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Consumer Acceptance of Genetically Modified Foods

A Profile of American Consumers

Pierre Ganiere and Wen S. Chern
Department of Agricultural, Environmental, and Development Economics
The Ohio State University

Contact: Wen S. Chern, e-mail: chern.1@osu.edu, The Ohio State University, (614) 292-6414
Pierre Ganiere, E-mail: ganiere.1@osu.edu, The Ohio State University, (614) 292-9519

Summary

A telephone survey was conducted on genetically modified foods in the U.S. Consumers' attitudes are studied using a multiple correspondence analysis, and typology constructed through the use of a cluster analysis. Five distinct behaviors are extracted.

Key words: Genetically modified, correspondence analysis, telephone survey, acceptance.

Subject Code: Consumer Behavior / Household Economics

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Introduction

In 1973, Herbert Boyer and Stanley Cohen provided the cornerstone for modern biotechnology by inventing a method of cloning genetically engineered molecules in foreign cells. Inserting new genes into an organism allows us to introduce desired traits; hence enabling new pharmaceutical, medical and agronomic applications. So far, the great majority of the commercial applications were in plant genetic engineering for crops with single-gene alterations that confer agronomic benefits (Conway and Toenniessen, 1999). Such benefits, for instance pest and herbicide resistance, have the potential to induce a new Green Revolution. However, with the negative impacts of the first Green Revolution, many are concerned that the new technology will have an equally negative impact on the environment, insofar as the full effects of genetically engineered crops on the environment are not fully known. Hence, uncertainties remain as for the spread of herbicide-resistant 'superweeds', and as for the potential ecological disturbance caused by a growing dependence on genetically modified (GM) crops.

Whereas the genetic traits currently being introduced tend to be relatively simple, monogenic alteration, the next generation features multiple gene introduction focusing on input and output traits. This new generation includes functional foods, such as plants with increased vitamin levels. The potential benefits of plant biotechnology can be considerable, especially in the parts of the world suffering from malnutrition. However, potential risks for human health cannot be ignored. Some mechanisms are still not fully understood and uncertainties remain. Hence, the development of a high cysteine and methionine content soybean, using the gene of a Brazil nut, was abandoned when it was discovered that the protein was highly allergenic (Nordlee et al., 1996).

Some argue that there is as yet no evidence that GM foods are inherently more dangerous than 'conventional' foods. Consequently, there would be no valid argument imposing additional regulation on GM foods. Nonetheless, it fails to take into account the need for public acceptance.

A large part of the public has expressed some concerns regarding the raising and use of genetically modified organisms (GMOs). Real or imaginary, these concerns have some bases. Thus, in Europe, for example, Governments and scientists failed to predict the outbreak of bovine spongiform encephalopathy (BSE) due to a more cost-effective feeding process for cattle.

As a result of reduced herbicide or pesticide use, GM seeds have been very popular and U.S. successful with farmers since their first introduction in 1996. Hence, in 2002, the adoption rates of GM soybeans and corn were 75% and 32%, respectively, in the U.S. Currently, all GM crop varieties present on the U.S. market must be

"recognized as safe" by the Food and Drug Administration (FDA) and certified as not hazardous to human health. Under this FDA policy, labeling of GMOs is not required, just voluntary. Consequently, and contrary to the European Union or Japan where the labeling of GM foods is mandatory, most Americans now eat a significant number of GM foods. Nevertheless, the U.S. consumer does not know which products are GM as there is no labeling requirement.

There is an extensive literature showing that a majority of American consumers are positive about biotechnology and support its application in food production (Hallman and Metcalfe, 1994; Hoban, 1999; Chern and Rickertsen, 2001; Alexander and Schleman, 2003). Nevertheless, and despite the government's guarantee, genetic engineering remains a highly controversial topic. For instance, a bill requiring mandatory labeling was introduced in the Colorado legislature in 2001, but died in committee. More recently, in March 2004, residents of Mendocino County, California, a rural area north of San Francisco, prohibited the growing and raising of GMOs in the county, the first of its kind in the U.S. Clearly, not all American consumers are in favor of GM foods. It is therefore essential to assess the consumer acceptance of GM foods since it could dramatically affect the U.S. food industry.

