The Effects of Risk Perceptions on Consumer Preferences for Biotech Labeling

by

Jae-Hwan Han and R.Wes.Harrison

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Dept. of Agricultural Economics and Agribusiness
101 Ag Administration Building, Louisiana State University
Baton Rouge, LA 70803-5604
Tel: (225) 578-2728
Fax: (225) 578-2716
e-mail: jhan4@lsu.edu and wharrison@agctr.lsu.edu

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The voluntary labeling system established by the U.S. Food and Drug Administration (FDA) in 1973 was replaced by the Nutritional Labeling Education Act (NLEA) of 1990. NLEA requires mandatory labeling for all packaged foods and strict regulations regarding health claims and nutritional contents. The U.S. Office of Technology Assessment defined biotechnology as "any technique that uses living organisms (or parts of organisms) to make or modify products, to improve plants or animals, or to develop micro-organisms for specific uses."(U.S. Congress, 1984:3)[1]. For example, animals may be genetically engineered to encourage growth and to have better quality characteristics. Bovine Somatotropin (BST) *or* bovine growth hormone is a naturally occurring protein made in the pituitary gland of the cow. Recombinant bovine somatotrophin (rBST) is BST produced by genetically modified bacteria in the laboratory (Aldrich and Blisard, 1998). A cow genetically engineered with rBST can produce milk by more than 20% (Schacter, 1995).

Most biotech products in the U.S. are not labeled as such, because FDA and the United States Department of Agriculture (USDA) require labeling only if biotech foods are determined materially different from conventional counterparts. Material differences contain different nutritional properties and safety contents from existing products, an allergen that consumers would not normally be presented based upon the name of the food, and so on. The current U.S. policy is based on the rationale that scientific results can confirm whether or not biotech products are materially different from traditional counterparts.

Policymakers, who may implement policy based on results of scientific studies, may not be aware of seemingly irrational concerns held by consumers. However, some consumers view

[1] The terms biotechnology, biotech, genetically modified, and genetically engineered are used interchangeably in this paper.

biotechnology as a risky process, and have hightened interest in food safety and qualities issues associated with biotech food. Some consumers who worry about potential unknown health risks that science might not detect agree for the "right to know" whether or not products are produced using biotechnology. These consumers' concerns for labeling are related to their perceptions of unknown health and safety risks. Preferences for labeling come from the consumers' desire to make an informed buying decision for biotech products. Uncertainties will obviously have an impact on consumers' choice for biotech product labeling.

Public Discussion

Based on the timing and types of information available to consumers, consumer products can be characterized as falling into categories: search goods, where consumers can ascertain the attributes (or quality) of a product before they buy and consume it; experience goods, where consumers can judge the attributes of a product after they buy and consume it; and credence goods, where consumers can not accurately determine the attributes of a product even after they inspect, buy, and consume it (Nelson, 1970; Darby and Karni, 1973). It is assumed that consumers would have considerable difficulty and could not measure the attributes of biotech products even after consumption. Most biotech products fall in the credence good category (Isaac and Phillips, 1999).

Concerns regarding biotechnology stem from potential unknown effects, or food safety due to change of genes and nutritional content, environmental quality, morality and animal welfare owing to transgene and mistreatment of animals, and so on. According to a study by Hoban and Kendall (1992), about forty seven percent of respondents have heard about biotechnology. Respondents showed that they feel acceptable in the case of transferring genes from plants to plants, but transferring it from animals to plants, animals to animal, and human

to animal is unacceptable. Opponents of biotechnology argue that the unknown risks outweigh the benefits and, on the other hand, proponents focus on benefits more (Wansink and Kim, 2001).

Also, the issue of labeling of biotech-derived products is presently being debated in many countries. European Union, (EU), Australia, Canada, New Zealand, and Japan regulate genetically modified products in specific ways. European Union (EU), with some exceptions, requires labeling on food containing ingredients genetically modified and produced through genetic modification techniques, and some European countries, such as Austria and Luxembourg, do not allow import and use of agricultural biotechnology (AB) products (Cunningham and Unnevehr, 1999; Shoemaker and et al, 2001). Accordingly, it is highly likely that EU would claim segregation of biotech products from non-biotech products in the near future, which will cause tremendous marketing costs to U.S. export, due to separate shipping, inspection, and handling cost besides different labeling cost.

This study provides information to understand the relationship between consumers' risk perceptions of biotech products and their attitude on mandatory labeling for those products. That is, the present study will help determine how consumers' risk perceptions of biotech products relate to their attitude on labeling policy.

