results for education have been found for organic choice (Thompson and Kidwell, 1998) and for pesticide reduction (Eom, 1994). Younger consumers have been found to be more willing to pay a premium for organic products (Govindasamy and Italia, 1999) . Having children was not found significant in this study though other studies have found it significant in choice of the organic produce alternative (Thompson and Kidwell, 1998) and willingness to pay a premium for and eco-labeled product (Loureiro, McCluskey and Mittelhammer, 2001). Gender is not significant at the 0.10 level in any model.

Comparison of the preference and buying results brings up a number of interesting points. Age was also very important in determining preference, but age had no impact on buying levels. Being a primary shopper had no evident impact on preference but decreased reported buying levels. This result may reflect the fact that the primary household shopper is more influenced by budget in selecting organic produce. These differences are interesting because it reflects on the usefulness of asking about buying behavior versus preferences.

Results are little different between fruits and vegetables for the preference model but the hi-lo buying model displays some differences. Of the two types of produce the buying model is more successful for organic vegetables and should possibly be taken as the more meaningful.

The most obvious change in goodness of fit is that the model for fruit buying predicts fewer of the low buyers correctly (only 63% of the low buyers for fruits vegetables are predicted correctly versus 73% of the low buyers of vegetables). In both buying models the Environmental Purchase Behavior factor score is of still the most important measured factor, but the significance of a number of other variables changes. The most noteworthy change in the parameter estimates and marginal effects is that the Nutrition factor has become significant at a level of 0.15, and that HHESENS is no longer significant. The results suggest that nutrition is a factor that strengthens the buying levels of those that prefer organic fruits, but not organic vegetables. These differences are somewhat surprising; 92% of those that preferred organic fruits had the same buying levels for both fruits and vegetables (high with high, low with low).

Conclusions

This study finds that both health and the environment is a motivation for organic preferences and purchasing, but that environmental motivations are more influential in determining higher levels of purchases. Using factor analysis to register consumers placement on indexes intended to capture environmental and health motivations from a broad spectrum of questions is clearly productive. This information provided a considerable improvement in ability to predict consumer choice over earlier studies that based choice primarily on demographic differences. These findings indicate that product marketing and policy will be better informed if consumers are grouped by direct rather than indirectly associated factors like education, age, or income.

An obvious limitation in this study is that it evaluates stated buying rather than actual purchases. Undoubtedly evaluation of actual purchase levels would be preferred, but would require a very extensive diary survey. Evaluating a single purchase day would be equally limited

since shopping at different locations and different days will have a profound influence on a particular days shopping basket. The advantage of a single survey with overall stated buying is clearly its efficiency. If we assume that consumers are (i) trying to be honest in reporting purchase percentages, and (ii) that any error in their statement is unbiased the model results should be reasonably good. Assumption (i) is of course made in any study in which the researcher relies on self-reporting, but assumption (ii) may be problematic.

Table 1 - Variable Statistics and Definitions

Name	Definitions	Mean	Std.Dev.	Minimum	Maximum	Cases
PRIMARY	Primary Shopper = 1	0.84	0.37	0	1	256
FEMALE	Female = 1	0.62	0.49	0	1	255
AGE	From 5 year age ranges between 18-24 and > 70 (assumed 72)	40	14	21	72	255
KIDS	Children at Home, 1 = yes	0.25	0.43	0	1	257
EDUCAT	1 is high school or below, 4 post graduate	2.7	1.0	1	4	255
INCOMET	In $10,000 range midpoints between less than 20,000 to $100,000+	5.7	3.6	1.5	12	253
EEPB	Environmental Purchasing Behavior Factor Score	0.0	1.0	-3.0	2.0	257
EECRB	Energy Conservation and Recycling Behavior Factor Score	0.0	1.0	-3.1	2.3	257
HNUTRITI	Nutrition Factor Score	0.0	1.0	-3.9	2.2	257
HHESENS	Health Environmental Sensitivity Factor Score	0.0	1.0	-4.0	2.0	257
HFITNESS	Fitness Factor Score	0.0	1.0	-2.9	2.1	257
HPHRESP	Personal Health Responsibility Factor (high score is low responsibility)	0.0	1.0	-1.4	3.4	257
IMPRICE	1=Price not important, 2=Somewhat Important 3=Very important	2.4	0.6	1	3	253
IMAPPEAR	1=Appearance not important, 2=Somewhat Important 3=Very important	2.5	0.6	1	3	248

Table 2. Rotated Component Matrix(Environmental Factors)

Questions	Component 1	Component 2	Factor
I have switched products for environmental reasons	0.831	0.279	Environmental Purchasing Behavior
I have convinced family/friends not to buy env. harmful	0.817	0.205	
I will not buy from a company if it is ecologically irresponsible	0.808	0.101	
I have purchased products because they cause less pollution	0.799	0.338	
I do not buy household products that harm the environment	0.756	0.356	
I try to buy only products that can be recycled	0.714	0.426	
I buy energy efficient lgt bulbs for my household	0.032	0.827	Energy Conservation and Recycling Behavior
I purchase recycled paper	0.482	0.639	
I have tried very hard to reduce the amount of electricity I use	0.281	0.599	
I recycle paper, cans or bottles.	0.290	0.560	

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 3 iterations.

