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Who Do Consumers Trust for Information: The Case of Genetically Modified Foods?

Abstract

To be effective, groups that disseminate information need trust. When different groups provide conflicting information on a new product or process like genetically modified (GM) foods, we hypothesize that consumers place different levels of trust in the sources and trust is related to their income, personal and social capital, and prior beliefs. A random sample of adults was asked to state their preferences for sources they would trust to provide verifiable (i.e., objective) information on genetic modification. Their responses were grouped into six categories, and a multinomial logit model used to explain relative trust in information sources. Relative trust is shown to be related to a participant's schooling, age, prior beliefs, and religious upbringing.

JEL codes: D82, L15, Z13

Key words: information trust, multinomial logit, personal capital, social capital, genetically modified foods

Who Do Consumers Trust for Information: The Case of Genetically Modified Foods?

During the 20th century, R&D has produced a steady stream of inventions and new consumer goods, many of which have been adopted and proven to be the source of a rising standard of living (Boskin et al., 1998). The introduction of new goods, however, creates a disequilibrium ([Hausman, 1996](#)), which in turn creates a demand by economic agents for objective information to assist in making decisions on adoption and use (Schultz, 1975).¹ The consumer's challenge is to sort through the various, competing and sometimes conflicting, sources of information.

Consider, for example, the controversial products—GM-foods. The agricultural biotechnology firms, e.g., Monsanto, Syngenta, and the industry's Council on Biotechnology Information have hailed the use of biotechnology to create new products as a major revolution in product innovation ([Hoban, 1997, 2001](#)). They have disseminated information claiming that GM-crops will lower food costs worldwide and improve environmental quality. The Council has even created and distributed children's coloring books that promote the positive aspects of GM-foods. In contrast, Greenpeace and Friends of the Earth, two international environmental NGOs, have distributed negative information through websites, press releases, and demonstrations claiming risks to human health, the environment and biodiversity; consumers have the right to know with respect to GM labeling; and new technology benefits only large multi-nationals and not consumers (Friends of the Earth, 2001; Greenpeace, 1997). The federal government is also a supplier of information on genetic modification. In 1992, the Food and Drug Administration (FDA) issued a statement saying that genetically modified foods do not have to be labeled if the new product has the same characteristics as its non- genetically modified counterpart (FDA,

1992). If, however, a new vitamin were introduced into a food crop using genetic modification, the food product would have to be labeled (FDA, 2001). In contrast, the European Union, Australia, New Zealand, Japan, and Brazil have mandatory labeling policies for GM-foods. Furthermore, in 1998 the European Union enacted a moratorium on approvals of genetically modified foods, which has not been lifted.

In principle, society can recapture some of the losses from diverse information disseminated by interested parties if decision makers have access to independent, third-party information. For example, see the discussion of verifiable information in Milgrom and Roberts (1986) and Huffman and Tegene (2002). In recent research, Huffman et al. (2003) have defined verifiable information for genetic modification as information that is from a knowledgeable independent, third-party source that has no significant financial ties to the agricultural biotechnology industry. Although government agencies provide information, we do not claim that federal government agencies present an independent, third-party perspective. Federal regulatory agencies do not have the resources required to engage in significant independent research, and they must rely heavily upon the firms that they regulate to provide them the information they use to make recommendations. Although biotech firms are not always pleased with decisions made by the FDA, USDA, or EPA, the international NGOs believe that these agencies have a decidedly pro-biotech perspective (Greenpeace 2000). Also, elected government officials may receive campaign contributions from interested parties who are hoping to obtain future favorable treatment. Consequently, Huffman and Tegene (2002) have proposed that a quasi-governmental agency, that is funded, perhaps by the federal government, but not controlled by government officials, would be most credible source of independent, third-party information on genetic modification. [Rousu et al. \(2003\)](#) have concluded that verifiable information on

genetically modified (GM) food products can have an annual value to U.S. consumers of over \$2 billion annually.

