

## Selected Consumers' Evaluations of Genetically Modified Food Labels

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### Abstract

Genetically modified (GM) organisms are commonplace in modern agricultural practice. However, polls and surveys have indicated a lack of consumer acceptance of GM ingredients and a desire to see such products identified through the use of labels. In this study, three focus groups composed of consumers in two northwest Arkansas counties evaluated and discussed four genetically modified food labels developed through the use of the Elaboration Likelihood Model, a persuasive communication theory. Findings revealed that participants want labels on food containing GM ingredients. Participants agreed on two features that a GM food label should have: contact information and an identifying symbol. They felt that this label should appear on the front of the package or near the nutrition information. Participants also wanted more consumer education about GM foods and indicated that any label adopted in the future should identify them as such. Further qualitative and quantitative research on consumer preferences regarding GM food labels and the design of such labels is needed.

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Courtney A. Meyers and Jefferson D. Miller

## Abstract

Genetically modified (GM) organisms are commonplace in modern agricultural practice. However, polls and surveys have indicated a lack of consumer acceptance of GM ingredients and a desire to see such products identified through the use of labels. In this study, three focus groups composed of consumers in two northwest Arkansas counties evaluated and discussed four genetically modified food labels developed through the use of the Elaboration Likelihood Model, a persuasive communication theory. Findings revealed that participants want labels on food containing GM ingredients. Participants agreed on two features that a GM food label should have: contact information and an identifying symbol. They felt that this label should appear on the front of the package or near the nutrition information. Participants also wanted more consumer education about GM foods and indicated that any label adopted in the future should identify them as such. Further qualitative and quantitative research on consumer preferences regarding GM food labels and the design of such labels is needed.

## So What?

Genetically modified foods are common in modern agricultural practice. However, consumers have expressed a desire for foods with GM ingredients to be labeled. This research gathered selected consumers' perceptions of GM food labels designed within the framework of a persuasive communication theory. Applied communicators can utilize the findings to design potential GM food labels and develop consumer education campaigns about GM food.

Over the course of the past century, an increasing number of Americans have moved away from rural settings, contributing to a rapid decline in consumer understanding of agricultural practices. Food production

## Research

techniques and practices are abstract concepts to citizens who have never been exposed to the farming lifestyle. This lack of knowledge fosters questions and concerns about food safety practices, including those related to crops derived through biotechnology (Brom, 2000).

The United States is the world's leading producer of genetically modified (GM) crops. The most commonly planted genetically modified U.S. crop varieties are corn (46% GM), cotton (76% GM), and soybeans (85% GM). Production of GM canola, squash, and papaya varieties is also increasing (United States Department of Agriculture, 2005).

Consumer support for labeling products that contain GM ingredients has increased in recent years. A 2003 study showed that 94% of U.S. citizens support mandatory labeling on all genetically altered foods (Hallman, Hebden, Aquino, Cuite, & Lang, 2003), up from 86% in 2000 (Shanahan, Scheufele, & Lee, 2001). Labeling "includes any written, printed, or graphic matter that is present on the label, accompanies the food or is displayed near the food, including that for the purpose of promoting its sale or disposal" (Einsiedel, 2000, p. 231). Consumer advocacy groups argue for labels, maintaining that consumers have a right to know what they are eating. Vegetarians, for example, may want to know if a GM food contains a gene or protein from an animal. Other consumers may want to avoid GM food for religious reasons or because of concerns about the safety of GM foods (Hart, 2004).

Labeling GM foods in the United States would be a complex and potentially expensive process. Consumers' clear preference for labeling and choice supports the practice of mandatory labeling. However, labels can be misleading, ignored, misunderstood, or useless. To make informed decisions, consumers need to be better educated and more aware of the available options (McHughen, 2000). This study explores and evaluates potential GM food label designs, using focus groups to gather consumers' perceptions of potential labels. This research is relatively unique because few, if any, existing studies specifically address consumer preferences related to potential GM food label designs. Three research questions guided the project:

1. Do the selected consumers want to see labels on foods that contain GM ingredients?
2. What types of information do the selected consumers want on a food product that contains genetically modified ingredients?
3. Where on the food package should information about genetically modified ingredients be displayed?