The objective of this study is to obtain an understanding of the sources of heterogeneity regarding the consumer acceptance of GM foods. We propose to show that various attitudes towards GMOs can be found within the American population, and also to present the associated distributional information useful for policy makers and for the biotechnology and food industry in terms of market evaluation.

The Survey

For the purpose of this study, a telephone survey was conducted in the U.S. in 2003. This comprehensive survey dealt with both stated preferences for GM vs. non GM foods as well as behavioral intentions, since behavioral intention reflects a person's decision to perform the behavior (Fishbein and Ajzen, 1975). The questionnaire included various questions dealing with the willingness to consume GM foods in terms of favorable (e.g., if it was more nutritious) or adverse arguments (e.g., if it posed a risk of causing some allergic reactions for some people), the knowledge of the respondents regarding biotechnology in general and GMOs in particular, and the labeling regulation of GM foods. In addition, the survey elicited the willingness to pay to consume GM foods through contingent valuation questions focusing on three specific products: namely, vegetable oil, cornflakes and salmon, and asked respondents to make choices between GM and non-GM products under different price scenarios. The first two products were chosen insofar as soybean and corn are the two main GM crops grown in the U.S. and

also because those are products consumers are familiar with. The third product was selected because, contrary to the last two products, it is an animal based product.[1] Current research on public attitudes towards biotechnology have indicated that consumer acceptance of GM products is affected by factors such as the organisms involved, i.e., plant or animal based products (e.g., Chern et al., 2002; Hallman et al., 2002; Hamstra, 1998; Kinsey and Senauer, 1997). Information also was collected on respondents' socio-economic characteristics.

The survey was conducted during May-June 2003 by the Center for Survey Research at The Ohio State University. The target population was limited to food shoppers in the household aged 18 and over in the U.S. (except Hawaii and Alaska). A random digit dialing was used to select the households (generation of random telephone numbers avoiding undercoverage of unlisted numbers). The survey was conducted within a four-week period, with a mix of day times and evenings. Each working telephone number was called several times, at different times of the week, to reach people who were infrequently at home. A total of 1,014 interviews were finally completed, with a response rate of 23.9% using the response rate computation method adopted by the American Association for Public Opinion Research (AAPOR).[2] Respondents were spread to 48 different states.

Data and Summary Statistics

Data Description

Table 1 compares the age repartition between the sample and the U.S. population for those aged 20 and more in the 2002 U.S. Census (2002 American Community Survey, U.S. Census Bureau). This comparison shows a slight bias as the class 20-24 years is under-represented whereas 55-59 years are over-represented in the sample. However, it has to be noted that our target population is not the U.S. population as a whole but food shoppers in the household. As for gender, it has to be stressed that participants are skewed towards women since 72% of the respondents are women (compared to 52% in the U.S. population for people of 18 years and over). Nevertheless, Katsaras et al. (2001) show that women make up a disproportional share of grocery shoppers (83% of shoppers). One can therefore assume that the sample is representative of the food shoppers' attitudes towards GM foods.

Descriptive Statistics

There is an extensive literature estimating the proportion of American consumers positive about biotechnology. Doyle (2000) showed that only 31% of American consumers would favor biotechnology, Alexander and Schleman (2003) found that 62% of the respondents thought biotechnology would provide benefits for them and their family in the next 5 years, and Hossain et al. (2003), an approval rate of 49% if the GM technology brings no

additional benefit to consumers. In the present study, 51.8% of the sample are found somewhat or extremely willing to consume foods produced with GM ingredients, which is in accordance with the previous studies mentioned. Moreover, as showed by Hossain et al. (2003), this proportion increases when the GM technology is associated with some benefits, 66.4% when the it helps reducing the amount of pesticide applied to crops and 70.5% when the GM product is more nutritious than its non-GM counterpart.

We find also that the acceptance rate for GM-salmon is lower than those found with products of plant origin – vegetable oil and cornflakes (see Figure 1). This result is in accordance with research on public attitudes towards biotechnology indicating that consumer acceptance of GM products is affected by factors such as the organisms involved, i.e., plant or animal based products (e.g., Hallman et al., 2002b; Hamstra, 1998; Kinsey and Senauer, 1997; Caswell et al., 1994).