Interested and disinterested parties disseminate information with the goal of affecting consumers' (and producers') decisions on GM-technology and other products. However, for these groups to be influential, they must garner "trust." Recent evidence by [Glaeser et al. \(2000\)](#) shows that individuals who are closer in social status or who have similar personal capital are more likely to trust one another. For example, individuals who were raised with a particular religious tradition place more trust in others who were raised within the same religious tradition, *ceteris paribus*. More generally, Becker (1996) argues that a consumer's social and personal capital are an important determinant of his or her tastes or preferences. Social capital is defined as the capital the individual acquires through his or her surroundings, upbringing, and social network. Personal capital is defined as capital that the individual personally acquires, such as schooling, habits, or experience. Becker shows when personal and social capital are incorporated into economic models, economic theory can explain many previously puzzling outcomes such as the effect of advertising on consumers' purchasing behavior and human addictions.

Understanding the formation of trust in information sources is an important step in understanding consumers' preferences for information on new products. With the aid of a model, we formulate hypotheses about the role of measurable attributes of a consumer, which are related to his or her household income, personal and social capital, and prior beliefs in the formation of trust. For this study, unique data were collected by an independent agency from a random sample of adults chosen from two major Midwestern cities. These people were paid \$40 to come to a central location, to provide social-demographic information and information on

prior beliefs about technologies, and to participate in a set of experiments (as explained in detail in a companion paper, Huffman et al. (2003)). At the end of the experiments, they were asked to complete a short questionnaire including the following question: “If a source of information were to give you verifiable information on genetically modified foods, who would you trust most?” This information was coded into six different categories: third-party, government, environmental or consumer group, private industry or organization, none or nobody, and “other” (including no response). A multinomial logit model is fitted to the sample of post-experiment participants to explain their relative trust in sources to provide verifiable information on GM-foods.

We find an individual’s household income has no significant effect on relative trust, but an increase in his or her schooling lowers the probability of trusting information from government, private industry or organizations, environmental or consumer groups, or “other” sources relative to information from an independent third-party source. Older individuals have significantly lower odds of trusting “nobody” for GM-information relative to an independent, third-party source. People who claimed to be informed about genetic modification before the experiments were more likely to trust the government than a third-party sources. People who had a conservative religious upbringing had a lower odds of trusting private industry or organizations and a higher odds of trusting “nobody” relative to an independent, third-party source. The paper has five sections.

Model

Following Becker (1996), consider the strictly quasi-concave utility function shown as:

$$U = U(X_l, X_{pi}, T_l, \dots T_j) \quad (1)$$

Utility is based on the consumption of two choice variables: foods labeled as genetically modified (X_l) and foods that have a plain label (X_{pl}). The utility of these two goods is hypothesized to be affected by information from j sources. This information differs in quality for each type (i.e., level of trust). Assume information quality or trust in the j th type is a function of the consumer's personal capital (PC) and social capital (SC):

$$T_j = f_j(SC, PC). \quad (2)$$

The market price for foods labeled as genetically modified is p_l and the price of plain-labeled foods is p_{pl} . At time t , the consumer maximizes his or her utility, subject to the budget constraint M , and stock of personal and social capital:

$$MAX U(X_l, X_{pl}; T_1, \dots, T_J), \quad T_j = f_j(SC, PC) \quad (3)$$

$$\text{s.t. } p_l X_l + p_{pl} X_{pl} \leq M.$$

The first-order conditions are as follows:

$$MU_l(X_l, X_{pl}; T_1, \dots, T_J) - \lambda p_l = 0. \quad (4)$$

$$MU_{pl}(X_l, X_{pl}; T_1, \dots, T_J) - \lambda p_{pl} = 0. \quad (5)$$

$$p_l X_l + p_{pl} X_{pl} - M = 0. \quad (6)$$

Equations 5 and 6 can be rearranged to show the marginal rate of substitution between genetically modified-labeled and plain-labeled foods, as shown in equation (7):

$$\frac{MU_l(X_l, X_{pl}; T_1, \dots, T_J)}{MU_{pl}(X_l, X_{pl}; T_1, \dots, T_J)} = \frac{p_l}{p_{pl}}. \quad (7)$$