Table 3. Rotated Component Matrix(Health Factors)

Questions	Component 1	Component 2	Component 3	Component 4	Factor
My daily diet is nutritionally balanced	0.827	0.043	-0.082	0.163	Nutrition
I am interested in information about my health	0.671	0.396	-0.152	-0.108	
I avoid foods containg nitrites or preservatives	0.660	0.293	-0.021	0.027	
I try to avoid stressful situations	0.508	0.027	0.151	0.334	
I try to avoid high levels of cholesterol in my diet	0.464	0.319	0.170	0.191	
I'm concerned about my drinking water quality	0.008	0.822	0.084	0.112	Health Env. Sensitivity
I worry that there are harmful chemicals in my food	0.255	0.805	0.020	-0.034	
Good health takes active participation on my part	0.319	0.510	-0.113	0.204	
I read more health related articles than I did 3 years ago	0.374	0.472	0.009	0.228	
My health is outside my control	-0.018	-0.016	0.868	-0.011	Personal Health Resp
It is the doctor's job to keep me well	0.000	0.046	0.846	0.063	
I exercise more than I did 3 years ago	-0.021	0.177	0.112	0.856	Fitness
I try to exercise at least 30 min./day, 3 days a week	0.374	0.066	-0.094	0.721	

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 3 iterations.

Table 4. Results for Fresh Vegetables

	Preference Model *Proportion Ones = 62.4%* All N=237				Hi Lo Buying Model *Proportion Ones = 72.8%* Prefer Subset N=147			
	Coeff	St. Error		Marginal effect	Coeff	St. Error		Marginal effect
Constant	4.4688	0.9749	**	1.5845	4.0418	1.5738	**	0.7310
PRIMARY	-0.1963	0.3272		-0.0672	-1.3960	0.6291	**	-0.1359
FEMALE	-0.1261	0.2364		-0.0443	0.5602	0.3420	~	0.1120
AGE	-0.0234	0.0077	**	-0.0083	-0.0151	0.0146		-0.0027
KIDS	-0.2713	0.2638		-0.0990	0.3938	0.4356		0.0612
EDUCAT	-0.1296	0.1430		-0.0459	-0.3899	0.1635	**	-0.0705
INCOMET	-0.0040	0.0373		-0.0014	0.0005	0.0525		0.0001
EEPB	0.4225	0.1374	**	0.1498	0.9876	0.2277	**	0.1786
EECRB	-0.0268	0.1099		-0.0095	-0.1469	0.1684		-0.0266
HNUTRITI	0.1826	0.1487		0.0648	-0.0491	0.1931		-0.0089
HHESENS	0.4533	0.1344	**	0.1607	0.5701	0.1937	**	0.1031
HFITNESS	0.0790	0.1127		0.0280	0.0514	0.2112		0.0093
HPHRESP	0.0109	0.1015		0.0039	-0.3795	0.1835	**	-0.0686
IMPRICE	-0.6048	0.1867	**	-0.2144	-0.7429	0.3166	**	-0.1344
IMAPPEAR	-0.2711	0.2081		-0.0961	0.1004	0.3095		0.0182
STORE2	-1.3707	0.2799	**	-0.4974	-0.9424	0.4549	**	-0.2525
STORE3	0.4394	0.3056		0.1493	1.2500	0.3749	**	0.2303
McFadden R-square				0.459				0.4483
Percentage Correctly Predicted				0.835				0.8776

Marginal effect for dummy variable are P(x=1)-P(x=0).

**Statistically signifcant at the 0.05 level, * at 0.10, and ~ at 0.15.

Table 5. Results for Fresh Fruit

	Preference Model *Proportion Ones = 62.86%* All N=237			Hi Lo Buying Model *Proportion Ones = 68.9%* Prefer Subset N=148		
	Coeff	St. Error	Marginal effect	Coeff	St. Error	Marginal effect
Constant	3.4709	0.9224 **	1.2708	1.8801	1.1584 ~	0.5620
PRIMARY	-0.3017	0.3079	-0.0801	-0.6425	0.4611	-0.1570
FEMALE	0.0674	0.2216	0.0100	-0.0976	0.3037	-0.0289
AGE	-0.0191	0.0080 **	-0.0066	-0.0112	0.0101	-0.0034
KIDS	-0.1106	0.2400	-0.1028	-0.0502	0.3196	-0.0152
EDUCAT	-0.1470	0.1316	-0.0131	-0.0627	0.1600	-0.0187
INCOMET	0.0086	0.0368	-0.0067	-0.0283	0.0464	-0.0085
EEPB	0.4485	0.1376 **	0.1592	0.7893	0.1921 **	0.2360
EECRB	-0.0349	0.1058	0.0034	-0.0019	0.1648	-0.0006
HNUTRITI	0.1047	0.1335	0.0490	0.2889	0.1930 ~	0.0864
HHESENS	0.3848	0.1192 **	0.1196	0.2255	0.1682	0.0674
HFITNESS	0.0198	0.1075	0.0336	-0.0522	0.1639	-0.0156
HPHRESP	-0.0346	0.1014	-0.0146	-0.1049	0.1444	-0.0314
IMPRICE	-0.4009	0.1787 **	-0.1843	-0.4645	0.2893 ~	-0.1389
IMAPPEAR	-0.1932	0.2027	-0.0711	0.2330	0.2551	0.0696
STORE2	-1.2424	0.2600 **	-0.4017	-0.7190	0.4126 *	-0.2511
STORE3	0.4813	0.3025 ~	0.1593	0.8718	0.3218 **	0.2539
McFadden R-square			0.415			0.3532
Percentage Correctly Predicted			0.819			0.8108

Marginal effect for dummy variable are P(x=1)-P(x=0).

**Statistically signifcant at the 0.05 level, * at 0.10, and ~ at 0.15.

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