These descriptive statistics are useful indicators of consumer acceptance of GM foods; however, they do not indicate clearly who the opponents vs. proponents of GM foods are. A multiple correspondence analysis is used to obtain further insights into the consumers' attitude towards GM foods.

Multiple Correspondence Analysis and Cluster Analysis

Not all consumers are in favor of GM foods; therefore, different profiles of attitudes exist conjointly within the population. For this study, we assume that two individuals have the same attitude if they answered the same way to the questions, or in statistical terms, if they chose the same categorical modalities. Furthermore, two individuals can be thought belonging to the same profile if their answers only diverged slightly. Lastly, each profile can be described through the people belonging to it. If all the people are women aged over sixty years, it can be thought as being one of the dominant features of this profile. Therefore we can explore and identify the structure of association amongst the set of categorical variables related to the consumer attitude.

The five questions used as active variables for this analysis are the following; they were aimed at assessing the attitudes of the respondents towards GM foods:

(1) How risky would you say GM foods are in terms of risk to human health?

(2) How willing are you to consume foods produced with GM ingredients?

(3) How willing would you be to consume GM food if it reduces the amount of pesticide applied to crops?

(4) How willing would you be to purchase GM food if it is more nutritious than similar food that isn't GM?

(5) How willing would you be to purchase GM food if it poses a risk of causing allergic reactions for some people?

For each of these questions, respondents were proposed the following categorical modalities:

1- Extremely unwilling / risky.
2- Somewhat unwilling / risky.
3- Neither willing nor unwilling / risky nor safe.
4- Somewhat willing / safe.
5- Extremely willing / safe.
6- Don't know (not spontaneously proposed to the interviewees)

Considering the complexity to analyze ten two-way cross-tabulations, a technique of data analysis is required, an exploratory technique intended to reveal features in the data. [3] Multiple correspondence analysis (MCA) is one such method to analyze the associations amongst categorical variables, with the purpose of visualizing the most salient relationships and patterns in the data.

MCA is a multivariate extension of correspondence analysis. It permits an analysis of the interrelationships between three or more variables. It is a technique for displaying the rows and columns of a data matrix as points in dual low-dimensional vector spaces (Greenacre, 1984). Each respondent is characterized by the modalities chosen in the survey. For example, in the question, "How risky would you say GM foods are in terms of risk to human health?", a respondent is characterized by the categorical modality he chose, such as "somewhat risky" or "extremely safe". Respondents can therefore be represented in a multidimensional space. Since we cannot observe points in a space with more than three dimensions, it becomes necessary to reduce the dimensionality of the points. The points are projected on a lower-dimensional subspace which is chosen to capture as much of the dispersion of the profiles as possible.

MCA is used to construct principal components, which best summarize the individuals' characteristics within the population represented by the sample. To search for a typology of the attitudes related to the consumer acceptance of GM foods, an ascending hierarchical classification can be carried out on the individuals described by the factors (Ward's minimum variance method – Ward, 1963). Using this method, individuals are grouped into clusters according to their proximity, i.e., their similar characteristics. A class is then defined as a group of individuals with common characteristics or, more specifically in this study, with a similar level of acceptance for GM food.

The hierarchical clustering algorithm constructs the hierarchical tree starting with the individuals. Ward's method seeks at each step to form a new cluster which minimizes the internal variance (inertia within) of the new merged class (Ward, 1963). Inertia is computed from the coordinates of the elements to be classified on the factor axes (Lebart et al., 1984). The construction is continued up to the root of the tree where the cluster containing all the individuals in the sample is created. We can then choose a classification that best summarizes the information.

Empirical Results

The principal objective of our analysis is to differentiate the respondents according to their attitudes toward GM foods with respect to a range of different arguments. As we have already mentioned, our analysis concentrates solely on shoppers in the household, as we consider that their attitudes are the closest to the reality, thereby decreasing the hypothetical bias of the study.

It is important to determine whether or not a modality is significantly associated to a class (individuals). That is, whether there is a discrepancy of appearance between the modalities in the class. The test-value (TV) method is used for that purpose. The difference is deemed significant, with a level of confidence equal to 95%, if the absolute value of the estimated TV is equal or greater than 1.96.[4]

A Typology of Consumer Acceptance for GM Foods

The hierarchical classification method leads to the construction of five clusters expressing 36.8% of the total inertia. All the factors created by the MCA were used for this classification. Table 2 shows the sample distribution among the five classes.