A consumer's marginal rate of substitution between genetically modified-labeled and plain-labeled food is a function of the relative prices of the goods and personal and social capital, which influences the trust for the j providers of information. By moving the ratio of prices to the

left-hand side, we can differentiate with respect to personal capital or social capital. Consider the equation below, which examines the impact of a change in a consumer's personal capital for the two goods:

$$\frac{MU_{pl}(\bullet) \left(\sum_{j=1}^J \frac{\partial MU_l(\bullet)}{\partial f_j} \frac{\partial f_j}{\partial PC} \right) - MU_l(\bullet) \left(\sum_{j=1}^J \frac{\partial MU_{pl}(\bullet)}{\partial f_j} \frac{\partial f_j}{\partial PC} \right)}{[MU_{pl}(\bullet)]^2} \quad (8)$$

A change in personal capital seems likely to have differential impacts across the j information quality types and is not neutral on the marginal rate of substitution between genetically modified-labeled and plain-labeled food. To simplify the analysis and without loss of generality, assume a change in T_j , $j = 1, \dots, J$, does not impact the marginal utility for plain-labeled (nongenetically modified) foods. Then equation (8) becomes

$$\frac{MU_{pl}(\bullet) \left(\sum_{j=1}^J \frac{\partial MU_l(\bullet)}{\partial f_j} \frac{\partial f_j}{\partial PC} \right)}{[MU_{pl}(\bullet)]^2}. \quad (8a)$$

To further understand how social capital can change consumption behavior, consider the following example. Suppose environmental groups provide negative information about genetically modified food, and agribusiness companies provide positive information about genetically modified food. Suppose an increase in a consumer's education increases his or her trust in environmental groups while decreasing his or her trust in agribusiness companies, other things equal. The response is summarized in equation (9):

$$\frac{MU_{pl}(\bullet) \left(\frac{\partial MU_l(\bullet)}{\partial f_{ENV}} \frac{\partial f_{ENV}}{\partial PC} + \frac{\partial MU_l(\bullet)}{\partial f_{AGRI}} \frac{\partial f_{AGRI}}{\partial PC} \right)}{[MU_{pl}(\bullet)]^2}. \quad (9)$$

Consider the sign of the derivative. First, assume that the marginal utility of plain-labeled foods is positive. Second, the change in marginal utility of foods labeled as genetically modified is

negative with respect to trust of environmental groups, because environmental groups provide negative information on foods labeled as genetically modified. Third, the change in the marginal utility of foods labeled as genetically modified is positive with respect to trust of agribusiness firms because agribusiness firms provide positive information on foods labeled as genetically modified. If an increase in personal capital causes a consumer to trust environmental information more and agribusiness information less, then equation (9) has a negative sign and the consumer would purchase more plain-labeled food products relative to their genetically modified-labeled counterparts.

For this case, an increase in personal capital causes the consumer's marginal rate of substitution between genetically modified-labeled and plain-labeled foods to decrease, and the consumer will purchase more plain-labeled foods (see figure 1). The opposite result holds if a change in a consumer's personal capital causes him or her to trust environmental groups less and agribusiness firms more. A change in a consumer's social capital causes similar effects on the demand for foods labeled as genetically modified. This example illustrates that, when personal or social capital changes the trust in an interested party (by changing the perceived quality of the information), it can change the consumer's demand for genetically modified-labeled or plain-labeled food.

The Survey

The participants in our post-experiment survey were adult consumers over 18 years of age from two major Midwestern metropolitan areas that were chosen by a random digit dialing method (see [Huffman et al., 2003](#)). Three-hundred-eighteen individuals participated in our project out of 1,673 contacted, which was a response rate of approximately 19 percent. Table 1 summarizes the demographic characteristics of the survey participants (or respondents). The

demographics of our sample do not perfectly match the U.S. census demographic characteristics for these regions, but they are similar and provide a sufficient representation to examine who consumers trust for information on genetically modified foods (see the Appendix for the demographic characteristics of the areas). Although our participants are slightly skewed toward women, Katsaras et al. (2001) show that women make up a disproportional share of grocery shoppers—83 percent of shoppers versus 52 percent in the U.S. Census of Population. We now briefly discuss some of the demographic characteristics of the participants, which are presented in Tables 2 and 3.