Literature Review

From an economic perspective, Caswell and et al. (1994) studied the development of agricultural biotechnology. Caswell and et al. said that the success of biotech products depends upon some factors, such as public policies, producer's expectation, and consumer demand on biotech products. The study suggested that if profitability of using the biotechnology is expected to be high, then demand for that by farmers and processors would increase. Caswell

and et al. indicated that consumer demand on biotech products would, eventually, determine the demand of biotechnology in the farm sector.

Caswell (1999) stated that the initial direction and speed of development of market for foods produced using genetically modified organism (GMOs) are significantly influenced by the choice of labeling policy. However, Caswell argued that there are a few realistic and economic reasons for not requiring all information to be disclosed on food labels. For example, those include substantial difficulty to separate biotech ingredients from non-biotech ingredients, increased marketing cost due to segregation of biotech products from non-biotech products, and limit of information to display on a label.

Using nationwide consumer survey data, Grobe and et al. (1996) studied consumer risk perception associated with genetically modified product, recombinant Bovine growth hormone(rbGH), which is a food-related biotechnology used in milk production. The study investigated how consumers react to different typologies of risk perception toward the use of rbGH, and found the characteristics of consumers at each risk perception typology. Taking account of the complexity and unfamiliarity of biotechnology, consumers are distinguished into two groups. One group is about those with prior knowledge about rbGH's use, and the other group is those who are not conscious of rbGH's use. Grobe and et al. demonstrated that consumers with similar information showed the various risk perceptions. Consumer groups with shared information on rbGH displayed incoherent beliefs and roles relating to their own preferences. In addition, the study found that those who engaged in self-protective action were strongly correlated with environmentalist concerns.

Investigated are consumers' perceptions toward biotechnology in fifteen developed countries including U.S. and France. Hoban (1999) demonstrated that consumers from different

areas of the world have quite diverse perceptions and understanding toward biotechnology. The study showed that consumer perceptions about biotech products are very different depending on type of information, government credibility, and cultural preferences. Especially, U.S. showed strong public support for biotechnology applications in comparison to other European countries. Most U.S. consumers expressed the circumspect optimism about benefits of biotechnology, and they will accept the biotech products if the price is appropriate and biotechnology benefits society.

FDA (2000) examined consumer perceptions and awareness in four cities: Calverton, MD; Burlington VT; Seattle, WA; and Kansas City, MS. Most of participants said that to tell whether a food is produced using biotechnology, all foods should be labeled. Their concern for labeling was not in specific effect of biotechnology but in unknown long-term health and safety risk which motivates the demand for biotechnology labeling. In terms of labeling approach, nearly all participants recognized value in having "mere disclosure" labeling, and many of them were aware of symbolic value when they decided not to purchase biotech products. In regarad to the practicability of labeling, most participants expressed that labeling should be simple and effective. This suggests that too wordy and complicated labeling might put burden on consumer to get more informed.

According to Hallman and Metcalfe (1995), eighty four percent of respondents supported special labels, that is, mandatory labeling, on biotech products. Sixty percent of participants answered that they would consider purchasing biotech vegetables if those are labeled as having been produced using biotechnology. Fifty eight percent said that they would spend time for looking at biotech labels while shopping. Forty two percent of respondents who

said that they would search for produce labeled "not genetically engineered" also stated that if label conveys the information of biotech produce, then they would buy produce.

Mojduszka and Caswell (2000) examined the effectiveness of markets in providing information to consumers on nutritional quality of processed foods. The study found that voluntary labeling on nutritional quality of processed foods was ineffective. Mojduszka and Caswell demonstrated that incentives for voluntary labeling of nutrient content by food processing company did not provide the consistent and effective quality signals to consumers. Thus, Mojduszka and Caswell suggested that it is more likely that mandatory labeling for nutrition quality, in comparison with voluntary labeling, increases the information available to consumers. The other study investigated the impact of food labels on consumers' intake of selected nutrients. Kim and et al. (2000) has compared the nutrient intakes of label users with the expected nutrient of intakes of label users in the absence of labels. The study showed that the use of mandatory labeling on nutrients reduced the average daily calories from total fat by 2.10 percentage points, the average daily cholesterol intake by 67.60 milligrams, and the average daily sodium intake by 29.58 milligrams. Kim and et al. demonstrated that mandatory labeling on the selected nutrients improved the intakes by consumers. The study provided the evidence that mandatory labeling is more likely to provide health benefits and society welfares, compared to voluntary labeling. However, none of the studies, including those of both Mojduszka and Caswell and Kim et al., has not been found to compare voluntary with mandatory labeling on biotech products. Thus, the present study is worthy in that consumer's preferences for voluntary and mandatory labeling on biotech products are analyzed.