Class 1: Proponents (9.8% of the sample)

This class, with its very marked and significant characteristics, include people highly favorable to GM foods ("extremely willing to consume GM foods", TV= 17.87, "extremely safe", TV= 12.32, etc.). They are willing to consume GM foods even if GM food poses a risk of causing allergic reactions for some people (TV= 13.26). They also think the government is excellent in the food safety area (TV= 2.37) and consider labeling specifically GM foods is unimportant (TV= 3.62); no label is necessary (TV= 4). They appear to have a good knowledge regarding genetic modifications (they answer significantly better than the average to the three questions dealing with genetic modifications).[5]

Their support for GM foods ,however, seems mainly to be due to the benefits associated: less pesticides used (TV=16.87), more nutritious (TV= 14.13). This is in line with consumer behavior theory: consumers perceive a product as a bundle of benefits. When neither GM nor non-GM products are associated with a specific benefit, respondents tend to answer that "both products are equally good" (TV= 4.89 for oil, 3.80 for cornflakes, 2.21 for non-GM vs. GM-fed salmon, 3.39 for non-GM vs. GM salmon, and 3.12 for GM-fed vs. GM salmon). It would mean they do not perceive a significant difference between GM and non-GM products. Some would perceive the absence of genetic modification as a benefit if nothing more is associated; nonetheless, these respondents are likely

to change their minds for the GM counterpart if there is a discount. Some of them would choose the GM food commodity even if the price is higher but this does not constitute a major trend.

When considering the socio-demographic variables that might serve to better characterize this class, emphasis should be made on the over-representation of men (see Table 3), especially white men (TV= 1.81). Furthermore, they tend to be better-off than the average population with a median household income of $75,000 (income before taxes, Table 4).[6] Employment in services would be over-represented in this class (TV= 2.44). 85% of them are white (TV= 1.81).

Class 2: Moderate Proponents (49.6% of the sample)

This second class includes moderate proponents of GM foods. These respondents are very similar to the proponents described earlier; however, they differ in the way that they tend to be more moderate. Thus, while proponents chose extreme modalities in order to describe how likely they are to consume GM foods ("extremely willing"), moderate proponents tend to be "somewhat willing" ("somewhat willing to consume GM foods" TV= 18.78; "somewhat willing to consume GM foods if it reduced the amount of pesticide applied to crops", TV= 17.99; "somewhat willing if it was more nutritious", TV= 13.88; "somewhat willing to consume GM foods if GM food posed a risk of causing allergic reactions for some people", TV= 12.66). They consider the U.S. government has a good performance in the food safety area (TV= 2.23) and think labeling is somewhat necessary (TV= 7.03); they are in favor of a voluntary labeling (TV= 3.20).

They also tend to answer that "both products are equally good" (TV= 4.45 for oil, 4.07 for cornflakes, 5.25 for non-GM vs. GM-fed salmon, 3.13 for non-GM vs. GM salmon, and 2.16 for GM-fed vs. GM salmon). However, an equal proportion chooses the non-GM product in the absence of benefit associated with the GM one.

Individuals belonging to that class tend to be younger than the average (see Table 4) with an over-representation of younger age classes. This is in accordance with many opinion polls showing that younger generations tend to have a different risk perception than older generations.

Class 3: Don't know (5.5% of the sample)

This class of "non-expression" includes those with lack of interest in the survey and those who refuse to become involved. Older women (often widows, TV= 2.91) with a lower level of education constitute the majority of this class. Most of these respondents are retired (about 46% of them, TV= 4.36).

Class 4: Moderate Opponents (26.6% of the sample)

This is an intermediate class, as in class 2. It includes respondents with a moderate opposition to GM foods; for instance, they are "somewhat unwilling to consume GM foods" (TV= 15.68), and "somewhat" or "extremely unwilling to consume GM foods if it poses a risk of causing allergic reactions for some people" (TV= 6.24, for "somewhat" and 5.97 for "extremely"). Furthermore, the only other extreme modality significantly associated with that class is that GM foods are extremely risky for human health (TV= 2.09).Thus their attitude might, at least partially, be determined by health concern. However, their position changes slightly when GM foods are associated with a benefit; thus, despite 34.2% of them are somewhat unwilling to consume GM foods even if it is more nutritious (TV= 14.51), 23.42% are only "neither willing nor unwilling to consume them if it is more nutritious" (TV=9.52). Their attitude does not appear to be motivated by some environmental concerns inasmuch as they tend not to recycle materials (TV= 2.66).