## Literature Review

### *Public Opinion and Labeling*

Despite the prevalence of GM foods in the marketplace, surveys have shown that U.S. consumers have only a limited understanding of food biotechnology (Heffernan & Hillers, 2002; Shanahan et al., 2001; Teisl, Halverson, et al., 2002). In fact, American consumers' awareness of genetically modified foods actually decreased between 2001 and 2006. In 2001, 44% of consumers had heard about genetically modified food being sold in grocery stores, but by 2006, that figure was down to 40% (Pew Initiative on Food and Biotechnology, 2006). Numerous surveys over the last dozen years have demonstrated that Americans think it is important to know whether a product contains genetically modified ingredients (Hallman et al., 2003; Hallman & Metcalfe, 1995; Hart, 2004).

Other labeling studies (Teisl, Halverson, et al., 2002; Teisl, Peavey, Newman, Buono, & Hermann, 2002) have illustrated how focus group participants react to certain label designs. These studies were used to help create the methodology for this research project. Teisl, Halverson, et al. (2002) used six focus groups to discover how consumers responded to different labeling messages. Participants were shown several GM label props (mock-ups of various label designs) that provided different types and amounts of information indicating whether the product did or did not contain GM ingredients. One label specifically identified the product as "GM-free." Labels that indicated the product did contain GM ingredients were further divided into positive (mention of a benefit), negative (mention of some warning), or neutral statements (simply stating the product contains GM ingredients). The majority of participants in the study agreed that the label should clearly indicate whether the food product contains any GM ingredients and explain why the genetic modification was done (Teisl, Halverson, et al., 2002). This finding supports previous focus group studies showing that the wording on GM food labels has an important effect on consumer understanding and acceptance of biotechnology (Hoban, 1999).

Priest (2001) focused on media coverage of biotechnology and GM foods and included a thorough discussion of labeling issues. Labels, Priest wrote, "are a part of the mass communication environment ...and...are an important source of food-related consumer information in the United States" (p. 86). Labels for GM foods and ingredients are not required by regulatory agencies in the United States. Priest hypothesized that if labels were required, some individuals in the food industry might fear that the labels could have a negative impact on consumers, making them more aware (in a negative way) of biotech-related issues.

## Research

### *The Elaboration Likelihood Model*

Petty and Cacioppo (1981) developed the Elaboration Likelihood Model (ELM) to evaluate how individuals react to persuasive messages. The theory states that people process persuasive messages at different levels of elaboration depending on how much attention they have paid to message content (Littlejohn, 1992). Elaboration likelihood is influenced by an individual's motivation and ability to process a persuasive message (Petty & Cacioppo). Within the ELM, there are two distinct routes to persuasion: the central route and the peripheral route. The route utilized depends on how motivated and able a message recipient is to process the message. The central route is highly dependent on the persuasive quality of the message content. "The message recipient attends to the message arguments, attempts to understand them, and then evaluates them" (Petty & Cacioppo, p. 256). Attitudes developed through the second approach, the peripheral route, are based less on thoughtful evaluation and more on inferred perceptions. For instance, attitudes may be influenced by perceived rewards or punishments related to the message, judgmental distortions when perceiving the message, or opinions as to why a speaker is advocating a certain point of view (Petty & Cacioppo).