The Empirical Model

A binary probit analysis is conducted to investigate the effects of consumer risk perceptions of biotech foods on the current U.S. labeling policy. As the basis for the analysis, labeling preferences for voluntary or mandatory labeling are expressed as a function of consumers' risk perceptions, willingness to purchase biotech foods, consumer use of food labels, and demographics. The structural equation is specified as follows:

$$\Pr(Y = 1|x) = \int_{-\infty}^{x'} \phi(t)dt = \Phi(x'\beta)$$

A regression for the probability model is

$$E[y|x] = 0[1 - F(x'\beta)] + 1[F(x'\beta)] = F(x'\beta).$$

Generally, marginal effects for the binary probit model are given by;

$$\frac{\partial E[y|x]}{\partial x} = \phi(x'\beta)\beta,$$

where $\phi(t)$ is the standard normal density, y is a dependent variable, and $\boldsymbol{x}$ is a matrix of independent variable including dummy variables.

However, when $\boldsymbol{x}$ contains dummy variables, calculating marginal effects in the binary probit model is more complicated. Because the derivative is with respect to a small change, it is not appropriate using above method (Greene). The appropriate marginal effect for a binary independent variable, according to Greene, is

$$\text{Marginal Effect} = \Pr[Y = 1|\bar{x}_d, d = 1] - \Pr[Y = 1|\bar{x}_d, d = 0]$$

where d is a binary independent dummy variable, indicating purchasing biotech product and socioeconomic/demographic information, and $\bar{x}_{(d)}$ indicates the means of all the other variables in the model.

The dependent variable, *y*, is defined as mandatory and voluntary labeling. Mandatory labeling is represented by 0, and the FDA's current voluntary labeling policy is represented by 1. Independent variables, $\boldsymbol{x}$, characterize consumers' perceptions toward biotech foods, purchasing behavior of biotech foods, consumer use of food labels, and demographics. Variables indicating consumers' perceptions of biotech products are those regarding human health, morality, environmental biodiversity, religious motivation, and so on. Whether or not respondents will purchase biotech foods is another variable. Frequency of food label use of respondents is the other explanatory variable. Demographic variables are gender, age, income, marital status, and etc..

The coding for either purchasing or not purchasing biotech foods is defined as follows: Non-Meat_i=1if the ith respondent purchases non-meat produced using biotech, otherwise Non-Meat_i= 0; and, Meat_i=1 if ith respondent purchases biotech meat, otherwise Meat_i=0. The coding for demographic variables is as follows: Age_{ij}=1 if the ith respondent's age corresponds to the jth group, otherwise Age_{ij}=0; Inc_{ij}=1 if ith respondents' income falls into jth category, otherwise Inc_{ij}=0; Eth_{ij} =1if the ith respondent's race corresponds to jth category, otherwise Eth_{ij} =0; Edu_{ij}=1if the ith respondents' education level indicates the jth category, otherwise Edu_{ij}=0; Mar_i=1 if ith respondent is married, otherwise Mar_i= 0; Fem_i=1 if the ith individual is female, otherwise Fem_i= 0; Occup_{ij}=1 if ith respondent's occupation falls in the jth category, otherwise Occup_{ij}=0; and, Infants_i=1 if ith respondent has infants, otherwise Infants_i=0. In addition, the coding for respondents' perceived level of risks and benefits associated with biotechnology is expressed as ranging from 5 (strongly agree) to 1(strongly disagree). The coding for consumer use of food labels is represented as raging from 5 (never) to 1 (always).

The Questionnaire and Survey

A questionnaire was developed that included questions on mandatory and voluntary labeling preferences; questions on consumer perceptions of biotech foods; questions on purchasing biotech foods; questions regarding the consumers' use of food labels; and questions on consumer demographic.

The first part of the questionnaire presented background information on biotechnology. It contains a definition of biotechnology, present and future uses (benefits), and example of present application of biotechnology. This was followed by several questions in regard to the respondents' general knowledge of, and their attitudes toward biotechnology. In the following section respondents were asked whether they are in favor of either voluntary or mandatory labeling policy for biotech products. Next section describes a question on consumers' willingness to purchase biotech foods and a question on how often they read food labels while shopping. In the last section, information is collected regarding respondents' socioeconomic and demographic characteristics (e.g., age, income, marital status, education, and so on).