They are in favor of mandatory labeling (TV= 4.46) and would support this labeling even if prices were higher by 5% or more (TV= 3.05). They tend to choose non-GM foods even when price is higher.

Women (TV= 2.23, see also Table 3) and Black people (TV= 2.50) are over-represented in this cluster. They tend to have a lower level of education (see Table 4).

Class 5: Extreme Opponents (8.5% of the sample)

Respondents in this class are extremely averse to GM foods. Thus, 90.7% of them are "extremely unwilling" to consume foods produced with GMOs (TV=17.02) and 61.6% think GM foods are extremely risky for human health (TV= 12.8). Whatever the question about GM food acceptance they are asked, they remain "extremely unwilling" to consume/purchase the products. They are radically opposed to the GM technology.

Price does not appear to be an important decision factor in the purchase of GM foods. Thus, 58% of them are ready to support GM labeling even if prices were higher by 5% or more (TV= 2.87) and they are not likely to purchase GM food even if the associated price is significantly lower. Furthermore, they grade poorly the U.S. government in terms of performance in the food safety area (TV= 4.22), and they are in favor of mandatory labeling (92% of them).

Note that, in various cases, they would buy "neither of the two products" (TV= 2.57 for oil, 3.45 for cornflakes, 3.95 for non-GM vs. GM-fed salmon, 3.02 for non-GM vs. GM salmon, and 4.27 for GM-fed vs. GM

salmon). Infrequent purchasers / consumers of a given product would be more likely to reject the non-traditional product.

Contrary to the proponents, they are likely to be wrong when they answer questions related to GMOs. As with moderate opponents, women and black people tend to be over-represented in this cluster even if the trend is not significant. Note that their lack of knowledge regarding GMOs, as suggested above, is not associated with a lower level of education. Finally, 28% of them would live on the West coast (TV= 2.30) and 37%, more generally, in the area known as the Sun Belt (TV=1.63).

Discussion and Conclusion

This paper reports results from a U.S. national telephone survey on GMOs. The data were analyzed with a multiple correspondence analysis and a cluster analysis. Five distinct profiles of consumer attitudes towards GM products were found; these five profiles can be combined into three groups.

Consumers in favor of GM foods represent 59.4% of the surveyed population. Two profiles can be distinguished:

(1) Proponents represent 9.8% of the sample. They appear to be extremely favorable to GM foods. However, their choice is mainly determined by the existence of perceived benefits. If no benefit is perceived, they are likely to consider both GM and non-GM food products as equivalent; however, they might choose the non-GM product if the price associated is lower. Men, more educated individuals and wealthier households constitute the major socio-demographic feature of this class.

(2) The largest proportion of the surveyed sample, 49.6%, is composed of moderate proponents of the GM technology. They are very similar to the proponents but tend to be more moderate. They are also less likely to choose the GM product in the absence of perceived benefits. Individuals belonging to that class tend to be younger than the average.

Opponents of GM foods, 35.1% of the sample, constitute the second group. Two profiles can be considered based on the intensity of the opposition.

(1) The moderate opponents constitute 26.6% of the sample. They mainly seem to be worried about the perceived health risks related to GMOs. Women and Black people are over-represented in this profile. They have a lower level of education.

(2) The extreme opponents, 8.5% of the sample, reject the biotechnology overall. Their attitude may be due to a higher perceived risk. Indeed, besides being opposed to GMOs, they consider the U.S. government performs poorly in the food safety area. These respondents tend to be women and to be black. People living on the West coast are over-represented. They represent a very risk-averse part of the population.

The third group, 5.5%, gathers non-involved respondents. Facing the choice between a GM and a non-GM food product, they do not know which one to choose. These individuals are mainly older women with a lower level of education.