Although many studies employing the ELM have focused on advertising, the principles can be applied to other forms of marketing, such as food labeling, logos, and branding (Davies & Wright, 1994). Previous studies using the ELM (Andrews & Shimp, 1990; Lord, Lee, & Sauer, 1995) helped to determine the specific content, sources, and designs of the proposed GM food labels. Andrews and Shimp conducted an experiment to test the Elaboration Likelihood Model in a consumer behavior context. This study used the three basic variables of the ELM—message processing involvement (elaboration likelihood), message argument strength, and peripheral cues—to test cognitive responses and attitude changes. The results indicated that high-involvement subjects concentrated more on the claims in the advertisement (versus the picture) than low-involvement subjects. High-involvement subjects also remembered a significantly higher number of message arguments than low-involvement subjects. This finding supports the ELM theory that individuals with higher elaboration likelihood will focus more on the central route to persuasion.

### **Methods**

Focus group methodology is an especially good fit with exploratory investigations such as this one. Focus groups "can provide insight into complicated topics where opinions or attitudes are conditional or where the area of concern relates to multifaceted behavior or motivation" (Krueger,



1994, p. 45). A key feature of focus groups is their potential to produce rich data and uninhibited insights that might not have been evident without the group interaction (Morgan, 1997). Additionally, the format of a focus group allows the moderator flexibility to probe into unanticipated issues that might not be discovered by a more structured questioning design. Focus groups also have high face validity because the technique is easily understood and results are presented in an uncomplicated format (Krueger).

Three consumer focus group sessions were held in northwest Arkansas in February 2005. The University of Arkansas Survey Research Center conducted random-digit dialing to recruit participants for the sessions from a two-county area (Benton and Washington counties). The Survey Research Center used a telephone screening script that included questions to identify the participants' age, gender, education, ethnicity, and socioeconomic status. This process aided in identifying a group of candidates who represented the demographics of northwest Arkansas, according to 2005 U.S. Census statistics. Recruited participants also regularly shopped for groceries and were, therefore, familiar with current package labels. Subject selection efforts focused on minimizing sample bias (Morgan, 1997). When a list of 30 suitable candidates was reached (10 for each session), sampling stopped. Because of attrition between the end of recruiting and the beginning of the focus group session, final groups had 4 to 8 participants. The small group size encouraged more discussion and allowed participants more time to share insights. The group with only 4 participants was considered a minigroup; this is still an acceptable group size according to Krueger (1994), but it did not produce the same volume of ideas and suggestions. Participants received a gift certificate and lunch for attending the 2-hour session.

Review of past studies (Hoban, 1996; Pew Initiative on Food and Biotechnology, 2001) aided in the development of the questioning route. Researchers familiar with qualitative methodology evaluated the questioning route and made suggestions. Following these corrections, representatives of the target population who were not in the recruited focus groups participated in a pilot test for the focus group session. This process improved the clarity and effectiveness of the questioning route and label designs. The moderator's use of a structured questioning route provided consistency between sessions (Morgan, 1997).

The moderator began each focus group session by explaining the purpose of the research, clarifying the participants' roles, and asking introductory questions (Krueger, 1994). Following this, the moderator asked participants about their general attitudes regarding biotechnology and genetic modification and whether foods developed through this process

## Research

should be labeled. The question about labeling was asked three times, each time after participants received additional information that might have influenced their responses. Finally, participants were shown four label examples developed using the Elaboration Likelihood Model as a theoretical foundation (see Figure 1). These labels were categorized as: a) central route weak, b) central route strong, c) peripheral route weak, and d) peripheral route strong. The labels were shown to the participants in respective order. Each label was displayed on a box of generic corn flakes, and participants received a printed copy of each label for closer evaluation.

### Label 1

This product contains corn derived through biotechnology to reduce pesticide use and exposure to the toxin fumonisin, which may cause esophageal cancer in humans.

### Label 2

In accordance with U.S. Food and Drug Administration regulations, this product contains corn derived through biotechnology to reduce pesticide use and exposure to the toxin fumonisin, which may cause esophageal cancer in humans.

For more information about foods produced through biotechnology, visit the FDA website [www.fda.gov](http://www.fda.gov) or call (888)-BIO-INFO.

### Label 3

READY TO EAT!



This product contains corn derived through biotechnology.