Education is a form of personal capital. An individual's education not only affects his or her opportunity cost of his or her time, but also his or her ability to acquire and process information and to make decisions (Schultz, 1975; Huffman, 1977). Six percent of the participants did not complete high school; about 19 percent of the participants completed high school but did not attend college. Almost 35 percent of the participants attended college but did not obtain a 4-year degree. About 20 percent of the participants received a 4-year college degree, and 19 percent completed at least some graduate work.

An individual's age is a proxy for years of experience as a decision-maker and also an indicator of length of expected remaining length of life. Accumulated experience as a decision maker is expected to affect trust in information sources in general. Also, as an individual ages he or she has fewer expected years over which to obtain benefits from acquired information.

Religious upbringing is a form of social capital. An individual's religious upbringing could affect every decision that he or she makes and could play a significant role in trust formation. Our survey asked people to indicate their religious affiliation when they were young. Fifteen percent of the participants were raised as Baptists, slightly more than 26 percent of

participants were raised as Catholics, over 17 percent of the participants were raised as Lutherans, and almost 16 percent were raised as Methodists (see table 2). Almost 20 percent indicated they were raised with some other specific religious upbringing and almost 6 percent indicated that they were not raised with any religious upbringing.

Individuals participating in our project were asked to bid on vegetable oil, tortilla chips, and Russet potatoes. After these bidding experiments were completed, they were then asked to complete a post-auction questionnaire containing the question: “If a source were to give you verifiable information on genetically modified foods, who would you trust most?”² This was an open-ended question, and participants wrote their answer down on the questionnaire. We then coded the responses into six categories: government; university, scientists/researchers, or third-party groups; environmental or consumer group; private industry or organization; none or nobody; and “other”, including media.³

The first category is independent third-party sources. It contains responses from individuals who would most trust universities, scientists, or an independent third-party group that does not have financial ties to genetic modification. The second category, “government,” contains responses from individuals who named a government (national, state, or local) or a governmental entity (e.g., the FDA). The third category “environmental or consumer group” is for participants who indicated they would most trust an environmental or consumer group to provide verifiable information on genetically modified foods. The fourth category is “private industry or organizations,” which contains the response for any individual who listed a private entity or business as the group they would trust most. Most of these responses were for agribusiness firms or grocery stores. The fifth category is “none or no body” and it is for individuals who said they would not trust any source. The last category is classified as “other,”

and it contains responses by individuals who would trust the media, and some responses that were too sparse for their own category (e.g., one person said he or she most trusted God to provide verifiable information on genetically modified foods).

Excluding the “other” category, the most frequently reported trusted source for information on genetic modification the first group, “third-party including university, scientists/researches,” accounting for 30 percent of the responses (see table 4). The “government” was listed by 20 percent of the respondents. The “environmental or consumer group,” “private industry or organizations,” and “none” each received less than 6 percent of the responses.

Econometric Model

Consider a random indirect utility model in which the utility of a consumer’s choice j is determined by x_j , consumer’s household income, goods’ prices, and attributes:⁴

$$U_{ij} = \beta' x_{ij} + \varepsilon_{ij}. \quad (10)$$

Here the utility of consumer i is based on choice $j \in J$. If he or she chooses j , it must be the choice that yields the highest utility to the individual. With disturbance terms that are independently and identically distributed Weibull, the probability of consumer i choosing choice j is:

$$\text{Prob}(Y_i = j) = \frac{e^{\beta_j' x_i}}{\sum_{k=1}^J e^{\beta_k' x_i}} \quad \text{for } j=0,1,\dots,J. \quad (11)$$