Overall, consumers appear to be in favor of GM foods; however, they remain concerned about the potential risks on human health. If the GM products offer benefits (price discount, a health or an environmental attribute) that traditional products cannot offer, then, perceived benefits can outweigh the perceived risks. Nevertheless, this perception of benefits is linked to the process of attitude-relevant information by the consumer, and this process is more likely to happen if the prior evaluation of the object is positive (Darley and Smith, 1993). Consequently, as it has been found in social psychological research, the consumer perceptions of the risks and benefits is determined, partially, by the socio-political attitudes. Hence, trust in the institutions regulating biotechnologies is important (Hoban et al., 1992; Siegrist, 2000) and the trust in the government is a good indicator of the consumer acceptance of GM foods.

Furthermore, there is evidence that the acceptance of GM foods is related to a higher level of knowledge regarding biology and biotechnology. The more informed people are, and the more likely they are supportive. However, the education level is not really found significantly associated with the level of information or acceptance. It seems that the level of scientific literacy is much more relevant, that is, whether or not people answer correctly to the three questions, in the survey, dealing with biotechnology. Hence, whereas people were asked "What is the highest grade or year of school you have completed?", it might be better to replace it by the number of high-school and/or college-level science courses taken. Indeed, Miller (2002) finds it is the strongest predictor of scientific literacy.

Men appear to be more supportive of GMOs than women. Furthermore, it seems that the consumer acceptance of GM foods is likely to vary with race and region but also the type of product involved in the choice; people are more supportive of the genetic modification of plants than they are on animals.

Endnotes

[1] The survey covered three types of salmon, namely non-GM salmon, GM-fed salmon (salmon raised with GM soybean meals) and GM salmon (genetically modified by laboratory scientists).

[2] Number of completed interviews divided by the number of interviews (complete plus partial) plus the number of non-interviews (refusal and break-off plus non-contacts plus others) plus all cases of unknown disposition codes.

[3] In the general case of Q variables, there are Q(Q-1)/2 possible two-way cross-tabulations of pairs of variables, here Q=5.

[4] For testing the association between modality and class, the Test-Value (TV) is given as:

$$TV = \frac{\overline{X_k} - \overline{X}}{S_{\overline{X_k}}}$$

Where $\overline{X_k}$ is the mean of the modality X in the class k; $\overline{X}$ is the mean of the modality X in the sample; $S_{\overline{X_k}}$ is the standard deviation of the modality X in the class k.

The null hypothesis (H_0) is that there is no significant difference between $\overline{X_k}$ and $\overline{X}$. For example, we can use this test to examine if the proportion of men in the class 1 is significantly different from the proportion in the sample, that is, if the modality "male" is a characteristic of the class 1. TV has a standard normal distribution. For a significance level ($\alpha = 5\%$), the critical value of the test statistics is $Z_{1-\alpha/2} = 1.96$.

[5] The three questions assessing the knowledge of the respondents regarding biotechnology and GMOs are the following:
By eating GM foods, a person's genes could be altered. (Agree, Disagree)
GM technology has been used to create soybeans that are tolerant of herbicides or resistant to pests. (Agree, Disagree)
Fish contain DNA, but corn does not. (Agree, Disagree)

[6] The median constitutes a more conservative estimate of the income insofar as extreme incomes are not considered.

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Table 1: Age composition of the sample and the U.S. population aged 20 years and more.

Age	U.S. Population (2002)	Sample	z-statistic	Significancy
20 to 24 years	9.25%	7.76%	-2.843	S
25 to 34 years	19.25%	16.83%	-0.097	NS
35 to 44 years	21.99%	21.88%	0.551	NS
45 to 54 years	19.74%	20.46%	0.692	NS
55 to 59 years	7.38%	8.27%	2.578	S
60 to 64 years	5.71%	7.96%	0.168	NS
65 and over	16.69%	16.83%	0.000	NS
Total	100.00%	100.00%		

NS: there is no difference between the population and the sample at a 5% level of significance.
S: there is a difference between the population and the sample at a 5% level of significance.

Source: U.S. Census Bureau, 2002 Census of Population (http://www.census.gov)

Table 2: Sample distribution among the four classes related to acceptance of GMOs.

Class	Sample Distribution	Percentage
Class 1	99	9.8%
Class 2	503	49.6%
Class 3	56	5.5%
Class 4	269	26.6%
Class 5	86	8.5%

Source: Primary Data

Table 3: Gender characteristics by class.