National Corn Growers Association



### Label 4



This product contains biotech corn proven to:

- reduce ground and surface water contamination
- reduce harmful impact on wildlife
- reduce exposure to cancer-causing toxin

U.S. Food and Drug Administration



Figure 1. Labels developed through the Elaboration Likelihood Model.

The central elements of labels 1 and 2 included printed messages pertaining to the product contents and, in the case of label 2, contact information to learn more about the product. The message was fact-based, containing informational and unbiased descriptions of the product. Peripheral elements on labels 3 and 4 included both relevant and irrelevant graphics and certifying sources. The label text was very concise on label 3, and a bulleted list of items on label 4 allowed for easy reading and a visual indication of the number of printed messages.

To ensure the rigor of this research project, the study followed Guba and Lincoln's (1989) recommendations for credibility, dependability, and confirmability. This study earned credibility through persistent observation (pilot study and three 2-hour focus group sessions), peer debriefing (committee review), and member checks (final question asked



during each session). Dependability was ensured by audiorecording focus group discussions and keeping a typed transcript to provide traceable and documented data. Confirmability was achieved by keeping the data in raw form, demonstrating a clear data trail on the printed transcripts, and discussing the conclusions with research colleagues to ensure that the data, interpretations, and outcomes were actual and not manufactured by the researcher (Guba & Lincoln).

The researchers used transcript-based analysis to categorize and code the collected data (Lindlof & Taylor, 2002). Through this analysis, clear themes emerged related to the research questions. These themes and the related representative excerpts from the focus group transcripts make up the results of the study.

## Results

Participants were united in their opinions on several issues, including desire for GM labeling; design, content, and placement of the labels; and perceived need for public education about genetically modified foods.

### *Need for GM Labels*

To address the first research question, participants were asked "Should foods containing genetically modified (GM) ingredients be labeled?" three times during each session. The question was asked at three different points to explore the influence of additional information on the participants' responses. Table 1 displays the three phases of this question and selected participant responses. When the question was first asked after a definition of "genetically modified" was provided, participants responded that these products should be labeled. Participants were then informed that an estimated 70% of processed foods currently in the marketplace may contain genetically modified ingredients (Brown & Ping, 2003). When asked again if foods containing GM ingredients should be labeled, respondents indicated that they should. The question was asked a final time after participants were informed of the current FDA regulation that requires GM food products to be labeled if the product is significantly different from its conventional counterpart in terms of its nutritional value or if it contains a known allergen (United States Department of Agriculture, 2005). Participants focused on the terminology of "significant difference" and voiced hesitancy about what that phrase implies.

## Research

**Table 1.** *Selected Participant Responses to the Question: Should Foods Containing Genetically Modified (GM) Ingredients Be Labeled?*

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**Phase One: After an explanation of the term “genetically modified”**

Even though it's expensive and even though it's a nightmare deciding how much genetic material does there need [to be] to make it genetically modified, I think we need the information.

It should be an informed choice.

I'd like it to say, “Whole-grain oats, genetically modified,” or whatever the proper term is, then go on. It doesn't mean I will stop buying; I just want to know.

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**Phase Two: After learning that processed foods may already contain GM ingredients**

I don't think we should forget about labeling just because they snuck something in on us. It's still so early in the game. We don't know what the long-term effects will be.

I would say that I feel more strongly because that's a high percentage, and I would have never known about it if you didn't tell me. It's like, wow, how did we not know that?

Just because they snuck 70% into our products doesn't mean we can't go back and retrofit the system. It's not going to be an overnight thing to change it from 70% to whatever, but it doesn't mean that we can't start to rectify the situation.

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**Phase Three: After learning of FDA regulations**

It said known allergens have to be identified; that's a good thing. The percentage, or as you stated, the significant difference—I'd want to know that information.

Significant in my opinion is not an absolute term. I just think instead of making labels a mile long, I'd rather just see [are they] genetically modified or are they not.