Equation (11) is the multinomial logit model. To solve the model, however, one must first define $\beta^*_j = \beta_j + q$, for a vector q , and then normalize $\beta_0 = 0$.⁵ The probability of choice j is then

$$\text{Prob}(Y = j) = \frac{e^{\beta_j' x_i}}{1 + \sum_{k=1}^J e^{\beta_k' x_i}} \text{ for } j=1,2,\dots,J. \quad (12)$$

$$\text{Prob}(Y = 0) = \frac{1}{1 + \sum_{k=1}^J e^{\beta_k' x_i}}. \quad (13)$$

We can represent the probability a consumer prefers one choice over another as the log-odds ratios:

$$\ln\left(\frac{P_{ij}}{P_{i0}}\right) = \beta_j' x_i. \quad (14)$$

Equation (14) shows the probability that a consumer prefers (trust) choice j over choice 0, the reference choice.⁶ If β_j' is positive, then a marginal increase in x_i increases the odds that the consumer prefers choice j over the reference choice. For this study, the reference choice is the “independent third-party source.” The regressors are variables proxying an individual’s personal and social capital, his or her beliefs, and his or her household income.⁷

Econometric Results

The fitted model allows us to examine the odds that a consumer trusts one of the five sources of information more or less than he or she trusts an “independent third-party source” to provide verifiable information on genetically modified foods. Five regressors are included in this multinomial logit model: a participant’s household income, education, age (which can be thought of as a proxy for experience), and a dummy variable for prior beliefs. This dummy variable equals one if the respondent perceives him- or herself as being “at least somewhat informed regarding genetically modified foods.” These latter three variables are all types of personal capital. The fifth regressor is a participant’s religious upbringing, represented by a dummy variable that equals one if the consumer was raised as a Baptist, a Catholic, or a

Lutheran (the three strictest religious upbringings in the survey relative to the origin of life). Religious upbringing is a form of social capital.

The estimated coefficients for the multinomial logit model of an individual's or consumers' trust in sources to provide verifiable information on GM-foods are reported in table 5. The independent variables are listed on the far-left column in table 5, while the information sources are listed along the top. Matching the regressor on the left-hand side with the information source (written relative to the third-party source) provides the coefficient for the log-odds ratio. Increasing a participant's household income does not change the odds significantly of any of the five choices relative to third-party information. Household income could, however, have positive individual effects but neutral relative effects.

An individual who is well educated is shown to more likely trust an "independent third-party" source relative to other sources. Increasing a participant's schooling lowers significantly the odds that he or she trusts government, private industry or organization, nobody, and "other" relative to a third-party source. Although the coefficient of education for the odds of environmental or consumer group is positive, it is not significantly different from zero.

As an individual becomes older, the odds he or she trusts an environmental or consumer group or "nobody" falls significantly relative to trusting third-party sources. His or her age, however, has a positive effect on the odds of trusting government, private industry or organization, or other relative to third-party information. These effects, however, are statistically weak. If a participant reported in the pre-auction questionnaire that he or she was "informed about genetically modified foods", he or she is significantly more likely to trust government relative to third-party source. If a participant had a strict religious upbringing, he or she has significantly lower odds of trusting private industry or organization and higher odds of trusting

“no body” relative to a third-party source. The person’s religious upbringing, however, did not have a significant effect on the odds of any of the other choices relative to third-party information.⁸

Discussion

Huffman and Tegene (2002) hypothesize that an independent third-party source of information on genetically modified foods would improve welfare, and [Rousu et al. \(2003\)](#) show that verifiable information on genetically modified foods could have an annual value to U.S. consumers of over \$2 billion dollars. To be effective this type of information would have to be independent of interested parties—the international environmental NGOs and the agricultural biotechnology industry. The entity that creates this information may want to be at least partially independent of the government, because some individuals and groups are not in favor of current governmental, e.g., FDA, policies on voluntary food labels.

Of the individuals in our survey, approximately 30 percent said they would most trust information on genetically modified foods obtained from an independent third-party source, and if we exclude the “other” category, the share is 46 percent. A quasi-governmental entity funded by the government but not answering to the government may be the best possible source to provide information on foods labeled as genetically modified. Furthermore, given the large cost of performing and evaluating research to verify claims, the federal government is most likely the only source with sufficient resources to fund a public goods producing venture on the topic of genetic modification and agricultural biotechnology.⁹

Conclusion and Implications

Although many organizations disseminate information on a wide range of topics, they must gain the trust of a constituent group before they can affect decisions. In the case of GM-foods, the international environmental NGOs and agricultural biotech industry disseminate conflicting information. International environmental NGOs disseminate negative information; agricultural biotech industry disseminates positive information. In fact, the international environmental NGOs, agricultural biotechnology industry, and U.S. government all have different interpretations of the role genetically modified foods should play in our society.