In order to meet the objectives of the study, a mail survey was conducted during the month of July 2002. Questionnaires were mailed to randomly selected 3,450 households for the seven metropolitan regions in the U.S.: Atlanta, Denver, Houston, Chicago, Los Angeles, New Orleans, and New York. Number of surveys mailed to Atlanta is 450, Denver 500, Houston 500, Chicago 500, Los Angeles 500, New Orleans 500, and New York 500. Five hundred nine usable surveys were returned, for an overall response rate of 14.75%.

Results

Frequency distributions of the socioeconomic/demographic information of the sample are presented in Table1. Out of 509 respondents, 54 % (274) are male and 46% (235) are female. All age groups are represented in the sample, with the 45-54 age groups representing

27% of the sample. Most of the respondents are highly educated, as more than 80% finished some college course, completed bachelor degree, and did post graduate work. The median income of respondents is between $30,000 and $44,999, accounting for 20% of the sample.

Frequency distributions concerning respondents' agreement or disagreement with the mandatory labeling versus voluntary labeling question are presented in Table2. As shown, of the 509 respondents, 80% (409) support mandatory labeling policy for biotech products. Only 20% of respondents favor the voluntary labeling policy.

Results of the probit model are presented in Table 3. The chi-square test showed that the overall model is significant at the 0.05 level of significance. Coefficients on questions 7, 8, 10, 11 are significant at the 5% significance level, and all of the variables have the expected sign except questions 8. Question 7 has a negative sign suggesting that as respondents are aware of side effects of biotech crops on the wildlife and the environment, they are more likely to support a mandatory labeling policy. The marginal effect on this variable indicates that as respondent's perceptions of unfavorable effect on the wildlife and the environment increases, the probability of their supporting a voluntary labeling policy would decrease by 0.064. Question 8 shows an unexpected sign. Some of the studies have found that consumers are less likely to accept the use of biotechnology with animals and meat products produced using biotechnology (Hallman and Metcalfe, 1995). Thus, a negative sign is expected, but our results reveal that respondents favor a voluntary labeling policy. Question 10 shows a positive sign indicating that when respondents trust the U.S. Food and Drug Administration (FDA) as a scientific and regulatory institution of biotech foods, it is more likely for them to favor a voluntary labeling policy. The marginal effect indicates that if respondents have credit for FDA as an inspection and regulatory agency regarding biotech foods, the probability for them to

maintain a voluntary labeling policy increases by 0.053. Question 11 has a negative sign as expected, which states that as respondents become conscious of unknown health risk associated with biotech foods, they are more likely to be in favor of a mandatory labeling policy. The marginal effect says that as respondents are aware of unpredicted health danger, the probability of agreeing with a voluntary labeling policy decreases by 0.086.

Socioeconomic/demographic variables are incorporated into the model to examine the differences of respondent characteristics on labeling preferences. Coefficients of age and infant are statistically significant at the 10% significance level. The negative sign of age variable suggests that respondents more than fifty five who are expected to have more health concerns for biotech food, compared to other different age groups, are more likely to support a mandatory labeling policy. The marginal effect of age variable indicates that the probability for them to support a voluntary labeling policy decreases by 0.092. In regard to ethnic background, all the coefficients estimated are not significant. The gender coefficient is not significantly different from zero. Also, none of the occupation variables is significant. However, interestingly, marginal effects of engineering and education variable are significant at the 5% and 1% significance level, respectively. It is assumed that income of respondents with engineering occupation is relatively high. Respondents with high income are more likely to be cautious about health risk, and, thus, are in favor of mandatory labeling policy. As predicted, the sign of engineering variable is negative. Respondents severing in education workplace support mandatory labeling policy suggesting that they might have better access to information and better understanding on the biotech foods. Thus, they may be better aware of unforeseen health risk on biotech foods. The negative infants coefficient suggests, as expected, that compared to other respondents without infants, respondents with infants who are expected to be

more sensitive to the possible health risk are relatively more likely to support a mandatory labeling policy. The marginal effect states that the probability of their supporting of a voluntary labeling policy decreases by 0.1.

