

Trust and U.S. Consumers' Acceptance of Genetically Modified Foods: A Laboratory Experiment

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by

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Introduction

The application of modern biotechnology in agriculture has been extremely fast, especially at the farm level (Kalaitzandonakes 1999). However, the application, and notably the use of genetically modified (GM) organisms (GMOs), has raised concern amongst Europeans, Australians, Asians and most recently the U.S. public (Barling et al. 1999, Consumer Reports, Sep. 1999, Newsweek, 13 Sep. 1999, Gaskell et al., 1999, The National Nutritional Foods Association 1999, Agrifood Alliance Australia 1999, Hoban 1998, etc.). Barling et al. (1999) note that the “values that underlie this public concern about food biotechnology include perceptions of: trust, choice, need and care for a sustainable society and natural balance.” Hoban (1998) adds to their list consumers' recognition of benefits from a food to the values that underlie the concern.

In an effort to garner consumer acceptance of biotechnology and the products derived from it, life-science companies and others have followed a strategy of offering consumers “scientific information” about the safety of GMOs. This strategy is based on the premise that consumers' acceptance of the GM technologies and products is based on the consumer's level of trust for the safety of the technologies and/or products. Furthermore, it is presupposed that the level of trust is generated from rational and methodical processes.

This strategy does not seem to be working however (see recent articles in Newsweek (Sep 13, 1999), AgriMarketing (Jul/Aug 1999), Consumer Report (Sep 1999), and The Wall Street Journal (May 11, 1999)). There are possibly many reasons to explain the strategy's shortcomings. This research questions the notion that objective information (only) is sufficient to garner adequate levels of trust in consumers to cause them to accept GMOs.

In an attempt to understand the relationship between consumers' trust of GM food products and their acceptance of those products, this study measures the effect consumers' trust of products has on consumers' willingness to accept the products, specifically GM products. Following the lead by Morrow et al. (1999), this research divides trust into two components, cognitive and affective, and then examines the effect of each (or both) on a consumer's willingness to accept GMOs. Cognitive trust, according to Morrow et al., “...is objective in nature and is based on a rational, methodical process that results in a belief that an individual, group or organization (and in the case of GM products as well) is trustworthy.” Contrast that to affective trust, which is generated in a subjective manner based on an individual's moods, feelings and emotions.

Goal of the Study

The goal of the study was to answer the question: do various levels of cognitive and affective trust influence consumers' willingness to purchase a GM food product? To answer this question, we designed a laboratory experiment to study the relationship between consumers' levels of cognitive and affective trust and their willingness to accept

a (fictitious) spaghetti sauce made with soybean oil from genetically modified soybeans. Our design also enabled us to examine the differences in cognitive versus affective trust on consumers' acceptance of the spaghetti sauce, and to suggest ways to apply the findings to the development of a consumer-acceptance campaign for GM foods.

Methods

Trust has received much attention recently in both business-management and agricultural-economics literature. Strategic alliances have been analyzed in terms of the trust or lack of trust among parties (e.g., Wicks et al. 1999, Starbird 1999 and Sporleder 1999). However, little work has been done to measure the relationship between consumers' level of trust and their willingness to accept technologies or products produced from the technologies. The notable exception is research conducted by Hoban et al. (1996 through 1998), albeit the work only indirectly investigated the effects of trust.

The methods for this study are derived from a methodology used by Morrow et al. (1999) in their effort to measure, in short, the relationship between trust among members of a cooperative and the co-op's performance. Their method is modified and applied in a laboratory setting. In this case, the relationship between and among cognitive and affective trust and consumers' acceptance of GM spaghetti sauce is being studied in an effort to answer the question stated above.

Four scenarios are defined and presented to groups of participants (consumers). Scenario one and two are the cases of high and low levels of affective trust. Scenarios three and four are the cases of high and low levels of cognitive trust. Each scenario is presented as a fictitious "press release," although references to actual events and/or personalities may be made within the context.¹

College students serve as the sample. The students are divided into four groups and asked to read a press release by a food manufacturer of popular spaghetti sauces. Each group of students reads one of four scenarios regarding the use of soybean oil derived from genetically modified soybeans in the spaghetti sauces. Each group is asked to read one of four scenarios. The content of the four "press releases" is summarized in Table I. Cognitive information is defined as objective or quantitative in content, whereas affective information is considered subjective or qualitative in nature.

Participants are then asked to read and answer a series of questions regarding the spaghetti sauce. The questionnaire is designed to estimate the interaction between the levels of cognitive and/or affective trust and their acceptance of the GM spaghetti sauce. The questions are divided into four categories. The first set of questions and responses is intended to generate an understanding of how the participant felt about the spaghetti sauce after reading their respective scenario.