Although the literature on the economics of trust is growing rapidly, few studies have examined the contribution of an individual's personal and social capital to his or her trust. This paper has provided new econometric evidence that personal and social capital of adults who are consumers affect significantly their trust in five different sources of information on genetic modification relative to an independent, third-party source. We have shown that an individual's schooling, age, religion, and self-reporting status as being informed about genetically modified foods contributed significantly to explaining the odds of particular outcomes. Considering the ongoing, contentious debates over genetically modified foods and other products, our analysis makes a significant contribution by linking personal and social capital of consumers to their trust in information on genetically modified foods. Additional work remains to be done to explore important information quality issues associated with other new products and processes.

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Table 1. Characteristics of the Auction Participants (N = 318)

Variable	Definition	Mean	St. Dev
Gender	1 if female	0.62	0.49
Age	The participant's age	50.10	17.5
Married	1 if the individual is married	0.67	0.47
Household	Number of people in participant's household	2.73	1.47
Income	Household's income level (in thousands)	54.70	34.10
White	1 if participant is white	0.93	0.26
Read_L*	1 if participant never reads labels before a new food purchase	0.02	0.14
	1 if rarely reads labels before a new food purchase	0.90	0.29
	1 if sometimes reads labels before a new food purchase	0.32	0.47
	1 if often reads labels before a new food purchase	0.36	0.48
	1 if always reads labels before a new food purchase	0.21	0.40
Informed*	1 if an participant considered him/herself at least somewhat informed regarding genetically modified foods	0.48	0.44

*Pre-auction information.

Table 2. Religious Upbringing of Individuals in the Survey (N = 318)

Religious Upbringing	Percent
Baptist	15.0
Catholic	26.1
Lutheran	17.6
Methodist	15.7
Other	19.7
None	5.9

Table 3. Education of Individuals in the Survey (N = 318)

Highest Level of Schooling Completed	Percent
Did not complete high school	6.0
Completed high school	18.6
Attended some college	22.6
Two-year college degree	12.3
Four-year college degree	21.4
Some graduate school work	19.2

Table 4. Who Individuals Trust for Information on Genetically Modified Food

Information Sources Individuals Trust	Number	Percentage
All	318	100
Third-party including university, scientists/researchers	94	29.6
Government	62	19.5
Environmental or consumer group	12	3.8
Private industry or organization	16	5
None or nobody	19	6
Other, media, or no answer	115	36.1

Table 5. Estimates of Multinomial Logit Model: Who would you Trust to Provide Verifiable Information on Genetically Modified Foods?^a (N = 318)

Variable	(Government/ Third-Party)	(Env. or Con. Group/ Third-Party)	(Private Ind. or Org./ Third-Party)	(Nobody/ Third-Party)	(Other/ Third-Party)
Intercept	1.169 (1.286)	-1.658 (2.420)	2.369 (2.172)	4.043 * (1.810)	5.568 *** (1.141)
Household income	-0.0010 (0.0052)	-0.0099 (0.0110)	0.0076 (0.0085)	-0.0100 (0.0096)	0.0017 (0.0046)
Education	-0.138* (0.080)	0.081 (0.149)	-0.347 ** (0.147)	-0.242 * (0.124)	-0.389 *** (0.074)
Age	0.010 (0.010)	-0.025 (0.019)	0.001 (0.017)	-0.035 ** (0.016)	0.004 (0.009)
Informed	0.344 ** (0.170)	0.442 (0.328)	0.003 (0.286)	0.050 (0.269)	0.158 (0.149)
Religious upbringing	-0.042 (0.171)	0.055 (0.316)	-0.840 ** (0.399)	0.556 ** (0.280)	-0.074 (0.151)