Coefficient of question 16 has the expected positive sign. When respondents are asked if they would purchase a meat product produced using biotechnology, respondents who say yes are more likely to favor a voluntary labeling policy. It is understood that these respondents have big trust toward FDA as an inspection and regulatory institution of biotech products. The marginal effect indicates as they purchase a biotech meat product, the probability of agreeing with a voluntary labeling policy increases by 0.188. In question 20, respondents are asked whether or not they read the ingredient section of food labels before purchasing a new product. As expected, the less they read food labels, the more they are likely to favor a voluntary labeling policy. The marginal effect explains that the probability that respondents who are not interested in reading food labels are in favor of a voluntary labeling policy increases by 0.043.

Conclusions

This study conducting a national survey investigated the effects of consumers' risk perceptions of biotech foods on attitudes toward the current U.S. labeling policy for biotech foods. A binary probit analysis is used to examine the effects of risk perceptions of biotech foods on consumer preferences for mandatory and voluntary labeling.

Results showed that as respondents are more aware of adverse effect of biotech crops toward wildlife and environment, they are more likely to support a mandatory labeling policy. This suggests that respondents in favor of a mandatory labeling policy have a big concern about environmental quality, morality, and animal welfare. Results also demonstrated that respondents favor a voluntary labeling policy when they trust the FDA as an inspection and

regulatory agency for biotech foods. Furthermore, results indicated that as respondents' level of perceptions of unknown health risks associated with biotech foods increases, they are more likely to support a mandatory labeling policy. This implies that mandatory labeling of biotech foods will serve not only a function of information but also play a role as a safety signal. Finally, the study found that when respondents are asked if they would purchase a meat product produced using biotechnology, respondents who say yes are more likely to support a voluntary labeling policy. The less respondents read food labels, the more they are likely to favor a voluntary labeling policy, as anticipated.

This study has a few limitations. Above all, most respondents are well educated. Respondents of eighty one percent finished at least some college course. As discussed by Kim and et al. the higher the education level, the lower the intake of saturated fat and cholesterol and the higher the intake of fiber. This suggests that well-educated respondents may have better access to information and, thus, be more conscious of health and safety risk of biotech foods than others. Thus, it is assumed that risk perceptions and attitudes on biotech labeling of less educated respondents would be different from well-educated respondents. Another imitation of this study is that survey was implemented in the seven largest cities in the U.S.. It is likely that consumers' risk perceptions of biotech foods and attitudes for a labeling policy would be different from consumers in other areas. Thus, future research need to focus on these limitations mentioned. In addition, as it is expected that mandatory labeling makes consumers pay more marketing cost, future extension of the study would be worthy to research consumers' willing to pay for mandatory labeling.

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Table 1. Frequency Distribution of Socio-Demographic Characteristics of Survey Respondents of Biotech Labeling Survey

Demographic Characteristics Sample (n= 509)	Number	Percentage
Gender		
Male	274	54.0
Female	235	46.0
Age (years)		
18-24	12	2.36
25-34	56	11.00
35-44	99	19.45
45-54	135	26.52
55-65	93	18.27
65 or older	114	22.40
Education		
Less than high school	2	0.39
Completed High school	58	11.39
Technical school	37	7.27
Some college	119	23.88
Completed bachelor degree	150	29.47
Post graduate work	143	28.09
Income		
Less than $15,000	33	6.48
$15,000 -$29,000	47	9.23
$30,000 - $44,999	101	19.84
$45,000 - $59,999	99	19.45
$60,000 -$74,999	76	14.93
$75,000 -$89,999	53	10.41
$90,000 -$104,999	32	6.29
$105,000 -$119,999	19	3.73
More than $120,000	49	9.63

Table 2. Respondent's Responses to a Mandatory or Voluntary Labeling Policy.

	Number of Respondents	Percentage of Respondents
Voluntary Labeling	103	20
Mandatory Labeling	406	80

Table 3. Binary Probit Coefficients and Marginal Probabilities for Mandatory Versus Voluntary Biotech Labeling.