Gender	Class 1	Class 2	Class 3	Class 4	Class 5	Total sample
Men	49%	29%	14%	23%	24%	28%
Women	51%	71%	86%	77%	76%	72%

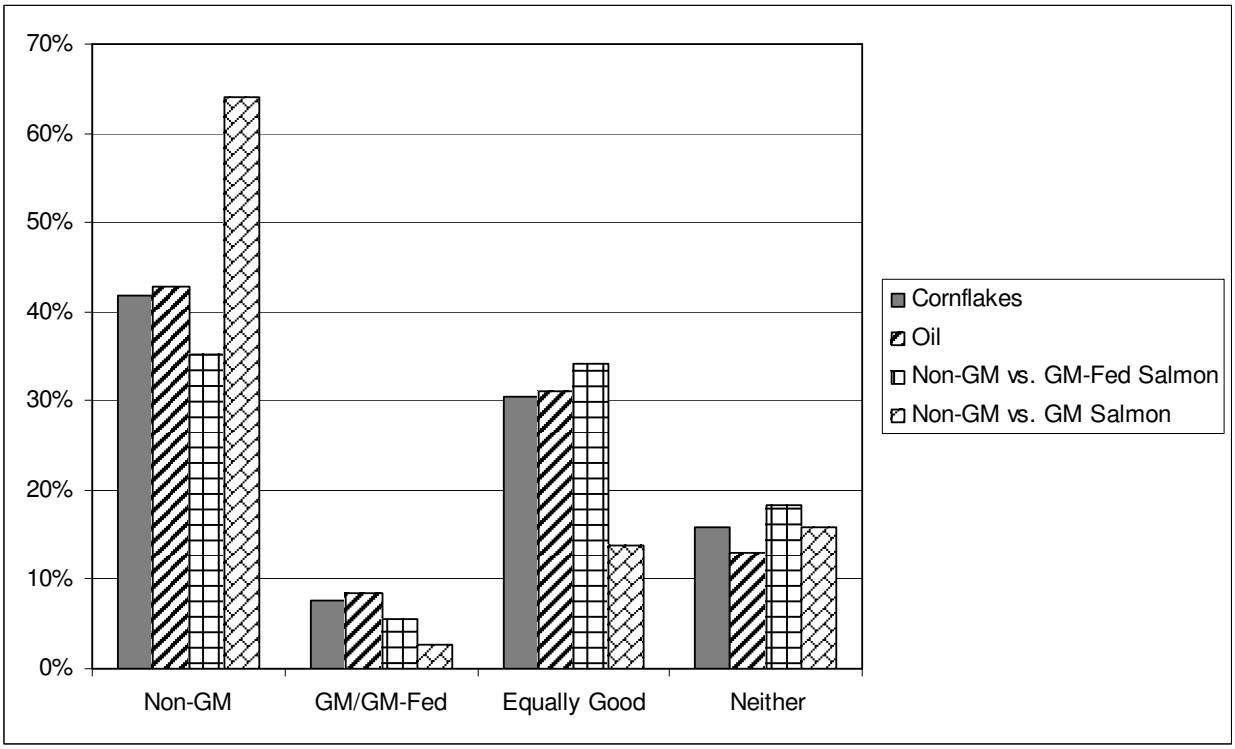
Source: Primary Data

Table 4: Demographic characteristics by class.

Class	Statistics	Age (Years)	Education Level (Years)	Household Income (U.S. Dollars)
Class 1	Mean	47	14	-
	Median	46	14	75,000
	Standard Deviation	18	2	-
Class 2	Mean	45	14	-
	Median	43	13	60,000
	Standard Deviation	16	2	-
Class 3	Mean	59	13	-
	Median	63	12	32,000
	Standard Deviation	17	2	-
Class 4	Mean	48	13	-
	Median	47	13	50,000
	Standard Deviation	16	2	-
Class 5	Mean	52	14	-
	Median	51	13	52,000
	Standard Deviation	15	3	-
Total sample	Mean	47	14	-
	Median	46	13	58,000
	Standard Deviation	16	2	-

Source: Primary Data

Figure 1: Stated Purchase preferences under the Same Price Scenarios, Four Product Pairs.



Source: Primary Data