The word significant—that's a really subjective kind of word. What's significant to you and what's significant to me are two different things possibly.

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Participants noted that consumers are not usually told whether foods contain GM ingredients. They felt that the decision to purchase GM foods should be an informed choice. The concept of being informed and educated was a common theme throughout the focus group discussions (Table 2).



**Table 2.** *Selected Participant Responses Supporting Theme of Being Informed and Educated*


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The consumers have a big responsibility to help police the thing [GM foods] if they feel it's important to them. The only way to do that is to get more educated consumers.

I think that if I know more about it, I don't care if it's labeled or not. Before they start labeling and all that, I think more information should be on TV or radio or whatever about what this really is.

Although I agree that in general, the public needs to be better educated about this issue, I really think people should be allowed to make choices based on the label and information.

First of all, I think there should be more education of the public on what this means. I think all of us are a little nervous just about that term. It would be nice to be educated. If they're wanting us to be more accepting, they need to give us the pros and the cons.

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Some discussion focused on the relative amounts of GM ingredients in a product, and whether that factor changed their opinions as to the necessity of a label. Most participants indicated that the percentage of GM ingredients in a product was not relevant; what was important was the fact that the product contained GM ingredients at all. Several participants qualified their statements about wanting a label by expressing their uncertainty about the long-term effects of GM products. Again, this issue led to more discussion about the need for consumer education.

Despite learning more from the focus group moderator about the current abundance of GM ingredients in foods and about the current labeling regulations, participants strongly agreed throughout the focus group discussions that they want to see labels on foods containing genetically modified ingredients. One participant said, "I'm still with labeling. My feeling is there's not enough oversight concerning the foods and drugs that are marketed to the public." Another participant supported the idea of the consumer's right to know, saying, "The important thing about labeling is that you'll know they're [GM ingredients] there. Otherwise you don't know."

#### *Design, Content, and Placement of GM Labels*

Responses to the second and third research questions emerged throughout the focus group sessions as participants shared their expectations regarding the design, content, and placement of the labels, which they clearly felt were desirable. In reference to the second research question, the two most desired features of the labels were contact information and the use of a biotechnology symbol.



## Research

Contact information, such as a toll-free number or Internet address, is an element associated with central route (strong) processing. It was viewed as a proactive way for consumers to learn more about biotechnology and its use in food products. Participants' responses suggested that they were both motivated and able to process centrally (Table 3).

**Table 3.** *Selected Participant Responses Regarding the Use of Contact Information on GM Food Labels*

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I just feel that if they add something that is very different from the natural product, it needs to be stated: "This product contains" whatever it is that it contains. Then go to the Web site if you want to do research on whatever that is. You would have that option.

I love it. I have a way to find out more. I can go there and hopefully find out the processes and the effects of it.

I do like the contact information. That provides the consumer with a source of information if they are interested.

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Participants also wanted to know in what way the product had been modified; some said this information could be on the Web site and did not need to be on the label itself. The participants' preference to base their decisions on this type of information suggests central route processing, which commonly involves high message processing and motivation to try to learn more about the topic at hand. Additionally, in all focus groups, participants proposed the creation of a biotechnology symbol comparable to other common food symbols, such as the Real<sup>®</sup> seal on dairy products or the organic symbol that identifies organic produce.

To answer the third research question, participants shared their opinions as to where a GM food label should appear on a package. Several wanted the label on the front of the package so it could be easily identified while browsing store aisles. Others said it should appear near the nutrition label or ingredients list because many consumers look at this information.

### *Consumer Education*

To ensure a systematic analysis of the findings, the moderator provided a short summary of key findings at the end of each discussion and asked them if they had any additional comments. The need for consumer education, a theme that had permeated many aspects of the discussion but had never been the primary topic, was invariably reinforced during the summary phase of the discussion. One participant said, "They [regulatory agencies] should do an advertising campaign to acquaint people with the label and

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educate them [about] what the wording means." Another participant suggested, "They [regulatory agencies] could do TV spots and pick up ads in newspapers. Something other than just slapping the label on there and saying, 'We've got a label.'"