Variable	Equations				Marginal Effects			
	Coefficient	*Std. Error*	*t-ratio*	*P-Value*	*Coefficient*	*Std. Error*	*t-ratio*	*P-Value*
Constant Term	-.769	0.973	-0.790	0. 429	-0.152	0.192	-0.795	0.426
Q6. Biotech Foods are reasonably safe for human consumption.	0.098	0.155	0.635	0.525	0.019	0.030	0.637	0.523
Q7. Biotech crops may have adverse effects on wildlife and the environment.	-0.322***	0.102	-3.149	0.001	-0.064***	0.019	-3.232	0.001
Q8. Meat products produced using biotechnology are more likely to pose health risks than foods made from biotech crops.	0.253**	0.118	2.131	0.033	0.052**	0.023	2.164	0.030
Q9. Biotechnology benefits society because it allows farmers to produce food more efficiently.	-0.059	0.134	-0.442	0.658	-0.011	0.026	-0.442	0.658
Q10. There is no need to be concerned about the safety of biotech foods because the U.S. Food and Drug Administration (FDA) would not let these products be sold in supermarket if they were not safe.	0.268***	0.079	3.391	0.000	0.053***	0.015	3.411	0.000
Q11. Foods labels are needed to show the presence of biotech ingredients, since consumers could face unknown health risks.	-0.433***	0.096	-4.480	0.000	-0.086***	0.019	-4.447	0.000
Q12. It is unethical to produce a food using biotechnology.	0.012	0.110	0.115	0.908	0.002	0.021	0.115	0.908

* Indicates statistical significance at the 0.10 level
** Indicates statistical significance at the 0.05 level
*** Indicates statistical significance at the 0.01 level
N = 509; Chi-square = 152.522; χ^2 Log-L=-180.098
The dependent variable is defined as voluntary labeling and mandatory labeling. Voluntary labeling is represented by 1 and mandatory labeling is represented by 0.

Continued.

Variable	Equations				Marginal Effects			
	Coefficient	*Std. Error*	*t-ratio*	*P-Value*	*Coefficient*	*Std. Error*	*t-ratio*	*P-Value*
Age[a]	-0.491**	0.215	-2.276	0.022	-0.092	0.038	-2.389	0.016
Income[b]	-0.127	0.282	-0.454	0.650	-0.023	0.049	-0.485	0.627
Ethnic Background								
African American	0.725	0.566	1.281	0.200	0.196	0.189	1.036	0.300
Hispanic	0.716	0.602	1.191	0.233	0.197	0.207	0.952	0.341
Caucasian (white)	0.394	0.509	0.775	0.438	0.068	0.075	0.903	0.366
Asian	0.312	0.625	0.500	0.617	0.072	0.165	0.438	0.661
Education Level[c]	-0.079	0.245	-0.325	0.745	-0.016	0.052	-0.314	0.753
Married	-0.035	0.176	-0.204	0.838	-0.007	0.035	-0.203	0.839
Female	0.250	0.180	1.386	0.165	0.050	0.036	1.307	0.170
Occupations								
Business	-0.044	0.244	-0.183	0.854	-0.008	0.046	-0.186	0.852
Agriculture and Natural Resources	-0.445	0.357	-1.245	0.213	-0.069	0.042	-1.636	0.101

* Indicates statistical significance at the 0.10 level
** Indicates statistical significance at the 0.05 level
*** Indicates statistical significance at the 0.01 level
N = 509; Chi-square = 152.522; χ^2 Log-L=-180.098; [a] indicates more than fifty five. [b] indicates more than $120,000. [c] indicates more than college.

Continued.

Variable	Equations				Marginal Effects			
	Coefficient	*Std. Error*	*t-ratio*	*P-Value*	*Coefficient*	*Std. Error*	*t-ratio*	*P-Value*
Engineering	-0.602	0.446	-1.350	0.177	-0.084**	0.041	-2.048	0.040
Education	-0.929	0.706	-1.315	0.188	-0.107**	0.037	-2.877	0.004
Government	0.424	0.270	1.565	0.117	0.096	0.069	1.389	0.164
Healthcare	0.628	0.715	0.879	0.379	0.170	0.243	0.702	0.482
Student	0.217	0.295	0.737	0.460	0.047	0.071	0.671	0.520
Retired	0.435	0.322	1.348	0.177	0.105	0.092	1.141	0.253
Infants	-0.799	0.420	-1.900	0.057	-0.100**	0.030	-3.246	0.001
Q15. Would you purchase a non-meat food product (example slow-ripening tomato or corn chips) that has been produced using biotechnology?	0.087	0.229	0.384	0.701	0.017	0.045	0.382	0.702
Q16. Would you purchase a meat product (example bST milk) that has been produced using biotechnology?	0.767***	0.216	3.546	0.000	0.188***	0.063	2.981	0.002
Q20. How often do you read the ingredient section Of food labels before buying a new product?	0.220**	0.866	2.551	0.0107	0.043**	0.017	2.555	0.010

* Indicates statistical significance at the 0.10 level
** Indicates statistical significance at the 0.05 level
*** Indicates statistical significance at the 0.01 level
N = 509
Chi-square = 152.522; χ^2 Log-L=-180.098