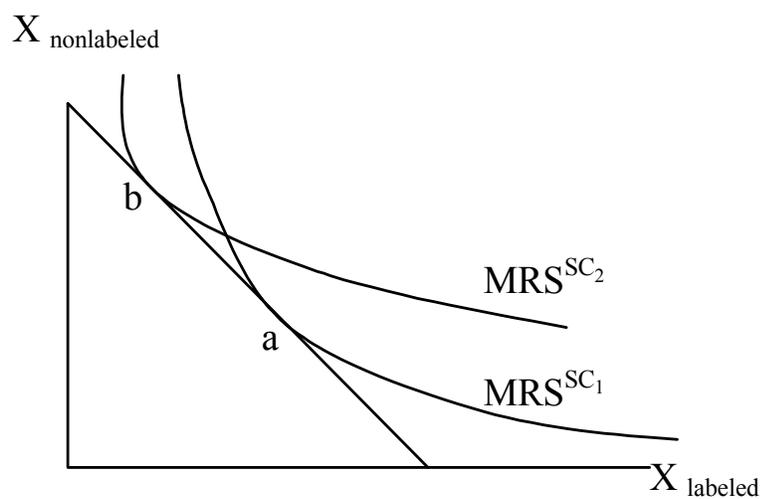
^a The reference group is an independent, third-party source.

*** Statistically significant at the 1% level

** Statistically significant at the 5% level

* Statistically significant at the 10% level

Figure 1. Graphical Depiction of a Change in Marginal Rate of Substitution (MRS) When a Change in Social Capital Causes the Individual to Place More Trust in a Source of Information That Views Genetically Modified Foods Negatively



**Appendix Demographic Characteristics of Polk County, IA (including Des Moines area)
and Ramsey County, MN (including St. Paul area)**

Variable	Definition	Polk	Ramsey	Average
Gender	1 if female	0.52	0.52	0.52
Age	Median age	45.7	45.7	45.7
Married	1 if the individual is married*	59.5	51.4	55.5
Education	Years of schooling**	13.52	13.76	13.64
Income	The median household's income level (in thousands)	46.1	45.7	45.9
White	1 if participant is white	0.9	0.8	0.85

All variables are for individuals of all ages, except for married, which is for individuals 18 or older; education, which is for individuals 25 or older; and age, which is for individuals 20 or older.

*The estimate of the number of married people who are 18 or older was obtained by taking the number of people married over 15 and assuming that the number of people who were married at ages 15, 16, and 17 was zero. This gives the percentage of people who are married who are 18 or older.

**The years of schooling was estimated by placing a value of 8 for those who have not completed 9th grade, 10.5 for those who have not completed high school, 12 for those who have completed high school but have had no college, 13.5 for those with some college but no degree, 14 for those with an associate's degree, 16 for those with a bachelor's degree, and 18 for those with a graduate or professional degree.

Footnotes

¹ The appearance of new goods (or new attributes) has the same effect that the appearance of a new means of production has on a firm; it changes the household's production technology (Bianchi; Becker, 1976, p.137).

² To see the format of the experiments, see Huffman et al. (2003) or Tegene et al. (2003).

³ If an individual listed more than one category, we chose the first item they listed.

⁴ This section follows Greene (p. 720-722) closely.

⁵ This arises because the alternatives are mutually exclusive and exhaustive and the associated probabilities sum to one. Only J parameter vectors are needed to determine the $(J + 1)$ probabilities.

⁶ From the point of view of estimation, it is a major advantage that the odds ratio does not depend on the other choices, which follows from the independence of disturbances in the original model. From a behavioral viewpoint, however, this fact is not so attractive.

⁷ Prices are not included, because no price data are available for trust of information sources.

⁸ Multinomial logit models including a participant's gender and marital status were also fitted. These variables did not have any coefficient that was statistically different from zero at a conventional level of significance.

⁹ It is noteworthy that less than 10 percent of participants said they would most trust information from the interested parties (i.e., environmental or consumer group, private industry or organization), and this information is already available through websites.