### Conclusions and Recommendations

These findings led to some clear conclusions and recommendations about the Arkansas consumers who participated in this study. The consumers were adamant in their desire for GM food labeling. This supports several other public opinion studies (Pew Initiative on Food and Biotechnology, 2001; Shanahan et al., 2001) and sends a message to regulators, food companies, and retailers. The overwhelming support for genetically modified food labels indicates that this issue is enduring. Previous studies show consumer support for such labels, and the percentage appears to be increasing over time. In fact, it is reasonable to assume that consumers may become much more vocal about the need to have such products identified through the use of labels.

The consumers also had obvious preferences for the design, content, and location of the label. Suggestions regarding specific label elements included preferences for a consistent biotechnology symbol and contact information where consumers can learn more about genetically modified foods. Participants also suggested placing the biotechnology symbol on the front of the package, with any additional information about genetic modification on the front or near the nutrition label. These preferences indicate that consumers want to be persuaded through both the central and the peripheral routes of the ELM as to the safety of genetically modified food. The most likely explanation for this is that the consumers want to use a peripheral route (a symbol required by a certifying regulatory organization), but want access to a central route (a telephone number or Web address where detailed information may be found) to use if they so choose. Roe and Teisl (2007) found that inclusion of contact information, such as a Web site address or toll-free number, on GM or non-GM food labels increased survey respondents' ratings of credibility and adequacy of information on the label. The inclusion of contact information may even negate the need for labels. An International Food Information Council (2001) survey found that 75% of Americans surveyed wanted more food biotechnology information through Web sites, brochures, and toll-free numbers, rather than through labeling.

The concept of consumer education was a dominant theme throughout the focus group discussions, and participants indicated that their level of education would affect how they viewed any potential GM food label. This conclusion supports McHughen's (2000) suggestion that consumers must be



better educated and aware of the options available if they are to make more informed decisions. The availability of this information is important because the ELM shows that with repeated exposure to a message, recipients begin to use the central route to persuasion. Opinions formed through the central route are more permanent than those formed as a temporary attitude change through the peripheral route (Petty & Cacioppo, 1981).

The amount of emphasis participants placed on the concept of consumer education raised the question of who should be responsible for educational efforts: the U.S. government, food companies, or some other group? Participants placed a high level of trust in the U.S. government and said it was the government's responsibility (not food companies') to provide objective information to consumers. Other studies agree with this finding (Baker & Mazzocco, 2002; Hoban, 1996). However, food companies should evaluate how they can address consumer concerns and examine how a potential GM food label could be used as a marketing tool. Labeling can be used to build trust between consumers and producers because it provides consumers with an informed choice about whether to purchase the product (McCullum, 2000).

From a marketing perspective, the most obvious recommendation is to give consumers what they want. Based on previous research, 94% of them desire labeling (Hallman et al., 2003). The consumers in this study certainly did as well. However, giving consumers what they want is not always the most socially or economically responsible action. Ultimately, consumers themselves will determine if labeling ever becomes mandatory through their purchasing behaviors. As long as they continue to purchase GM foods that do not carry a label, the need for labels will probably never seem to be pressing. Still, regulatory agencies and the food industry alike should be prepared with a plan for labeling (including a set of proposed label design characteristics) in case consumers take a stand on this issue.

Because the research does not exactly reflect practice on this issue (since the majority of consumers report wanting labels, yet the same consumers seem to be showing little concern for this issue when they purchase their food), further research on this topic is needed in other locations, using both qualitative and quantitative research designs. The Elaboration Likelihood Model should also continue to be employed and evaluated in future studies to test its effectiveness in developing potential GM food labels.

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## About the Authors

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## Keywords

genetically modified organisms, biotechnology, labeling, Elaboration Likelihood Model, focus groups

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