The second set of questions measures the level of overall trust established toward the product after reading the respective scenarios. The third set seeks to determine the level of acceptance by asking about the participants' willingness to purchase and use the spaghetti sauce. The fourth set of questions asks about the participant's awareness of GM crops and foods, gender, race or nationality, and age.²

¹ Copies of the scenarios can be obtained by contacting the lead author.

² Copies of the questionnaire can be obtained by contacting the lead author.

Table I. The Content of the Four Press Releases

Types of Trust	High Cognitive	Low Cognitive
High Affective	Much “objective” and “subjective” information	Much “subjective” and very little “factual” information
Low Affective	Much “objective” and very little “subjective” information	Very little information

Results

This study reports the results from a pilot study used to validate the aforementioned methodology and instrument. Although the sample is relatively small (an “n” of 100, with 25 in each of the four groups), the ANOVA of the primary data is encouraging. Tables II through IV contain the statistical results.

Table II contains the mean responses (out of a possible seven points) for the questions inquiring about cognitive trust. For example, the mean of 5.38 that appears in the upper left cell of Table I is the mean response to the cognitive questions by the individuals who read the press release that contained the high level of both cognitive (objective) and affective (subjective) information. The next cell to the right contains the mean response—a 4.80—to the cognitive questions for the individuals who read the press release containing a significant amount of subjective information and very little objective information.

Table II. Mean Responses to the Cognitive-Trust Questions

Types of Information in the Press Releases	High Cognitive	Low Cognitive
High Affective	5.38	4.80
Low Affective	5.08	4.72

The data summarized in Table II suggest that the cognitive questions are indeed soliciting response based on cognitive information. That explains the relatively higher means in the first column compared to the second column. Notice the results suggest that

in order to maximize the impact of cognitive information, there needs to be a high level of affective information, hence the relatively high mean score in the upper left-hand cell.

The results presented in Table III also support the usefulness of the method and the instrument in that the magnitudes of the means are consistent with responses to questions inquiring about affective trust. That is, you would expect high means responses for affective questions when the level of affective information was high in the press release. Again, the results in Table III support a strong interaction effect between affective and cognitive trust.

Table III. Mean Responses to the Affective-Trust Questions

Types of Information in the Press Releases	High Cognitive	Low Cognitive
High Affective	5.82	5.08
Low Affective	5.28	4.82

The goal of the study was to gain insights into consumers' willingness to buy spaghetti sauce made with soybean oil from GM soybeans. Based on the mean responses we collected and presented in Table IV, it appears that consumers are most willing to purchase GM spaghetti sauce when provided with information that leads to high levels of both cognitive and affective trust. Indeed, consumers' willingness to purchase increases from a low of 5.17 (when they are provided very little cognitive and affective information about the product) to a high of 6.03 when provided both cognitive and affective information.

Table IV. Mean Responses to the Willingness-to-Buy Questions

Types of Information in the Press Releases	High Cognitive	Low Cognitive
High Affective	6.03	5.56
Low Affective	5.75	5.17

In summary, the data in the tables suggest two things. They suggest the methods and the instrument are useful for capturing the constructs we were attempting to measure. They also suggest that consumers' are most willing to buy or acceptance GM spaghetti sauce, when they are provided with both cognitive and affective information about the product.

Conclusions

The findings in this study are particularly noteworthy given the state of affairs surrounding recent propaganda campaigns aimed at persuading the public of the benefits of genetically enhanced foods.

Recent strategies deployed by the scientific community as well as industry to influence consumers' attitudes toward GM technologies and products have been cognitive in nature. Most if not all are founded on the premise that consumers will accept the technologies and products as long as they have trust in the safety of the technologies and/or products. And safety is synonymous with scientific evidence. Therefore, the campaigns for the most part have relied on rational and methodical processes to disseminate scientific data and evidence in hopes of generating trust.

This study hypothesized that this may be too simple an approach because consumers don't have just a single level of trust. Instead consumers rely on two types of trust—cognitive and affective—in making their decisions. This study conducted a laboratory experiment to test these hypotheses using college students as consumers.

The results suggest that each of the trust can be manipulated separately and there also seems to be a strong interactive affect between consumers' levels of cognitive and affective trust. Therefore, it is recommended that any campaigns aimed at influencing consumers' attitudes toward GM products should include both cognitive and affective "trust-building" information. Given that much of the effort to date to persuade consumers has been cognitive in nature, it follows that future efforts should focus on developing affective trust among consumers.